

Infrastructure Equity for State-and Nation-Building Processes: The Case of Ethiopia



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Addis Ababa University College of Law and Governance Studies**

Center for Federalism and Governance Studies

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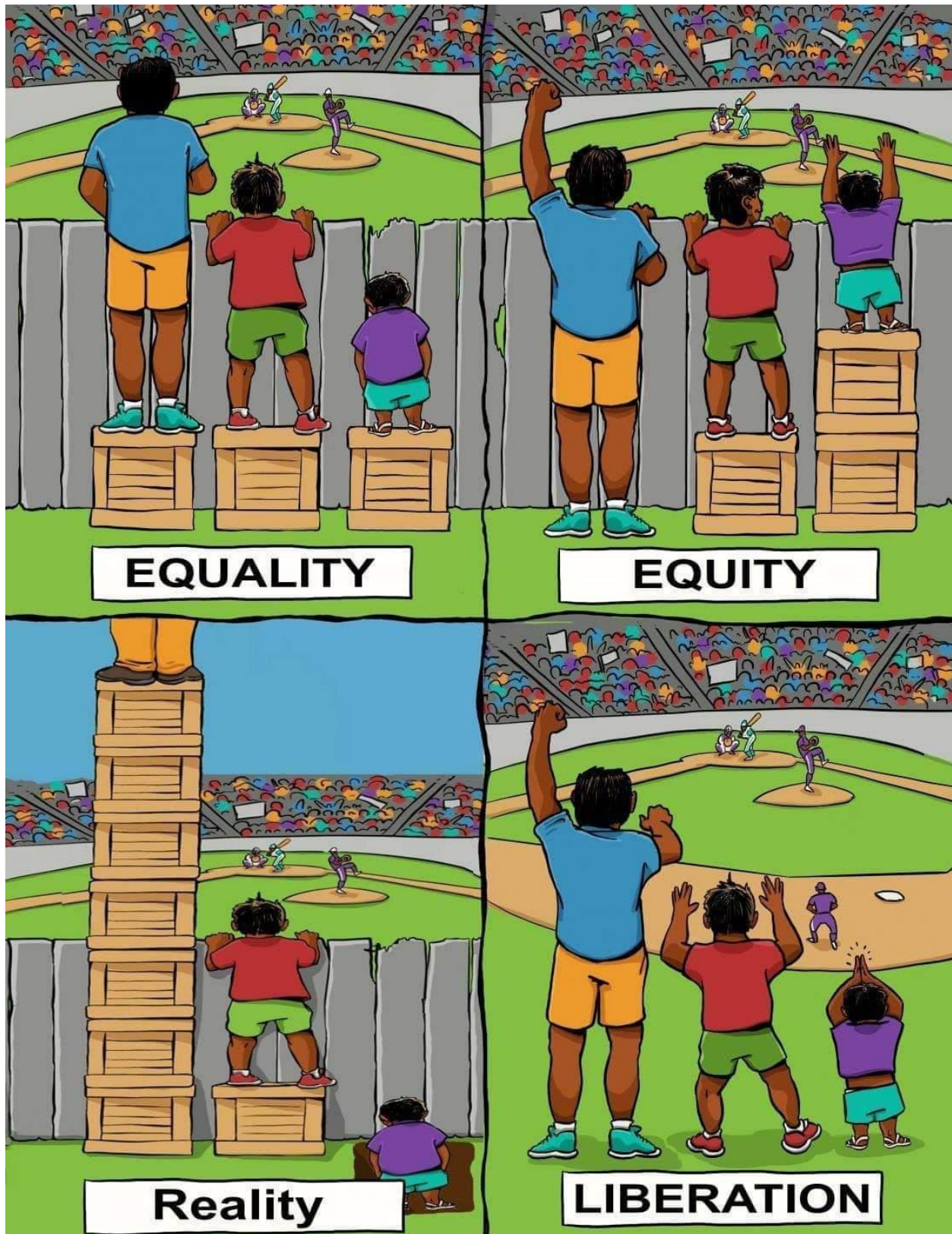
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Addis Ababa

Ethiopia

Infrastructure Equity for State-and Nation-Building Processes: The Case of Ethiopia

Let us make a fairer Ethiopia to “leave no-one behind”!!



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ABSTRACT

In the past two decades, Ethiopia has achieved tremendous economic development. This has brought recognition from the international community including the International Monetary Fund (IMF) and World Bank. Despite this fateful economic growth, internal conflict is not contained. The federal arrangement is sought to overcome the problems arising from the previous mismanagement of diversity. However multifaceted political unrest has been witnessed especially since 2014. The main protests came from the two largest regions, Oromia and Amhara, and other regions joined later. The subsequent party fragmentation and leadership change supporting the popular uprising was another phenomenal event in the history of the party which was allegedly controlled by the then ruling party- Ethiopian Peoples Republic Democratic Front (EPRDF).

Currently, the country is in transition accompanied by sporadic conflicts. The main question that can be raised is why the political system which aims to accommodate diversity fails to achieve its goal while it has been scoring promising economic development? The economic sector has been severely threatened by spontaneous protests outbreak everywhere. Some scholars attempt to answer the question in relation to the inappropriate implementation of the federal system. Some authors also argue that the self-rule rights of regional states were constrained by the encroachment of the federal government via its laws and centralized party structures. Others attribute to the securitizing measures of the Tigray Peoples Liberation Front (TPLF) on those ethnic groups (Amhara and Oromo) potentially threatened its stronghold of political power in the country.

Moreover, there is a lack of peace in the county due to ethnicized conflict. Thus, Ethiopia has become a theatre of conflict. The above causes are significant in contributing to the current fragility of the nation-building process. Meanwhile, there is also another, arguably the most important, variable for the political crisis of Ethiopia: the issue of infrastructure inequity. In a country adopted federal arrangement to accommodate diversity and committed to bringing economic development in which it began to succeed, the intensification of identity conflicts and political unrest is best explained by examining the equity of this economic development. Among others, the country has been allocating a huge capital investment is on infrastructure development notably on road, electricity, telecommunication, higher education (university infrastructure), airport, and industrial parks.

The general objective of this thesis is to examine the impacts of institutional capacity, infrastructure governance, and infrastructure equity on the nation-building process in a developing country context, specifically in Ethiopia. The study has developed and empirically tested the theoretical/conceptual model

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that showed these interrelations. More importantly, infrastructure, through its direct and indirect effects, has a bearing effect on growth, equity, and overall development of the nation. In this study, Multi-Criteria Analysis- the Principal Component Analysis (PCA), Composite Infrastructure Index (CII), Factor Analysis, quantitative (using Structural Equation modeling-Partial least Square (SEM-PLS)), and qualitative (using in-depth interviews and focus group discussions) surveys results showed that infrastructure equity is falling or disrupting across regional states, and negatively impacting the state-and nation-building processes in Ethiopia due to the coordination failures as well as political and government failures (on why optimal solutions for sector governance and equity have not properly implemented) in the infrastructure sector.

As revealed in the theoretical and empirical assessment, government policy, human capital, and regional/territorial/spatial differences are likely to be the major drivers of these differences in infrastructure. It is also argued that the skewed distribution of public expenditures to the more affluent regional states is the key contributory factor to widening regional inequity. Thus, widening inequity has significant implications for growth and macroeconomic stability leading to suboptimal allocation of infrastructure resources and concentration of decision-making in the hands of a few. I argue that if the distribution of infrastructural development is far from fair, the state-and nation-building processes will be more constrained and the way to fragility will continue.

KEYWORDS: Nation-building process (NBP), Federalism, Institutional capacity (IC), Infrastructure Governance (IG), Infrastructure equity (IE), Factor Analysis, Structural Equation Modeling (SEM), Confirmatory Factor Analysis (CFA), Exploratory Factor analysis (EFA), Latent Variable (LV), Infrastructure, Coordination Failure, Multi-Criteria Analysis, Composite Infrastructure Index (CII), Road, Electricity, Telecom, University, Airport, Principal Component Analysis (PCA), Normalization, Formula, Federal Government, Ethiopian Regional States, Ethiopia.

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DEDICATION

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ABBREVIATIONS

ADLI	Agricultural Development Led Industrialization
ADP	Amhara Democratic Party
AfDB	African Development Bank
AIDI	Africa Infrastructure Development Index
AVE	Average Variance Extracted
BSJO	Basic Social Justice Orientations
CBA	Cost-Based Analysis
CB-SEM	Covariance-Based-Structural Equation Modelling
CFA	Confirmatory Factor Analysis
CII	Composite Infrastructure Index
CPI	Corruption Perceptions Index
CR	Composite Reliability
CRGE	Climate Resilient Green Economy
CS	Citizen Satisfaction
CSA	Central Statistics Authority
DA	Democratic Accountability
DMP	Decision Making procedures
DV	Discriminant Validity
EEP	Ethiopian Electric Power
EEU	Ethiopian Electric Utility
EFA	Exploratory Factor Analysis
EO	Equal Opportunity
EPRDF	Ethiopian People Revolutionary Democratic Front
ERA	Ethiopian Road Authority
FAA	Federal Aviation Administration
FAO	Food and Agriculture Organization
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focus Group Discussion
GCR	Global Competitiveness Report
GDP	Growth Domestic Product
GNP	Gross National Product
GPGT	General Purpose Grant Transfer
GTP	Growth and Transformation Plan
GVC	Global Value Chain
HCI	Human Capital Index
HDR	Human Development Report
HE	Horizontal Equity
HEI	Higher Education Institution
HRM	Human Resource Management
IC	Institutional Capacity
ICAO	International Civil Aviation Organization
ICG	International Crisis Group
ICT	Information and Communication Technology
IE	Infrastructure Equity
IF	Infrastructure Funding
IG	Infrastructure Governance
IG&S	Inclusive Growth and Sustainability
IGR	Intergovernmental Relations
IMF	International Monetary Fund
IPDC	Industry Park Development Corporation
ISU	Infrastructure Service Unit
ITU	International Telecommunication Union
KII	Key Informant Interview

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LAF	Land Acquisition Framework
LDC	Least Developed Countries
LIDC	Low Income Developing Country
LV	Latent Variable
MCA	Multi-Criteria Analysis
MoUDH	Ministry of Urban Development and Construction
MPCE	Monthly Per Capita Consumption Expenditure
NBP	Nation-Building process
NC	National Competitiveness
NGO	Non-Governmental Organization
NIR	New Industrial Policy
NPC	National Planning Commission
NRC	National Research Council
ODP	Oromo Democratic Parity
OECD	Organization for Economic Co-operation and Development
OR	Organizational Structure
OS&F	Organizational Systems& Frameworks
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
PBP	Placed-Based Policies
PC	Political Commitment
PCA	Principal Component Analysis
PLS-SEM	Partial Least Square-Structural Equation Modelling
PP	Prosperity Party
RL	Rule of Law
RMSEA	Root Mean Square Error of Approximation
RWSS	Report on the World Social Situation
SD	Standard Deviations
SDG	Sustainable Development Goal
SDPRP	Sustainable Development and Poverty Reduction Program
SEM	Structural Equation Modelling
SEPDM	South Ethiopia Peoples Democratic Front
SERVQUAL	Service Quality
SI	Spatial Intervention
SJ	Social Justice
SNI	Shared National Identity
SNNP	South Nations and Nationalities Peoples
SOE	State-Owned Enterprise
SPG	Specific Purpose Grant
TCA	Thematic Content Analysis
TI	Transparency International
TPLF	Tigray Peoples Liberation Front
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UN-ECA	United Nations Economic Commission for Africa
UNESCO-UIS	United Nations Educational, Scientific and Cultural Organization Institute for Statistics
VE	Vertical Equity
WBG	World Bank Group
WDR	World Development Report
WEF	World Economic Forum
WJP	World Justice Project

CHAPTER 1 INTRODUCTION

1.1 Background

Over the previous decades, Ethiopia has attained noteworthy and sustained economic growth and development, especially from 2007-2017/18 (National Planning Commission of Ethiopia (NPC), 2019). This has positioned the country amongst the faster growing developing economies in the world whilst also accomplishing a vital poverty reduction record. Growth-friendly fiscal policies have supported this process. Undeniably, fiscal policy has played an essential role in translating rapid economic growth into sustained development. As part of comprehensive national development endeavors, particularly in the past 15 years, the Ethiopian government has made a huge investment on infrastructure development. This emphasis is fundamentally because the government showed that the existed very poor status of social and economic infrastructure of the nation would undoubtedly impede the targets of the overall national development. A few instances that clarify that infrastructure access of that time (1997), and the progress (2017) include the following:

By the end of 1997, Ethiopia's road network was 26, 550 km. Whereas, it was 120,000 km in 2017 including Universal Rural Road Access Program, of which only 14,000 km or about 13% are paved (Jalles d'Orey & Prizzon, 2017; Iimi *et al*, 2018). By the end of 1997, the total electric power generating capacity was 378 MW, and only 648 towns and rural villages were served. Whereas, it was 4250 MW, and 6238 towns and rural villages in 2017 respectively (Ethiopian Electric power, 2017/18). As the scheme has worked well, the nation has been able to achieve rewarding success in such areas as road transport, electricity, urban development, and construction. There are also 11 federal Industrial Parks across regions (Harris *et al*, 2019); 46 universities including 4 state owned universities, and 170 certified private-owned higher education institutions including four Private universities (Ministry of Science and Higher Education of Ethiopia, 2019); and, 22 airports (Ethiopian Airport Enterprise, 2018).

Meanwhile, facilitating the economic and social relations that establish a strong nation necessitates an effective infrastructure (Hippler (Ed.), 2004, 2005; Dinnen, 2006). In recent years, economic literature has given great attention to the factors that could clarify the regional equitable distribution of public infrastructure investment (Albalade *et al*, 2012). Thus, the study has a strong

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significance for inter-regional infrastructure schemes, the involvement of regional and national stakeholder groups in the approval and funding of those schemes, the large numbers of people potentially issue to equity and other wider influences, and the degree of disparity in the regional goals and priorities for infrastructure decision-makers (Macharis *et al*, 2008; Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013; Litman, 2020). It also contributes by delivering some vital methodological improvement to the factually problematic question of how to assess equity and other wider effects (Thomopoulos & Grant-Muller, 2013; Litman, 2020). In relation to this, the perception of the existence of substantial disparities in the distribution of social and economic infrastructure across the country has begun as a growing concern in Ethiopia (Harris *et al*, 2019).

In spite of Ethiopia's encouraging overall record of better allocation of resources to pro-poor sectors, there is intensifying debate among policymakers, parliamentarians, academicians, and the elite and the public at large around the extent of infrastructure equity (Harris *et al*, 2019). This is because the building process of a state and nation necessitates a physical, social, and media infrastructure that is distributed by the entire civil society (Hippler (Ed.), 2004, 2005; Dinnen, 2006).¹ The study also demands international understandings of infrastructure equity but grounds this within the Ethiopian context. In addition, the Constitution and government policy documents such as the Growth and Transformation Plan (GTP) which speak to issues of equality and equity examined so as to guarantee that the definition of infrastructure equity would be outlined within the Ethiopian context.²

Fundamentally, devolution/decentralization in the Federal Democratic Republic of Ethiopia (FDRE) was declared in 1991 in order to promote “self-rule” (regional autonomy) and “shared-rule” (horizontal cooperation) between different groups and regional states (Fiseha, 2006). As well,

¹ Nation-building A Key Concept for Peaceful Conflict Transformation? Edited by Jochen Hippler (2004, 2005), Development and Peace Foundation 2004, 2005. Nation-building is, on the one hand, *a process of sociopolitical Development....* Nation-building can, on the other hand, be *a political objective as well as a strategy....* P. 7.

² The *Growth and Transformation Plan I (GTP)* is a national five-year development plan created by the Government of Ethiopia to improve the country's economic well-being and work towards eradicating poverty. The four overarching objectives of GTP I are: 1) maintaining at least an average real GDP growth rate of 11% per annum and attaining the Millennium Development Goals (MDGs) by 2014/15; 2) expanding access and ensuring the qualities of education and health services and achieve MDGs in the social sectors; 3) establishing conditions for sustainable nation building through the creation of a stable democratic and developmental state; 4) ensuring the sustainability of growth by maintaining macroeconomic stability. Coverage Date: GTP I (2010 to 2015); GTP II (2016 to 2020).

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there are nine regional states in Ethiopia.³ There are also two city administrations-Addis Ababa and Dire Dawa-which are chartered by federal proclamations. There is also a third level of devolution/decentralization at the Woreda (Local Government) level. According to the Ethiopian constitution 1995, regional states are delineated based on the “settlement patterns, language identity and consent of the people concerned.” Devolution/decentralization ensured regional states with legislative, executive, and judicial powers within their geographical area of jurisdiction for all matters outside the jurisdiction of the federal government (Fiseha, 2006). Although states have the autonomy to execute policies through their respective budgets, there is an important interplay between the federal government and the states in terms of the designing of national policies and the decisions concerning the inter-regional allocation of federal spending on such policies that in turn affect the outcomes in states, and the entire state- and nation-building processes (Harris *et al*, 2019). Actually, the subject of state-and nation-building process is principally the population that together wishes to form a state-nation and undertakes the responsibility for these processes (Hippler (Ed.), 2004, 2005; Dinnen, 2006).⁴

Central to the interplay between the governments is the role of fiscal policy in the federal system. Fiscal decentralization in Ethiopia is considered by resource sharing between the two governments through Shared Revenue, General Purpose Grant Transfers (GPGTs), and Specific Purpose Grants (SPGs). For instance, the GPGTs system is the core fiscal tool used to share resources and is administered by a “fiscal formula” which endeavors to narrow economic and social development gaps across regional states, while enhancing states’ fiscal capacity to change their regions. Besides this, there are also specific purpose capital grants both from the treasury and external finance sources. The third is the federal capital spending as well as assessing the access to key public goods

³ Ethiopian Constitution, 1995, Article 47- 1 Member States of the Federal Democratic Republic of Ethiopia are the Following: 1) The State of Tigray 2) The State of Afar 3) The State of Amhara 4) The State of Oromia 5) The State of Somalia 6) The State of Benshangul/Gumuz 7) The State of the Southern Nations, Nationalities and Peoples 8) The State of the Gambela Peoples 9) The State of the Harari People; Sub-article 4 Member States of the Federal Democratic Republic of Ethiopia shall have equal rights and powers.

⁴ Sinclair Dinnen (2006), Nation-Building: Though widely used, the term ‘nation-building’ remains imprecise and contested. In much of the policy documentation, its meaning is assumed rather than defined. There is also a tendency to use the term ‘nation-building’ interchangeably with that of ‘state-building’. Despite this, many observers would maintain that, while closely related, ‘state-building’ and ‘nation-building’ are distinct processes, p.1. See discussions, stats, and author profiles for this publication. at: <https://www.researchgate.net/publication/283136264>. Accessed: 27 Aug 2018.

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across regional states in Ethiopia. Hence, capital spending by the federal government is a basic policy instrument which impacts on both growth and equity across regional states.

Moreover, the block grant transfers are central to fiscal equalization in Ethiopia as in many federal systems globally. In principle, block transfers and special purpose grants are distributed to regional states to minimize fiscal disparities and reduce vertical equity, whilst also promoting specific national objectives. The federal government remains responsible for the delivery of large-scale infrastructure that transcends state boundaries and benefits several regional states. For example, it spends on roads that link regions and neighboring countries, public utility infrastructure throughout the country (e.g. electricity and telecommunications), tertiary education(university), airports and industry-related outlays that are growth-promoting (e.g. industrial parks) (Harris *et al*, 2019). Hence, issues of fiscal equity raised by politicians, parliamentarians, and regional representatives, and political elites predominantly relate to the spending side of the federal budget. The central concern is the criteria used by sectorial ministries, public bodies, and state-owned enterprises (SOEs) when allocating federal capital spending and public infrastructure across regional states (Harris *et al*, 2019).

The study is based on the equity in access to public infrastructure, and all conclusions are based on access indicators across regional states (and not spending across regional states). Moreover, there is a link between regional spending and regional access, but spending is driven by other factors (such as differences in costs and needs) and not only equity considerations (Harris *et al*, 2019). Therefore, spending is not the basis by which infrastructure equity is assessed. In line with the Constitution of the FDRE (1995), equity in access to public goods like infrastructure is the objective; and is thus the benchmark for this study. Assumed that aggregate federal capital spending cannot be easily broken down by regional states, this study focuses only on the access of infrastructure equity of the six major types of capital spending-roads, electricity, higher education (university), airport, industrial parks, and telecommunications; but no other types of capital spending. In addition, the assessment of infrastructure equity needs a concern on changes over time.

The study period differs based on the availability of data for each sector. For most of the access indicators, calculations are based on stock data rather than flows. A trend analysis is employed

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when suitable data is available. In addition to this, the analysis is limited to studying infrastructure equity across regional states and does not consider infrastructure equity within regions-although this issue is almost indeed significant. Generally, implementing smart practices and securing more funds alone cannot guarantee equity. Instead, there needs to be an acknowledgment that equity has been missing from the conversation and recognition that its absence leads to the kinds of disparities (Rubin, 2006) in Ethiopia today. However, it is not to say that there is no “lip service” about infrastructure equity in each institution in the infrastructure sector.

Finally, the study has mainly focused on the equity of federal capital spending policy which is measured by physical infrastructure equity (not fiscal equity) as well as the interrelationship among institutional capacity in the infrastructure sector, infrastructure governance, infrastructure equity, and the state-and nation-building processes in Ethiopia. Following this, the related experiences of federal systems, understanding and practicing a constitution, institutional capacity from the perspective of infrastructure, explanation of infrastructure governance, and equity in development are considered as a background.

1.1.1 Experiences of Federal Systems

There are roughly 28 federal countries in the world today, which together represent 40% of the world's population (Watts, 2008). They comprise some of the greatest and most complex democracies like the US, India, Brazil, Germany, Mexico, Canada, Australia, Brazil, and others (Forum of federations, 2019; Palotti, 2019). As mentioned above, Ethiopia has a federal government system, founded in the early 1990s, with 9 autonomous regional states (‘regions’) and two chartered cities (Addis Ababa and Dire Dawa) (Ethiopian constitution, 1995). According to the researcher’s knowledge and practical experience, although the federal constitution formally establishes two government levels, in practice, Ethiopia has three main government levels: federal, regional, and local government.⁵ Regional states have their own constitutions and are typically sub-divided into “administrative zones”, which is not constitutional but constitutional for the nationalities zones. Local governments, as the third tier, are recognized by the regional government according to their own constitutions and governance structures. City administrations/Urban Local

⁵ Desalegn Ambaw (2019), practical experience in Ethiopia, State Minister (Ministry of urban development and construction from 2010-2015, and Ministry of transport from 2015-2017).

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Governments (ULGs) and Woredas (or rural local governments) including Kebele councils and administrations are semi-autonomous local government entities, with legal status as distinct bodies with their own political leadership (council) and their own budget.

Indeed, according to the Forum of Federations, a federal system of government, while it could be complex, has created many federations including the most prosperous countries in the world with high standards of government services. Therefore, federal governments support to address the extensive variety of requirements of a geographically large country. Thus, it is no wonder that federal governments exist in relatively large countries like Ethiopia. Moreover, ‘the number of countries embracing federalism is growing’ (Palermo, 2019). According to Palermo (2019), “the increasing importance of federalism has to do with the fact that its complex machinery can provide potential solutions to some societal challenges” (Palermo (2019, p.6), such as ethnic conflicts. Alongside this, it is good to start by defining federal principles. In relation to this, Wheare (1946) defined the federal principle as follows:

“By the federal principle I mean the method of dividing powers so that the general and regional governments are each, within a sphere, co-ordinate and independent” (1946, p. 11).

Moreover, “what is necessary for the federal principle is not merely that the general government, like the regional governments, should operate directly upon the people, but, further, that each government should be limited to its own sphere and, within that sphere, should be independent of the other” (Wheare, 1963, p.14). Indeed, federalism principles are concerned with the combination of “self-rule” and “shared-rule” (Elazar, 1987). Additionally, federal systems are implemented principally not as a “descriptive” but as a “normative” term and denote to the advocacy of multi-tiered government linking elements of “shared-rule” and regional “self-rule” (Watts, 2008). Federalism is a constitutional mechanism for dividing power between diverse levels of government so that federated units can enjoy substantial, constitutionally guaranteed autonomy over certain policy areas while sharing power in accordance with agreed rules over other areas (Bulmer, 2017; Ashindorbe, 2019). Thus, federalism endeavors to settle a desire for unity and communality on certain concerns with a desire for diversity and autonomy on others (Bulmer, 2017). By citing Riker (1975), it is also stated that “federalism is a political organization in which the actions of government are separated into regional governments and a central government in such a way that each kind of government has some actions on which it makes final decisions” (Law, 2014, E-94). Consequently, the federal principle delivers for the sharing of duties (for example, legislative,

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executive, and financial) between the federal governments on the one hand and the regional states on the other. Thus, it is in contrast with the centralist shape of an organization, where the legislative and executive powers are kept to the central government. In legal terms, federalism-the federal principle-is preserved in the Federal Constitution. Moreover, federalism is considered suitable for heterogeneous and culturally marked by a variety of countries (Ashindorbe, 2019), like Ethiopia.

In addition, Watts (2008) also outlined that the generally common structural features of federations as a specific form of the federal political system are the following:

- at least two orders of government, one for the entire federation and the other for the regional states, each acting straightforwardly on its citizens;
- formal constitutional delivery of legislative and executive authority and allocation of revenue resources between the two orders of government guaranteeing some areas of genuine autonomy for each order;
- provision for the nominated representation of distinct regional opinions within the federal policy-making institutions, commonly provided by the particular form of the federal second chamber;
- a supreme written constitution not unilaterally amendable and demanding the consent for amendments of a major proportion of the constituent units;
- an umpire (in the arrangement of courts, provision for referendums, or an upper house with special powers); and
- Processes and institutions to simplify intergovernmental collaboration for those areas where governmental tasks are shared or inevitably overlap.

Equally important, by referring to Lijphart, Elazar (1987) also identified five principal attributes of federalism: a written constitution; bicameral legislation; over-representation of the smaller constituents' units in the federal chamber of the bicameral legislature; the right of the constituents' units to be concerned in the process of amending the federal constitution but to alter their own constitutions unilaterally; and decentralized government.

In other ways, a federal system can also be defined as a mode of governance that establishes more or less unity while preserving more or less diversity (Kincaid, 2011). By citing Hans Zehetmair,

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Hegemer and Buhler (2013) mentioned that federalism has continued as an improving factor, for example, in German politics for almost 70 years, in which they stated it as follows:

Democracy, parliamentarism, rule of law and federalism are the main elements of the political system in Germany and the foundation for a peaceful existence of nations in Europe since World War II.... Federalism is more than a tool of governance. It is a principle of state organization, which accumulates in constitutional as well as societal arrangements. Federalism goes hand in hand with democracy and the other elements of good governance. In many countries conflicts arise because minorities do not feel represented in the right way. Federalism is an important factor to ensure political stability in societies which are ethnically, culturally or religiously diverse by acknowledging and accommodating local interest and identity. But of course, pros and cons must always be weighed up against each other. Ultimately arguments in favor of federalism prove to be advantages for each individual citizen. Federalism is nothing that can be invented on a drawing board. Federalism is a process of adaptation and change that never comes to an end. There is no blueprint and there is no perfect federal system. Federalism is – more than any other political system – a permanent construction site, a perpetual give and take, negotiating and refining. It has to grow bottom up and has to respect national contexts, traditions and the national balance of powers (Hegemer & Buhler, 2013, Hans Zehetmai, p. 11-12).

Kincaid (2011) also stated that a key principle of federalism is to prevent a tyranny of the majority and whereby one group of people or coalition of groups/regional states can constitute a majority and trample on the right of minorities by outvoting those minorities in elections and referendums and occupying most of the positions of power in government, for example, Quebec within Canada's federation, the Kurds in Iraq, etc. (Kincaid, 2011). At the same time, federal countries such as Ethiopia, Iraq, Nigeria, Pakistan, Russia, and Venezuela demonstrate that federalism is not always a highly successful government in terms of human rights, economic prosperity, and vibrant democracy (Bulmer, 2017). While federal systems have facilitated some countries to settle conflicts or enhance governance, it can also exacerbate current differences, sometimes leading to deeper conflicts or state failure (Bulmer, 2017). Moreover, it has been concluded that “there is no single formula for federal governance, advocates of different federal arrangements emphasize different values, and perhaps it is the values and objectives of federal solutions to political problems that need to be clarified than federalism itself” (Kincaid, 2011, P. 243). Additionally, federal systems are always in change (Palotti, 2019).

But, for divided societies with geographically concentrated groups/regional states, a federal system is certainly an outstanding way to deliver autonomy for these groups/regional states in power-sharing. In divided societies where the groups/communities are not geographically concentrated, autonomy can also be organized on a non-territorial basis. In divided societies, a broad representation of all regional states/communities/groups is important not only in cabinets and parliaments, but also in the civil service, judiciary, police, and military (Lijphart, 2004). So,

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federalism is a means/device of guaranteeing peace, stability, and mutual accommodation in nations that entertain territorially concentrated differences of identity, religion, ethnicity, or language (Bulmer, 2017). As well, federalism, specifically in huge or diverse countries, can also enhance service provision and democratic resilience, guarantee decisions are made at the most suitable level, safeguard against the over-concentration of power and resources (the allocation of socially valued-goods like infrastructure and the redistribution of resources among territories which is a common rationale of federal arrangements), and generate more opportunities for democratic participation (Bulmer, 2017).

More importantly, Ethiopia is a multilingual and multicultural country that constitutes around more than 80 nations and nationalities (Fiseha, 2006; Bishaw & Melesse, 2017). In relation to this, in the 21st century, federalism has become a more appropriate subject because this is an era of affirmation of by different ethnic groups in public participation which is mainly fulfilled by this mechanism (Vasudeo, 2019). Specifically, federalism is a system of government in which the sovereign authority of political power is categorized between the center level and the federal units (Kumar, 2014). Thus, Ethiopia implemented ethnic federalism and reorganized the regions along ethnic lines as soon as the EPRDF (Ethiopian Peoples' Revolutionary Democratic Party) which is a political party that took political power by overthrowing the Marxist military government, the "Dergue regime" in 1991 (Teshome & Zahorik, 2008; Mengie, 2016; Vasudeo, 2019).⁶ There are five distinct models of ethnically defined federal arrangements which are "ethnic", "territorial", "ethno-territorial", "anti-ethnic", and "federacy" (Anderson, 2013). It is stated that, from the two practices of ethnically identified federal arrangements, "federacy" and "ethno-territorial" are related with less failure rates, whereas "ethnic" federalism has been practiced a far more rate of failure (Anderson, 2013).

Meanwhile, ethnic federalism (each group, as well as the largest, becomes its own "ethnic homeland") is a federal system of national government in which the federated units are defined

⁶ The Ethiopian People's Revolutionary Democratic Front (EPRDF) was an ethnic federalist political coalition in Ethiopia. The EPRDF consisted of four political parties, namely Tigray People's Liberation Front (TPLF), Amhara Democratic Party (ADP), Oromo Democratic Party (ODP) and Southern Ethiopian People's Democratic Movement (SEPDM). After leading the overthrow of the Communist People's Democratic Republic of Ethiopia, it dominated Ethiopian politics from 1991 to 2019. In November 2019, the EPRDF dissolved, and Prime Minister and EPDRF chairman Abiy Ahmed merged most of the constituent parties of the coalition (except the TPLF) into a new party called the *Prosperity Party* (Abiy dissolved the four blocks and merging them, ODP, ADP, and SEPDM plus five parties of the emerging regions (Afar, Benishangul-Gumuz, Gambella, Harari, and Somali), into a new party, the Prosperity Party (PP). TPLF/Tigray leaders/ refused to join the new party (ICG, 2019).) The party was officially founded on 1 December 2019.

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according to ethnicity like Ethiopia. Generally, it has been formed in endeavors to accommodate desires for regional autonomy and to manage interethnic pressures within a state. Whereas, ethno-territorial federation is a ‘compromise model’ for the largest ethnic group to be divided among more than one constituents (Anderson, 2013), although it has “the endless minorities problem” like ethnic federalism (Anderson, 2013, p. 172). The causes for this needs to be studied and the effects of this for the design or policy of federal systems in “ethnically divided societies”, for example, Ethiopia are assessed in this case (see Chap. 5). Since its introduction in 1991 and officially recognized in the country’s 1995 constitution, Ethiopian federalism seems “ethno-territorial” in some part, but practically the so-called “ethnic” federalism and Article 39 of the Constitution that gave the self-rule regional states as well as the right to secede. Based on Lijphart (1979), Anderson (2013) stated that ethnic federalism is mainly an instrument for the averting of conflict rather than the dynamic advancement of agreement and collaboration. The intention is not to raise fresh collective identities that can succeed ethnic identity, it is to alleviate and guarantee the continued presence of a society with uncertainly deep-divisions (Anderson, 2013). Hence, it is remarked that “Ethiopia’s bold experiment with ethnic federalism is, perhaps, the purest form of the genus in existence today, closely followed by Bosnia and Herzegovina but the former is not democratic, and the future prospects of the latter remain questionable” (Anderson, 2013, p. 16). By mentioning different scholars, Anderson (2013) also stated the following straightforward issues:

Ethnically defined federal arrangements are prone to a variety of pathologies; they harden, rather than alleviate, ethnic identities; they empower extremist ethnic leaders; they foster a zero-sum political dynamic at the center; they elevate a “primitive” form of identity over more elevated, progressive identities; they generate periodic state crises because they are unable to achieve equilibrium; and, ultimately, they equip ethnic groups with the resources needed to challenge the territorial integrity of the common-state. Hence, ethno federations are inherently vulnerable to the secession of one, or all, of the ethnically-defined subunits (Anderson, 2013, p. 4).

The above issues show the current situation of Ethiopia. Nevertheless, Fiseha (2016) explained that “territorial autonomy” for geographically concentrated ethnic groups is a vital constituent of the Ethiopian federalism, which is one of the main descriptions of the 1995 Constitution and the foundations for the internal organization of the federal state (Fiseha, 2016). It is also stated that “every nation, nationality, and people” in Ethiopia has the right to a full measure of self-government which contains the right to create institutions of government in the territory that it occupies and to equitable representation in a federal government and state respectively (Ethiopian Constitution, 1995). Although, it has been criticized by “the exclusion and segregation of ‘non-

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indigenous’ peoples from the right to political participation are deep-rooted to the ‘unfaithful’ and incompatible nature of ‘ethnoterritorial’ institutional administrative structure of the current federal approach of the country” (Gizachew, 2019, p. 201), this situation is also true for almost all regional states of the country. Moreover, according to Getachew (2019), “the ‘indigenous’ groups become ‘politically major’ who unilaterally control the power and resources of the region while ‘non-indigenous’ peoples become ‘politically minor’” (Getachew (2019, p. 201).

The above descriptions show that there are both “accommodation and denial”, accommodation (ethnic federations and federacies) and denial (anti-ethnic federations and territorial federations). (Anderson, 2013, p. 6). While in some regional states in Ethiopia, the ‘non-indigenous’ are greater in number than indigenous people, for example, in some areas in Benshangul/Gumuz which needs, for example, consociational democracy. The goals of consociationalism are governmental stability, the survival of the power-sharing arrangements, the survival of democracy, and the avoidance of violence (Lijphart, 2004). The fifth type of federal system is ethno territorial federations, in which “one or more territorially concentrated ethnic groups are accommodated”, for example, Canada, Spain, and India (Anderson, 2013, p. 7).

Concurrently, this study agrees on the above list of a federal system that is more or less included in the Ethiopian constitution (1995) as Ethiopia is a federal country. The problem is Ethiopia’s federalism is written in the constitution but not federal in practice. It was a very centralized country by the federal government and the then ruling party (EPRDF) (Fiseha, 2006). Nevertheless, a federal system comprises the linking of individuals, groups/regional states/communities, and politics in a lasting but restricted combination in such a way as to deliver for the energetic pursuit of common ends while preserving the respective integrities of all parties (Elazar, 1987). Basically, federal systems do this by constitutionally allocating power among general and regional states governing bodies in a manner intended to protect the existence and authority of all (Elazar, 1987). Nevertheless, in his article, “*why do federal studies matter and what does matter?*” Palermo (2019) has identified that the needs of a more careful analysis of policies in various areas have three crucial issues: 1) a better understanding of new forms of participation; 2) a new approach to the objectives of federalism in regards to ethnocultural pluralism; and, 3) a bigger emphasis on local governments (Palermo, 2019). Subsequently, assessing the experiences of a federal system is worthy to gain a stronghold in this study as a means for nation-building processes in Ethiopia

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(see Chap. 5 for more details). Following this, it is also vital to consider the practice of a constitution in federal countries.

1.1.2 Understanding and Practicing a Constitution

It is stated that “the practice of the constitution is more important than the law of the constitution” (Wheare, 1963, p.20), for example, United States, Switzerland, and Australia have federal constitutions and federal governments. The other point Wheare (1963) explained that the cases of other countries which have either federal constitutions but not federal governments, or quasi-federal constitutions but not federal governments or constitutions and governments which are not federal at all. However, Ethiopia has a federal constitution and a federal government. Currently, as far as the researcher’s understanding, Ethiopia has faced the practice of the constitution more than the law of the institution.

Watts (2008) stated that there are three lists of authority (exclusively federal, concurrent, and exclusively state). It is described that the representative institutions of federal governments by considering the federal principle such as self-rule of the regional states, and shared-rule (Institutions of the federal government) which is the glue to hold the federation together (Watts, 2008). Watts (2008) also stated that the importance of processes for intergovernmental collaboration such as extensive consultation, cooperation, and coordination between governments (federal and regional state, and inter-regional states relations); and conflict resolution and a means of adapting to changing circumstances including ‘cooperative versus competitive federalism’ (Watts, 2008). In addition to this, constitutional supremacy (the juridical superiority of a constitution over ordinary laws) and constitutional entrenchment (the fact that it is more difficult to amend a constitution compared to ordinary laws) is necessarily associated with federalism (Bulmer, 2017).

More specifically, the Ethiopian constitution, article 51(2) reads that “the federal governments and the states shall have executive, legislative, and judicial powers”. Article 51 has the power and functions of the federal government with 21 lists. Article 52 has also the powers and functions of states with 9 lists. All the above issues are very crucial to Ethiopia as there is no clear list of authority (exclusively federal, concurrent, and exclusively state) in the constitution, and also need to consider the self-rule and shared-rule principles. For example, Fiseha (2006) emphasized that

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the proper balance that should exist between self-rule and shared-rule in the federal systems in general and in Ethiopia in particular. Fiseha (2006) also emphasized that the federal idea, in short, is generally conceived as a negotiation between ‘unity and diversity, autonomy and sovereignty, the national and the regional’ (Fiseha, 2006). Thus, balance is a necessary prerequisite.

In other ways, since 1995 in Ethiopia, it is established a new federal structure of government, whereby power is shared between the federal and the regional states both being autonomous in certain clearly defined areas (Kaso *et al*, 2018). For example, the regional states are responsible for administering their areas except for foreign relations, defense, and general policies of common interest and benefit, which are the responsibilities of the federal government. Ethiopia is also organized along the lines of bicameral parliament involving a House of Federation and a House of Peoples’ Representatives where both a federal government and a regional state shall have executive, legislative and judicial powers (Kaso *et al*, 2018).

In relation to this study, the Ethiopian constitution (1995) article 51 (9) states that “the federal government shall be responsible for the development, administration, and regulation of rail, air, sea and waterways transport and major roads linking two or more regional states, including for postal and telecommunication services” including Industry Parks, universities and airports. And, article 52 (10) also states that “the federal government shall collect duties and levy taxes on revenue sources reserved to the Federal Government; it shall draw up, administer and approve the Federal Government’s budget”. As mentioned earlier, the Ethiopian Constitution Article 52(1) states that “all powers do not give expressly to the federal government alone or concurrently to the federal government and the states are reserved to the states”. In the article 62 (Powers and Functions of the house of the federation), sub-article 7 says that it (the House of Federation) shall govern the division of revenues derived from joint Federal and State tax sources and the subsidies that the Federal Government might deliver to the States.

Most important of all for this study, the Ethiopian constitution article 89 (1) says that “government shall have the duty to formulate policies which ensure that all Ethiopians can benefit from the country’s legacy of material and intellectual resources”. Sub-article 2 also says that “the government has the duty to ensure that all Ethiopians get equal opportunity to develop their economic condition and to encourage equitable distribution of wealth among them”. And, sub-

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article 4 also says that “government shall provide special assistance to nations, nationalities, and peoples least advantaged in economic and social development”.

Therefore, it can be concluded that, in all federations, there have been powerful motives to be united for certain purposes and motives for autonomous regional states. The fundamental defining character of federations is that it has the constitutional sharing of powers between the federal and regional states. It is also very important to consider the balance between ‘unity and diversity’. There are also differences in the form of the sharing of legislative authority such as exclusive, concurrent, shared, residual, and emergency or override powers. It is necessary to look at the distribution of finance such as the allocation of financial resources, the distribution of revenue powers, the allocation of expenditure powers, the role of financial transfers, etc. in federations (Ashindorbe, 2019). In addition to these, there are key features of federal arrangements in different federal systems that need to be considered, such as the status of the regional states’ instruments, the division of power, the scope of an economic union, regional disparity, and the relationship of federalism to the rest of the system of government (Fiseha, 2006; Kincaid, 2011) in this study in Ethiopia. Hence, the study needs to use these practices carefully but there is no doubt that they have usefulness. The above principles and experiences of the constitution are very relevant for the study of the impacts of institutional capacity, infrastructure governance, and equity on the state-and nation-building processes in Ethiopia. The next related point is the institutional capacity from the perspective of infrastructure equity.

1.1.3 Institutional Capacity from the Perspective of Infrastructure Equity

Traditional institutional development is primarily concerned with government institutions and public sector organizations. The traditional factors of production - nature, capital, and labor - have already exhausted their contributions (Bhagavan & Virgin, 2004). The need to manage these interdependencies across infrastructure sectors poses difficulties for the traditional form of institutional structure. Traditionally, the government is organized with many specialized and non-overlapping departments resulting in fragmented planning, policy-making, and uncoordinated actions (Hoff, 2001). The increasing complementarities between infrastructure development activities requires a high degree of coordination across several policy ranges, sectors, and regional states (Hoff, 2001). Now the vital actions are the structure, generation, distribution, development, sharing, and using of knowledge; belongs to the people, the human capital (Joshi & Narkhede,

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2007; Claussen, 2011). Especially, while sector performance is weak, there can be several legitimate clarifications such as low political accountability meaning that the reasons for failure have to organize with the political level including institutional capacity limits (Benitez *et al*, 2012).

Therefore, these issues become acute during periods of high economic activities, when demand for construction outputs, especially extra-large infrastructure facilities is higher (Wells & Hawkins, 2010). The literature in this area increases several challenges to capacity building activities targeted at building institutional effectiveness (Hwang & Ng, 2013). These challenges result in the lack of clear understanding around capacity building, little attention or effort to the framing of capacity building initiatives, and lack of appropriate support for effective activities, and lack of coordination of institutions (Claussen, 2011). This means that institutional functions include institution-building and structural preparations, policy formulation, and implementation, decision-making, information flows, effectiveness and efficiency of leadership, and the relations between government officials and the public (Okoh & Ebi, 2013). Generally, institutional capacity includes human resource management, organizational structure, organizational systems and frameworks, and infrastructure funding. It also assigns to the public authorities a vital and potentially active role in founding the economic environment and defining the distribution of infrastructure assets and benefits equitably (Okoh & Ebi, 2013), which are crucial in the infrastructure sector in Ethiopia. And then, infrastructure governance has been explained.

1.1.4 Explaining Infrastructure Governance

First of all, what is “Infrastructure”? The American Heritage Dictionary (2004), defines the term “infrastructure” as the ‘basic services, facilities, and installations required for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions as well as post offices, schools, and prisons’. Thus, infrastructure is the basic physical and organizational structures and facilities (i.e. roads, power supplies, etc.) (Oyedele, 2012; Rammelt, 2018). Moreover, infrastructure governance tells to the interaction between government institutions internally, including their dealings with the private sector, users, and citizens. It also consists of the institutional roles, procedures, assessment tools, and related

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issues (OECD, 2015; OECD, 2017).⁷ As well, according to Akanbi (2013), governance is the pillar of poverty-reduction strategies prescribed by major international development institutions (as cited e.g. The World Bank, IMF, African Development Bank (AfDB) and the United Nations) in recent times.

Governance plays an important role in the development process of any economy and, to an even greater extent, in the growth of infrastructure (Prud'homme, 2004; Baldwin & Dixon, 2008; Akanbi, 2013). Of great concern, governance does matter in infrastructure development. First of all, infrastructure is the pillar of economic capacity, but it also impacts directly on human capital, social inclusion, State- and nation-building, and environmental sustainability and so the growth of infrastructure is a fundamental concern of both governments (federal and regional states) and citizens (Prud'homme, 2004; OECD, 2015; Akanbi, 2013; Cunningham and Kwakkel, 2009). In other ways, it is central to major development outcomes and, therefore, weak governance can have an enormously negative impact on returns on infrastructure investment and then on nation-building (Kenny, 2007; OECD, 2015). Above all, failed governance can lead to the construction of the wrong infrastructure, poor construction and quality of provision, insufficient maintenance, and high levels of thefts and losses (Kenny, 2007; Oyedele, 2012; OECD, 2015). It is also stated that governance failure as a probable explanatory factor at the back of ineffective infrastructure policies and weak sector performance (Benitez *et al*, 2012).

In general, governance has 8 major characteristics such as participatory, consensus-oriented, transparent, accountable, effective and efficient, responsive, equitable and inclusive and follows the rule of law (Oyedele, 2012; OECD, 2015; OECD, 2017). Thus, governance and institutions can be a significant determinant of economic growth and income levels, and governance can have a direct effect on growth and income, and nation-building (Prud'homme, 2004). Governance can also influence growth and income indirectly, through its effect on other decisive factors such as investments, trade, infrastructure, and geography (De, 2009; OECD, 2017). Moreover,

⁷ See OECD (2015), Public Governance and Territorial Development Directorate Public Governance Committee, Towards-a-Framework-for-the-Governance- of-infrastructure.... Good governance is a necessary condition for good infrastructure delivery....By the governance of infrastructure is meant the processes, tools and norms of interaction, decision-making and monitoring used by governmental organizations and their counterparts with respect to making infrastructure services available to the public and the public sector at large.

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infrastructure is mainly a governance challenge, which comprises the selection of infrastructure projects to attain more equitable growth; the finding of financing and the distribution of funding; the institution of accountable and transparent governance; effective and efficient monitoring; and accurate measurement of social and environmental impacts (Oyedele, 2012; OECD, 2015; Fisher, 2016; Peters & Pintus, 2018). The “infrastructure sectors are among the more exposed sectors to biases at the political level. Distortions in politics cannot be ignored when seeking to explain performance failures. Governments may not be as benevolent as standard policy recommendations for the sector-level tend to imply” (Benitez *et al*, 2012, p. 3).⁸ In this context, there is an urgent requirement to invest in enhancing governance and the institutional environment in order to deliver the desired level of infrastructural development that will lead to sustainable long-term growth and development (Akanbi, 2013). Akanbi (2013) concluded that the stylized facts presented on infrastructure and governance revealed that an improvement in governance will have a direct and positive effect on the countries’ and regional states’ infrastructure stock (Akanbi, 2013). This indicates that good governance remains important to infrastructural development and equity.

Therefore, the above all scholars and institutions have similar opinions about the concepts and importance of governance for infrastructure development in a country. Meanwhile, Ethiopia is engaged in huge investments in power, road, and telecom construction including university, airport, and Industry Parks to meet the rising demand of the economy (Bishaw & Melesse, 2017). Generally, good governance is a necessary condition for equitable infrastructure distribution including intergovernmental relations, decision-making procedures, land acquisition frameworks, and political commitment. Subsequently, the right infrastructure governance is the concern of this study. Actually, infrastructure governance has to be considered as an issue of equitable infrastructure development and the nation-building processes related to institutional capacity in the infrastructure sector in Ethiopia. And then, the idea of equity, the principles of “infrastructure equity”, and infrastructure context in Sub-Saharan Africa and Ethiopia are explained briefly.

⁸ Benitez, D., Estache, A., and Soreide, T. (2012), Infrastructure policy and governance failures, WP 2012: 5, CHR Michelson Institute (CMI).... Despite the very clear evidence that a well-functioning infrastructure system is needed for economic development, there is substantial variation across countries in infrastructure supply and quality..... This evidence continues to fuel debates about how the infrastructure sectors can best be organized and regulated.

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1.1.5 Equity in Development

A. Defining Equity

As a background, the intention is to indicate a comprehensive definition of equity that is workable to the Ethiopian context, while also taking the complexity and implicit trade-offs in any definition. Stakeholders have conveyed the need to have an acknowledged and accepted definition of equity that can be used when evaluating equity across regional states in Ethiopia. A central idea of this subtopic is thus to deliver important concepts relating to equity to inform the debate, followed by a harmonized definition. Therefore, the dictionary definition of equity is the quality of being fair and impartial or justice according to natural law or right; precisely: “freedom from bias or favoritism” (Webster’s New Collegiate Dictionary, 2006) or the ideal, state, or impartial, quality of being just, and fair; and, “Inequity,” then, is the linguistic opposite: ideal, the state, or quality of being unjust, partial, or unfair (American Heritage Dictionary, 2004). Most importantly, notice that not equality of distributions but rather fairness of distributions is central to the definition equity (Whitehead, 1991; Stevens, 1993). Equity is also defined as fairness/justice, or unfair-injustice-inequity (Al-Zawahreh & Al-Madi, 2012; Litman, 2020).

A theory of inequity is existing. To understand an inequity, the theory identifies the conditions under which perceived inequity will arise and the tools or instruments by which it may be reduced or removed (Adams, 1993; Al-Zawahreh & Al-Madi, 2012; Watkins, 2015; Gashgari, 2016; Litman, 2020). It appeared to everyone highly unlikely that persons who practiced inequity in their dealings with others would only feel and manifest dissatisfaction, whatever its emotional pattern and strength (Adams, 1963).⁹ Concerning the terminology, no common term has been recognized as fairness, equity, and justice are generally used interchangeably contingent on the context, adding a more degree of vagueness, including solidarity or (spatial/territorial) cohesion in the infrastructure sector (Thomopoulos *et al*, 2009; Litman, 2020). Hence, equity and fairness/social justice are interchangeably used in this study.

⁹ Adams J S. Toward an understanding of inequity. J. Abnormal Soc. Psychol. 67:422-36, 1963. The article provided a theoretical structure that specified the conditions under which perceived inequity in social exchanges occurs and the conditions that lead to differing modes of inequity reduction, both cognitive and behavioral.

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In other ways, according to the World Bank (2006), equity has to be defined based on two basic principles.¹⁰ The first is “equal opportunities”, and the second is the “avoidance of deprivation in outcomes”. The first principle is equal opportunities that are “a person’s life attainments should be determined primarily by his or her “talents and efforts”, rather than by pre-determined circumstances such as social, gender, or family background, race” (World Bank, 2006, p. xi). It is ensuring that efforts and talent determine outcomes. This is achieved through equality before the law, equal enforcement of personal and property rights, non-discriminatory institutions, and equal access to public services and infrastructure (World Bank, 2006).

The second principle is the “avoidance of deprivation in outcomes”, particularly in education, health and consumption levels. Here, a key objective is to show how disparities interact, combine, and are replicated through interlinked political, economic, and sociocultural processes (World Bank, 2006). According to Jones (2009), although there is growing recognition as equity is important for nation-building, issues of inequality and inequity has been debated for some time. There are also some objections to using equity to guide development. Besides, these are either based on misunderstanding or other features of ideas of equity and are becoming a ‘new equity agenda’ (Anderson & O’Neil, 2006).¹¹ Therefore, “Equity is a very important matter for development, but so far has been underrepresented in policy and practice” (Jones, 2009, p. 43). There is a growing recognition of the importance of equity to development, and many development authorities accept equity as a key goal for their programming (Jones, 2009).¹² Then, the beginning point in applying a coherent and up to date assessment framework that embraces equity is the analysis of the equity procedures presently found in transport infrastructure assessment

¹⁰ World Development Report (2006), Equity and Development...It looks at the role of equity in the development process. It defines equity in terms of two basic principles. The first is equal opportunities... and the second principle is the avoidance of extreme deprivation in outcomes, particularly in health, education and consumption levels...This Report offers practical insights for policymakers, executives, scholars, and all those with an interest in economic development... *World Bank*. <https://openknowledge.worldbank.org/handle/10986/5988> License: CC BY 3.0 IGO.

¹¹ Anderson, E. and O’Neil, T. (2006), A New Equity Agenda? Reflections on the 2006 World Development Report, the 2005 Human Development Report (HDR) and the 2005 Report on the World Social Situation (RWSS), Overseas Development Institute... According to WDR therefore, equity requires equality of opportunities, but not equality of outcomes. Its interest in the distribution of outcomes is limited to their instrumental impact on the distribution of opportunities and other social goals (e.g. efficiency), and focuses on the distribution of assets rather than income. It is also careful to point out the close link between inequalities of outcomes and inequalities of opportunities... The HDR and RWSS do not give as much space to setting out a specific conceptualization of equity. Nevertheless, they appear to be in agreement with WDR that, at a minimum, this should include equality of opportunity and ‘life chances’...

¹² Jones, H. (2009), Equity in development, Why it is important and how to achieve it, Working Paper 311, Overseas Development Institute, www.odi.org.uk. ...Equity comes from the idea of moral equality, that people should be treated as equals. Thinking about equity can help us decide how to distribute goods and services across society, holding the state responsible for its influence over how goods and services are distributed in a society, and using this influence to ensure fair treatment for all citizens.

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(Thomopoulos *et al*, 2009; Litman, 2020), which can also be adapted for other sectors like electricity and telecommunication for equitable infrastructure distributions across regions.

While high and increasing inequality/inequity is stimulating divided political arguments around the world, a consensus has certainly begun that all should enjoy equal access to opportunity—that one's chances to flourish in life ought not to be decided by situations beyond an individual's control (World Social Report, 2020). It is indicated that in national infrastructure policy documents emphasis is given to accessibility, equal rights on access to public infrastructure and basic technologies, and other basic needs (employment, health, and education), the equal allocation of public funds for infrastructure among diverse regional states, i.e. horizontal equity or the prerequisite to maintain a minimum level of infrastructure links within all parts of a region in a country, i.e. vertical equity (Thomopoulos *et al*, 2009; Litman, 2020; World Social Report, 2020). It is also disclosed that scholars distinguish their terms according to their emphasis and experience, which might occasionally impede the expansion of mutual ground for the argument of thoughts and understandings (Thomopoulos *et al*, 2009; Litman, 2020; World Social Report, 2020).

Therefore, based on these scholars, issues of equity are very crucial for development which also needs to be considered in the infrastructure equity in Ethiopia. Table 1 makes available summarized terms grounded in the literature review and adapted from Thomopoulos *et al* (2009).¹³ Table 1 illustrates the continuum of terms used by practitioners and scholars and identifies the need to distinguish among diverse principles and types of equity; these clearly link to varied objectives in spite of all denoting to a common term (Thomopoulos *et al*, 2009; Thomopoulos & Grant Muller, 2013; Litman, 2020). It could be required to explain diverse criteria in order to reveal the diverse principles and purposes underlying each type. Thus, the task can in principle be attained using a multi-criteria analysis technique, with potentially divergent weights of significance assigned to each (Thomopoulos *et al*, 2009). See in the methodology chapter (Chap. 4 Sec. 4.4.1).

¹³ Thomopoulos, N. Grant-Muller, S., and Tight, M.R. (2009), Incorporating equity considerations in transport infrastructure evaluation: Current practice and a proposed methodology. Adjusted from EC (2002), Jones (2004), Litman (2007), Rietveld (2003, 2006), Sessa (2006), Viegas and Macario (2003), and Young (1994).

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Table 1. 1 Equity types and principles established in the literature.

Equity types	Equity types features
Equity theory	It is an attempt to explain relational satisfaction in terms of perceptions of fair or unfair distributions of resources within inter-individual, communities, groups, or interregional states interrelationships in this study.
Horizontal equity	Comparable individuals, groups, communities, or regional states ought to be treated in a comparable way
Vertical equity	Disadvantaged individuals, groups, communities, or regional states must be protected. People ought to be burdened according to their ability to contribute, and this might lead to arrangements/systems where taxes might be progressive.
Territorial equity	Results from the idea of individual equity when it is projected on relatively homogeneous regional states to require to get similar funds for public infrastructure investment
Territorial cohesion	Indicates a balanced development of institutional and human activities across regional states in Ethiopia
Level playing field	Infrastructure sectors ought to be treated in similar ways according to taxation, payment for the distribution of infrastructure, etc.
Infrastructure users should pay their way	This idea is usually interpreted in terms of average costs inferring that the collective of all users exactly pays for the aggregate costs
Individuals that are negatively affected by policies need to be compensated	This principle has its beginning point in the status-quo situation and suggests that relatively sound regional states have to compensate lagging regions
Egalitarianism	All individuals are treated equally, making the same contribution, disregarding their financial or other ability
Spatial equity	It indicates the geographical location of an individual, community, group, or regional states affected by an infrastructure project
Social equity	It indicates the effects on personal, economic, or social characteristics of an individual, community, group, or regional states
Solidarity	It is expected that an increased focus on solidarity issues could be simplified by setting the Ethiopian integrated infrastructure policy in the context of the wider constitutional arrangements and cohesion policy
Multi-Criteria Analysis (MCA)	It is, either an alternative to or complementary with, Cost-Benefit Analysis (CBA) mainly when measuring a wider set of distributional and other impacts

Source: Adapted from Thomopoulos, N. Grant-Muller, S., and Tight, M.R. (2009), Incorporating equity considerations in infrastructure evaluation: Current practice.

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B. Identifying Principles of Infrastructure Equity

Infrastructure policy is a relatively new and complex field for many equity advocates (Rubin, 2006). The phrase “Infrastructure Equity”, which is about smart, targeted, and equitable public infrastructure investments that can generate enormous community benefits-jobs, business opportunities, access to public infrastructure, and quality affordable housing, is used by PolicyLink website since 2006. New resources on the PolicyLink website, available in late 2006, is providing opportunities to learn about such specific advocacy and equity planning practices from around a country for parks, schools, transportation, etc. (Rubin, 2006). Therefore, while infrastructure investments in developing countries may bring about aggregate benefits, the distribution of those benefits cannot be ignored (Dethier & Moore, 2012; Rammelt, 2018; Duranton & Venables, 2018).

Historically, the role of infrastructure, for example, in fostering economic prosperity goes back to Adam Smith’s *Wealth of Nations*, which listed that “the erection and maintenance of the public works which facilitate the commerce of any country, such as good roads, bridges, navigable canals, harbors, etc. must require very different degrees of expense in the different periods of society, is evident without any proof” (Adam Smith (1776), edited by Jim Manis in 2005, p.590). As also described by Jones (2009), there is a range of issues on how to explain principles of equity such as ‘fairness’ in allocations (e.g. Rawls, 1971); equal opportunity; giving people with equal worry and respect (Dworkin, 1983); and that ‘the notion that alike cases should be treated as alike, with similar benefits (or problems) to be appreciated (or suffered) by similar people’. Jones (2009) also indicated that for the purpose of drawing out some areas of consensus, rather than relying on one precise principle it is informative to recognize the general shape of questions into equitable allocations, which involves:

- First, examining the various things that are allocated within society (like power and wealth as well as more tangible things such as shelter and infrastructure);
- Then, determining the relevant principles for allocating the different goods (or broad categories of goods such as infrastructure, etc.). This can be understood by looking at the nature of the infrastructures as well as features of the people getting them, or what having them (or not) means to people and why somebody might want to give them to them;
- Lastly, ensuring that these infrastructures are allocated consistently according to these principles, not according to other principles or the quantities of other goods people have.

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Indeed, infrastructure determines the landscape of economic opportunities and creates the conditions for social and physical wellbeing (PolicyLink, 2013). Therefore, guaranteeing that social justice is a central concern for public policy is a central task in making genuine policies on infrastructure equity, and in national development more generally. “Viewing infrastructure through an equity lens is an opportunity to examine, who benefits, who pays, and who decides” (Rubin, 2006, p. 5). Moreover, Rubin (2006) and PolicyLink (2013) also identified the following seven basic principles that can result in greater infrastructure equity.¹⁴

- Infrastructure decisions have an extensive effect on development, investment patterns, and quality of life, and the outcomes of those decisions must be fair and beneficial to all (regional state outcomes);
- Infrastructure plans must not have to compete with health, education, and human service requirements but should be known as equally critical governmental and societal responsibilities that yield equitable results (attention to community infrastructure);
- Budget priorities within infrastructure areas must be thoroughly evaluated using an equity lens (criteria for infrastructure priorities);
- Services and opportunities generated by infrastructure decisions must be available and accessible to everyone in all kinds of communities (equitable distribution);
- Employment and economic benefits related to building and maintaining infrastructure must be distributed throughout the region (economic opportunities);
- The means for collecting revenues to support infrastructure developments must be determined and applied in ways that are fair and do not disproportionately worry those with lower incomes (fair financing mechanisms);
- Infrastructure decision-making must be transparent and comprise mechanisms for everyone to provide to the planning and policymaking process (community engagement).

As cited by Thomopoulos *et al* (2009), Khisty (1996) suggested the equity types (which can be complementary) and the six equity principles (mutually exclusive) that stakeholders must initially

¹⁴ See Rubin, v. (2006), safety, growth, and equity: infrastructure policies that promote opportunity and inclusion. Infrastructure Policies. The seven infrastructure equity principles that Promote ... inclusive policies should be put in place so that the unprecedented federal infusion of ... Policymakers can take this unique opportunity to locate affordable infrastructure ... by Victor Rubin ... growth, diminished capital spending, challenges to building and financing By policylink (2013).

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decide on which to be incorporated in an application of the approach which could vary according to the detailed context, assumed it is a flexible framework method, but they are basically in line with the infrastructure project objectives as a starting point. Hence, according to Thomopoulos and Grant-Muller (2013), the core principles and equity types are designated as follows:

Equity principles-utilitarian policy principle aims to maximize the net benefit for all regions impacted by the project, disregarding the distribution of benefits; equal shares policy principle distributes an equal share of all project benefits to all regions impacted; Rawlsian policy principle distributes project benefits to the least advantaged regions until those reach the level of the most advantaged regions; Egalitarian policy principle reduces pre-existing inequalities between regions by distributing all project benefits to the least advantaged regions; minimum floor policy principle distributes minimum level of benefits to all regions; maximum range policy principle sets a maximum range of benefits to be distributed to each region and distributes project benefits to all regions respectively....Equity types-Horizontal equity objective-The project distributes the same benefit to all regions with similar socio-economic characteristics; Vertical equity objective-The project benefits more the least advantaged regions instead of the most advantaged ones; Environmental equity objective:-The project benefits environmental protection, through direct or compensatory actions and policies; Regional/spatial equity objective: The project distributes most benefits to the least advantaged and remote regions instead of those centrally located; and, Accessibility objective-The project improves accessibility for all regions impacted (Thomopoulos & Grant-Muller, 2013, p. 325-326).

Assuming that the equity aim is often ill-defined to be categorized into its different types, it is proposed that many or all of the recommended equity principles are encompassed in order to deliver an adequately wide-ranging applications (Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013; Litman, 2020). These principles and equity types have also been implemented in the situation of infrastructure assessment. Overall, most infrastructure sectors address horizontal, vertical, spatial, social, regional equity, environmental, gender equity, and intergenerational (Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013; Litman, 2020). Besides, it is also suggested that stakeholders also have the alternative to use varied equity principles for the divers' equity types if needed with the consensus of federal and regional states (Thomopoulos *et al*, 2009; Litman, 2020).

Furthermore, from its experience, for example, the national research council of USA discovered 3 broad principles of for dealing with local infrastructure issues, principles that can lead toward “win-win” circumstances in which parties potentially contrasting interests seek a way to resolve conflict such as that all parties gain (National Research Council (NRC), 1993). These principles are multifaceted and complex, but could be simply stated as geography matters (the specific physical, social, economic, and environmental features of a regional state ought to be the primary factors shaping that regional states' infrastructure investment and management); the paradigm is widening; and, value the “public” in public works (NRC, 1993). It is also stated that finding

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answers to a community's or regional states' infrastructure problems that are explicitly win-win may be impossible, but experience indicated that the right strategy-need tailored to the specific character of the community/regional states can make the difference (NRC, 1993).

Implementing these principles means a shift toward a wider opinion and input in the equitable infrastructure management system and development planning. In other ways, the seven principles of place-based policies (PBP) (the spatial context narrative-envisioned to address the important market failure (s) that inspire the policy, quantity change- policy persuaded to the relocation of economic activities between places, valuation of changes-social value including equity concerns, transparency, sensitivity-dependability, complimentary policies, and alternatives such as accessibility, greater proximity, etc.) are also considered to appraise the economic issues in the infrastructure sector by using PBP (Duranton & Venables, 2018). In this study, the policy environment includes national indicators and those that are place-based, i.e. infrastructure including utilities and institutions as well as the clarity and execution of arrangements (Duranton & Venables, 2018). It is also stated that, clearly, decent roads for exports are not enough if a place lacks reliable electricity. These strong complementarities make it intrinsically problematic to forecast quantity changes (Duranton & Venables, 2018), which results in a coordination failure and an inequitable distribution. Hence, the policy requires coordination across space, function, and time (integrated spatially and functionally, requiring a long-view, able to make trustworthy commitments to future region/city development, and coordinating the different levels of government, local, regional, and federal) (Duranton & Venables, 2018).

Generally, in addition to the above principles, two broad redistributive principles govern the analysis of the effect of government policies. The first is vertical equity (VE), which serves to assess the equity of that influence on individuals or communities/regional states with a different initial level of "wellbeing" or VE (also called *social justice*, *environmental justice*¹⁵ and *social inclusion*¹⁶) is desirable and may require transfers from regional states that are richer to those that are poorer regions; the second is horizontal equity (HE) (also referred to fairness and

¹⁵ Litman (2020) *Environmental justice* is defined as the "equitable distribution of both negative and positive impacts across ethnic, and income groups, with the environment defined to incorporate ecological, economic, and social effects" (Alsnih and Stopher 2003).

¹⁶ Litman (2020) *Social inclusion* means everybody can participate adequately in important activities and opportunities, including access to services, education, employment, and decision-making (Litman 2003b; Lucas 2004).

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*egalitarianism*¹⁷), which helps estimate the equity of the effect across individuals/regional states who are equal in all ‘relevant respects’ (Duclos, 2006; World Bank, 2006; Anderson & O’Neil, 2006; Thomopoulos & Grant-Muller, 2013; Litman, 2020). These diverse types of equity frequently overlap or conflict. For instance, HE necessitates that users tolerate the costs of their infrastructure facilities and services, but VE frequently necessitates subsidies for disadvantaged/deprived groups or regional states (Litman, 2020). Henceforth, infrastructure planning frequently encompasses making tradeoffs between diverse equity objectives (Litman, 2020).

Therefore, the study has mainly focused on the equal shares policy principle which allocates an equal share of all infrastructure project benefits to all-region impacted, and on horizontal equity (equal treatment) among regional states in Ethiopia. Meanwhile, the study understands that both the Jones’ (2006), Policy Link (2013), Khisty (1996), Rubin (2006), Thomopoulos *et al* (2009), Thomopoulos & Grant-Muller (2013); Wismadi *et al* (2015); Litman (2020) and other principles are very crucial for the planning and implementation of infrastructure equity as well as equal opportunity; social justice; national competitiveness, spatial intervention and citizen satisfaction across the regional states in Ethiopia. Apart from the political-cultural aspect, there are also practical requirements for this as the nation-building process needs a ‘national’ infrastructure (Hippler (Ed.), 2004, 2005). Above all, these principles of infrastructure equity are also crucial for economic growth and the state-and nation-building processes in Ethiopia.

1.1.6 Infrastructure Context in Sub-Saharan Africa and Ethiopia

An adequate supply of infrastructure access has long been viewed as a significant ingredient for economic development in the academic literature including in policy debate (World Bank, 1994; IMF, 2014). Actually, infrastructure is a key element present in policy debates. Therefore, long-term investments in infrastructure are now at the center of many policy initiatives worldwide (Calderon, 2009; Hooper *et al*, 2017). Over the past quarter-century, academic research has dedicated considerable energy to the theoretical and empirical analysis of the contribution of infrastructure development to productivity and growth (Calderon & Serven 2004; Prud’homme, 2004). More recently, increasing attention has also been given to the effect of infrastructure on

¹⁷ Litman (2020) *Egalitarianism* means treating everybody equally, regardless of factors such as groups, gender or income.

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poverty and disparity (Estache *et al.* 2002; World Bank, 2006; Calderon & Serven 2004; Wismadi *et al.*, 2015); Litman, 2020). Conversely, the infrastructure network in Sub-Saharan Africa remains poor on average, in spite of recent government efforts to expand it (World Bank Group (WBG), 2017; Calderon *et al.*, 2018). Thus, this study empirically assessed the pattern of physical infrastructure that revealed the equitable allocation of the infrastructure of Sub-Saharan Africa (Akanbi, 2013), particularly Ethiopia.

Moreover, infrastructure delivery is seen as a particularly vital instrument for promoting regional development in which the government can play a vital role due to the public goods nature of infrastructure amenities (Calderon & Serven, 2004; Fan & Zhang, 2004; Bajar & Rajeev, 2015). Meaningfully, increasing infrastructure investment increases growth, leading to a sharp enhance in the level of wealth (Gibson & Rioja, 2014). It is also suggested that investment in governance or institutional structures themselves is an essential first step in attaining pro-poor long-term economic growth for regional states (Akanbi, 2013) which also works for Ethiopia. As well, it is significant to understand the determining factors of infrastructure equity for sub-national regions or regional states (Bajar and Rajeev, 2015) in Ethiopia.

Meanwhile, one of the key features of the first Growth and Transformation Plan (GTP I), it had given a special focus to infrastructure development in Ethiopia. Large scale energy, transport, and telecommunication, as well as university and airport infrastructure development programs, were included in the plan. The plan also identified the envisaged challenges and possible measures to address them (NCP, 2016). Generally, in the GTP I evaluation period, the following development and governance issues had been raised in the infrastructure sector: lack of capacity for estimating and monitoring of rates of return of infrastructure projects, lack of participatory decision-making process, politicized decision-making, lack of transparency and accountability, institutional weaknesses in planning, lack of political commitment for fairness, corruption in infrastructure construction, lack of building capacity of local firms, problems of land acquisition/right-of-way and institutional and legal weaknesses in infrastructure construction (NCP, 2016), which are the results of the cooperation and coordination failure of the federal government across regional states in Ethiopia. Generally, at the very basic level, the case for government intervention in the infrastructure sector is well known and agreed and stems from the reality of well-documented market failures as well as coordination failures (Benitez *et al.*, 2012). In order to begin from clear

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understanding as a background, the theoretical framework has been briefly presented in the following sub-section.

1.1.7 Theoretical Framework

The Federal democratic republic of Ethiopian (FDRE) government records indicated that more than 50% of the annual budget (excluding block transfers) is distributed to capital expenditures like infrastructures (Harris *et al*, 2019).¹⁸ The issue that follows is whether or not this spending on infrastructure is equitable across regional states in Ethiopia. This aspect of the study targets to assess basic federal capital spending programs that have the potential to impact livelihoods and outcomes of regional states, and the citizens at large. In particular, it assessed the allocation of spending across regional states and determine how equity criteria factor into a genuine decision-making process, and the degree to which capital spending allocation is consistent with wider national ambitions of inclusive growth and sustainable development (Harris *et al*, 2019). It is indicated that, although there are variances in some measures of access, fiscal policy in the FDRE is as a whole equitable, and while variances in federal capital spending are detected, these variances are not systematic, and often result from ‘efficiency-based decisions’ (Harris *et al*, 2019). It is also stated that it has increased the perception of inequity (Harris *et al*, 2019).

Perceptions of inequities/disparities lead to dissatisfaction and stress; the higher the feeling of inequity/disparity, the greater the level of dissatisfaction and stress is (Adams, 1963; Al-Zawahreh & Al-Madi, 2012; Watkins, 2015; Gashgari, 2016), which needs a cohesive research approaches. By mentioning several scholars, it is stated that the process of theory building, in the context of qualitative and quantitative research, is noticeably different (Sarantakos, 1993). It is also different in the preparation of the theoretical framework that directs this process (Sarantakos, 1993). Hence,

¹⁸ Harris, J. *et al* (2019), Ethiopia Fiscal Equity Study: Assessing the equity of Fiscal Policy, Federal-State transfers and federal investment in Ethiopia. Through the Bill & Melinda Gates Foundation (BMGF), FISCUS (Public Finance Consultants, UK for consideration by the Ministry of Finance, Ethiopia) was commissioned to conduct an independent study of the equity of the fiscal system in Ethiopia. The “*Fiscal Equity Study: Assessing the equity of Fiscal Policy, Federal-State transfers and federal investment in Ethiopia*” has sought to evaluate the equity of fiscal policy in Ethiopia by reviewing the fiscal system in a holistic manner...which prioritises access as a measure of equity, and also takes into consideration national development objectives presented in GTP-I and GTP-II. The study finds that although there are differences in some measures of access, fiscal policy in the FDRE is on the whole equitable, and where differences in federal capital spending are observed, these differences are not systematic, and often result from efficiency-based decisions, Final Report.... While the current system of Block Grants and SPGs is equitable both in design and execution, improvements could be made to enhance the institutional process for calculating annual allocations and monitoring the use of funds.

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Sarantakos (1993) specified that the following issues should be considered to apply the two methodologies together by using mixed method approaches:

Logic of theory In qualitative research the logic of theory building is inductive, in quantitative research it is deductive... *Direction of theory building* Qualitative theory building begins from reality, quantitative theory does not... *Process of theory building* The course of theory building in qualitative research moves from data generation to verification, with both processes taking place concurrently; in quantitative research verification takes place when theory building is completed... *Concepts*. Concepts in qualitative theory are developed during the research process, that is, researchers enter the field without any notion of concepts; the concepts are either *orienting*..., or *sensitizing*..., or are just flexible concepts.... In quantitative theory building, concepts are already available and firmly defined before operation begins... *Generalizations* Quantitative theories normally warrant generalizations; qualitative theories allow *analytic generalization*, or *exemplar generalization*..., that is, the sample units can act as typical representatives of a class or group of phenomena (Sarantakos, 1993, p. 15).

Both deductive and inductive approaches are applied in this study accordingly. Therefore, by considering the above issues, the following integrated and comprehensive theoretical frameworks have been established.

Actually, although there is the perception of infrastructure inequity, little is known about infrastructure inequity which needs concrete pieces of evidence, actual experiences, or reasons, and to what extent institutional capacity in the infrastructure sector and infrastructure governance affect infrastructure equity, which in turn impact the state-and nation-building processes in Ethiopia. This is due to the lack of transparency and accountability and coordination failures in the government system, specifically in the infrastructure sector institutions in the country.¹⁹ In relations to this concern, it is stated that “the obstacle to achieving the better state of affairs is not a matter of technological opportunities (or even knowledge of those opportunities), or of resources or preferences, but only of coordination” (Hoff, 2001, p. 146), having good roads but no electric power leaves a place uninviting for private investors; thus, what matters is that coordinated packages of infrastructure investment (Duranton & Venables, 2018).

¹⁹ OECD (2015), Public Governance and Territorial Development Directorate Public governance Committee, Towards-a-Framework-for-the-Governance- of-infrastructure.... How can we go about identifying the elements of good infrastructure governance? One natural starting point is to assess the challenges that arise when governance arrangements fall short. Poor governance is a major reason why infrastructure projects fail to meet their timeframe, budget and service delivery objectives. Infrastructure projects with deficient governance often result in cost overruns, delays, underperformance, underutilization, accelerated deterioration due to poor maintenance, and, occasionally, in expensive “white elephants” and bridges-to-nowhere....It is helpful to bear in mind the various stages of infrastructure and how they interact with the governance dimension....Risks of capture by specific interest groups need to be managed. Public authorities can encourage them to adopt a high degree of transparency, provide comprehensive information regarding the project’s parameters and the state of infrastructure operations, and actively engage around the environmental and social impacts of their activities....Infrastructure investment requires a multiplicity of skills to assess, procure, manage and regulate that may not be sufficiently available in the relevant public sector organization.

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The occurrence of coordination failures (as well as political and government failures as market may not decide, rather people may decide) that may ascend in the manifestation of complementarities between the above activities specifies potential policies for interventions that eliminate the coordination problems and make the most equitable allocation of the accessible resources, thus attaining economic development and nation-building processes. Nevertheless, the role of government in refining the approach to coordinate infrastructure activities is not consistent in the literature on the problems of coordination. Recent works have challenged government intervention to resolve coordination problems. In addition, another feature of the literature highlights the insufficiency of models of coordination failures. This is because the choice of the equilibrium is decided “outside the model by initial conditions” (Hoff, 2001, p. 162). Hence, building the analysis of intervention in detailed needs a vibrant framework. Simply in a vibrant equitable infrastructure development framework, one can examine “whether an initial coordination failure will transmit itself over time” (Hoff, 2001, p. 162).

An unethical policy choice might also be one of the significant sources of a low investment) or “bad equilibrium” (Glavan, 2007, p. 10). In several developing countries, the government looks to be inequitable and is at the root of lively poverty traps. Thus, government policies are not larger than the market instrument in coordinating economic actions (Glavan, 2007). However, the emphasis of this study is that the government cannot overlook its role as coordinator and facilitator of the whole economic development, particularly in the least developed countries where market failure is great as well (Cooper & John, 1988; Jones, 2009; Dang & Sui Pheng, 2015). It also mainly emphasizes ‘microeconomic’ or ‘competitiveness’ policies that embrace a wide range of government interventions to permit markets, sectors, and regional states to take benefit of the opportunities given by market-oriented reforms (Rodríguez-Clare, 2005). Hence, government interventions are significant to guarantee that in the long-run the development that a country makes is targeted at economic and social priorities. From that viewpoint, this study argues the role of government in coordinating equitable infrastructure development (by considering social equity (attaining equity over socio-economic groups of society)) or spatial equity (attaining equity over geographical locations or regions) (Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013; Wismadi *et al*, 2015; Litman, 2020), and the nation-building processes in Ethiopia.

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Meanwhile, it is stated that ‘state-building’ emphasizes the practical task of capacity building or consolidation of state institutions, while ‘nation-building’ is more focused on the character of relationships between citizens and their state (Dinnen (2006); Hippler (Ed.), 2004, 2005). Actually, Ethiopia’s state-and nation-building processes are very weak (see Chap. 5 Sec. 5.3.2). Then, it is significant to consider state-nation and nation-state policies (Linz, 1993; Hippler (Ed.), 2004, 2005; Dinnen, 2006; von Bogdandy & Wolfrum (eds.), 2005; Bel, 2011; Stefan *et al*, 2011; Hundara, 2017), which serves an instrument for the state- and nation-building processes.

Consequently, the result, from the discussion above, has been coordination problems for a wide range of behaviors that matter for infrastructure development that are involving corruption, lack of transparency and accountability, and property rights in the allocation of public goods across regional states in Ethiopia. These are also critical challenges for infrastructure equity and nation-building processes including lack of rule of law; democratic accountability; shared national identity, inclusive and sustainable growth in Ethiopia. Coordinated program by a group of institutions might resolve the problem, but largely, there is “coordination failure” (Duranton & Venables, 2018, p. 7) in the infrastructure sector. Henceforward, “the modern theory of coordination failures” ensures that there should be government intervention when necessary across regional states that require accompanying changes in the institutions (Hoff, 2001, p. 145).²⁰ Though coordination failures happen everywhere, for example, lack of equitable allocation of infrastructure in this case (Glavan, 2007), the government is a part of the problem of coordination failure rather than the way out because it happens when the government causes deficiency during the allocation of the resources like infrastructure. These failures happen when people/institutions/governments (federal and regional) are unable to reach equilibrium or a mutually beneficial arrangement for the reason that they are unable to coordinate their activities. Therefore, coordination problems and solutions could help govern whether infrastructure development happens equitably, and then contributes for nation-building process.

²⁰ Hoff, K. (2001), Beyond Rosenstein-Rodan (1943): The Modern Theory of Coordination Problems in Development, the International Bank for Reconstruction and Development / The World Bank, p.146-147.

Role of government. Rosenstein-Rodana argued that there could be coordination "from above" when government planned the process of public goods. In contrast, most recent scholars recognize that there is no such thing because government is part of the endogenous set of institutions to be explained (see Dixit 1996 and Basu 1997, 2000). Moreover, governments fail even in democracies, just as markets do. But a positive development of recent years is to try more limited interventions to harness the spillovers among agents, and to try to sequence policy reforms in a way that makes it more likely for good equilibria to emerge.

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Thus, no instrument can support governments to attain the “perfect allocation of resources” except the use of “rational calculation”, “incentives” and “selection” criteria with the necessary arguments (Glavan, 2007. P. 10). For example, “Voters’ opportunity to sanction incumbent politicians through the reelection mechanism is a powerful incentive mechanism in democracies. At the same time, this mechanism may also trigger biases among politicians with an ambition to keep their party in position (Benitez *et al*, 2012, p. 6). In addition, utility sectors such as electricity, road transport, and telecommunication are among the more unprotected “when political decisions are biased to boost reelection chances for the incumbents (Benitez *et al*, 2012, p. 6). Moreover, politicians who are too motivated on reelection have been suspected of accommodating weak solutions for infrastructure projects that will damage other regional states than their own constituency (Benitez *et al*, 2012). This is because, for example, a government may invest more in a regional state where electoral output is higher (Castells & Sole-Olle, 2005), like putting “foundation stone” without any clear criteria when election time is approaching which is currently practiced in Ethiopia.

In addition, various development policies, such as allocation of infrastructure are “place-based”. These policies are a basic part of development policy, determined by both equity and efficiency. It is equity because the procedure of economic growth is spatially uneven. Whereas, it is efficiency because a spatial development procedure comprises market failures due to coordination failures, and government and political failures (Duranton & Venables, 2019). And hence, some places are served with roads, power, telecommunications, and other public facilities, before others. These regional inequities/disparities are expected to show up, maybe dangerously, in regional states and national politics (World Bank, 2009; Duranton & Venables, 2019). In relation to this, all regional states are developing in Ethiopia. Although there are perceptions about infrastructure inequity, the difference between relatively better regional states and lagging regional states is not clear, especially in the equitable allocation of infrastructure resources that needed scientifically studied.

Finally, the equitable infrastructure development framework combines people and places to build robust communities and people as well as great places/regional states with equitable access. The framework, with its equity drivers and equity outcomes, uses as an analytical instrument to guide this study to identify infrastructure inequities, and to attain equitable outcomes in the long-run for

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disadvantaged communities and regional states (Rubin, 2006; Jones, 2009; PolicyLink, 2013; Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013). In relation to theories of equity and coordination failure, the nation-building process has been examined as an independent variable (the main outcome) of the study. Therefore, the theoretical framework has been established by mixing the theories of coordination failures for resource allocations, equity in development, and infrastructure equity for the state- and nation-building processes (using democratic federalism as a device) through government deep interventions in Ethiopia (see Chap. 2 Sec. 2. 4 the conceptual model).

1.2 Statement of the Problem

Rising global disparity, especially over the past 20 years, is arguably having a negative impact on economic growth, political, social stability, and nation-building processes in poor, transition, and industrially advanced economies (Hooper *et al*, 2017). Moreover, the widening gap between the rich and poor is increasingly fueling major social unrest that could have long-term implications on the nation-building process not just on a national/regional states and regional level, but also at a global level (Hooper *et al*, 2017). In addition, equity exists in different forms, it can be across countries (at individual and country-level); equity within a country (at individual and group level/geographic/regional states); and equity in women, and the environment. Especially, infrastructure equity is a problem in developing countries. Access to infrastructure (roads, electricity, and telecoms including Industry Parks, university, and airport) is typically highly unequal across groups, communities, and regional states (World Bank, 2006; Anderson and O'Neil, 2006). For many people in developing countries, lack of access to inexpensive infrastructure services means living in isolation from markets and services, and having irregular or no supply of power for productive activities and daily existence. This often results in a significant limitation of economic opportunities (World Bank, 2006).

Moreover, research findings, in several studies, showed that infrastructure is considered as the determining factor of international competitiveness and the nation-building process (Nwankwo, 2000; Ayogu, 2000; World Economic Forum, 2014; Rammelt, 2018). Likewise, infrastructure directly impacts the capacity of countries to involve in international trade and to compete for foreign direct investments (FDIs). Therefore, poor quality and inadequacy of infrastructure are considered as the major marketing issues and challenges for the nation-building process in many

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developing countries (Chotia & Rao, 2015). As well, most studies on strategic infrastructure development for developing countries surveyed issues related to financing issues for infrastructure development, including under-investment in infrastructure, allocations of public capital, public resource constraints (Flyvbjerg, 2007; Dang and Sui Pheng, 2015), which are vital for this study.

The tension between equity and efficiency has been the emphasis of the main debate since equity aspects taking place to be measured as part of infrastructure project evaluation processes. (Thomopoulos *et al*, 2009). The concept of equity is often contrasted with that of efficiency, and people often talk, about the ‘equity-efficiency trade-off’ (Anderson & O’Neil, 2006). Study in the arena has mainly dedicated time to the efficiency and equity dilemma, in combination with the interests of political partisan, in giving explanations of the distribution of infrastructure investment across regions (Albalade *et al*, 2012). Therefore, it is important to recognize the relation between equity (understood as redistribution that aims to decrease disparities of income or wealth) and efficiency (understood as the maximum production that can be gained from the resources available) an issue of considerable importance in this study (Baldassarri *et al*, 1996; Bejakovic & Meinardus (Eds.), 2011). For example, the big-trade-off-that more efficiency can be achieved only at the cost of less equity (Okun, 1975; Castells & Sole-Olle, 2005; Bejakovic & Meinardus (Eds.), 2011; Bodislav, 2012), and that Pareto improvement is possible by improving both the efficiency and the equity of the system. The possible outcomes of efficiency and equity analysis, for example in the electric utility, are equitable (equitable and efficient-accept, and inequitable and efficient-inconclusive) and inequitable (equitable and inefficient-??), and inequitable and inefficient-reject (Felder, 2010). There have been many other endeavors to explain this debate, some concentrating on theory, while others concentrating further on practice (Thomopoulos *et al*, 2009). Thus, the empirical findings advise that government preferences in the regional allocation of infrastructure expenditure diverge, with evidence of only equity, only efficiency, and of both equity and efficiency (Mohanty *et al*, 2017; Bejakovic & Meinardus (Eds.), 2011).

Studies also suggest that efficiency criteria have only a limited role in the geographical allocation of government investment in infrastructure. Particular regional infrastructure requires and political factors both seem to be factors that do clarify the regional distribution of investment in infrastructure (Castells & Sole-Olle, 2005). At times, efficiency in the allocation of resources and equity go hand in hand (Bowditch & Noble, 2017). Henceforth, policymakers should continue to

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wrestle with the best way to proceed (Bowditch & Noble, 2017). Nevertheless, preventing misappropriations and wasteful spending will make it easier to support the poor (Ferro & Lentini, 2008). Actually, there is no one-size-fits-all answer to balancing efficiency and equity arguments (Anderson & O'Neil, 2006). Then again, the focus of this study is mainly equity in infrastructure development across regional states in Ethiopia.

Currently, in addition to inclusiveness, environment protection, and green development problems, infrastructure equity, and nation-building due to poor institutional capacity and infrastructure governance are also problems in developing countries (Patra & Acharya, 2011). For example, in India and Nigeria, there is evidence that has debated regional disparities in infrastructure development (Mohanty *et al*, 2017). Henceforward, it is insufficient and very limited to take these studies as a benchmark for developing countries like Ethiopia since these studies did not consider critical infrastructure equity and the interrelationships of institutional capacity, infrastructure governance, and equity on the state-and nation-building processes in a comprehensive manner. Although nation-building requires a physical, social, and communications infrastructure that is shared by the entire civil society (Dinnen, 2006). Moreover, infrastructure is the bedrock of a nation's competitiveness, prosperity, and even social well-being (World Economic Forum (WEF), 2014). In relation to this, strengthening the focus on citizens/customers/stakeholders is an important and necessary building block to help accelerate the power of the citizen/regional states in guiding and disciplining the nation's infrastructure capital and operational expenditure (Bowditch & Noble, 2017).

Specifically, according to the WEF (2014), for instance, effective modes of transport (including high-quality roads, railroads, ports, and air transport) empower entrepreneurs to get their goods and services to market in a safe and timely manner and ease the movement of workers to the most proper jobs. Economies are also contingent on electricity supplies that are free from interruptions and shortages so that businesses and factories can work unhindered. Moreover, a solid and wide telecommunications network permits for a rapid and free flow of information, which increases overall economic productivity by helping to certify that businesses can link and decisions are made by economic actors taking into account all available relevant information (Schwab, 2016–2017). Thus, these are very relevant to analyze the impacts of institutional capacity, infrastructure governance, and equity on the nation-building process in Ethiopia in a comprehensive way.

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Principally, as mentioned above, the Ethiopian constitution (1995) article 89 (2) encourages equal opportunity and equitable distribution of wealth to enhance their economic condition among citizens and regional states. Thus, how can infrastructure decisions and spending be equitable so that regional states are guaranteed the same protections and services as everyone else in the country by the federal government of Ethiopia needs plausible answers? Moreover, answering the questions, “who benefits, who pays, and who decides” (Rubin, 2006, p.5) need an inquiry to the infrastructure decision-making process. Because the issues of equity in infrastructure investment in Ethiopia have been raised from different stakeholders such as parliaments, government officials, political parties, civil societies, the private sector, and society at large as there are little transparency and accountability in planning and service delivery during the previous three decades. As a result of this, since 2014/15 there is political instability/unrest and suspicion among citizens, communities, and regional states due to disparity grievances, for instance, in infrastructure distribution.

Meanwhile, Ethiopia in the recent past has been rising at a rate of 10% and more, specifically from 2007 to 2017/18 (NPC, 2019). If this is to be maintained in the future, then it is expected that there should be balanced regional growth. Both GTP I and GTP II, five-year plans have been stressing on the state’s active role in developing their regional infrastructure to see that, their regions also grow along with the nation. In this context, a study on the inter-relations between economic activity, growth potential, and existing infrastructure services is of great importance (NPC, 2016). For example, road access is a significant determinant of poverty. Poverty rates increase by 7 percent for every 10 kilometers’ distance from a market town. Poverty reduction from agricultural growth displays similar patterns, as poverty reduction is higher for people close to urban centers (26 percent) than those living in rural areas (4 percent) (World Bank, 2017). This further illustrates the role of spatial connectivity in poverty reduction, for example, travel times to urban centers are an important variable in reducing poverty. Hence, distance from urban centers is a vital predictor of poverty. Generally, the national road network of Ethiopia expanded from 26,500 km in 1997 to 100,000 km in 2015, but road density (1 km per 1,000 people) is very low compared to African peers (World Bank, 2017). Further, changes in road density have not been homogenous across the country, which has implications for labor mobility, market access, and income growth for farmers (World Bank, 2017).

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Moreover, Kanth and Geiger (2017) studied that changes in road density over the ten years from 2006 to 2016, and in nightlights in six cities over four years from 2012 to 2016 in Ethiopia. Kanth and Geiger (2017) indicated that changes in road density pointed to greater economic concentration towards the center of Ethiopia and the North of the country. These are also areas of larger population density. They showed that, between 2006 and 2016, the rise in road density was relatively condensed in certain regional states, particularly Ethiopia's capital of Addis Ababa, including Tigray in the North of the country and in Oromia in the center. Whereas, remote and economically lagging regional states, and the Amhara region, see lesser rises in road density. But, in contrast to this, Tekeste (2018) observed that the federal road network constructed thus far in Ethiopia, its distribution across regional states have been largely "fair and balanced" (Fiseha (ed.), 2018). Tekeste (2018) also stressed that regional states with larger populations have a proportionately larger share of the network. For instance, Tekeste (2018) stated that nearly 32% of the federal road network is in the Oromia region, while close to 23 % of it is found in the Amhara region. The South region has 16% of the federal road network, which is disproved when considered road density per population per regional states" (Fiseha (ed.), 2018) (see Chap. 8 Sec. 8.3).

Kanth and Geiger (2017) also indicated that considering the development of roads as a proxy for the development of infrastructure which indicated that infrastructure development has been heterogeneous across all regional states. It is also indicated that road connectivity for some regional states is poor, both within those regions and with other regions, with significances for labor mobility, the transportation of goods and services, and for agricultural productivity as the distance and travel times to markets are extended (Kanth and Geiger, 2017).

Furthermore, according to Kanth and Geiger's (2017) findings, in spite of the huge infrastructure investments undertaken by the Ethiopian government in the past 10 years, accessibility by road to rural areas remains low in Ethiopia. The Rural Access Index was 21.6% in 2016, suggesting that only around 22% of the rural population had access within a 2km distance of them to a "decent" road. Similarly, they also found at nightlights in specific secondary cities. Kanth and Geiger (2017) interpreted that urban GDP is stagnant as there were no important changes in the density or delivery of night-time lights over the period of 2012–2016, although urbanization outside Addis Ababa is ongoing and urban poverty has been decreased since 2012. Together, these have allowed

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this study to put forward policy answers Ethiopia can adopt to bridge spatial disparities/inequities in infrastructure.

Similarly, there were also budget allocation disparities by the Ethiopian Road Authority in the 2017/18 budget year. From the total budget of 19.2 billion, South 2.5 billion (13%); Tigray 9.3 billion (48%); Oromia and South 3.5 billion (18%); Oromia 1.7 billion (8%); Amhara 1.6 billion (8%); and Drie Dawa 992 million (5%) had been allocated in this budget year (Ethiopian Road Authority Roads Magazine, 2018). As this was only a one-year budget allocation, it was not also possible to conclude that there is inequity in the road sector in Ethiopia. However, it has been further investigated by gathering time-series data in the infrastructure sector in Ethiopia (see Chap. 8 Sec. 8.3-8.5).

In addition, based on the GTP 2 preparation and 2006 census from Central Statistics Agency (CSA), generally, there are 18972 Kebeles and villages in the country. From 18972 Kebeles, 6238 Kebeles and villages have electric utilities. The remaining 12734 Kebeles and villages were on the waiting list. From these lists, 8694 (65%) Kebeles could have electric power directly from the grid sources and 4521 (35%) households from the off-grid (Ethiopian Electric Utility Program Office Report, 2018). At this juncture, there was one critical issue which is infrastructure equity. Who was/is the decision-maker for these rural Kebeles and villages? What were/are the criteria and processes? What were/are the roles of federal and regional governments' institutions in this infrastructure distribution? Was/is it equitable or not? No one could give an answer to such questions. Hence, it needed scientific research to give plausible answers. The same was/is true for other infrastructure such as road, telecommunication, Industry Parks, university and airport sectors in this study.

Generally, Rubin (2006) stated that except in times of crisis, most people seldom reflect about infrastructure and how roads, bridges, universities, airports, and parks are part of an all-inclusive system that helps communities and regional states (Rubin,2006). Thus, it was very significant to know the level of (in) equity of public infrastructure investments and its critical factors in Ethiopia. And then, success and/or a failure to apply equity principles to infrastructure planning in Ethiopia needed to be studied and ensured. It was also very important to review the evidence on the macroeconomic implication of the infrastructure sector in terms of growth and poverty alleviation

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by using GDP, Gini coefficient, etc. This is because, with the growing number of pro-poor programs and attention to equity issues, knowledge of equity-based resource allocation has become serious, mainly in circumstances where priority setting usually faces efficiency–equity trade-offs and/or budget limitation issues (Wismadi *et al*, 2015). Unfortunately, federal Ethiopia’s infrastructure allocation among regional states and administrative cities has gaps, concerns, and feelings of discrimination that need further investigations.

More importantly, effective institutional capacity and infrastructure governance and management have been credited for having just and fair allocation of infrastructure, as a result, it brings about an infrastructure equity and a sufficient nation-building process (Ashindorbe, 2019). Therefore, assessing the question of infrastructure distribution is as pertinent as ever (Rammelt, 2018; Harris *et al*, 2019), among regional states in Ethiopia. All the above facts presented that the presence of insufficient institutional capacity of the governments, lack of infrastructure governance (inadequate forecasting capacity of infrastructure development institutions, insufficient building capacity of local firms, and lack of an effective land acquisition framework), and lack of infrastructure equity which affects the state-and nation-building processes in Ethiopia. This is because many of the problems facing “fragile states” arise from both the lack of an effective state and the absence of a shared sense of identity and community among the local elites in particular, and in the society in general. State weakness and the relative lack of nationhood are mutually reinforcing conditions (Dinnen, 2006), in which Ethiopia, like other states in Africa, faces the challenge of state formation, national cohesion, and democratic consolidation. Hence, a convincing response required research and evidence. The intent of this study is a response to these concerns.

Therefore, the purpose of the study is to examine the equitableness of basic economic infrastructure development by the federal government among the 9 regional states and 2 city administrations which is very crucial for the state-and nation-building processes in Ethiopia. In this study, by focusing on the equitable distribution of infrastructure development and the nation-building process in Ethiopia, the target group is thus the nine regional states and 2 city administrations. Moreover, this study has included investigating the correlation analysis of independent variables (institutional capacity (IC), infrastructure governance (IG) and infrastructure equity (IE) - ((IG) and (IE) at the same time-dependent variables)) and dependent variable the overall impact of the nation-building process (NBP) in Ethiopia.

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Finally, this study has described and explored federal systems, state-and nation-building processes, equity, and then infrastructure equity from 1997 to 2017/18, and determined whether the existing federal system is equitable or not with regard to certain interventions by using time-series data analysis, quantitative (by using Structural Equation Modeling (SEM)-smart Partial Least Square (PLS) software) and qualitative methods (Interviews and Focus Group Discussions) of surveys, and to develop recommendations to make the allocation of government infrastructure resources more equitable and optimal.

1.3 Research Objective

The main objective of this study is to determine whether the existing allocation of physical infrastructure system is equitable or not and to improve infrastructure equity across regional states in Ethiopia. By doing so, this study has the following specific objectives:

1. To review and identify the major issues that could affect the institutional capacity, infrastructure governance, infrastructure equity, and nation-building process in developing countries;
2. To examine the practice of institutional capacity, infrastructure governance, and equity from the perspective of federalism and nation-building process in Ethiopia;
3. To assess infrastructure governance, equity, and nation-building process from the perspective of political and economic development in Ethiopia;
4. To analyze whether infrastructure decisions and federal capital spending's are equitable across the regional states by the federal government of Ethiopia including road, electricity, and telecommunication (as well as Industry Park, Airport, and Universities);
5. To examine the interrelationships among institutional capacity, infrastructure governance, infrastructure equity, and nation-building process, and its impacts on state-and nation-building processes as well as the equitable allocation of infrastructure across regional states in Ethiopia.

1.4 Research Questions and Hypothesis

The research questions and hypotheses have refined the purpose statement to forecasts about what is learned and questions are answered in this study (Creswell, 2014). Thus, the main research question is how physical infrastructure distribution decisions and capital spending by the federal

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government of Ethiopia are equitable across regional states and are guaranteed the same protections and accesses as everyone else in the country? Then, the sub-questions are:

1. What are the major issues that could affect infrastructure equity, institutional capacity, infrastructure governance, and nation-building process in developing countries?
2. How is the practice of institutional capacity, infrastructure governance, and equity from the perspective of federalism and nation-building processes in Ethiopia?
3. What are the major issues in infrastructure governance, equity, and the nation-building process from the perspective of political and economic development in Ethiopia?
4. How infrastructure decisions and spendings are equitable across the regional states by the federal government of Ethiopia including road, electricity, and telecommunication (as well as Industry Park, Airport, and Universities)?
5. What are the interrelationships among institutional capacity, infrastructure governance, infrastructure equity, and nation-building process, and its impacts on state-and nation-building processes as well as the equitable allocation of infrastructure across regional states in Ethiopia?

Next to this the related hypotheses are constructed. It is clearly stated that hypothesis is “an assumption about the status of events or about relations between variables. It is a tentative explanation of the research problem, a possible outcome of the research, or an educated guess about the research outcome” (Sarantakos, 1993, p. 119). It is also mentioned that “hypotheses can be in any form except in the form of a question”, and could meet a number of standards (“empirically testable”, “proven right or wrong”, “clear, specific and precise”, etc.) which can be also “relational” and “directional” in this study (Sarantakos, 1993, p. 120). The hypothesized constructs are the equitable allocation of public infrastructure investments in different ways are identified. Hence, institutional capacity and infrastructure governance are hypothesized to be the core constructs as they have critical impacts on others, which in turn affects infrastructure equity and the nation-building process in Ethiopia. More specifically, these hypotheses are:

H1: Lack of institutional capacity (human capital; organizational structure; infrastructure systems and infrastructure fund) negatively affects infrastructure equity (equal opportunity; social justice; national competitiveness, spatial intervention, and citizen satisfaction) in Ethiopia;

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H2: Lack of institutional capacity negatively affects infrastructure governance (decision-making process; intergovernmental collaboration and coordination; land acquisition framework; and, political commitment and partnerships) in Ethiopia;

H3: Lack of institutional capacity negatively affects the nation-building process (rule of law; democratic accountability; shared national identity, inclusive and sustainable growth) in Ethiopia;

H4: Lack of infrastructure equity is negatively related to the nation-building process in Ethiopia;

H5: Lack of infrastructure governance is negatively related to infrastructure equity in Ethiopia;

H6: Lack of infrastructure governance is negatively related to the nation-building process in Ethiopia;

H7: Infrastructure governance positively mediates the relationship between institutional capacity and infrastructure Equity;

H8: Infrastructure equity positively mediates the relationship between institutional capacity and the nation-building process in Ethiopia;

H9: Infrastructure equity positively mediates the relationship between infrastructure governance and nation-building process;

H10: Infrastructure governance and infrastructure equity positively mediate the interrelationship between institutional capacity and nation-building process;

H11: Infrastructure governance positively mediates the relationship between institutional capacity and nation-building process;

1.5 Research Methodology

Infrastructure plays a dynamic role to achieve Ethiopia's growth targets as well as attaining higher living standards of the mass population. In any case, infrastructure equity is problematic to measure, because it is challenging to detect things like the fairness of treatment such as opportunities and life chances which are multidimensional and tough to quantify (Jones, 2009). However, there are measures that can give a direct picture of the levels of equity in a country such as access to and/or utilization of some services (e.g. features of infrastructure such as electricity or

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telecommunication, etc.). Thus, due to the complication of measuring infrastructure equity, this study used a mixed research methodology. The research methodology is discussed in Chap. 4. However, it is useful to identify some features of the methodology at the beginning of this study:

- A time-series/cross-sectional survey of public investments in infrastructure was used to explore the extent to which physical public infrastructure investments was equitably allocated across regional states in Ethiopia;
- A questionnaire survey was adopted in this study to explore the key variables limiting the equitable allocation of public investments in infrastructure perceived by concerned parties. The sample includes government officials, middle-management, experts, consultants and contractors, World Bank and UNDP Ethiopia representatives involved in policy-making and planning, and delivering as well as in utilizing infrastructure. A five-point Likert scale was applied for questions relating to the degree of occurrence and influence of factors;
- In-depth interviews and Focus group discussions were carried out to explore the ways to address key factors identified from the questionnaire survey. In addition, Ethiopian Constitution (1995), GTP I and GTP II, strategic planning documents, program-related documents including final reports, evaluation reports, and other documents were collected as alternative sources for cross-checking. Information collected from the interviews formed the main basis for the study to make recommendations to improve the equitable allocation of public investments in infrastructure and to promote nation-building processes;
- Data analysis included both quantitative (Multi-Criteria Analysis, Factor Analysis-Confirmatory Factor Analysis, and Structural Equation Modelling-Partial Least Square-SEM-PLS) and qualitative (Thematic Content Analysis) methods as explained in Chap. 4.
- A two-stage (quantitative and qualitative) validation was conducted to validate the results.

1.6 Research Significance

Infrastructure is the bedrock of a nation's competitiveness, prosperity and even social well-being (World Economic Forum, 2014; OECD, 2015). Moreover, nation-building requires physical infrastructure, social and public services that are pooled by the entire civil society (Dinnen, 2006; Patra & Acharya, 2011). Broadly speaking, every economy either developing or developed has two kinds of major objectives one providing basic needs and facilities to their population second attaining higher growth rates (Srinivasu and Rao, 2013). One of the basic needs and facilities is infrastructure. Though, the rising disparity of infrastructure allocation is becoming a global

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challenge (Hooper *et al*, 2017). Meanwhile, as mentioned above, the Ethiopian constitution (1995) article 89 (2) demands that the government has the duty to ensure equal opportunity, to promote equitable distribution of wealth, and to improve their economic condition for all Ethiopians. Article 89 (4) also demands that the government has to provide “special assistance to Nations, Nationalities, and Peoples least advantaged in economic and social development”. In relation to this, it is also good to consider the regional states.

Moreover, the Ethiopian Constitution (1995) preamble, says that “Convinced that to live as one economic community is necessary in order to create sustainable and mutually supportive conditions for ensuring respect for our rights and freedoms and for the collective promotion of our interests”.²¹ Indeed, in order to ensure one economic community, these articles necessitate the equitable allocation of infrastructure across regional states in Ethiopia. Meanwhile, the issues of equity in infrastructure investment have been raised from different stakeholders such as government officials, political parties, civil societies, private sector, and society at large as there are little transparency and accountability in planning and infrastructure delivery during the previous three decades. Since 2015/16 there is also political instability/unrest, grievances, and suspicion among regional states, communities, and citizens due to inequities/disparity in, for example, infrastructure distribution.

Currently, equity in infrastructure development in the developed world is not as such raised as a problem in different kinds of literature. It seems that they have already addressed the issue. Nevertheless, problems such as gender inclusiveness, environment protection, and green development are not fully resolved yet. Similarly, in addition to inclusiveness, environment protection, and green development problems, infrastructure equity, and nation-building due to poor institutional capacity and infrastructure governance are also problems in developing countries (Patra & Acharya, 2011). For example, in India and Nigeria, there are published articles that have

²¹ The Constitution of the federal democratic republic of Ethiopia (1995), Article 89, Economic Objectives: 1. Government shall have the duty to formulate policies which ensure that all Ethiopians can benefit from the country’s legacy of intellectual and material resources; 2. Government has the duty to ensure that all Ethiopians get equal opportunity to improve their economic condition and to promote equitable distribution of wealth among them; 3. Government shall take measures to avert any natural and man-made disasters, and, in the event of disasters, to provide timely assistance to the victims; 4. Government shall provide special assistance to Nations, Nationalities, and Peoples least advantaged in economic and social development; 5. Government has the duty to hold, on behalf of the People, land and other natural resources and to deploy them for their common benefit and development; 6. Government shall at all times promote the participation of the People in the formulation of national development policies and programs; it shall also have the duty to support the initiatives of the People in their development endeavors; 7. Government shall ensure the participation of women in equality with men in all economic and social development endeavors; 8. Government shall endeavor to protect and promote health, welfare, and living standards of the working population of the country.

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discussed regional disparities in infrastructure development (Mohanty *et al*, 2017). Though, it is insufficient and very limited to take these studies as a benchmark for developing countries since these studies did not consider the impact of institutional capacity, infrastructure governance, and equity on nation-building processes in a comprehensive manner. In addition, as mentioned in the statement of the problem, some studies on infrastructure development in Ethiopia focused on some aspects of infrastructure development rather than on an entire infrastructure management system. As per the knowledge of the researcher, the Center of Federalism and Federal Studies (Addis Ababa University) does not address the issue of infrastructure equity in relation to federal systems and state-and nation-building processes yet.

Moreover, the challenges of managing more extensive infrastructure equity need such an approach to focus on the federal government on planning, regulation, and policy elaboration and implementation; and to balance the roles of national, regional, sectoral and local stakeholders. Thus, how can infrastructure decisions and spending be equitable so that regional states are guaranteed the same protections and services as everyone else in the country by the federal government of Ethiopia needs plausible answers? And, answering the questions, ‘who benefits, who pays, and who decides’ need an inquiry to the infrastructure decision-making process in Ethiopia. Consequently, investments in infrastructure are expected to promote economic activities and nation-building processes. Hence, this study explored the allocation of public infrastructure investments by using both at a macro-level and authority-level approaches in Ethiopia that cover planning, budgeting, inter-ministry, and inter-regional government cooperation, and delivery, and giving an overview of federal systems, nation-building, and equity agenda. Furthermore, the factors that are limiting the equitable allocation of public infrastructure investments are explored. It also set out to highlight what is meant by equity and inequity. It also considered how to promote equity through development interventions and what value the focus on equity might bring to develop policies and programs in the infrastructure sector.

Therefore, the study has provided a piece of knowledge on how to equitably allocate public infrastructure investments to benefit the economy and the nation-building process in Ethiopia. This study has also displayed how it is possible to measure qualitative issues in both qualitative and quantitative approaches. Therefore, examining constraints across government institutions and policy scopes in infrastructure equity, hence suggesting the government to put in place the required

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capacities to expand the public-sector performance is serious for developing countries (Estache, 2006; Dang & Sui Pheng, 2015). These understandings will also be appreciated for policy-makers to develop better equitable infrastructure policies when financial resources are tight.

Another contribution of this study is to sort out other potential determinants of infrastructure investment, such as the influence of firms and politicians including foreign donors on infrastructure investment policies. Thus, the findings of this study have provided vital insights into the determinants of public infrastructure policies. These insights are valuable for the creation of better infrastructure policies and regional economic development, including spatial equity effects between regional states (Flyvbjerg, 2008; Estache & Fay, 2009; Dang & Sui Pheng, 2015). Finally, this study has two broad contributions, that is, knowledge contribution which provides vital insights to fill the knowledge gap in infrastructure equity; practical implication which also provides valuable evidence to formulate infrastructure strategy and policy that would achieve equitable infrastructure investment among regional states in Ethiopia. It also provides valuable evidence for donors, managers, and policymakers for policy and strategy formulations.

1.7 Research Scope

In examining the main research question of what factors limit the equitable allocation of public investments in infrastructure development in Ethiopia, the approach taken in the study has several features:

- Equity could be categorized into power-sharing and resource-sharing. The focus of this study is on resource sharing, especially infrastructure resources;
- The study focused more on macro-level or statewide variables including micro- or agency-level variables. The approach is needed since public infrastructure investments (national infrastructure investment and policy) are initially determined at the macro-level to inspire changes in the economic environment in general, infrastructure development in particular;
- There are two major types of infrastructure, the economic infrastructure supporting economic activities of the national economy and social infrastructure supporting social development. The economic and social infrastructure where economic infrastructure is part of an economy's capital stock used to ease economic production. Structures including power utilities, telecommunication, roads, airports, and industrial parks are typical examples of economic infrastructure. Social infrastructure, on the other hand, enables

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investment in human capital with a result of enhancing workforce productivity. Social infrastructure includes health, education, and recreation services. Infrastructure can also be considered as hard infrastructure which entails the provision of physical structures for basic amenities including energy, transportation, communication, industry parks, airport, and university. While hard infrastructure is about the delivery of physical assets, soft infrastructure is about the development of knowledge and skill and access to proper services (WDR, 1994; Patra & Acharya, 2011; Africa's Pulse, 2017; Cantu, 2017; Sawada, 2015; Nuramo & Haupt, 2015). Since the study focused on infrastructure built to support economic development and the nation-building process, the scope of the study is limited to hard infrastructure and economic infrastructure as defined by World Bank (1994). However, the distribution of industrial parks, airports, and universities are included in the study exceptionally. Besides, the study has selected the above infrastructures for two reasons. First, they are the most relevant infrastructure category in Ethiopia. Second, these are the infrastructures that show a major impact on output in production function analysis with Ethiopian data. The study also used physical infrastructure stocks as a measurement. So it did not use monetary flows as a measurement;

- As explained above, efficiency is defined as the use of resources for maximizing the production of goods and services. Whereas, the dictionary meaning of equity is “the quality of being fair and impartial”. In this study, the equitable allocation of public infrastructure investments is referred to the allocation of infrastructure so as to maximize the competitiveness of the regional states and the country in terms of infrastructure development (WEF, 2014).
- Developing countries in this study are referred to as middle-income and low-income economies as classified by the World Bank (2011). The other group includes developed countries, which have high incomes and high living standards (World Bank, 2011). Thus, Ethiopia is categorized as a low-income country by the World Bank.
- For the time-series/ cross-sectional survey, the study has included the 9 regional states and 2 city administrations. But, for the questionnaire survey and in-depth interviews and Focus Group Discussions (FGDs), the study only focused on purposively selected four regional states (Oromia, Amhara, Tigray, and Benshangul/Goumuz) in Ethiopia. It also included 1 city in each region, a total of 4 cities for FGDs. The reason why the study has chosen

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Oromia, Amhara, and Tigray are because they are relatively bigger regional states, represent most of the population in the country, and they have attempted to prepare their Regional GDP. Whereas, the reason why the study has chosen Benshangul/Gumuz from emerging regional states is because of two reasons: 1) Amharic is its working language; and, it has tried to prepare its regional GDP. Thus, the four regional states have been chosen based on size, population, and data availability.

1.8 Limitations of the Study

Data deficiencies resulted in constraints in considering all factors in the case of all regional states, especially, regional-level data are rare (Jones, 2009). The empirical literature on the determinants of infrastructure distribution across regional states is rather sparse with regard to Ethiopia. Data limitations have taken much of the blame. Partly related to this complexity is the difficulty of measuring infrastructure equity as it involves multiple dimensions and complex processes, equity is not well suited to rankings or simple, standardized, quantified indicators. Worse, many of these large-scale quantitative surveys might miss precisely those who are worst off, like social exclusion, discrimination, and adverse incorporation may be hidden (Jones, 2009). In addition, equity concerns are mainly built on value-judgments of decision and policy-makers which is an acceptable risk (Thomopoulos *et al*, 2009). Thus, infrastructure equity is multidimensional property, a system-wide, connecting interdependent processes, and forces and not controllable by anyone actor/stakeholder. Finally, there are some limitations to the findings of this study:

- The study considers the major infrastructure sectors that support economic growth and the nation-building process in Ethiopia. Thus, the findings are based on analyses of what limits the equitable allocation of overall public investments in infrastructure. However, each infrastructure sector is different in the way it supports economic growth and the nation-building process. Thus, sectors would have different priorities that require different strategic approaches;
- Although the background information on the economic development, nation-building process, and infrastructure development of Ethiopia is based on time series data analysis, the major findings of the study are connected with data collected at a given time to reflect issues in the current allocation of public investments in infrastructure in Ethiopia. A “longitudinal design” may be useful to further explain the effects of relevant historical,

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political, and economic events on the equitable allocation of public investments in infrastructure over a period of time;

- Factors affecting the equitable allocation of public investments in infrastructure examined in this study are limited to internal factors in Ethiopia. However, the influence of external factors is of growing importance, as countries become more integrated into the world economy.

1.9 Organization of the Study

The study consists of the following ten chapters:

Chapter 1. Introduction: Introduced the title under consideration and provided contextual information about the research context. Moreover, this chapter included a theoretical framework, a statement of the problem, objectives, research questions, significances, and limitations of the study. Finally, it included the organization of the study.

Chapter 2. Literature Review I: It outlined theoretical/conceptual review related to the theory of political and economic development and contemporary theories of economic development. It also outlined a review of the theories of coordination failure, equity, and infrastructure equity which helped to develop a theoretical/conceptual framework. Moreover, it reviewed the empirical literature of the state-and nation-building processes, institutional capacity, infrastructure governance, and equity. Finally, it included a critique of the existing literature relevant to the study. It also developed a conceptual model showing the interrelationship among institutional capacity, infrastructure governance, infrastructure equity, and nation-building process in Ethiopia.

Chapter 3. Literature Review II-Issues of Institutional Capacity, Infrastructure governance, Equity and Nation-building Processes in developing countries: This chapter assessed the theory of coordination failure in the role of government in the infrastructure sector, knowledge gap, and issues of infrastructure development in developing countries like Ethiopia including problems of institutional capacity, infrastructure governance, and equity, and nation-building processes. Therefore, this chapter reviewed the literature to pinpoint major issues that could influence the equity of government-funded infrastructure in supporting economic growth and the nation-building process. Concerns examined in this chapter were the basis for the formulation of the questionnaire survey questions.

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Chapter 4. Research Methodology: This chapter discussed the research methodology used in this study. This chapter started with a review of the use of quantitative and qualitative research strategies within the literature of public administration. This section is followed by a brief description of the research design selected for research in infrastructure planning. Details of approaches used for data analysis and data collection for this study are then discussed. Finally, it has also included two-stage validation and ethical considerations.

Chapter 5. Institutional Capacity, Infrastructure Governance, and Equity from the Perspective of Federalism and Nation-Building Process in Ethiopia: This chapter assessed the practice of federalism and the nation-building process with the relation of international and national practices in Ethiopia including the impacts of institutional capacity, infrastructure governance, and equity on nation-building processes.

Chapter 6. Infrastructure Governance, Equity, and Nation-Building Process from the Perspective of Political and Economic Development in Ethiopia: An Overview: This chapter specified an overview of political-economic development in Ethiopia over the past decades. This chapter also described the political and economic overview, infrastructure development, infrastructure-related indicator compared to other African countries, and the role of government institutions in infrastructure development in Ethiopia. The contributions and development of the construction sector in Ethiopia are also considered. Moreover, it described the current nation-building process including capacity building and good governance, building a democratic system. It also briefly mentioned the future prospects of Ethiopia.

Chapter 7. Infrastructure equity Issues in the Industry Park, Airport, and Universities in Federal Ethiopia: A Preliminary Overview. This chapter examined the preliminary overview of the equitable allocation of industrial parks, airports, and universities across regional states in Ethiopia.

Chapter 8. Infrastructure development and Economic Growth: Analyzing Infrastructure Inequities/Disparities across regional states in Ethiopia: This chapter considered performance indicators of infrastructure and the effects of infrastructure on growth and income inequality. It also discussed the aggregate index of infrastructure stocks by using the Principal Component Analysis Approach. Finally, the Composite Infrastructure Index (CII) has been analyzed across regional states in Ethiopia.

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Chapter 9. The Interrelationship among Institutional Capacity, Infrastructure Governance and Equity, and Nation-Building Process in Ethiopia: This chapter focused on data analysis and discussion. A model of the critical factors affecting the equitable allocation of public investments in infrastructure to support economic and nation-building processes, and its impacts on state-and nation-building processes across regional states in Ethiopia is examined and validated. Results from both qualitative and quantitative data analyses are used to enrich the study findings.

Chapter 10. Summary of Findings, Conclusions, and Recommendations: This chapter summarized the subject matters of the study findings. This chapter also presented conclusions and recommendations. Moreover, this chapter ended with the research contribution and some suggestions for future works. See also operational definitions in annex 5.

CHAPTER 2

LITERATURE REVIEW I

Introduction

The purpose of the chapter is to briefly review theories of political and economic development, coordination failure, equity, and infrastructure equity to frame the theory. The chapter has also briefly reviewed institutional capacity, infrastructure governance, and state–and nation-building processes including 17 indicator variables. These issues are very relevant, currently workable, and continuously refined by different scholars for the study. This literature has also explained the strategies and tools for making development goals achievable. In relation to this, this chapter has reviewed the link between infrastructure and development, the value of federal systems, brief in infrastructure development in Ethiopia, and critique of the existing literature relevant to the study. All these issues used to prepare the theoretical framework, and the conceptual model for the study. In the end, the chapter has displayed the conceptual model and has a conclusion.

2.1 Framing the Theory

2.1.1 Theory of Political Development

Political scientists in the 1960s began to pursue more vigorously their interests in what is variously called “political modernization” or “political development” in which “the focus on political development, in turn, yielded to broader efforts to generate more general theories of political change” (Huntington, 1971, p. 285).²² According to Huntington (1971), society is called “traditional” (agricultural society) in which most relationships are the predominance of ascriptive (a group in which status is based on a factor other than achievement), particularistic, diffuse patterns, etc. Whereas, society is called “modern” (modern industrial society) in which most

²² Huntington, S.P. (1971), *The Change to Change: Modernization, Development, and Politics*, Comparative Politics, Vol. 3, No.3, 283-322: The differences between a modern polity and a traditional one flow from these more general characteristics of modern and traditional societies. Political scientists have attempted various formulations of these differences. Perhaps the most succinct yet complete checklist is that furnished by Robert E. Ward and Rustow. A modern polity, they argue, has the following characteristics which a traditional polity presumably lacks: 1. A highly differentiated and functionally specific system of governmental organization; 2. A high degree of integration within this governmental structure; 3. The prevalence of rational and secular procedures for the making of political decisions; 4. The large volume, wide range, and high efficacy of its political and administrative decisions; 5. A widespread and effective sense of popular identification with the history, territory, and national identity of the state; 6. Widespread popular interest and involvement in the political system, though not necessarily in the decision-making aspects thereof; 7. The allocation of political roles by achievement rather than ascription; and 8. Judicial and regulatory techniques based upon a predominantly secular and impersonal system of law.

More generally, a modern polity, in contrast to a traditional polity, is characterized by rationalized authority, differentiated structure, mass participation, and a consequent capability to accomplish a broad range of goals. The bridge across the Great Dichotomy between modern and traditional societies is the Grand Process of Modernization. The broad outlines and characteristics of this process are also generally agreed upon by scholars. Most writers on modernization implicitly or explicitly assign nine characteristics to the modernization process: 1. Modernization is a revolutionary process; 2. Modernization is a complex process; 3. Modernization is a systemic process; 4. Modernization is a global process; 5. Modernization is a lengthy process; 6. Modernization is a phased process; 7. Modernization is a homogenizing process; 8. Modernization is an irreversible process; 9. Modernization is a progressive process...Modernization in intellectual history. P. 287-290. <http://www.jstor.org/Thus> Feb 9 04:45:54 2006.

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relationships are the predominance of universalistic, specific, achievement norms, etc. And then, "modernization" referred to human beings as the process of transition from 'traditional' to 'modern' principles of social organization, and this process is what is currently occurring in Asia, Africa, and Latin America (Huntington, 1971), which is also state-and nation-building processes (Dinnen, 2006). Moreover, in recent years, institutionalization has become one of the central concepts in the politics of comparative studies in general, and political development in particular (Ben-Dor, 1975). Likewise, "political development is change over time in political institutions" (Fukuyama, 2011, p.21). Fundamentally, Fukuyama stated that there are three central types of institutions that established a "political order" which are "the state, rule of law, and mechanisms of accountability" (Fukuyama, 2011, p. 22). Fukuyama also discussed that:

These three categories of institutions may exist in different polities independently of one another and in various combinations. Hence, the People's Republic of China has a strong and well -developed state but a weak rule of law and no democracy. Singapore has a rule of law in addition to a state but a very limited democracy. Russia has democratic elections, a state that is good at suppressing dissidence but not so good at delivering services, and a weak rule of law. In many failed states, like Somalia, Haiti, and the Democratic Republic of the Congo in the early twenty-first century, the state and rule of law are weak or nonexistent, though the latter two have held democratic elections. By contrast, a politically developed liberal democracy includes all three sets of institutions-the state, rule of law, and procedural accountability-in some kind of balance. A state that is powerful without serious checks is a dictatorship; one that is weak and checked by a multitude of subordinate political forces is ineffective and often unstable (Fukuyama, 2011, p.22).

Moreover, Fukuyama stated that Denmark would have all three arrangements of political institutions in a perfect balance, that is, 'a competent state, strong rule of law, and democratic accountability' (Fukuyama, 2011). (Fukuyama, 2011) also indicated that the international community would like to turn Afghanistan, Somalia, Libya, and Haiti into idealized places like Denmark, but it doesn't have "the slightest idea" of how to bring this about. He argued that one doesn't recognize how Denmark itself came to be Denmark and therefore doesn't realize the complexity and difficulty of political development. Above all, the quality of government is the fairness of the institutions that could exercise the government's authorities (Rothstein &Teorell, 2008; Bowen, 2015). Fukuyama (2011) also mentioned that following Samuel Huntington's definition, political institutions grow by becoming more complex, flexible, autonomous, and coherent. However, Fukuyama (2011) argued that they can also decay.

By citing Almond and Powell, Rustow, and others' argument, Huntington (1971) stated that political development is a response of a system to the challenges of 'state-and nation-building, participation, distribution, and consensus-building'; the three key requirements of political modernization-'identity, authority, and equality'; and, the five crises that societies could ought to

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deal with in the processes of political modernization-‘identity, legitimacy, penetration, participation, and distribution’ by increasing equality, capacity, and differentiation of institutions and structures within political system (Huntington, 1971, P. 312). Hence, politics is change, but then again politics is also ideas, institutions, values, groups, power, conflict, structures, communication, interaction, influence, law, and organization including system-functions (conceptualizes by identifying its function within a system), social processes (correlates by relating one pattern of action to another pattern of action), and the comparative study (compares by relating to political changes) (Huntington, 1971).

On the whole, the subject matter of economic and political development intersects over a broad front. It is also noted that economic policy is made by incumbent politicians in the context of political institutions (Ruttan, 1989). Besides, political change in a country depends on political involvement whereas political involvement depends on institutionalization (Sikander, 2015; Vega-Redondo, 1993). Thus, political change cannot take place in the absence of efficient and effective institutions (i.e. state, rule of law and democratic accountability) that permits mass participation. In relation to the above description, according to Huntington (1971), the political system could be defined in a varied of ways and perceived of as having several components and elements, for example, the following five:

(a) culture, that is, the values, attitudes, orientations, myths, and beliefs relevant to politics and dominant in the society; (b) structure, that is, the formal organizations through which the society makes authoritative decisions, such as political parties, legislatures, executives, and bureaucracies; (c) groups, that is, the social and economic formations, formal and informal, which participate in politics and make demands on the political structures; (d) leadership, that is, the individuals in political institutions and groups who exercise more influence than others on the allocation of values; (e) policies, that is, the patterns of governmental activity which are consciously designed to affect the distribution of benefits and penalties within the society Consequently, stability might be defined as a particular set of relationships in which all components are changing gradually, but with the rates of change in culture and institutions slower than those in other components. Political stagnation, in turn, could be defined as a situation in which there is little or no change in the political culture and institutions but rapid changes in leadership and policies. Political instability may be a situation in which culture and institutions change more rapidly than leaders and policies, while political revolution involves simultaneous rapid change in all five components of the system (Huntington, 1971, p. 316-318).

Therefore, the study of political change could considerably begin with the analysis of the alterations in these five components and elements and the interrelation between change in a component and change in another (Huntington, 1971).

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2.1.2 Theory of Economic Development

A. Growth of Gross National Product

Economic development is not a geo-politically uniform (Demurger, 2001; Schultz, 2017). There is a geographic component that leaves some regions within the world more economically developed than others. However, there also spatial pattern or a geographic to economic development within a country between regional states (Demurger, 2001; Schultz, 2017). Schultz (2017) described that:

China, for example, displays a significant disparity in income between many of its coastal areas and its western provinces. The same is true for the Russian Federation as well as for many other states of the world. Often that geographic disparity is split between richer urban versus rural areas, with the former benefitting from better industrialization or now post-industrial high technology service economies. At one-time modernization theory described uneven development as a sign or indication of a backward economy. Yet that is not the case, as even advanced capitalist economies such as the United States of America face this problem (Schultz, 2017, p.181)

Therefore, development is defined as a multidimensional process that involves a variety of fundamental changes in the social structure, social behavior, and social institutions, in addition to the speeding up of economic growth, equitable distribution of infrastructure, and poverty reduction (World Bank, 2000; Demurger, 2001; Todaro & Smith, 2006). After all, the goal of economic development in its simplest form is to make the “wealth of a nation” (Todaro and Smith, 2009; Haque, 2004; Kira, 2013; Dang & Sui Pheng, 2015). Further, economic performance is measured by an annual increase in the gross national product (GNP-an alternative measure is a gross domestic product (GDP) (Soubotina, 2004; Dang and Sui Pheng, 2015).

Meanwhile, Ethiopia’s economic growth has been remarkably rapid and stable over the past decade. Real GDP growth averaged 10.9% in 2004–2014 (Deloitte, AfDB; UNDP, 2014), according to official data. Taking into consideration population growth of 2.4% per year, real GDP growth per capita averaged 8.0% per year (World Bank Group (WBG), 2016). Moreover, the country improved from being the second poorest in the world by 2000 to the eleventh poorest in 2014, according to GDP per capita, and came closer to its goal of reaching middle-income status by 2025 (WBG, 2016). In recent times, policy-makers and scholars in most less developed countries who understand that income growth is only one-dimension of development; a new economic development view has arrived that is the ‘quality of life’ (Sen, 1985), which also needs, for example, institutional capacity in the infrastructure sector, infrastructure governance and equity for nation-building process in a comprehensive way.

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B. Quality of Life

According to Sen (1985), the crucial goal of development is to enhance human capabilities, which is defined as “the freedom that a person has in terms of the choice of functioning’s, given his personal features (conversion of characteristics into functioning’s) and his command over commodities....” (Sen, 1985, p. 13).²³ This is to consider the significance of a combination of different “functionings” (the “doings and beings”-the achievement) and the “capability approach” (freedom to choice between diverse ways of living) to function as a determining factor of well-being (Sen, 1985). Moreover, as cited by Kerce (1992), Rice (1984) also defined that the “quality of life” is the degree to which the practice of an individual's life fulfills that individual's wants and needs (both physical and psychological). By the same token, quality of life has been defined in macro (societal, objective) and micro (individual, subjective) terms (Brown *et al*, 2004; Bowling & Gabril, 2007), which means employment opportunity, housing, infrastructure, quality education, quality health service, etc. Thus, the quality of life is the fulfilment of basic needs and interrelated matters (Sen, 1985). It is a task that anyone must face.

Today, sustainable development aims to increase the quality of life in an inclusive manner, including economic prosperity, social equity, and environmental protection (World Bank, 2003). In relation to this, Aschauer (1998) confirms that public infrastructure is the basis of the quality of life, for example, good roads reduce the number of accidents and increase public safety. Infrastructure also contributes to economic development by increasing productivity and providing facilities that enhance the quality of life (Prudhomme, 2004; Rubin, 2006). Moreover, efficient infrastructure supports economic growth, enhance the quality of life, and it is very vital for ‘national security’ (Baldwin & Dixon, 2008; Rubin, 2006). Therefore, to enhance the quality of life through infrastructure development, there should be a need to have equitable distribution of

²³ Sen, A. (1985), Commodities and capabilities-Functionings and Capability-Capability sets. Capability defines in terms of 1) well-being and 2) the freedom to pursue well-being. Well-being is a quality of a person's being. Living is functioning. The functioning can be of (1) being (2) doing - Functioning means achieving. Functioning can be elementary as well as complex.... Functioning is a constitutive of a person being and evaluation of well-being is the assessment of function. The functioning is closely related to capability. The functioning is various combinations which man can achieve. Capability gives freedom to live life any way. Capability set reflects the person's freedom.

Capability set gives us information of functions within reach of person and no matter how well-being defined. Capability approach is new, compare to primary goods, resources and income which are traditional. They are only instrumental to achieve well-being. They have limited function. They are in fixed boundaries. The traditional things are objective and only means to instrumental achievement in well-being. Capability reflects the freedom for constituents which help to get well-being. This is a direct route. Capability is in much broader term. Traditional approach works in the boundary. It does not allow the person to move anywhere. P.255-256.

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infrastructure which needed to be supported by facts whether it is done accordingly in Ethiopia or not.

C. The Sustainable Development Goals (SDGs)

In a contemporary way, it is significant to consider the SDG as there are very relevant goals for this study. Out of 17 SDGs, four are very important to equity and equality, which are the following: Goal 7: Ensure access to reliable, sustainable, affordable, and modern energy for all; Goal 8: Promote Sustained, Inclusive, and Sustainable Growth; Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation; and Goal 10: Reduce inequality within and among countries (United Nations Report, 2017). And then, high-quality infrastructure is essential for Africa, particularly for Ethiopia to attain the SDGs of the United Nations (UN), (AfDB, 2018).

2.1.3 Contemporary Theories of Economic Development

A. New Growth Theory

New growth theorists (Romer, 1986; Lucas, 1988; Aghion and Howitt, 1992; Vega-Redondo, 1993; Rodrik, 2008) linked the technological change to the production of knowledge.²⁴ Therefore, the new growth models promote the role of government and public policies in complementary investments in human capital formation, infrastructure and the encouragement of foreign private investments in knowledge-intensive industries such as computer software and telecommunications (World Bank, 2000; Thanh & Dapice, 2009; Dang & Sui Pheng, 2015). Moreover, there are many other factors that provide the incentives for economic growth that developing countries lack such as good quality infrastructure, adequate institutional structures, and seamless capital and goods market (Thanh & Dapice, 2009; Dang & Sui Pheng, 2015). Many successful nations deliver the economy and society with infrastructure demands to ensure growth. Consequently, development experience shows that investing 7% of GDP in infrastructure is the right order of magnitude for high and ensured growth (Thanh & Dapice, 2009). Accordingly, over the last fifteen years, the federal government of Ethiopia was able to sustain infrastructure investment approximately 12% in 2009, and 22% in 2015 of GDP (NPC, 2017), which was a great achievement.

²⁴ Romer, P.M. (1986), Increasing Returns and Long-Run Growth *Journal of Political Economy*, Vol. 94, No. 5, pp. 1002-1037: a fully specified model of long-run growth in which knowledge is assumed to be an input in production that has increasing marginal productivity. It is essentially a competitive equilibrium model with endogenous technological change.

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B. Theory of Coordination Failure

The foundation of the theory of coordination failure is the idea that the market may fail to attain coordination among complementary activities (Hoff, 2001; Glavan, 2007; Cooper & John, 1988).²⁵ Thus, the theory of coordination failure offers some vital overall lessons for policy-makers (Hoff, 2001). The theory often highlights the problems of market failure that require selective government intervention like public infrastructure investment to ensure that several things work well together at the same time (Cooper & John, 1988; Dang & Sui Pheng, 2015).²⁶ But, to get sustainable development underway is obviously not an easy task. In the future, the “big push” strategy is recommended by UNDP which suggests that for developing countries to break out of the poverty trap, a big push of basic investments between 2005 and 2025 in public administration, human capital, and key infrastructure is necessary (UNDP,2005; Glavan, 2007).

Moreover, an additional possibility is that there may perhaps be ‘multiple equilibria’ (“a low investment and a high-investment equilibrium”) which means that the same economic basics might support justifiably diverse patterns of regional states’ action (Duranton & Venables, 2019). Then, a regional state may be confined in a ‘low-level equilibrium’ or ‘poverty-trap’, in which case it may need a large shock (or ‘big-push’) to change to a diverse, and possibly superior equilibrium (“a high-investment equilibrium”). But, there are no market forces absorbing an economy from the “low-investment to the high-investment equilibrium”. Some type of coordination is needed to change the bad to the good equilibrium. Hence, when an economy is in the “bad equilibrium” one can say that there is a “coordination failure” (Rodríguez-Clare, 2005, p. 4). Since each of these circumstances comprises market failure and inefficiency there might be a situation for place-based

²⁵ Hoff, K. (2001), Beyond Rosenstein-Rodan: The Modern Theory of Coordination Problems in Development, the International Bank for Reconstruction and Development / The World Bank, p.145-176. ...Paul Rosenstein-Rodan (1943) famously argued that at an early stage of development, the investments of industrializing firms in one sector may increase the profitability of other sectors throughout the economy. Simultaneous industrialization of many sectors could be profitable for all of them, but no sector would be profitable industrializing alone. As a result, an underdevelopment equilibrium was possible: even the market may not succeed in coordinating the activities needed to ensure development. ...In modern terms there could be a coordination failure, where individuals' failure to coordinate complementary changes in their actions leads to a state of affairs that is worse for everyone than some alternative state of affairs that is also an equilibrium. ...Modern theory has considerably extended Rosenstein-Rodan's insight.

²⁶Spillover refers to the interactions between agents at the level of payoffs, while strategic complementarity refers to interactions at the level of strategies.....Strategic complementarities rise when the optimum strategy of an agent depends positively upon the strategies of the other agents.... Given these failures, one goal would be to understand the role of the government in coordinating economic activity, particularly in an inter-temporal context.

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policy (PBP); nevertheless, the strategy, execution, and assessment of such policy is challenging (Duranton & Venables, 2019).²⁷

As described above, coordination failures are generally indicated in a model with ‘multiple equilibria’, where one equilibrium Pareto-governs the others. It is specified that, in this case, when an economy is unsuccessful to coordinate expectations to realize the best equilibrium, it is supposed that it will experience suffering from a coordination failure (Rodríguez-Clare, 2005). Nevertheless, there might be coordination failures even in a lack of ‘multiple equilibrium’. Since there are actions that are not profitably accessible by institutions or firms. The typical example is that of public goods such as equitable infrastructure provision, which feels throbbing from a difficult of non-excludability (costly or difficult for one user to ignore others from using a good) (Rodríguez-Clare, 2005). Obviously, in this case, there is no equilibrium where the “market” provides this good. This is one of the typical explanations for government action, but the point here is that when the government is perceived as another agent (with the difference that it has access to fiscal and tax policies) then an equilibrium somewhere the government does not provide a socially profitable public good is described as a coordination failure (Rodríguez-Clare, 2005), which is usually mentioned as a “government failure”.

However, the theory of coordination failure has been criticized for its overemphasis on the roles of government (Cooper & John, 1988; Dang & Sui Pheng, 2015), which resulted in a coordination challenge in infrastructure governance in many countries (OECD, 2015).²⁸ Coordination failure creates its challenging actions to generate alternative economic centers (Duranton & Venables, 2019). In relation to spatial context and complementarities and coordination, Duranton and Venables (2019) stated that:

²⁷ Duranton, G. and Venables, A.J. (2019), Place-Based Policies: principles and developing country applications Department of Economics, Discussion Paper Series..... Inevitably, some places will develop before others, this creating the likelihood of a Kuznets curve, with spatial inequalities increasing before diminishing during the course of development (World Bank 2009). Many of the public investments that are needed for development – transport and other infrastructure investments – are ‘lumpy’, so have to be concentrated in particular places.

²⁸ OECD (2015), Public Governance and Territorial Development Directorate Public governance Committee, Towards-a-Framework-for-the-Governance- of-infrastructure.... The coordination challenge - a multiplicity of actors across levels of government may ultimately derail a good infrastructure project...Public investment is generally a shared responsibility across levels of government. Whether through shared policy competencies or joint funding arrangements, public investment typically involves different levels of government at some stage of the investment process. This makes its governance particularly complex. Sub-national governments, defined as regional states, and other.

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Coordinated movement by a group of firms or a ‘large developer’ can solve this problem, but generally, there is coordination failure. Thus, a planner can construct a model of a perfectly functioning new town but there has to be a path of public and private sector investment decisions that lead from the initial situation of empty fields to the completed, and occupied town. If such a path is not in place, then development will fail. These arguments are particularly acute in a developing country. This is partly because the economic environment is one of rapid change in all respects, including spatial. And also because the cost of making a poor location decision may be higher. In a developed economy, even if a firm does not have a supplier of some specialist components in the same city, there is probably a supplier within 24 hours’ delivery time. In a developing country this is not true, so the need for coordination – and the cost of coordination failure – are greater (Duranton & Venables, 2019, p. 3).

Finally, the descriptions above make a result where economic infrastructure action is unevenly and inefficiently distributed across regional states. Clustering related to externalities (agglomeration (a positive externality) and congestion (negative)) hence the market effect is inefficient. Thus, coordination failure means that it is hard to start an action in a new region, leading to additional priority (Duranton & Venables, 2019). It is also known from the data that this is an over-all context of less developed countries, related to developed countries when they were at comparable periods of growth (Kim, 2008; Duranton & Venables, 2019). The coordination failures’ models with heterogeneity provide a new perspective on policy. These models recommend that it is vital to know the cross-sectional distribution of relevant variables in evaluating the consequence of a particular policy, like infrastructure governance and equity. Additionally, these models advise that policymakers should be aware of both the immediate and more long-run implications of these actions through the changing aspects encouraged by the cross-sectional distribution (Cooper & John, 1988). Consequently, the implementation of reforms needs to make the difference between a “deep intervention” (which requires irreversibility) and a “shallow intervention” (which does not alter the incentives of a key group of actors and thus may fail to develop matters), as with privatization and anti-corruption struggles (Hoof, 2001, p. 169-170). This needs coordination and consistency between various levels of government including local, regional, and national. Hence, the theory of coordination failure is analytically used later in the study of infrastructure governance and equity in Ethiopia.

2.1.4 Theory of Developmental State

The idea of a developmental state is not entirely new to the literature in international political economy and development economics. While the term has been used to denote to state-led economic planning as practiced in the countries of East Asia and some other countries who won the label since the 1970s (UNDP Ethiopia, 2012; Onis, 1991). In addition to this, “Developmental state was the dominant model underlying East Asian development, Taiwan, South Korea, Hong

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Kong, and Singapore” (Levy & Fukuyama, 2010, p.15). It is also exercised in other developing countries. Examples range from Ethiopia, Rwanda, and Uganda in Africa, to Azerbaijan in Central Asia, and Vietnam in South East Asia (Levy & Fukuyama, 2010). However, the market is guided with instruments framed by elite economic bureaucracy who are employed with the top managerial talent available in the system and started with a small-scale (Onis, 1991).

Within the bureaucracy, a pilot agency plays a key role in policy formulation and implementation (Onis, 1991). In relation to this, Ethiopia’s development strategy was unique (WBG, 2016). Ethiopia had followed the model of a developmental state which was often defined in terms of “its ideological orientation (i.e. promoting the ideal and agenda of developmentalism) and its institutional preparations (i.e., its institutional ability to formulate and implement its policies and programs)” (UNDP Ethiopia, 2012, p.5). Moreover, there are three basic debates on the role of the state in infrastructure (it should be the main provider of these services; it should deliver its regulatory responsibility only; and, about the optimal allocation across government levels for these two main responsibilities) (Estache & Fay, 2009). Hence, Estache and Fay (2009) explained that the role of governments in infrastructure likely will be a source of ideological debates for the foreseeable future. Estache and Fay (2009) also stated that governments will continue to play a key role play as providers and financiers of the sector. In addition, Estache and Fay (2009) also indicate that the implementation of the mandate to deliver is troubled with potential sources of political interference.

Lastly, it is the institutions themselves that change as the outcome of a process of social bargaining. Therefore, the above three basic types of institutions (i.e., the state, rule of law, and mechanism of accountability) serve as a base and guide for infrastructure equity and the nation-building process in this study.

2.1.5 Theory of Equity and Infrastructure

A. Equity Theory

Equity theory emphasizes on defining whether the allocation of resources is fair to both relational partners (individuals, groups, communities, and regions) (Adams, 1963; Redmond, 2010; Litman, 2020). Equity is measured by comparing the ratio of costs and rewards for each partner which is

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reflected as one of the justice theories (Adams, 1963).²⁹ According to Tyler and Smith (1995), (in) equity theory is vital for two reasons:

First, it hypothesizes that both satisfaction and behavior are linked not to objective outcome levels, but to outcomes received relative to those judged to be equitable. Second, it articulates a criterion against which individuals are suggested to judge the fairness of their wages. The basic justice principle underlying equity theory is a balance between contributions and rewards (Tyler & Smith, 1995, p. 8).

Equity theory proposed that individuals who recognize themselves as either under-rewarded (under-benefited) or over rewarded (over-benefited) would experience dissatisfaction/stress and that this dissatisfaction/stress leads to determinations to return equity (Adams, 1963; Tyler & Smith, 1995; Huseman *et al*, 1987; Redmond, 2010; Al-Zawahreh & Al-Madi, 2012; Gashgari, 2016; Liebig *et al*, 2016; Litman, 2020). Restoring equity is either psychological or actual or requires “retributive justice” (Tyler & Smith, 1995, p. 13). Equity reestablishment techniques comprise changing inputs or outcomes, acting on or varying the comparison of others, or discharging the relationship (Huseman *et al*, 1987; Redmond, 2010; Al-Zawahreh & Al-Madi, 2012; Watkins, 2015; Gashgari, 2016). Even though equity theory has dominated the notion of justice in institutional relations, equality also shapes justice opportunities and performances. Power governs distributive directions, and, so, it is a significant cause of conflict burdens. In relation to this, the fostering or maintenance of enjoyable social relations is the common goal, equality tends to be the dominant ‘distributive principle’ (Kabanoff, 1991).³⁰

Thus, theories of distributive justice (outcomes are spread evenly and fairly throughout an organization) require the conditions under which particular distributions more recently, (procedural justice which determines if the process of allocating outcomes/rewards is fair by making the procedures fully transparent) are perceived to be “just” or “fair” (Cook & Hegtvedt, 1983; Tyler & Smith, 1995; Castells & Sole-Olle, 2005; Redmond, 2010; Bejakovic & Meinardus (Eds.), 2011; Litman, 2020). Whereas, according to Cook and Hegtvedt (1983), there is a difference between “equity” and “distributive justice” i.e. “the former involves notions of

²⁹ Adams, J. S. (1963), toward an understanding of inequity, *Journal of Abnormal and Social Psychology*, 67. A theory of inequity is presented. Adams (1965) defines inequity as “inequity exists for person whenever he perceives that the ratio of his outcomes to inputs and the ratio of others outcomes to others inputs are unequal”.

³⁰ Kabanoff, B. (1991), Equity, Equality, Power, and conflict, *academy of Management Review*.....This article emphasized two of the main distributive rules—equity and equality (cf. Meindl, 1989). Although empirical research suggests that equity is the only rule of distributive justice used by people in organizations, justice theorists and researchers (e.g., Deutsch, 1975, 1985; Leventhal, 1976; Reis, 1986a; Sampson, 1986) now agree that people use a variety of principles or values as the basis for distributing outcomes. Equity, equality, and a number of other distributive rules (e.g., need) are called on, depending on the nature of the social context or the form of social interdependence that is involved.

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exchange and the latter concerns general fairness in allocation situations” (Cook & Hegtvedt (1983, p.218). Nevertheless, they are interchangeably used in this study. As cited by Huseman *et al* (1987), Leventhal (1976), for instance, proposed three “distribution rules” including the contribution (Equity) rule; the needs rule; and, the equality rule. Huseman *et al* (1987) also indicated that a continuum of these preferences with three classes of individuals represented along the continuum which is benevolent, equity sensitive, and entitled are described as follows.

Equity Sensitives feel "distress" when under-rewarded and guilt when overrewarded. This is the only group that experiences both of these feelings. Benevolents are satisfied when under-rewarded and experience guilt when either equitably- or overrewarded. Entitleds are satisfied when overrewarded and feel "distress" when under- or equitably-rewarded (Huseman *et al*, 1987, p. 225).

According to Huseman *et al* (1987), the equity sensitivity construct recommends that individuals have varied preferences for equity and thus react in varied ways to perceived equity and inequity/disparity. In other words, it is stated that welfare analysis is essentially based on monetized effects, often concentrating only on income distribution. However, monetized influences are not the only effects that matter when measuring infrastructure. It is vibrant that there is a necessity for an alternative valuation method or framework to evaluate the indirect effects of large infrastructure projects with equity concerns (Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013). To address equity concerns in the infrastructure sector, by citing Young (1994), Thomopoulos *et al* (2009) considered the three central equity theories including the core principles implemented in practice which are Egalitarian-where everyone has equal rights or benefits for a particular provision or system; Utilitarian-where the purpose is to enhance the total welfare of the society as a whole; and, Rawlsian-where the purpose is to maintain the prevailing status quo between those better-and worse-off, along with an effort to increase the circumstances of those worse-off as much as possible, after everybody has safeguarded one’s fundamental rights. These principles have also been implemented in the context of infrastructure assessment (Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013).

Therefore, according to different scholars, equity theory can be adapted into 4 basic propositions of under-benefited or over-benefited equity theory in relation to infrastructure equity: 1) Citizens or regional states could develop their perception of fairness of infrastructure equity by calculating a ratio of their inputs (taxation, payment for the distribution of infrastructure, etc.) and outcomes (employment opportunity, access to infrastructure, quality of life, health, education, etc.) and then

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comparing this to the ratio of others; 2) When the comparative ratios are perceived by the citizens or regional states to be unequal, then infrastructure inequity/disparity occurs; 3) When the difference in infrastructure inequity/disparity increases, the dissatisfaction and stress felt by citizens or regional states will increase; and, 4) The larger the tension citizens or regional states feel due to perceived infrastructure inequity/disparity, the tougher they will work to reduce their stress and increase perceived levels of infrastructure equity (Adams, 1963; Huseman *et. al*, 1987; Wismadi *et al*, 2015).

Meanwhile, the distributional patterns of infrastructure equity can also be considered in terms of social equity (attaining equity over socio-economic groups of society) or spatial equity (attaining equity over geographical locations) (Rubin, 2006; PolicyLink, 2013; Wismadi *et al*, 2015 Chotia & Rao, 2015; Simon & Natarajan, 2017). Therefore, policymakers need to sustain efforts to eradicate infrastructure inequity/disparity by following a growth-oriented strategy (Chotia & Rao, 2015; Simon & Natarajan, 2017). And hence, eradication of infrastructure inequity/disparities lies at the heart of an efficient and effective development process (Chotia & Rao, 2015; Simon and Natarajan, 2017), by reassessing equity norm, social comparison, cognitive and behavioral processes in the infrastructure sector.

According to different scholars there are also ways to reduce infrastructure inequity. Equity sensitive's keep an eye on the standard of equity theory and favor their ratios to be equal to their comparison other (Huseman *et. al*, 1987). When a citizen or regional state experiences unease due to perceived infrastructure inequity they will work to decrease that strain (Adams, 1963 Rubin, 2006; PolicyLink, 2013; Wismadi *et al*, 2015). The greater the stress they experience, the more effort they will put into decreasing it (Adams, 1963). Therefore, there are two core processes a citizen or regional state could use to reestablish infrastructure equity: behavioral processes and cognitive processes (Adams, 1963; Huseman *et. al*, 1987). Behavioral processes comprise altering a citizen's or regional states' input or outcomes. Whereas, citizen cognitive processes to reestablish equity comprise evolving explanations for the inequity to make it seem equitable, fixing perceptions of inputs and outcomes, altering the comparative other, or any other way that endeavors to frame the perception of the circumstances (Adams, 1963; Huseman *et. al*, 1987; Rubin, 2006; PolicyLink, 2013; Wismadi *et al*, 2015).

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In certain ways, cognitive processes could necessitate less effort than behavioral processes; nevertheless, they could also be tougher to undertake due to the inevitability of distorting citizen's or regional states' own perceptions (Adams, 1963; Huseman *et. al*, 1987; Wismadi *et al*, 2015). In addition to the two processes, the federal government processes to reestablish infrastructure equity in which the government needs to recall that the citizens or regional states could value diverse outcomes. Hence, equity theory is established on the 'norm of equity' which undertakes that everybody is equally sensitive to equity and inequity (Huseman *et. al*, 1987; Liebig *et al*, 2016). However, the means of decreasing infrastructure inequity will differ depending on the circumstances and will not all be equally adequate to a citizen or regional state (Adams, 1963; Rubin, 2006; PolicyLink, 2013; Wismadi *et al*, 2015). Execution to address this deficit in planning and assessment need to be effectively directed at an institutional level to increase accountability and transparency-potentially by integrating equity within the evaluation of large infrastructure schemes applying an appropriate framework (Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013; Litman, 2020). This will permit decision-makers to not only become acquainted with the pertinent theory but also to apply it in practice and by doing so, to accomplish their duty for "public accountability" and "distributive justice" (Thomopoulos *et al*, 2009, p, 354-355).

Moreover, it is also very vital to consider the relationship between equity and equality. According to UNESCO-UIS (2018), "equity" and "equality" are questioned terms, used differently by different people. And UNESCO-UIS (2018) stated the following definition:

Following Jacob and Holsinger (2008, p. 4) we define equality as "the state of being equal in terms of quantity, rank, status, value or degree", while equity "considers the social justice ramifications of education in relation to the fairness, justness and impartiality of its distribution at all levels of educational sub-sectors". We take equity to mean that *distribution* is fair or justified. Equity involves a normative judgment of distribution, but how people make that judgment will vary (UNESCO-UIS, 2018, p. 17).

UNESCO-UIS (2018) also discussed that both ideas can be used in a wide variety of ways. Thus, equality can be exercised across individuals, groups, or countries, and to different indicators. Equity can also be used with different theories of justice in mind and with different understandings of the wider ramifications of the distribution of resources. It is stated that an emphasis on equity suggests that a particular distribution needs to be justified, with some combination of a reference to abstract principles and concrete evidence. It is also stated that, for an elongated time, the term 'equity' has been common in policy dialogs; 'Growth with distribution', 'growth with equity', 'growth with a human face', 'integrating growth with development' and 'pro-poor growth' have

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been some of the vital and common sayings in development policy dialogs (Tilak, 2015, p. 186). Now, these terms are being replaced by ‘inclusive growth’ which includes equity (Tilak, 2015, p.186).

In addition, Son (2011) discussed that even though, equity has long been a significant policy goal, inequity continues globally. Son (2011) noted that equity is not the same as equality, although the two are related and used interchangeably. According to Son (2011), equality, in its usual connotation, means that each individual has the same amount of some measurable good, be it income, welfare, or utility. Equality is easy enough to measure and it does not necessarily need to know individual identities. Either the good is distributed equally or it isn’t. Son (2011) also mentioned that equity, unlike efficiency, is essential “a moral issue”. Moreover, more inclusive equity analysis allows planners to better anticipate problems, incorporate equity objectives in planning, and it can help to adjust planning decisions to maximize equity objectives (Son, 2011; Litman, 2020). Additionally, new analysis tools and information resources are available to better evaluate equity and incorporate equity objectives into planning (Son, 2011; Litman, 2020). Therefore, equity is giving everyone what they need to be successful. Equality is treating everyone the same. Equality aims to promote fairness, but it can only work if everyone starts from the same place and needs the same help (Son, 2011; Litman, 2020).

Likewise, equity (also called justice or fairness) denotes the distribution of effects (benefits and costs) and whether that distribution is considered fair and right (Litman, 2018; Litman, 2020). Equity analysis could be problematic because there are numerous types of equity to consider, several impacts and methods of measuring those impacts, and different ways that people can come together for equity analysis (Son, 2011; Litman, 2020). As well, it is an abstract concept, for example, a specific decision may seem equitable when evaluated one way but inequitable when evaluated another (Son, 2011; Litman, 2020). Henceforward, equity analysis is significant and inevitable (Litman, 2018; Litman, 2020). This is because policies for spatially balanced growth are often justified by equity (WDR, 2009). Improved equity analysis in planning can reduce conflicts and delays, and better reflect a community’s needs and values (Litman, 2018; Litman, 2020). Actually, leading scholars and practitioners now recommend increased spending on infrastructure to stimulate balanced growth and reduce income gaps, especially between the upper

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and lower deciles; this should occur not only during declines but also when economies are increasing (Peters & Pintus, 2018).

In other ways, in terms of implications for policy-makers in governments and national organizations, Anderson and O'Neil (2006) have identified the need to be committed to the values of equality (equal privileges and prospects) and cohesion (equity and social impartiality). Generally, according to the 2006 World Development Report (WDR), the 2005 Human Development Report (HDR), the 2005 Report on the World Social Situation (RWSS), and Anderson and O'Neil (2006) have identified two arguments, i.e., 'intrinsic' and 'instrumental' arguments. All three reports discussed the 'intrinsic' significance of addressing inequality and present two central arguments in particular. The first argument is that most societies share a worry for equity and justice. For example, according to WDR (2006), equity requires equality of opportunities, but not equality of outcomes. The second argument is that the principle of equality and equity is integral to many legal traditions. Whereas, all three reports also made a strong case for the 'instrumental' significance of addressing inequality. These are more wide-ranging than the intrinsic arguments and can be grouped according to three main themes. The first is the impact of inequality on efficiency and economic growth. The second main theme is the impact of inequality on poverty reduction. The third main theme is the impact of inequality on social cohesion (Anderson & O'Neil, 2006).

Furthermore, Anderson and O'Neil (2006) raised some issues including how a focus on (in) equity differs from one on (in) equality; how equity is to be defined; and, how (in) equity and (in) equalities are addressed which looks at the types of policies and interventions that can be used to address equities and inequalities. First of all, regarding the question 'equality of what?' there are tensions within liberalism, "between those who believe that neutral rules have no bearing on distributive issues, and those who believe state action should be used to secure social justice" (Anderson & O'Neil, 2006, p.7). The first camp believes that a society is just if it guarantees a fair process, generally secured through the protection of negative liberties for all (equality of formal opportunities). Whereas, the second camp believes that social justice requires ensuring a particular pattern of goods and services based on transparent criteria (outcomes). Even within the second camp, there are disagreements regarding the correct criteria or choice of space in which equality matters. For instance, according to Anderson and O'Neil (2006), Sen challenged "the adequacy of

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Rawls' primary goods on the basis that human diversity and variations in external environments mean that individuals do not have equal capacity to convert primary goods into achievements of well-being" Anderson and O'Neil (2006, p.7). Anderson and O'Neil (2006) stated that Sen also suggests that the most appropriate space is capabilities-an individual's actual freedom to achieve certain functioning, that is the 'beings' and 'doings' that make up their well-being.

Anderson and O'Neil (2006) also stated that one still desires to resolve pressures between the goals of growing capabilities (or primary goods, or some other notion) for all, regardless of distributional considerations, and confirming an equitable distribution of capabilities (or primary goods, or some other idea); in other words, pressures between equity and efficiency. As argued above, there are no one way of interpretation of equity, and exactly what qualifies as the most 'relevant' principles for distributing goods and services, and the most valuable broad groupings of goods, is "a value judgment". Therefore, Anderson and O'Neil (2006) clearly discourses (following recent arguments by two leading Theorists-Sen, 2009 & Sandel, 2009) on distributive justice or equity needs to be a top priority for national political and policy debates. Therefore, the second category or camp is considered in this study. Without doubt, questions as to the fairest way of allocating resources arise in all social activities, and the ways these found everywhere questions are responded can have crucial, wide-reaching effects on the individual's interest and on society in general (Greenberg, 1981; Cook & Hegtvedt, 1983; Redmond, 2010).

The depth of such questions comes into clear focus when the supply of resources in question is inadequate to meet all claims. There will also be the "politics of scarcity" that may well include the strategic use of distribution rules, conflict over distributional policies, and the mobilization of collective reactions general (Greenberg, 1981; Cook & Hegtvedt, 1983; Redmond, 2010; Al-Zawahreh & Al-Madi, 2012). Thus, Gashgari (2016) stated that a process which pursues to encourage mutual advantage is established on equity theory. It is stated that criticism has been focused on both the assumptions and practical implementation of equity theory to real-world situations. Different scholars have questioned the easiness of the model, debating that a number of psychological and demographic variables affect people's perceptions of fair-mindedness and dealings with others (Huseman *et al*, 1987). Moreover, equity theorists have debated that equity principles have been used broadly. It is specified that the overall principles of equity theory are used as a framework for exploring the allocating and accommodating of resources (Tyler & Smith,

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1995), for example, infrastructure equity in this case. Nevertheless, it is also indicated that there are a number of difficulties which ascend when issues of equity are considered such as “how inputs and outcomes are defined is subjective and often, controversial...the empirical difficulty for equity research was the discovery that other measures besides equity were more closely related to feelings of satisfaction with close relationships”, etc. (Tyler & Smith, 1995, p. 9), which are generally avoided by making artificial circumstances as, for example, there are only restricted types of contributions to be reflected, there are clear and usually recognized rules about proper rewards, and contributions and rewards are certainly quantifiable (Tyler & Smith, 1995).

Finally, equity theory has a number of implications for federal government practices in the infrastructure sector in Ethiopia. It underlines the importance of the government of establishing and maintaining fair and equitable methods of treating its citizens and regional states. It also draws attention to the fact that the government must not only treat its citizens and regional states fairly and equitably; they must be seen to do so in the eyes of the federal member states/citizens themselves (Redmond, 2010; Al-Zawahreh & Al-Madi, 2012; Watkins, 2015; Gashgari, 2016; Litman, 2020). This is because (in) equity is in the mind of the holder or in the judgment of the beholder (Tyler & Smith, 1995; St. Mary's University, 2006). In addition, the shortcoming of equity theory is that “it has not accounted for the individual differences and different cultures” (Al-Zawahreh & Al-Madi, 2012, p. 166). Based on this theoretical framework, if one currently considers the situations in Ethiopia, there is a very complicated attitude about infrastructure equity. Thus, it is a must to study the equitability of infrastructure distribution in Ethiopia as it is becoming one of the issues for political instability in the country since 2016 which is also crucial for the state-and nation-building processes. The next issue is the theory of infrastructure equity.

B. Infrastructure Equity Theory

Until today one cannot dispose of a well-founded and useful definition of infrastructure (“infra” stems from the Latin language, meaning below, thus “infrastructure” can be taken to express ‘the underlying foundation or basic framework’ (Buhr, 2003; Patra & Acharya, 2011). In addition, infrastructure is a wide term that initiates from the French “infra”, meaning below; and the term “structure” which denotes an arrangement of, and connections between the parts or elements of something different (Cantu, 2017). With time, infrastructure has been generally defined as a complex term of “capital goods” that deliver services in relation to other inputs (Prud'homme,

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2004; Baldwin & Dixon, 2008). Therefore, the term “infrastructure” generally invokes the notion of physical resource systems made by humans for public consumption (Frischmann, 2005).

In other ways, WDR (1994) also mentioned that infrastructure is an umbrella term for many activities referred to as "social overhead capital" by such development economists as Paul Rosenstein-Rodan, Ragnar Nurkse, and Albert Hirschman. This shows that there is no clear standard description of infrastructure across economic studies (Torrise, 2009). This is because the following three analytic objectives are difficult to grasp and not essentially well-matched with each other. These objectives are the formulation of a notion for the term "infrastructure", the integration of theoretic approaches (for example, the theory of public goods), and the explanation of the reality of infrastructure delivery (Buhr, 2003; Torrise, 2009; Baskakova & Malafeev, 2017). Henceforth, modern economic literature considers infrastructure as one of the key factors behind economic growth, welfare, quality of life, the performance of trade, and labor mobility (Frischmann, 2005; Baskakova & Malafeev, 2017).

Moreover, WDR (1994) identified as economic infrastructure and services include Public utilities-power, telecommunications and piped water supply; Public works-roads and other transport sectors-urban transport, and airports. There are also different types of infrastructure including personal (Human capital), institutional (rules of the community as well as the services and procedures), and (im) material infrastructures (for instance, research centers, innovation networks, services to the enterprises) (Buhr, 2003; Buhr, 2009); Torrise, 2009). Finally, territory infrastructures include, for instance, tourist, trade, and monetary intermediation infrastructures (Torrise, 2009). Baldwin and Dixon (2008) also classified infrastructure into three categories which are machinery and equipment, buildings, and engineering structures. Even though, the area of this study includes only the major physical infrastructures.

Generally, infrastructure has to do with the fixed delivery of tangible assets on which other intangibles can be built on which is not limited in scope. It also revolves around the delivery of electricity, transport, communication, education, and technology (Gbadebo & Olalusi, 2014). Moreover, infrastructure is the means of attaining an objective or set of objectives and also comprises the objectives (Gbadebo & Olalusi, 2014). In view of the large theoretical literature supporting the view that investments in infrastructure are key to ensure high levels of standards of

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living and economic growth, large-scale plans to enhance infrastructure should be given high priority (Hooper *et al*, 2017), as a result of a long term policy that has used infrastructure for nation-building (Bel, 2011).

Accordingly, infrastructure may include capital-intensive facilities that are not of public interest. Even though, the public actively uses most of the infrastructure. Economists explain such objects as “physical infrastructure” or “infrastructure capital” (Rubin, 2006; Palei, 2015). Usually, in the scientific literature, the role of infrastructure is evaluated by the physical infrastructure assets, and the services provided. In such a manner, under the infrastructure, the study means the basic physical infrastructure consisting of road, telecommunication, and electricity infrastructure including Industry Parks, university, and airports. These infrastructures are called the public infrastructure because it creates benefits for a large number of users. Actually, the strong contribution of infrastructure investment arises from a substantial physical infrastructure expansion combined with their high returns in Ethiopia (WBG, 2016; Ashenafi, 2017; Seid *et al*, 2016).). Thus, when designing their infrastructure policy, many advanced countries have given priority to the requirements of the economic system. For example, Spain used infrastructure policy for the purposes of nation-building (Bel, 2011), which is also considered in this study. Thus, infrastructure-led development is, of course, not a new phenomenon and has always been debatable about its infrastructure allocation in Ethiopia (Rammelt, 2018). Nevertheless, the question is to what extent that infrastructure is allocated or distributed fairly or equitably across regional states in Ethiopia to build the nation.

Furthermore, the relationship between infrastructure and economic growth is various and complex, because not only does it affect production and consumption directly, but it also generates many direct and indirect externalities, and includes large flows of expenditure thereby creating additional employment. In this theoretical framework, infrastructure influences output in two ways which are the direct channel where infrastructure enhances the output by decreasing the cost of intermediate goods; and, the other channel is through the externality effect (Seid *et al*, 2016; Ashenafi, 2017). It is also crucial to focus on ten principles of customer/stakeholder stewardship (Bowditch & Noble, 2017). According to Bowditch and Noble (2017), these are ‘rights and fairness, informed with choice, stakeholder management, human capital, customer-centric design, transparency, planning, innovation, risk, and leadership’ (Bowditch & Noble, 2017). The first five principles

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focus on shorter-term customer needs, and the second five principles focus on longer-term stewardship needs. By citing Kucheva (2011), Schultz (2017) stated that classical economic theory indicates that three factors, natural amenities, remoteness, and infrastructure all affect economic development. The third factor affecting uneven development is the infrastructure (due to distributional and procedural equity as, for some, it could be a question of resources whereas for others it is the opportunities facilitated by infrastructure that should be the emphasis of measures to improve equity) which is the focus area of this study.

Finally, the goal of infrastructure investment is to offset both natural amenities and remoteness as variables affecting “uneven investment or development” (Schultz, 2017). Thus, “Infrastructure Equity”, which is about equitable public infrastructure as well as investments, institutional capacity, infrastructure governance, and nation-building process relationships that can generate enormous national and regional community benefits-jobs, business opportunities, access to infrastructure (Rubin, 2006; PolicyLink, 2013), and including theories of coordination failure, equity, and infrastructure equity for nation-building processes are used as a theoretical framework for this study. And then, the conceptual model has been prepared at the end of this chapter.

2.2 Review of Empirical Literature

2.2.1 Infrastructure and Development

A. The Link between Infrastructure and Development

The well-known scholar Aschauer (1989) (although later much-criticized) found that almost simultaneously with a decreasing of public investment in infrastructure very nearly everywhere the productivity growth fell sharply (Prudhomme, 2004).³¹ Infrastructure is an area in which government policy and finance have a vital role to play because of its universal effect on economic development and human welfare (WDR, 1994; OECD, 2015).³² Thus, according to WDR (1994),

³¹ Prud'homme, R. (2004), Infrastructure and Development, How Infrastructure Contribute to Development: Contribution of Infrastructure to Economic Growth, the contribution of infrastructure to economic growth; the relationship between financing options for infrastructure investments and economic efficiency; and the magnitude of forecasting errors in infrastructure projects and what they mean in terms of uncertainty and risks. It is usually considered to imply some form of public intervention. Infrastructure, and infrastructure services cannot be left to pure market forces only. This important policy conclusion, which is generally true, must be handled with caution, however. Economic and social infrastructure, social overhead capital, P.3-10.

³² OECD (2015), Public Governance and Territorial Development Directorate Public governance Committee, Towards-a-Framework-for-the-Governance- of-infrastructure.... Infrastructure is the backbone of economic capacity, but it also impacts directly on human development, social inclusion, and environmental sustainability and so the development of infrastructure is a fundamental concern of both governments and citizens. At the sub-national level, government capacities also vary greatly across jurisdictions. Where the capacities to design and implement investment policies and projects are weak, policies may fail to achieve their objectives.

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less developed countries have made extensive infrastructure investments, attaining dramatic gains for households and producers by increasing their access to services such as electric, telecommunications, and transport. More importantly, infrastructure capacity nurtures step for step with economic output- a 1 percent increase in the stock of infrastructure is associated with a 1 percent increase in the gross domestic product (GDP) across all countries (WDR, 1994). In addition, a majority of studies concluded that infrastructure generally has a significant effect on growth, particularly in developing countries (Dethier & Moore, 2012). However, there are also negative results that infrastructure investment does not contribute to economic growth (Okoh & Ebi, 2013). There are also studies which had inconclusive results and a negligible or negative impact of infrastructure (Dethier & Moore, 2012). Because many infrastructure investments are immovable and serve local markets, excess capacity cannot serve other markets and it remains underused (WDR, 1994).

Prudhomme (2004) and Baldwin and Dixon (2008) stated that the idea of infrastructure is presented as a subset of the idea of capital. According to Prudhomme (2004), for two centuries, infrastructure as an analytic notion has been almost absent from “the economist’s toolbox” (Prudhomme, 2004, p.1). Even though, “by contrast, during the 1990s, a vast body of literature introduced infrastructure as a determinant of production functions, with a view to estimating its contribution to economic growth” (Prudhomme, 2004, p.1). Prudhomme (2004) also discussed that “infrastructure and infrastructure-related services have always been with us, but the word itself is relatively recent, particularly in English, like roads, and similar public works that have in common all or most of the following characteristics” (Prudhomme, 2004, p.3). First, they are “capital goods”. Second, infrastructure is very lumpy, as opposed to incremental. Third, the infrastructure is very long-lasting. Fourth, the infrastructure is space-specific (immobile). A fifth characteristic is that infrastructure, or rather the facility it renders, is associated with market failures. This is usually considered to indicate some form of public intervention. Sixth, infrastructure, or the facility it provides, is commonly used by both households and enterprises. It is at the same time a final consumption item, and an intermediate consumption item (Prudhomme, 2004; Duranton & Venables, 2018).

Moreover, a satisfactory supply of infrastructure facilities has long been seen as a key component for economic development, in the academic literature (since the work of Aschauer, 1989) as well

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as in policy debate (for example, World Bank 1994; IMF, 2014; Okoh & Ebi, 2013; Dethier & Moore, 2012). There have been studies in the literature emphasizing that infrastructure is a key catalyst for economic growth and development (Ascher & Krupp, 2010; Dethier & Moore, 2012; Chotia & Rao, 2015; Rammelt, 2018; Duranton & Venables, 2018). Therefore, there is a strong link between infrastructure and development.

By referring to Kay (1990) and Prudhomme (2004), Africa's Pulse (2017) has also mentioned five characteristics of infrastructure. First, infrastructure projects could be explained as networks. Second, when infrastructure is built, new projects form a small part of the total cost of the wide range of products in which they are used. Third, infrastructure construction results in monopolistic elements. Fourth, the capital cost of infrastructure might be larger than its running cost. Fifth, infrastructure projects usually incur relatively important sunk costs (Africa's Pulse, 2017). Thus, infrastructure is the stock of main services and capital equipment desired for the functioning of a country or area; the term to denote collectively to the roads and similar public works that are essential for an industrial economy, or a portion of it, to function (Ferro & Lentini, 2008; Srinivasu & Rao, 2013).

Essentially, as a matter of fact, infrastructure can be categorized into hard or soft, which some call economic or social. Soft infrastructure includes different sectors, namely, education, commercial, housing, and security or defense. Hard or economic infrastructure refers to large physical networks (Road, Electric, Telecommunication, Airport, and Industry Park) that are needed to promote economic activity and maintain a functioning nation (WDR, 1994; Patra & Acharya, 2011; Africa's Pulse, 2017; Cantu, 2017; Sawada, 2015; Nuramo & Haupt, 2015). Moreover, all infrastructure elements of dimension (quantity, quality, and access), levels (regional, national and transnational), sectors, and type (soft and hard) exist in the societal area for optimal development (Africa's Pulse, 2017; Cantu, 2017; Calderon *et al*, 2018). For this reason, infrastructure must be studied as a multidimensional component (Cantu, 2017), especially the access dimension in this study.

B. The Link between Infrastructure and Poverty

Actually, academics and policymakers have long considered a satisfactory supply of infrastructure facilities to be indispensable for economic development (Calderon & Serven, 2014; Seid *et al*,

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2016). In effect, infrastructure is crucial for increasing economic progress and reducing poverty (WDR (2000/01; Fay *et al*, 2010). Hence, diverse infrastructure sectors have different impacts on enhancing the quality of life and decreasing poverty (WDR, 1994). For example, access to transport can contribute to higher and more stable incomes, enabling the poor to manage risks. In fact, infrastructure investment may improve the productivity of the poor and alleviate poverty, but that doesn't mean that it achieves these goals more successfully than would other targets for the investment (Ferro & Lentini, 2008; Ascher & Krupp, 2010). These feedback effects are potentially important for poverty alleviation, and then an economy-wide analysis is needed (Estache, 2006; Ferro & Lentini, 2008).

C. The link between Infrastructure and Environment

Two major agendas, in the field of infrastructure provision, are environment, and development (Cunningham and Kwakkel, 2009). Above all, infrastructure delivery results from the efforts of individuals and communities to modify their physical environments or habitat in order to enhance their comfort, productivity, and protection (WDR, 1994). The impacts of climate change, for example, are practiced to different degrees within and across nations due to variances in exposure, vulnerability, and coping capacities (World Social Report, 2020). Thus, environment-friendly infrastructure services are critical for improving living standards and offering public health protection. Therefore, infrastructure selections matter for economic growth, poverty reduction, and environmental sustainability (Ascher & Krupp, 2010; Fay *et al*, 2010). In relation to environmental sustainability, Ethiopia is one of the few countries to have formally merged its aims of developing with 'a green economy' (Jalles d'Orey & Prizzon, 2017). It is related to the Ethiopian constitution (1995) article 92.³³ Although, it lacks proper implementations.

D. Infrastructure's Impact on the Development

Calderon and Serven (2004) used panel data from 1960-2000 including over 100 countries and found out that the quantity of infrastructure has an important impact on growth which is a one standard deviation increase in the stock of infrastructure results in a 3% increase in economic

³³ Ethiopian constitution (1995), Article 92 Environmental Objectives, 1. Government shall endeavor to ensure that all Ethiopians live in a clean and healthy environment; 2. The design and implementation of programs and projects of development shall not damage or destroy the environment; 3. People have the right to full consultation and to the expression of views in the planning and implementations of environmental policies and projects that affect them directly; and, 4. Government and citizens shall have the duty to protect the environment.

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growth rate. On the one hand, macroeconomic theories and empirical studies clearly indicate the aggregate effects of infrastructure in an economy. On the other hand, existing micro-econometric studies show insights into the role of infrastructure in enhancing productivity and decreasing poverty (Estache & Fay 2007; Sawada, 2015; Ashenafi, 2017; Seid *et al*, 2016). Therefore, much research has been devoted to estimating the productivity of infrastructure investments (Nuramo & Haupt, 2015). For example, some cross-national studies of economic growth and infrastructure notably, one using public investments in transport and communications and another using capital stocks in roads, railways, and telephones also display that infrastructure variables are positively and significantly correlated with growth in less developed countries (WDR, 1994; Estache & Fay 2007; Sawada, 2015). However, in both types of studies, whether an investment of infrastructure causes growth or growth causes investment of infrastructure is not fully well-known (WDR, 1994). While there is still no agreement on the magnitude or on the exact nature of the impact of infrastructure on growth, many studies on this topic have established that the role of infrastructure in growth is substantial, noteworthy, and often greater than that of investment in other practices of capital (WDR, 1994; Estache & Fay 2007; Sawada, 2015).

From WDR (1994), what is obvious is that a strong association occurs between the availability of certain infrastructure (telecom, electricity, paved roads) and per capita GDP. For example, data for 1990 indicate that, while total infrastructure stocks increase by 1% with each 1% increment in per capita GDP, paved roads increase by 0.8%, power by 1.5%, and telecommunications by 1.7% (WDR, 1994). In another way, one-point increase in infrastructure stocks would lead to an approximately 0.06 point in growth rate per capita GDP (Yilmaz & Cetin, 2018).

E. The Infrastructure Challenges in the Development

Infrastructure is one part of the development challenge, but its effects are among the most significant. It is about poverty and growth, and it is about transport, electricity, and telecom (both the infrastructure, and the infrastructure facilities) (Asian Development Bank/The World Bank, 2005). Ascher and Krupp (2010) also emphasized the intrinsic infrastructure development challenges that must be addressed as it has long time horizons, complex distributional impacts, perverse incentives growing out of political economy considerations, and the inevitability of having multiple government agencies involved in the decision-making processes (Ascher & Krupp, 2010). Therefore, the policies and specific decisions that determine the growth, efficiency,

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and fairness of physical infrastructure depend on the processes and institutions that create them (Oyedele, 2012). Although, the demand for infrastructural investment is higher and resources used in the delivery of infrastructure are limited. Moreover, the encounters are many and comprise technology for development, finance, maintenance, and design. The challenges also comprise the international necessities of the project to be sustainably established (Oyedele, 2012). In addition, a state can also fail because politicians, bureaucrats, and donor agencies often pursue their own objectives (Oyedele, 2012). Thus, local participation is seen as the most effective and sustainable way of redressing local government failure-tackling corruption, giving the poor a greater say in policy decisions, and holding local governments more accountable (Oyedele, 2012; Sawada, 2015). Such challenges are also examined in the context of Ethiopia in Chapter 6.

2.2.2 Infrastructure, Growth, and Inequality

A. Infrastructure and Growth

Generally, in the literature, it is accepted that infrastructure positively attributes to growth (Ferro & Lentini, 2008; Yilmaz & Cetin, 2018; Ashenafi, 2017; Seid *et al*, 2016). Productivity growth is higher in countries with an efficient and adequate supply of infrastructure facilities (World Bank, 1994). Infrastructure, through its indirect and direct effects, has an impact on equity, growth, and overall development of a country (Simon & Natarajan, 2017; Yilmaz & Cetin, 2018). Generally, access to and use of infrastructure services show a key role in the integration of individuals and households into social and economic life (World Bank, 2003; Yilmaz & Cetin, 2018). Infrastructure also plays a decisive role in encouraging economic growth and thereby contributes to the reduction of economic disparity, poverty, and deprivations in a country (Ferro & Lentini, 2008; Srinivasu & Rao, 2013; Calderon & Servén, 2014). For instance, better transport networks may decrease the fixing costs of new capital (Turnovsky, 1996; Agenor, 2011). In contrast to this, even if the infrastructure is required for modern economies to function, more infrastructure could not necessarily cause more growth (Fay *et al*, 2010). It is also stated that “infrastructure causes growth and growth cause greater demand for (and usually supply of) infrastructure” (Estache & Fay, 2009, p. 18).

Equally important, the distribution of infrastructure facilities across different regional states within an economy assumes importance in the context of attaining balanced regional growth (Mohanty *et al*, 2017). For example, the literature on regional growth advises that a divergence in infrastructure

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is a major factor behind the wide and persistent inequities in regional growth in India (Mohanty *et al*, 2017). India is a good case for exploring the factors behind regional infrastructure delivery because there is a growing emphasis on infrastructure investment to reduce regional disparity. It is also possible that “internal geography and infrastructure conditions matter to the regional disparity when a spatially large economy, such as China and India, opens up” (Fan & Zhang, 2002, p. 1). Thus, according to Fan and Zhang (2002), by the late 1990s, the great regional inequality has begun to cause great policy alarms within India. Moreover, there are other concerns about infrastructure development in developing countries, including cost overruns and benefit shortfalls, waste, or corruption in huge infrastructure investment projects (Flyvbjerg, 2007). Ansar *et al* (2016) indicated that high investment in low performing projects instead leads to economic and financial fragility. Ansar *et al* (2016) also stated that China’s infrastructure investment model is not one to follow for other countries but one to avoid. These are good examples for Ethiopia to consider.

B. Infrastructure and Income Inequality

Increased access to vital infrastructure facilities could decrease inequality, foster inclusion, and support poverty-reducing efforts (Calderon and Chong 2004; Calderon and Serven 2010). Due to this reason, infrastructure investment has become a policy priority in many countries (Calderon & Serven, 2014). Moreover, there are two key themes followed in empirical literature observing in the link between infrastructure and inequality. One is related mainly to directly observing the inequality effect of infrastructure by using Gini coefficients as the inequality measure and the effect of infrastructure variables (Calderon & Chong, 2004; Calderon & Serven, 2010). For example, physical and social infrastructure facilities have proved to be highly significant factors in determining the inter-state level of development in India (Bajar & Rajeev, 2015). Basically, the infrastructure helps less-developed regional states and disadvantaged individuals gain access to productive opportunities by facilitating their connection to core economic activities (Estache & Fay, 1995). Moreover, decreasing production and transaction costs through access to roads has been a basic cause of income convergence for the poorest regions in Argentina and Brazil, for example. The other essential point is that “the levels of access to infrastructure facilities are, as expected, strongly correlated with a country’s average income” (Estache & Fay, 2009, p.11).

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Meanwhile, concerning on how infrastructure and inequality are interrelated, previous studies reported different results regarding their relationship. The empirical evidence on the infrastructure investment-inequality relationship is mixed and quite conflicting (Hooper *et al*, 2017; Makmuri, 2017). On the one hand, several studies found that public investment has encouraged growth and enhanced towards the alleviation of inequality. On the other hand, government spending on infrastructure has improved regional inequities within Europe and excessive public investment as a contributing factor to rising income inequality in Africa (Makmuri, 2017). In addition, Bajar & Rajeev (2015) found that infrastructure (power and roads) tends to increase inequality in India.

C. Infrastructure, Growth, and Productivity in Sub-Saharan Africa (SSA)

Poor development of infrastructure hinders economic growth in Sub-Saharan Africa (SSA) (Calderon and Seven, 2010; World Bank, 2013; Calderon *et al*, 2018). Although, the role of infrastructure investment in economic development has been a fundamental theme in policy circles (Chakamera & Alagidede, 2016; Kodongo & Ojah, 2016). Calderon and Serven (2010) found that the quantity and quality of infrastructure have positive impacts on growth and the distribution of income in SSA. In other words, poor infrastructure could be a source of resource misallocation through the selection channel (Cantu, 2017). More importantly, SSA is facing a critical shortage of infrastructure. It has been held that, as one of the key factors, slows economic growth in the region (Chakamera & Alagidede, 2016; Kodongo & Ojah, 2016). Equally important, so long as the unmet demand for infrastructure exists, it remains a key restrain on doing business in most African countries which depresses their firms' productivity by roughly 40% (World Bank, 2013). In addition, surveys exhibited that infrastructure limitations are responsible for an estimated 50% of the productivity challenges faced by Ethiopian firms (Foster & Morella, 2011). Foster and Morella (2011) also showed that Ethiopia has the highest capital expenditure portion in government spending amongst African countries.

Furthermore, the economic literature has given increasing attention to studying the factors that could impact the regional distribution of public investment in infrastructure. Some initial studies focused on the traditional equity-efficiency trade-off. Other studies, while still troubled with this trade-off including the risk of overlooking, stretched their analyses to embrace the hierarchical structure of territorial direction and political power and other indicators such as institutional capacity, infrastructure governance, and equity as a determining factor of government investment

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in infrastructure to promote nation-building processes (Castells & Sole-Olle, 2005; Bel, 2011; Albalade *et al*, 2012). Hereafter, the state-and, nation-building processes, institutional capacity, infrastructure governance, and equity are briefly reviewed as follows.

2.2.3 Infrastructure and Nation-Building Process

A. Nation-Building Process

Though widely used, the term “state-building” and “nation-building” remains challenged and vague. Though closely linked and often both needed in countries with weak states and little sense of shared community, these processes are also separate. ‘State-building’ is seen as the task of constructing functioning states capable of achieving the vital elements of modern statehood (Linz, 1993; Dinnen, 2006; Hippler (Ed.), 2004, 2005; Stefan *et al*, 2011; Hundara, 2017). It also means the formation, reformation, and solidification of a public structure in a given territory capable of providing public goods like infrastructure (von Bogdandy & Wolfrum (eds.) (2005). Whereas, ‘nation-building’ denotes to the more abstract process of developing a shared sense of identity or community among the several ethnic groups making up the population of a specific state that is the institutional shaping of the nation, i.e. state-building or defined as contributors about strengthening of the functionality of ‘weak’ and ‘fragile’ states (Linz, 1993; Dinnen, 2006; Stefan *et al*, 2010; Bourgon, 2010; Alesina & Reich, 2015). In other ways, it is “the most common form of a process of collective identity development with a view to legitimizing public power within a given territory” that is basically an “indigenous process” (von Bogdandy & Wolfrum (eds.) (2005, p. 586). Hence, distinguished in this way, ‘state-building’ emphasizes on the practical task of building or consolidation of state institutions, while ‘nation-building’ gives more attention with the character of relations between ‘citizens and their state’ (de Walle & Scott, 2009; Dinnen, 2006; von Bogdandy & Wolfrum, 2005; Bowen, 2015; Saad, 2012; Hundara, 2017; Alesina & Reich, 2015). The nation-building process is an ongoing process in all countries aimed at creating and replicating a cohesive national society based on ‘shared values and goals’. Moreover, state-building is a core aspect of successful nation-building processes (Hippler (Ed.), 2004, 2005). Hippler (Ed.), 2004, 2005) also described that:

A range of views are emerging in the debate, which can essentially be divided between two poles: On the one side, nation-building is seen in the context of or even equated with state-building. It is felt that nation-building should be organized from outside by the community of states in order to boost international security, in particular..... At the other pole, nation-building is regarded as an autonomous process of the development of a nation, that is nation-forming, which can only be achieved by the societies themselves and which goes beyond securing a monopoly of force, the ability of the state apparatus to function and the setting-up of infrastructure (Hippler (Ed.), 2004, 2005, p. 138-139).

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Meanwhile, territorial autonomy for geographically focused on ethnic groups is an important constituent of the Ethiopian federalism (Bach, 2014). This particular approach has also “ignored the consideration of another historically and politically relevant identity, namely, “provincialism”, in designing the territorial structure of the state” (Yonatan Feseha, 2016, p.9). These show that the nation-building process in Ethiopia is a challenging task as there is a political crisis. Consequently, at the core of federal arrangements lie the establishment and care of power-sharing or consociational democracy (four broad principles including “grand coalition, segmental autonomy (including non-territorial and territorial autonomy), proportionality, and minority veto”) for divided societies which seek to accommodate certain values suitable to their common circumstances (Lijphart, 2004) or to design various electoral mechanisms (e.g. “alternative vote”) that would encourage the election of moderate representatives as well as the integrity of the boundary delimitation process (Horowitz, 2002) in the processes of nation-building. However, amongst the complications related to defining the boundary of sub-units in an ethnic federation, one of the most severe concerns is the drawing of boundary lines that classify concentrations of ethnic groups such that each group inhabits a comprehensible and contiguous part of territory (Anderson, 2013), which is serious in the Ethiopian current situation among regional states.

In relation to the above, efficient infrastructure is essential to promoting a country’s future productivity and prosperity (Prudhomme, 2004). Nationwide physical infrastructure and communication networks are required to enhance the national economy including interaction and integration of social groups in state-and nation-building processes (Hippler (Ed.), 2004, 2005). Each of the infrastructure sectors plays a significant role in the enhancement of the states, and finally of the nation (Chotia & Rao, 2015). Thus, nation-building can involve the allocation of major infrastructure development to foster social harmony and economic growth (Saad, 2012; Commonwealth of Australia, 2009; UNDP, 2014). Meanwhile, what is needed above all is state-building, which is the establishment of an administrative apparatus to effectively manage functions and investments in the areas of security, the economy, infrastructure, health, education, etc. (Hippler (Ed.), 2004, 2005). More specifically, by citing DFID (2010), Hundara (2017) described the Ethiopian contexts as follows:

State-building is examined from two approaches: responsive and unresponsive. The approach which gives priority to meet public expectations in order to enhance state legitimacy is known as a responsive state-building approach. The political settlement extends beyond elites reflecting a broader compact between the state and society. The major indicators of the responsive approach include: state focuses on enhancing

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legitimacy and recognizes the importance of inclusive politics; state creates structures and robust institutions responsive to citizens; state accepts the need to meet some expectations; as a result, public confidence and expectations grow; citizens are active responsible. On the contrary, the unresponsive approach primarily focuses on ensuring state power at the cost of public expectations as the government relies more on the system of patronage leading to intra-elite tension and instability in the society at large. As a result, state institutions are patronage, hence, some groups pose a potential threat to the others; there is a low drive for loyalty, reliance on repression and little attention given to expectations from the government side; and steps change (conflict, people's movement, and demand for new political settlement) (Hundara, 2017, p. 5).

Accordingly, the current situation of Ethiopia is the unresponsive approach. Thus, infrastructure development is nation-building by itself, but, when it is equitably distributed across regional states. Consequently, nation-building processes in Ethiopia should have an effectively functioning state, rule of law, democratic accountability, shared national identity ('unity in diversity'), and inclusive and sustainable growth (Fukuyama, 2011). These issues are explained as follows.

Rule of law

Rule of law anchors the relationship between state and society around an accepted set of political, social, and economic rules including the five principles: separation of powers, legality, acknowledgement of individual freedom and equality/equity, judicial review and the connection between morality and law (Domingo, 2009; Cordenillo & Sample, 2014). Moreover, it is about a greater focus on more equitable and inclusionary forms of development (Domingo, 2016). A number of international, regional, and bilateral agencies are currently engaged in various aspects of promoting the rule of law for nation-building processes (Bergling *et al*, 2008). Hereafter, the World Just Project Rule of Law Index 2017–2018 presented in 113 countries by providing scores and rankings. Scores range from 0 to 1, with 1 indicating the strongest adherence to the rule of law. Ethiopia ranked 107 out of 113 with a 0.38 score. From Sub-Saharan Africa, Ethiopia is ranked 16 out of 18. Moreover, Ethiopia suffers from a shortage of civil society organizations working on human rights and good governance issues (Abebe, 2012; Lie & Mesfin, 2018). Currently, there are a lot of reforms in Ethiopia. In this study, the focus is on the necessity of the rule of law in infrastructure governance and equity in Ethiopia for the genuine nation-building processes.

Democratic Accountability/Public Accountability

According to Siegle (2012), accountability has six key focus areas where the expectations of public accountability are greatest which are 'policy priorities (inclusive and equitable); use of public funds; delinking economic prospect to political allegiances/loyalties; equality before the law; a

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level playing field in the process of competing for political power and avoiding the arrangement of the coercive capacity of the security force for political ends' (Siegle, 2012). Thus, corruption, weak accountability systems, and a lack of responsiveness on the part of the government of Ethiopia are often cited as the bases of growing disillusionment of citizens with their governments (Terefe, 2014). Consequently, the institutions of accountability are instrumental to attaining continued development and stability. This is also very critical to equitable infrastructure development and for the nation-building process in Ethiopia.

Shared National Identity (Unity in Diversity)

National identity is defined through a dual process of emphasizing the similarities of the in-group (the 'Self') and its dissimilarities with those outside the "political community" (the 'Others'). (Kuzio, 2001; Inac &Unal, 2013). As a result, encouraging a shared identity and values is a subject that runs through several projects (Hippler (Ed.), 2004, 2005). Hence, there is an argument on how to explain the transition from the ethnic identities into the common (national) one in relation to the identity formation mechanism and nation-building strategies (Inac &Unal, 2013; Hippler (Ed.), 2004, 2005). Split and conflicting identities, and low levels of societal cohesion, are strategic factors that can preserve state fragility (Herbert, 2013). Despite these challenges, five prominent areas of methods and tools for promoting national identities are civic engagement, cultural approaches, dialogue, decentralization, and building inclusive institutions across identity which is important, especially to confirm that law and order, policing, and justice methods and tools are equitable and assist the interests of all citizens (Herbert, 2013). It is a bond of loyalty that binds together the citizens of a state to form a political community and then a necessary prerequisite for the construction of a state-and nation-building a democratic system of governance (Hippler (Ed.), 2004, 2005).

Moreover, national identity is never fixed but always in the process of changing and evolving. Its construction differs over time, requires difference, and is never a finished process or complete (Kuzio, 2001). This is because the lack of accommodation of diversity could lead to clashes and pose threat for a unification, particularly, in multiethnic federal systems like Ethiopia (Mengie, 2016). Henceforward, the development of a national identity supports the population to nurture together into a collective community of will which is a continuous and ongoing process in all

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countries (Hippler (Ed.), 2004, 2005; Dinnen, 2006). Meanwhile, in Africa and the Middle East, new political borders paid little attention to national identities in the creation of new states (Saad, 2012). In Ethiopia, following the fall of the Derg regime and the coming of the TPLF/EPRDF to power, one could see that the nation-building process strategy, as indicated by this front, specified the “primordial” belonging to “Nations, Nationalities, and Peoples” as the beginning of Ethiopians’ identity (Bach, 2014; Constitution, 1995).

Inclusive and Sustainable Growth

High-quality infrastructure is one of the backbones for achieving long-term inclusive development (OECD, 2017). The notion of inclusive growth typically denotes to equity with growth or to broadly collective prosperity resulting from economic growth (UNDP, 2017). In other ways, inclusiveness itself can be more or less pro-poor. Beyond job creation, the prospective for equitable economic growth resulting from public works and infrastructure development also includes the opportunity for wealth creation through policies and programs for inclusion (Rose & Dangerfield, 2015). For instance, the Ethiopian Government set itself the ambitious task of ensuring shared, sustainable, and inclusive economic growth of more than 10% per annum for at least 15 years in order to eliminate poverty and strengthen social integration and territorial cohesion (NPC, 2017). This serves as a base for infrastructure equity and nation-building processes in Ethiopia.

B. Institutional Capacity in the Infrastructure Sector and Nation-Building

The capacity building integrates many of the key features of traditional capacity development, governance, and institutional microeconomics (Bhagavan & Virgin, 2004). Specifically, institutions emerge as sets of rules, structures, and common frameworks for managing the infrastructure provision key actors process, and for enforcing binding agreements (Cunningham and Kwakkel, 2009; Okoh & Ebi, 2013). Infrastructure shapes citizens’ lives. Infrastructure is the foundation upon which a nation’s economy is built. Infrastructure can be a powerful force in helping to unlock the economic potential of regional states, supporting jobs, and helping to balance the economy (Crown, 2016). In infrastructure capability building, infrastructure planning, infrastructure delivery, and infrastructure funding are very critical (Infrastructure New Zealand, 2017). Therefore, a nation’s infrastructural development largely depends on its institutional strength and diversity (Akanbi, 2013). Nevertheless, public institutions are not yet aligned with

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the multifaceted problems they are anticipated to address (Bourgon, 2010). Thus, institutional capacity incorporates, on the one hand, the tasks that institutions should have the ability to accomplish, and, on the other, the resources (financial, human, and technical) and structures they want to that end (Bhagavan & Virgin, 2004). In the institutional capacity building processes for infrastructure development, at least four issues have been considered: human capital, organizational structure, organizational systems and frameworks, and infrastructure funding. Each of these main focus areas of institutional capacity is explained as follows.

Human Resource Management

Human capital is a source for building the architecture of the nation as a paradigm to society (Lonska, 2015). It is a set of a person's abilities and skills, having a direct impact on one's economic and social activity potential. Lonska (2015) also reflected the visible link establishing a connection between human capital development and the country's economic growth and competitiveness, as well as the change of society. Above and beyond, states are shaped by images and practices, and public services contribute to the creation of these images and practices (de Walle & Scott, 2009). Thus, investments in human capital have become more and more important, as the nature of work of infrastructure development, has evolved in response to rapid technological change (WBG, 2018). From an infrastructure perspective, for example, mobile users (per 100 people), internet users (per 100 people), and quality of domestic transport will be used as human capital measures from World Development Indicators and World Economic Forum. In the Human Capital Index (HCI) (2018), Ethiopia ranks 135 from 157 countries and has got a value of 0.38 which is from the lowest category as it is less than 0.40 (The Human Capital Index ranges between 0 and 1) (WBG, 2018).

Organizational/Administrative Structure

An institution's structure is a system whose parts are made up of relations of work, hierarchies and lines of command, division of labor and responsibilities, and channels of communication and information sharing (Bhagavan & Virgin, 2004). It has been recognized that there is a lack of sound organization structure which is a prerequisite for organizational effectiveness (Ahmady *et al*, 2016). In relation to this, according to the constitution (1995), Ethiopia is a federal democratic republic where the regional states are demarcated according to ethnic-based federalism, in order

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to accommodate demands for regional autonomy and to manage ethnic pressures within the state (Lie & Mesfin, 2018). Thus, building infrastructure requires institutions that are stable, yet adaptable across regional states in Ethiopia. This shows that there is a need to build enabling structures at federal and regional states including local firms in the infrastructure sector in Ethiopia.

Organizational System and Frameworks

All activities and processes in management systems including planning, implementing, monitoring, and review should be measured with appropriate performance indicators. This has largely remained an unexplored gap, and it matters and directly impacts the ultimate value creation for organizations' strategic plans (Dunn *et al*, 2013; Wang & Parlikad, 2014). Consequently, to extract the full long-term benefits of infrastructure investment, it must have a stronger framework so that all individual authorities (public and private) have a shared commitment to the betterment of the system (network) of infrastructure, not just the individual infrastructure asset or entity only (Bowditch & Noble, 2017). Moreover, institutions are the structures, rules, and frames of reference which enable and motivate the choices of actors. The complexity of the process can only understand by examining the ways the interests of key actors become intertwined (Cunningham & Kwakkel, 2009). This promotes networking both with the senior governmental sector authorities (ministers, state ministers, and directors-general) and with middle-level management (directors, advisors, and appointed officials) in ways that promote synergy (Infrastructure Service Unit, 2017). Hence, effective governance of infrastructure stresses a clear regulatory and institutional framework, vigorous coordination across levels of governments, and feasible performance throughout the life-cycle of the infrastructure asset (OECD, 2017).

Infrastructure Funding

Infrastructure investment is capital intensive. Government capital budget and the involvement of private investment is minimal in developing countries (World Bank, 1994). Even if infrastructure maintenance can be provided through user fees, or through taxation mechanisms, local and national governments often need access to additional capital (Cunningham & Kwakkel, 2009). Traditionally, infrastructure investments have been financed with public funds (OECD, 2015). Infrastructure is ultimately paid for (funded) through consumer bills, user charging, public funds from taxation, or a combination of these mechanisms (WEF, 2014; Crown, 2016; Miller,

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2013). Generally, there are three ways in which infrastructure projects can be funded which are public funding (government capital spending), private funding, and mixed public/private funding (Dethier & Moore, 2012; Rhodes, 2018). Each method has related costs and benefits, and no single approach dominates the others in all situations (Dethier & Moore, 2012). However, the public sector remains the dominant source of funding for energy and transport in most African countries. Therefore, to sustain high growth rates, analytical work prepared by the WBG suggests that Ethiopia needs to identify sustainable ways to finance infrastructure (WBG, 2017). This is because bridging this gap is a complex interdisciplinary challenge that requires creativity and innovation in the planning, funding, financing, construction, and operations of infrastructure assets. As well, the government of Ethiopia has to consider alternative sources for infrastructure funding (the availability and suitability of funding mechanisms). Even though, there is evidence of a lack of strategic management of sources (and providers) of finance to the infrastructure sector in Ethiopia (Jalles d'Orey & Prizzon, 2017).

C. Infrastructure Governance and Nation-Building

Governance is an essential prerequisite for building an effective infrastructure (De, 2009; OECD, 2017). Financiers and regional and national governments display a number of interactions significant for infrastructure governance (Cunningham and Kwakkel, 2009; Kenny, 2007; Oyedele, 2012). The governance of infrastructure involves its own diverse set of challenges and necessitates a careful, organized approach including institutions and tools, public procedures, institutional capacity, and demands “the development of a coherent and integrated national framework” (OECD, 2015, p. 1). Hence, it must address various challenges in the areas of planning, mechanisms for coordination and dialogue, human resources, measurement, and evaluation and many others in the sector (Infrastructure Service Unit, 2017). Therefore, infrastructure governance broadly includes intergovernmental relations (IGR), political commitment and partnerships, land acquisition framework, legal framework, decision-making processes, and transparent and accountable governance.

Decision-Making Process

In contemporary societies, decision-making process has become an extremely complicated task. Traditional institutional decision-making is without a doubt no longer sufficient to cope with contemporary complexity challenges (Palermo & Alber, 2015; Ypi, 2016; Palotti, 2019). Political decision-making concerning equitable infrastructure investment often relies on exhaustive

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quantitative consideration, both on the national as well on the regional/local level (Brocker *et al*, 2010). Thus, decisions relating to infrastructure and their implementation are highly sensitive to political and economic cycles, with events such as elections or economic changes that have a direct impact on the sector (Infrastructure Service Unit (ISU), 2017). In addition, lack of dialogue on infrastructure development with its end-users, civil society, and the private sector, has also a negative impact on the quality of planning and project implementation (ISU, 2017). The renewed interest in infrastructure governance has directed attention to the way governments make decisions about the allocation of resources for investment in infrastructure in a number of countries (Wegrich & Hammerschmid, 2016). Wegrich and Hammerschmid (2016) also stated that governments are said to lack the tools and institutions that provide the foundation for the good decision-making process. Hence, when one considers Ethiopia, it is necessary to have clear decision-making processes in infrastructure governance (Jalles d'Orey & Prizzon, 2017). This is because decisions leading to an inequitable distribution of public services such as infrastructures can result in social tensions (Wismadi *et al*, 2015).

Intergovernmental Relations/Collaboration and Coordination

Intergovernmental relations (IGR procedures) are the lifeblood of real-life federalism (Poirier & Saunders, 2015). Modalities of collaboration between orders of government in a federation comprise cooperative institutions and processes (e.g., consultation and co-decision) as well as 'more conflictual courses of tension, collusion, control, competition, and even coercion' (Poirier & Saunders, 2015). In this respect, Nico (2005, p.176) argues that "conflict between tiers of states may be inevitable because they would often compete for the same powers and resources. Where such conflict occurs, they should be settled in the spirit of cooperation". Hence, IGR is crucial for federations, although they also exist in unitary countries (Palotti, 2019). Though there is an absence of an independent institution with the responsibility of consolidating IGR in Ethiopia and this, in turn, has led to limitations in the 'continuity, regularity, and effectiveness of the dealings' (Fiseha, 2009; Afesha, 2015).

Land Acquisition Frameworks

It is clear that infrastructure accessibility and land-use planning are interconnected and should preferably be evaluated in an integrated framework (Thomopoulos & Grant-Muller, 2013). It is

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also important to describe how infrastructure development could displace disadvantaged people/communities/groups and how it could possibly affect their access to cost-effective opportunities. Most of the time, countries preserve powers of compulsory acquisition in order to empower governments to obtain land for specific purposes, for example for infrastructure development which may bring high displacement risk and /or low access to opportunity (FAO, 2009; Arul vikram & Murali, 2015; Alemu, 2012). Entirely across the world, the state is given the power to obtain land for a public purpose, in which compensation may be remunerated to the landholders. This power and the terms under which it can be implemented is either directly assigned by the constitution, as in the case of the US, Australia, and China, or, is specified in endorsed legislation, as is the case in Hong Kong, Malaysia, and Singapore (Mahalingam, 2011). Moreover, megaprojects are “large unique projects” where public actors play an important role and are very possible to be affected by the corruption that, as eradication of corruption is one of the critical challenges, the world faces (Locatelli *et al*, 2016). Besides, corruption in construction can decrease the efficiency, effectiveness, and equity of infrastructure facilities that resulted in construction projects that are unsuitable, defective, and unnecessary (Sohail & Cavill, 2008; Nordin *et al*, 2011).

Actually, the lack of political commitment is often raised as a reason for the failure of anti-corruption reforms and a major obstacle to economic performances and the achievement of development goals (TI, 2015). In relation to this, TI’s annual Perceptions of Corruption Index ranked Ethiopia 103rd out of 175 countries in 2015. Hence, corruption has been a roadblock to institutional accountability and governance in Ethiopia (WBG, 2017). In relation to the land acquisition framework, for instance, the proclamation 455/2005 of Ethiopia established joint collaboration of federal and regional states on compensation, displacement, and rehabilitation issues. But, due to lack of commitment, this makes a lot of problems on the appropriateness and adequacy of the well-being, compensation, and rehabilitation of displaced people and nearby inhabitants (Azmach, 2019). Thus, this is implemented in contrast to the constitution of Ethiopia (1995) article 89 sub-article 5.³⁴

³⁴ See Ethiopian constitution (1995), Article 89, Economic Objectives, sub-article 5. Government has the duty to hold, on behalf of the People, land and other natural resources and to deploy them for their common benefit and development.

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Political Commitment and Partnerships

The state of infrastructure of any state is directly related to the quality of life which needs political commitment (Dethier & Moore, 2012; Oyedele, 2012). Ypi (2016) argued that political commitment matters and because certain associative practices are indispensable to satisfying and fostering it. Above and beyond, a society without political commitment is a society of continually disengaged or permanently disaffected citizens, where important decisions end up being taken by some of the elites (Ypi, 2016). Thus, achieving the goal of economic infrastructure equity cannot be the product of the *laissez-faire*; instead, it requires strategic endeavors that are targeted to regional states' economically little served residents guided by best practices, focused on outcomes, and motivated by political commitment and partnerships with strong leadership (Rose & Dangerfield, 2015).

D. Infrastructure Equity and Nation-Building

Wider distributional effects are related to a range of effects and in specific with equity (socio-economic, accessibility, land-use, and environmental) (Thomopoulos & Grant-Muller, 2013). These effects are significant as new or enhanced infrastructure might result in the redistribution of economic activity within social groups, communities, spatial regions (Thomopoulos & Grant-Muller, 2013). Special attention is given in this study to the microeconomic and institutional conditions that are necessary for the socially equitable provision of infrastructure assets (Castells & Sole-Olle, 2006; Ferro & Lentini, 2008; Rammelt, 2018). More importantly, the literature on infrastructure, opportunity, and equity delivers a number of programs and strategies with the potential for linking hard-to-employ job seekers, and low-income inhabitants to permanent and temporary job opportunities (Rose & Dangerfield, 2015). An equitable growth scenario will reduce poverty more quickly than an inequitable growth scenario (Ferro & Lentini, 2008; Son, 2011). As mentioned in Chap. 1, this is due to, except in times of crisis, most governments seldom think about infrastructure equity which is part of an inclusive system that supports communities and regional states (Rubin, 2006). Therefore, all citizens/customers/regional states need to be entitled to know and understand their rights to fairness, access, service quality, and compensation for faulty and/or non-performance in the infrastructure opportunities (Bowditch & Noble, 2017). Thus, by identifying key equity issues, infrastructure equity broadly includes equal opportunity, social justice, national/regional competitiveness, citizen satisfaction, and spatial interventions which are explained as follows.

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Equal Opportunity

Since the early 1970s, a number of powerful thinkers, including John Rawls, Amartya Sen, Ronald Dworkin, and John Roemer, have made distinct and significant contributions to the way one thinks about equity (World Bank, 2006). Even though the theories of justice and social choice expected by each of them are different in important respects, they have much in common (World Bank, 2006). In spite of important differences, all four thinkers have contributed to shifting the focus of social justice from outcomes to opportunities. More equitable access to infrastructure is very significant for growth and equity (WDR, 2006). It is also stated that a fair allocation of resources must be one that all potential members of society would agree on before they recognized which position they would occupy (WDR, 2006). In relation to equal opportunity, efficiency generally relates to how well an economy allocates scarce resources to meet the needs and wants of consumers, equity concerns the distribution of resources and is inevitably linked with concepts of fairness and social justice (Castells & Sole-Olle, 2006; Bejakovic & Meinardus (Eds.), 2011). In view of the concern about the connection between infrastructure capital and distributive equity, the objective of this study is to systematize, describe, analyze and comment on public policies and practices in the country of Ethiopia, with an emphasis on lessons learned (Ferro & Lentini, 2008).

The Constitution of the FDRE (1995) delivers for equity in opportunities. The Constitution indicates the human and democratic rights of citizens. Article 41 of the Constitution provides the Economic, Social, and Cultural Rights. For example, Article 41 sub-article 3 reads that “Every Ethiopian national has the right to equal access to publicly funded social services.” Sub-article 4 also reads that “The State has the obligation to allocate ever-increasing resources to provide to the public health, education and other social services.” Therefore, the constitution defines equity with respect to equal access to public goods and services. This aligns with the discussion above on equity in opportunities (rather than outcomes). However, equity is not formally defined in the GTP, as is done in the Constitution in Ethiopia (Harris *et al*, 2019). And then, equitable infrastructure development should connect all communities and regional states to equal opportunity.

Social/Distributive Justice

Equity concerns the distribution of resources and is inevitably linked with concepts of fairness and social justice (Tyler & Smith, 1995; Castells & Sole-Olle, 2006; Bejakovic & Meinardus (Eds.),

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2011). From the broader perspective of development, the study has identified in the literature the different theoretical connections and the empirical patterns that link infrastructure to productivity, on the one hand, and those that link it to social inclusion and equity, on the other hand (Rubin, 2006; Ferro & Lentini, 2008). Moreover, social justice is a broader concept than equity and has a different conceptual underpinning (Miller, 2005). However, the broader issues of social justice do not have to be determined prior to examine equity within a specific context (Felder, 2010). For concrete reasons, society classifies issues of equity and does not endeavor to coordinate allocation decisions across diverse spheres; accordingly, each problem needs to be treated on its own advantages and based on the standards and patterns that collected overtime for that condition (Felder, 2010). Miller (2005) advocates that social justice rests on four principles which are equal citizenship; the social minimum; equality of opportunity; and, fair distribution. Even though, this framework is still open to the challenge that it involves extremely subjective assessments (Miller, 2005).

Basically, the idea is to discover policy situations that promote greater equity but have little effect on efficiency or even better policy situations where equity and efficiency complement each other and where government policies, mostly allocate from advantageous to the disadvantage regional states, may even perhaps produce a more efficient society than would occur in lack of those activities (Castells & Sole-Olle, 2006; Bejakovic & Meinardus (Eds.), 2011; Bodislav, 2012). In relation to social justice, historically, it is indicated that the case of Ethiopia is relatively helpful in this respect, as the progress-nationalization of land, decentralized governance structure-was endorsed to a mass movement, originally led by students' movement, whose effects percolated through institutions to create a polity more responsive to citizens' rights than appeared to be the case elsewhere in East Africa (Coninck *et al*, 2013). Moreover, the two basic principles of equal distribution of primary goods such as rights and freedoms, infrastructure in this case and equal opportunity in developing capabilities are the focus area in this sub-topic which are measured, in minimum, by poverty rate, unemployment rate, national debt, etc. (Giebler & Merkel, 2014).

National and Regional Competitiveness

The extension of the globalization process has a direct charge in the growth of the competitiveness between countries. National competitiveness is established by the actions of policies, public investments such as infrastructure and institutions which directly influence the evolution of the

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total economy (Ulman, 2013; Palei, 2015). Thus, infrastructure is the bedrock of a nation's competitiveness, prosperity, and even social well-being (WEF, 2014). Moreover, infrastructure is a crucial component of a nation's growth, and at the core of any effective public strategy and policy discourse (Cantu, 2017). However, in the Global Competitiveness Index 2017-2018 edition, Ethiopia ranked 108 out of 137 countries. In infrastructure, she also ranked 115 out of 137 (Schwab, 2017-2018). Unfortunately, Ethiopia has a lot of work to do for improving its national competitiveness scores and to be placed in a better position, especially in infrastructure development. It is also possible to measure regional state competitiveness in physical infrastructure by considering roads, electricity supply, mobile telephone, and fixed telephone lines (Africa's Pulse, 2017; Calderon *et al*, 2018). Therefore, governments' investments in physical infrastructure represent a significant determinant of national and regional state competitiveness. Hence, in practice, there is often a concern about allocation impacts, in particular, about the spatial allocation of impacts (Brocker *et al*, 2010).

Spatial Intervention /Planning

Spatial planning aims to intervene to shape the development outcomes affecting a specific area, whether this is a region or a neighborhood (Kim, 2008; The Royal Town of Planning Institute, 2008; Duranton & Venables, 2018). More importantly, all infrastructures require evidence of long-term planning to support its current and future strategic and operational requirements (Bowditch & Noble, 2017). It is also vital to consider "the theory of utilitarianism" which is an ethical theory of the 'rightness and wrongness' of acts depends fully on facts about the enlargement of overall well-being (Mill, 2008; Eggleston, 2012; Chen, 2013; St. Mary's University, 2014). Based on John Stuart Mill's political philosophy, utilitarianism is the principle that the activities of governments should be judged simply by the extent to which they encouraged the 'greatest happiness of the greatest number' (Baujard, 2013; St. Mary's University, 2014; Wismadi *et al*, 2015). Relating this concept to federalism in Ethiopia, a utilitarian method would favor the highest welfare for the highest number of regional states in the country, while a Rawlsian method would aim to realize no regional state is left behind (Harris *et al*, 2019). In other words, all laws and institutions should be judged by their utility. A strictly egalitarian procedure (a Rawlsian social welfare function) will need just such equality of service to addressing the desires of 'the least well off' that is Rawls' 'difference principle' which is the attention is on the holdings of "primary goods" of diverse people

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in creating interpersonal comparisons (Sen, 1985). The demand for Rawlsian principles attains is the beginning of threshold levels in the allocation of the burdens of infrastructure under which it is not allowable to fall. Whilst Rawls delivers limits below which actions ought to not fall, the ‘capabilities approach’ (Sen, 1985) delivers thresholds that require action that is the lifting of all citizens beyond the threshold level is the crucial criterion in contradiction of which policies are measured (Wismadi *et al*, 2015; Duranton & Venables, 2018).

Especially, to address spatial equity, Wismadi *et al* (2015) have developed a new type of spatial preference modeling to distribute resources, for example, infrastructure that takes into account regional inequity that impacts the measurement of equality between regional states.³⁵ Thus, infrastructure service provision is one of the tools for allocating welfare and addressing social and spatial equity (equality of opportunity) (Wismadi *et al*, 2015). Wismadi *et al* (2015) stated that, typically, distributional patterns are assessed in terms of social equity (attaining equity over socio-economic groups of society) or spatial equity (attaining equity over geographical locations) (Wismadi *et al*, 2015; Duranton & Venables, 2018; Litman, 2020). This study mainly focuses on spatial equity which considers across locations; but then, uses Gini coefficient and poverty line to measure social equity which also considers among people. The spatial unit in this study is a regional state and a city administration in Ethiopia.

Moreover, four strategic concepts for the spatial planning and development policy are as follows: developing competitiveness; ensuring the provision of public services; controlling and sustainably enhancing land uses; and, influencing climate change and the change of the energy system its common orientation which does justice to spatial cohesion and the principle of sustainability at the same time (Federal Ministry of Transport of Germany, 2016). Thus, allowance must be made for the diversity of the regional states (e.g. less favored regional state, rural areas, metropolitan areas) by adopting suitable policy approaches. The infrastructure required to be secured includes roads (i.e. connections to the road network) and utilities (Turowski, 2002). However, the competitiveness of regional states and sub-regions depends to a decisive degree on their links and interconnectivity

³⁵ See Wismadi, A. *et al* (2015), equitable distribution of growth for utilitarian and non-utilitarian infrastructure planning. Infrastructure Complexity. Infrastructure access is one of the instruments for distributing welfare and addressing social and spatial equity (equality of opportunity)... The application of preference modelling for equity-based resource allocation for infrastructure and contributes to the debate of “people-centered” (as in market driven) versus “place-based” (addressing regional disparity) development.

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of infrastructures (Federal Ministry of Transport of Germany, 2016). Those groups and regional states face an equity insufficiency, which is presently not considered for in assessment (Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013; Litman, 2020). This results in Pareto inequity resource distribution; Additional project delays, benefit deficits and ultimately cost overruns; Ambiguous environment for infrastructure project and policy planning, implementation and process; and, Difficulties increase due to projects' scope and budget (Flyvbjerg, 2007). More specifically, there is a lack of ensuring the provision of public services and infrastructures for basic needs to warrant equivalent living states across the regional areas in Ethiopia (MoUDH, 2015; Duranton & Venables, 2018; Harris *et al*, 2019).

Citizens/Stakeholder/Public Satisfaction

Citizens are the principal users of the infrastructure. Across national boundaries and economic classes, citizens have remarkably similar needs and preferences for infrastructure (Cunningham and Kwakkel, 2009). In the Ethiopian constitution (1995), Article 41 (3) says “every Ethiopian national has the right to equal access to publicly funded social services”. In recent years, Ethiopia has made important progress in infrastructure, and its infrastructure indicators match relatively well with developing country peers (Foster & Morella, 2010). However, Ethiopia has faced more challenging infrastructure equity than any country in Africa (Foster & Morella, 2010; Kanth and Geiger, 2017). Though, according to equity theory, feelings of inequity are uncomfortable and create a sense of tension with citizens and regional states (Tyler & Smith, 1995; Rubin, 2006; St. Mary's University, 2006). Therefore, knowing who the customer/stakeholder is, what they expect, and how to please them is evolving in a highly dynamic environment that is rich in challenges and opportunities (Bowditch & Noble, 2017; Asfaw, 2019). Next to this, some federal systems in relation to infrastructure equity are explained briefly.

2.2.4 Federal Systems and the Value of Federalism

A. Federal Systems and Infrastructure Equity

It is very crucial to consider a federal system as a device for nation-building processes. In relation to federal systems, it is stated that “Constitutions alone do not make or break federations” (Saunders, 1995, p.61). Saunders (1995) also indicated that, in any event, federations are not static. They change over time through political understandings and judicial review, even without

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constitutional change. Moreover, institutions, principles, and procedures for which constitutions provide have substantial influences on federations. For example, the involvement of an efficient and equitable transport system and other forms of infrastructure to the internal market is recognized as significant in a federation. Resources are shared across geographical space (Saunders, 1995; Bulmer, 2017). Thus, federalism is a means of ensuring peace, stability, and mutual accommodation in countries that have territorially concentrated differences of identity, ethnicity, religion, or language like Ethiopia. While federalism has facilitated some countries to settle conflicts or increase governance, it can also exacerbate current differences, sometimes leading to deeper conflicts or even failed states (Bulmer, 2017). Currently, this is happening in federal Ethiopia. Based on these issues, “there are important philosophical questions about the degree of disparity between regions that is acceptable in a federation and how it should be alleviated” (Saunders, 1995, p.75). Saunders (1995) also stated that federation considers diversity and, within limits, regional autonomy, and continuing compensation for natural disadvantages also increases equity considerations. On the other hand, large differences in economic situations between regional states are likely to threaten the social cohesion of the federation and to distort federal policymaking and the operation of the internal market. Therefore, infrastructure inequity is incompatible with the very notion of a federal system of government (Saunders, 1995).

B. The Values of Federalism and their Relevance for Equity

Kincaid (2011) discussed that federalism, as a mode of governance, is concerned with combining ‘self-rule and shared rule’ (Elazar, 1987), whereby the regional states of the federal union could govern themselves autonomously while they and their citizens also participate together in the common national governing regime, which is autonomous within its sphere of constitutional authority (Kincaid, 2011). Thus, based on Kincaid’s (2011) idea, it is very important to consider the rationales for federalism which are very relevant for infrastructure equity and the nation-building process in Ethiopia. There are different reasons.

These are: (a) To establish peace and security; (b) To establish a large common market or free-trade zone that fosters economic development and prosperity by eliminating trade and tax barriers between the regional states that make up the union; (c) To form a federal polity is to unite diverse, territorially based national, racial, ethnic, religions, and/or linguistic communities into one state-nation; (d) To establish or preserve liberty and the rights of individuals and/or communities and

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regional states (Kincaid, 2011) as well as practical uses of “pluralism values”- the presence of a diversity of “heterogeneous values”- (participation in the processes of “constitutional reform” like “constitutional asymmetry” need to be built in some cases, equality, equity, autonomy, and self-respect in a multinational democratic federalism) in the emerging federalism like Ethiopia. Therefore, Kincaid (2011) stated that “mobility and choice” trigger values of efficiency, innovation, and equity that have often been attributed to federalism in more recent years. Above and beyond, these issues recurrently cause controversy, especially political conflict over the distribution of formulas, etc. (Kincaid, 2011).

C. Decentralization and Equity

The considerations of the benefits and costs of decentralization lead to a general prescription of the sorts of responsibilities for which the federal government might be best suited, those which should be left to the regional states and their localities, and those which might be shared by the two levels of government (Boadway & Shah, 2009). Boadway and Shah (2009) argued that, at the most general level, the presumption they adopt is that the federal government should assume responsibility for important national efficiency objectives and national equity objectives (Boadway & Shah, 2009). Thus, how the sharing of responsibilities for national efficiency and equity objectives might be implemented in a federal setting is a key issue for the design of federal-regional state fiscal relations (Boadway & Shah, 2009). Moreover, it is also indicated that the standard argument for assigning the federal government’s primary responsibility for equity is that all citizens and regional states ought to be treated the same regardless of where they reside in the country, and only the federal government can assure that this occurs (Boadway & Shah, 2009). At the same time, the provision of these public investments (for instance, infrastructure) may have implications for the efficiency of the common market and for national equity (Boadway & Shah, 2009). Following this, the development policy and equity in infrastructure in Ethiopia are briefly reviewed.

2.2.5 Brief in Infrastructure Development in Ethiopia

A. Ethiopia’s Development Strategy and Developmental State

Ethiopia categorized itself as a developmental state and the government was actively engaged in driving developmental efforts. Therefore, all its programs were aimed at providing key infrastructure, improving the land ownership system, reducing corruption incidence, income

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equality, and extreme poverty (Kedir, 2015). Moreover, Ethiopia had a strong “public state ideology” and it was pursuing a development strategy that emphasizes growth through high levels of public investment (WBG, 2016; Jalles d’Orey & Prizzon, 2017). This strategy includes giving public enterprises a dominant role in infrastructure investments. An additional key feature has been the focus on equity and nation-building, particularly addressing historic regional states’ disparities which is guaranteed by the constitution (1995).³⁶ Thus, public investment in basic services and infrastructure remains important to reducing poverty in Ethiopia (WBG, 2016). Despite rapid growth, Ethiopia continued to be one of the most equal countries in the world, with a Gini coefficient that remained at 30 percent from 2005 to 2011 (WBG, 2016). See the details in Chap. 8 Sec. 8.7. The government’s development plans have had a strong focus on inclusive growth, together with an increase in pro-poor spending (IMF, 2015). World Bank (2013) also recognized the Ethiopian commitment to attaining a developmental state and notes that the Ethiopian government has an approach that targets to attain transformation, equity, and fairness. According to Government reports, Ethiopia has achieved encouraging development results, maintaining an economic growth rate of 11 % for the last 10 years (UNDP Ethiopia, 2012).

B. Contexts of Economic Infrastructure Development in Ethiopia

The primary goal of the Ethiopian government is to eradicate poverty by delivering economic growth and transforming the structure of the economy. To this end, the government had established three successive blueprints that had been implemented with varying degree of success:

- The Sustainable Development and Poverty Reduction Program (SDPRP), implemented from 2002/03 to 2004/05;
- The Plan for Accelerated and Sustained Development to End Poverty (PASDEP), implemented from 2005/06 to 2009/10;
- The Growth and Transformation Plan (GTP), covering 2010/11 to 2014/15.

³⁶ Ethiopian constitution (1995), Article 41 Economic, Social and Cultural Rights, sub-article 9. Ethiopian farmers and pastoralists have the right to receive fair price for their products, that would lead to improvement in their conditions of life and to enable them to obtain an equitable share of the national wealth commensurate with their contribution. This objective shall guide the State in the formulation of economic, social and development policies.

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Generally, over the past decades, Ethiopia had benefited from robust economic growth. The share of the people living below the poverty line halved between 1995 and 2010, from 60.5% down to 29.6% (IMF, 2015). And also, “An Interim Report on 2015/16 Poverty Analysis Study” had put 23.5 percent of the total population (25.6% in rural and 14.8% in urban areas) and was found to be under the poverty line in 2015/16 (CSA, 2018). Besides, the high rate of public infrastructure investment has generated growth in construction and related industries and triggered growth in other sectors through linkage effects in Ethiopia (WBG, 2016; Seid *et al*, 2016). More specifically, the GTP II 2015/2016-2019/2020 plans the FDRE’s government policy objectives of attaining middle-income status by 2025 through rapid growth and inclusive development.

From the national vision, equity is significant to this as “social justice” features in the national vision. The vision further demands an inclusive economy (Harris *et al*, 2019). Although, the performance evaluation of GTP I in GTP II in 2015 didn’t say anything about equity in infrastructure development across regional states in Ethiopia. Conversely, the issue of disparity in development has been debated for some time. At another level, it is known that one of the basic functions of the regional state is to promote equity as stated in the Ethiopian constitution (1995). Generally, greater equity, in turn, needs there to be greater equality in at least some things, ‘be they life chances, opportunities, capabilities or outcomes’ (Anderson & O’Neil, 2006). Thus, there is a need to fill the gap in the Ethiopian context from an equitable infrastructure development point of view as Ethiopia has faced one of the more exciting infrastructure conditions of any country in Africa (Foster & Morella, 2010; Ashenafi, 2017). Good governance is also critical for ensuring the effective and equitable provision of infrastructure. This is basically because, firstly, good governance means that resource allocations could reflect national developmental priorities and thus answer to societal demands (Gbadebo & Olalusi, 2014).

Accordingly, the Ethiopian Road Authority (ERA) stated that, for instance, “road infrastructure supports and catalyzes the achievement of social and economic growth and the meeting of poverty reduction objectives” (ERA, 2007, p. 7). Besides, electricity is also indispensable to modernity and development. Since rural inhabitants account for the largest percentage of the population in countries like Ethiopia, rural electrification should be a central element in the development agenda of a government (Ethiopian Electric Utility (EEU), 2017/18). It is also the same in the telecommunication sector in Ethiopia. Moreover, lack of satisfactory power; roads, and similar

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infrastructure like industrial parks, universities, and airports will continue to hinder economic development in the country.

As mentioned in the problem statement, this study focuses on critical factors affecting the equitable allocation of public infrastructure investments to support economic development and nation-building process in Ethiopia. In the planning process, these factors include inadequate capacity for estimating and monitoring of rates of return of infrastructure projects; politicized decision making; transparency and accountability problems; and institutional weaknesses in decision making. In the implementation process, these factors include lack of political commitment in the implementation of infrastructure development plans; problems in land acquisition/right-of-way; corruption in infrastructure construction; shortages of local construction firms' competences and resources; and legal and institutional weaknesses in infrastructure construction (NCP, 2016; Ashenafi, 2017). Hence, it is imperative to investigate the impact of public capital investment on infrastructure and its effect on economic growth in less-developed countries (Nuramo & Haupt, 2015) in this case Ethiopia.

Finally, there is no empirical evidence on the interaction of regional economic performance and infrastructure investment, especially about equitable infrastructure development among regional states in Ethiopia. However, there are some experiences in Nigeria among states, Cambodia among provinces, East Asia ("Connecting East Asia: A New Framework for Infrastructure") between Countries, and in India among states. In many countries, regional disparities are a major source of inequality. To this end, the critique of the existing literature relevant to the study is identified.

2.3 Critique of the Existing Literature Relevant to the Study

The more restricted research on the distributional implications of infrastructure development offers some suggestive evidence of an equity-enhancing effect (Calderon & Servén, 2014). In other words, the literature supports the concept that infrastructure matters but it cannot serve to clearly argue in favor of more or fewer infrastructure investments (Estache & Fay, 2009). Moreover, an overall consensus is attained around the idea that basic infrastructure assets are vital features related to economic performance. Apart from this main idea opinion differs greatly on both magnitude and causality which remains subjects of debate (Brakman et al, 2002; Torrissi, 2009). Therefore, three major concerns arise from the literature on the development effect of infrastructure which are measurement, identification, and heterogeneity. If one takes measurement

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first which needs two approaches. The first approach is to measure in monetary terms. The second approach is to measure in physical terms. Thus, infrastructure investment is a ‘multi-dimensional notion’ (Calderon & Serven, 2014; Baskakova & Malafeev, 2017).

Moreover, many studies take a single indicator (most often telephone density) to proxy for “infrastructure”. This motivates the use of synthetic infrastructure indices. However, measures of infrastructure based on spending flows pose their own problems (Harris *et al*, 2019). In contrast to this, these limitations do not apply to physical measures of infrastructure, which may be the reason why studies based on physical measures are more conclusive than those based on monetary measures of infrastructure (Calderon & Serven, 2014; Harris *et al*, 2019). Even though, both types of measures have serious aspects to be considered when interpreting results regarding infrastructure investments (Torrise, 2009).

The other pointed issue is identification. The impact of infrastructure supplies on growth that empirical studies aim to estimate may be confounded with enhanced demand for infrastructure facilities which is encouraged by rising levels of income (Calderon & Serven, 2014; Harris *et al*, 2019). It is also indicated that failure to account for this form of simultaneity can lead to overestimation of the impacts of infrastructure on growth and equity (Calderon & Serven, 2014; Harris *et al*, 2019). Lastly, heterogeneity is also a main concern. The contribution of infrastructure to development outcomes may differ across different countries and overtime for multiple reasons, starting with the heterogeneous quality of infrastructure assets and services themselves (Calderon & Serven, 2014).

The results of measurement of infrastructure endowment in physical and monetary terms may differ significantly (Baskakova & Malafeev, 2017). In addition, an adequate calculation using this method requires a long-time series of data, which is often not available in developing countries (Baskakova & Malafeev, 2017; Palei, 2015). Overall, there is no consensus regarding the correct unit of analysis to study uneven economic development (Schultz, 2017; Calderon & Serven, 2014; Harris *et al*, 2019). Varying levels of analysis along with often overlapping criteria are employed to study this phenomenon. Measurement in physical terms, particularly employing the common inventory method, does not have the aforementioned shortcomings, yet the result does not take into account the quality of infrastructure and it is difficult to link it to a concrete measure of economic policy. Therefore, only the use of several approaches simultaneously (i.e. a combined

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approach to measuring the infrastructure stock) may prove the quality of the research findings (Dethier & Moore, 2012; Palei, 2015; Baskakova & Malafeev, 2017). Nevertheless, there are conditions when no satisfactory monetary values happen for evaluation elements and this is where multi-criteria analysis techniques have importance. The multi-criteria analysis does not pursue to monetize and therefore lets more impacts to be incorporated in the assessment. It also has the potential to carry out a degree of structure in the entire decision-making process (Thomopoulos & Grant-Muller, 2013).

In fact, the use of infrastructure asset built up is likely to better indicate the input-output connections relative to investment facts (Ghosh & De, 2005). Therefore, there is no consensus among researchers on a set of indicator variables that characterize the infrastructure, for instance, some authors examine the infrastructure as a set, and the others study one particular type of infrastructure such as road transport, and ignore any relation between various types of infrastructure. Anyway, researchers have tried to use physical indicators (such as road length or road space) rather than monetary indicators to bypass the infrastructure valuation difficulty (Prudhomme, 2004). Hence, physical measurement is used in this study

Basically, infrastructure is the basis of neighborhoods, communities, and regional states and provides the support necessary to ensure that everyone, as well as residents of low-income communities, have the opportunity to contribute and flourish (Rubin, 2006; PolicyLink, 2013). The central equity questions ('who decides, who benefits, and who pays?') should be applied to infrastructure as they work to health care, education, and other aspects of government (Rubin, 2006). According to Rubin (2006), the specific kinds of questions to be considered include:

- Which regional states/communities are well or poorly served by new services and facilities of infrastructure?
- Which population groups/regional states get connected to economic opportunity and which are isolated?
- How open and responsive are decision-making processes?

More importantly, equity concerns need to be addressed not only to achieve greater fairness and opportunity but also to create the conditions necessary to sustain economic growth and the state-

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and nation-building processes. However, the inadequacy of equity theory is that it has not quantified the individual variances and diverse cultures (Al-Zawahreh & Al-Madi, 2012). So, organized efforts to bring equity into infrastructure planning, decision-making processes, and spending can build political consensus for new funding. These efforts include institutional capacity, infrastructure governance, and equity for the nation-building process. Thus, advocacy endeavors should focus on economic efficiency, social justice, and political commitment, etc., as criteria for equitable infrastructure decisions and spending (Rubin, 2006; PolicyLink, 2013). Henceforth, infrastructure development frequently encompasses making tradeoffs between diverse equity goals (Litman, 2020).

In other ways, this study has explored “the possibility that infrastructures accelerate or expand unequal patterns of growth by acting as so-called ‘catalysts’ in the context of ‘inhibitors’ and ‘promoters’” (Rammelt, 2018, p. 4) in Ethiopia. Rammelt (2018) described that, for example in the road sector in Ethiopia:

The catalyst-The expansion of the rural road network catalyzes aggregate productivity and economic growth by facilitating and accelerating the flows of employment-seeking labor, the access to agricultural inputs, and the selling of output on distant markets.... The promoter-The catalytic effect is most effective for those who control a disproportionate amount of productive land, who produce higher levels of surplus, and who are able to reinvest profits in other assets, e.g., means of transportation and production.... The Inhibitor-Limited land resources and productivity restrict the benefits of enhanced access to inputs and market outlets. Improved mobility benefits labor, but also increases competition among a growing labor force (Rammelt, 2018, p. 12).

Therefore, to have a better understanding of the determinants of infrastructure investment policy, the study has investigated the decision-making processes and the interaction between actors in Ethiopia.

As a summary, tackling infrastructure inequity is critical especially for developing country governments and development agencies: as well as being a valuable goal in itself, enhancing equity establishes a fundamental place in one’s understanding of beneficial change and development, driving poverty reduction in combination with growth. Essentially, the empirical evidence disclosed that infrastructure equity is instrumentally important to long-term change, through its links to growth, efficiency, poverty reduction, and social cohesion which are also very crucial for nation-building by avoiding coordination failures of the government and introducing selective interventions to ensure infrastructure equity across regional states in Ethiopia. On the basis of the

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above theories and empirical assessments, the study has understood that a relationship exists between institutional capacity, infrastructure governance and equity, and nation-building process.

Moreover, the study has confirmed that how the relationship actually works. After empirically tested these relationships, the study is able to explain how institutional capacity and infrastructure governance are related to the nation-building process, as well as the role that infrastructure governance and equity are played in mediating those relationships. Therefore, the purpose of this study is to examine the impacts and the interrelationships of institutional capacity, infrastructure governance, and equity on the nation-building process in Ethiopia. Both issues are assessed and empirically tested by this study. Based on the above literature review, the following conceptual model has been discussed.

2.4 Conceptual Model

As explained above, system-functions identifies its function within a system, social processes relate one arrangement of action to another arrangement of action, and the comparative study also relates to political changes. The social process approach specifically establishes “relationships between variables and particularly between changes in one set of variables and changes in another” (Huntington, 1971, p. 310), using cross-sectional analysis, not longitudinal in this study. But, its limitations are: It considers “levels of development rather than rates of development”; it only concerns “the links between the usually social, economic, and demographic independent variable and the political dependent ones”; and, it also only concerns “the extent to which it makes politics dependent upon economic and social forces” (Huntington, 1971, 3010-3011). Thus, the system-function conceptualizes, the social process correlates, and the comparative study compares. However, by constructing and relating the strengths of all three methods, it could be possible to overcome the insufficiencies of each (Huntington, 1971). Based on the above theoretical and empirical literature review, the conceptual model (which lays out the key constructs/variables/ and factors, and presumes relationships among them) has been developed (Hair et al, 2017).

Moreover, models are developed based on theory. Economics is mainly concerned with the explanation and prediction of the observed phenomenon. The explanation and prediction of the phenomenon are based on the use of theories. The dictionary meaning of theory is a ‘set of properly argued ideas intended to explain facts or events in terms of a set of basic rules and assumptions’, for example, the theory of firm assumes profit maximization and the theory of consumer assumes

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utility maximization (Sarantakos, 1993; St. Mary's University, 2014). With the application of statistical tools and econometric techniques, models can be constructed from economic theories. Hence, a model is a formal framework for representing the basic features of a complex system by a few central relationships (Sarantakos, 1993; St. Mary's University, 2014). Specially, this study focuses on “causal relationships” which are establishing a causal description to develop theories (Sarantakos, 1993). It is a basic representation of the real circumstances that is realized by a set of meaningful and reliable assumptions. In making assumptions, one has to make sure that the assumptions are consistent and retain as much as realism as possible. They should also attain a reasonable degree of generality.

Specifically, to this study, a theory is a set of systematically related hypotheses developed following the scientific method that are used to explain and predict outcomes or social phenomena (Sarantakos, 1993; Hair et al, 2017). Thus, hypotheses are individual conjectures, whereas theories are multiple hypotheses that are logically linked together and are tested empirically (Hair et al, 2017). Two types of theory are required to develop path models which are structural theory and measurement theory. The former indicates how the construct variables are related to each other in the structural model, while measurement theory indicates how each construct variable is measured by measuring indicators/factors (Sarantakos, 1993; Hand, 1996; Sewell, 1992; Hair et al, 2017).

Therefore, the first step is to prepare a diagram that illustrated the research hypotheses and displayed the variable relationships that are examined by using a path model which is a diagram that connects construct variables based on theory, logic, and practical experiences observed by the study to visually display the hypotheses that are tested empirically. This is because preparing a path model early in the research process enabled the study to organize its thoughts and visually consider the interrelationships between the construct variables of interest. The sequence of the structural model (in this study) is displayed from top to down, with independent (predictor) constructs at the top and dependent (outcome) variables at the lower side. Constructs that operate as both independent and dependent variables in a model are also considered on the left side and in the middle of the diagram. Theory, logic, and practical experiences should always determine the sequence of constructs in a conceptual model, but when the literature is inconsistent or unclear, researchers must use their best judgment to determine the sequence (Hair et al, 2017; Dang & Sui Pheng, 2015). Thus, the structural model described the interrelationships between latent variables

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(constructs) or the inner model. In contrast, the measurement models represented the interrelationships between constructs and their corresponding indicator variables (Generally called the outer models in Partial Least Square- Structural Equation Modeling (PLS-SEM) (Monecke & Leisch, 2012; Kwong & Wong, 2013; Hair et al, 2017).

Moreover, it is also very important to consider two broad types of measurement specifications including formative and reflective measurement models. According to the above theory, reflective measures signified the effects (or manifestations) of the constructs. Therefore, causality is from the construct to its measures. In contrast, formative measurement models are based on the assumption that indicators form the construct by means of linear combinations. Besides, the measurement model requirements are quite flexible. PLS-SEM can manage formative and reflective measurement models as well as single-item measures without extra requirements or constraints. Generally, model complexity is not an issue for PLS-SEM. As long as appropriate data meet minimum sample-size requirements, the complexity of the structural model is nearly unrestricted in the PLS-SEM (Monecke & Leisch, 2012; Kwong & Wong, 2013; Hair et al, 2017).

To propose a theory/concept, researchers generally build on existing research knowledge. For example, when PLS-SEM is applied, the structural model shows the concept/theory with its key elements (i.e., constructs) and cause-effect relationships (i.e., paths). Researchers usually develop hypotheses for the constructs and their path interrelationships in the structural model. PLS-SEM allowed statistically testing the importance of the hypothesized relationship. When conceptualizing the theoretical constructs and their hypothesized structural interrelationships for PLS-SEM, it is important to make sure the model has no circular relationships (i.e., loops) (Hair, 2017). More importantly, the model is supported by theory and previous research (Dang & Sui Pheng, 2015).³⁷

The hypotheses are visually illustrated in Fig.2.1 below. The model displayed 17 measured indicator variables and 4 latent constructs (Institutional Capacity (IC), Infrastructure Governance (IG), Infrastructure Equity (IE) and Nation-Building Processes (NBP)). While measured variables

³⁷ Giang Dang • Low Sui Pheng (2015), *Infrastructure Investments in Developing Economies: The Case of Vietnam*, Springer Science+Business Media Singapore 2015, DOI 10.1007/978-981-287-248-7. A questionnaire survey and in-depth interviews with respondents from both government agencies and nongovernment agencies....Data analysis included both quantitative (Factor Analysis and Structural Equation Modelling-Partial Least Square-SEM-PLS) and qualitative (Thematic Content Analysis) methods.

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are shown with a box, latent constructs are shown with an oval. IC is exogenous (independent) construct in this model, as there is no single-headed arrow, entering the construct. IC is indicated by 4 measured indicators (human capital; organizational Structure; infrastructure systems and frameworks; and, infrastructure fund). IG and IE are both independent and dependent variables which are all hypothesized as outcomes in some relationships and as predictors in others. NBP is an endogenous (dependent) constructs that are hypothesized as outcomes. IG is indicated by 4 measured indicated variables (decision-making process; intergovernmental collaboration and coordination; land acquisition framework; and, political commitment and partnerships). IE is indicated by 5 measured indicator items (equal opportunity; social justice; national competitiveness, spatial intervention, and citizen satisfaction).

NBP is the final outcome and is indicated by 4 measured indicators (rule of law; democratic accountability; shared national identity, inclusive and sustainable growth). The following theoretical structural modeling has been prepared by using Smart PLS 3 software, which implements many of the latest extensions in a highly user-friendly way (Hair et al, 2017). Therefore, the goal of the model is to explain the effects of institutional capacity and infrastructure governance on infrastructure equity and, ultimately, on the nation-building process. Specifically, for as an initial model, the study hypothesized a path model to estimate the relationships between institutional capacity, infrastructure governance and infrastructure equity, and nation-building process.

The other significant point is that a mediating effect which is created when a third variable or construct intervenes between two other related constructs, as shown in figure 2.1 below, for example, infrastructure governance plays a mediation role between institutional capacity and infrastructure equity. Infrastructure equity plays a mediation role between institutional capacity and the nation-building process. It also mediates infrastructure governance and nation-building process. Direct effects are the relationships linking two constructs with a single arrow, for example, the relationships between institutional capacity and nation-building process; indirect effects are those relationships that involve a sequence of interrelationships with at least one intervening construct involved, for example, between infrastructure governance through infrastructure equity to the nation-building process. Thus, an indirect effect is an arrangement of two or more direct

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effects (compound path) that are signified visually by “multiple arrows” (Monecke & Leisch, 2012; Kwong & Wong, 2013; Hair *et al*, 2017).

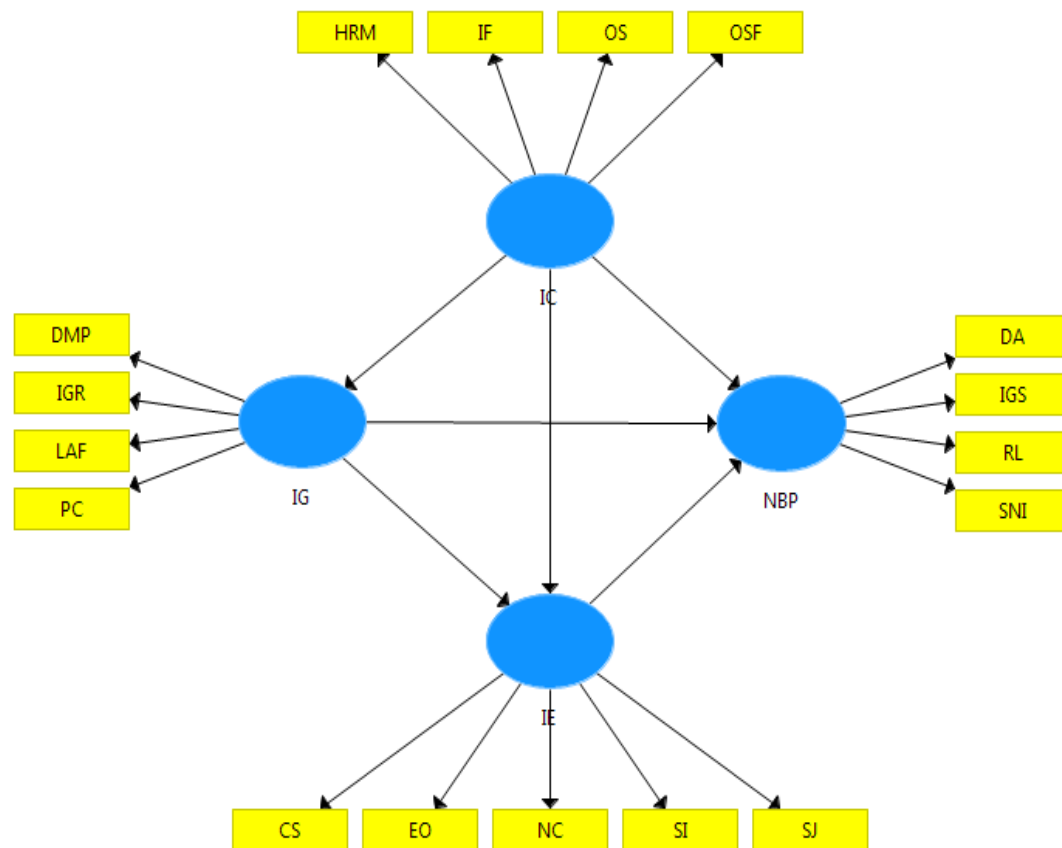
Related to the concept of mediation is moderation. With moderation, a third variable could directly affect the relationship between the exogenous and endogenous latent variables but in a different way. Referred to as a moderator effect, this situation occurs when the moderator (an independent variable or construct) changes the strength or even the direction of the interrelationship between two constructs in the model. There are two types of moderating relationships. One is referred to as *continuous* and the other as *categorical*. The variance in the two types of relationships is that a continuous moderating effect happens when the moderating variable is “metrically measured”, whereas a categorical moderating effect occurs when the moderating variable is categorical, such as gender (Hair *et al*, 2017). However, moderation is not included in this study. Therefore, the role of the mediator variable then is to reveal the true interrelationship between an independent and a dependent construct. Thus, based on the nature (positive or negative) of the relationships as well as the direction is hypothesized on the basis of theory, logic, previous research, and researcher judgment, the following conceptual model is used for this study.

In summary, simply, institutional capacity, infrastructure governance, infrastructure equity, and nation-building process model has two main conceptual components which are the target constructs of interest—namely nation-building process (endogenous/dependent variables)—and, the three main dimensions, i.e. institutional capacity, infrastructure governance, and infrastructure equity (exogenous/independent variables), which represent key determinants of the target constructs. Figure 2.1 displayed the constructs and their interrelationships, which represented the structural model for the PLS-SEM case study. Researchers can select between a formative and reflective measurement model for every construct. In addition, in this study, all four constructs have reflective measurement models as indicated by the arrows pointing from the construct to the indicators. Although, PLS-SEM used for predictive analysis and both formative and reflective variables. This method is non-parametric in nature, which means that this technique does not require any supposition concerning the distribution of the data (Hair *et al*, 2017). The PLS-SEM is a common multivariate analysis method to compute variance-based SEMs, mainly in social sciences fields (Hair *et al*, 2012). One can call the things in ovals or boxes concepts and the lines between the ovals or boxes, interrelationships.

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Therefore, theories are composed of concepts linked by interrelationships. In order to test a theory, one needs to compare the predictions it makes with measurements made of the social world. Moreover, it is more difficult than it seems because concepts cannot be measured directly. In general, in order to test theories, there must be a way of measuring each concept, that is, for each, there must be an indicator. An indicator is a method of measurement that aims to measure the concept accurately. The study wants to test the following hypotheses as the study needs independent and dependent variables for both concepts. Fig. 2.1 summarizes the concepts and the indicators as a diagram. It is also a theory as a diagram.

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Legend:

IC-Institutional Capacity (HRM-Human Resource Management; OR-Organizational Structure; OS&F- Organizational Systems& Frameworks; and, IF-Infrastructure Fund).

IG- Infrastructure Governance (IGR- Intergovernmental Relations; DMP-Decision Making process; LAF- Land Acquisition Framework; and, PC- Political Commitment).

IE- Infrastructure Equity (EO-Equal Opportunity; SJ-Social Justice; NC- National Competitiveness; SI- Spatial Intervention; and, CS-Citizen Satisfaction).

NBP- Nation-Building process (RL-Rule of Law; DA-Democratic Accountability; SNI- Shared National Identity; IG&S- Inclusive Growth and Sustainability).

Figure 2. 1 Theoretical Structural Modelling depicting the interrelationships of Institutional Capacity, Infrastructure Governance, Infrastructure Equity, and the Nation-Building Process in Ethiopia.

Obviously, researchers want their indicators to be as good as possible. That means the measurements that they make should be valid (accurately measuring the concept) and reliable (consistent from one measurement to the next) (see Chap. 4 for the pilot test result and Chap. 9 for tested results). Finally, the model is evaluated by considering the following issues. An equilibrium notion assumes the presence of a system comprised of two or more functionally linked variables

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(Huntington, 1971). Changes in variable yield changes in other variables. Given that prediction is an important reason for using models, a model can be evaluated based on how well it predicts its phenomenon (according to an economist called M. Freidman); realism of its assumptions (according to an economist called P. Samuelson); The power of the model in explaining the behavior of the economic unit under consideration (according to an economist called P. Samuelson); its generality; and, its simplicity (St. Mary's University, 2014). Thus, this model is evaluated based on these assumptions and it has satisfied these assumptions (see Chap. 9).

2.5 Conclusion

The review of the literature indicated that there is gradually a consensus that economic development is a multidimensional process that includes interactions among different goals of development and therefore would need systematically designed policies and strategies (Ashenafi, 2017; Rammelt, 2018). Specifically, infrastructure equity issues are also complex and multifaceted. That is why there is no one single pathway for infrastructure equity that all countries can pursue. In the long term, the infrastructure equity process requires changes in policies to account for new emerging factors and trends. Nevertheless, history has demonstrated that focusing on one single factor alone cannot guarantee success in the infrastructure equity process. Moreover, infrastructure equity is a complex process that involves interrelationships different construct variables as discussed above. One cannot risk overlooking these relationships as they lie at the center of the development process in general, infrastructure equity in particular. Thus, in the literature review I above, the integrated theories of coordination failure, equity and infrastructure equity served as a theoretical foundation for connecting growth, equitable infrastructure development and state-and nation-building processes later in this study. Meanwhile, the theories themselves are further investigated in literature review II in Chap. 3. Following this, based on Chap. 2, the issues of institutional capacity, infrastructure governance, infrastructure equity, and nation-building process including 17 measuring indicators are discussed in the context of developing countries in a certain detail in Chap. 3.

CHAPTER 3

LITERATURE REVIEW II: ISSUES OF INSTITUTIONAL CAPACITY, INFRASTRUCTURE GOVERNANCE AND EQUITY, AND NATION-BUILDING PROCESS IN DEVELOPING COUNTRIES

Introduction

The objective of the chapter is to identify the issues of institutional capacity, infrastructure governance and equity, and state-and nation-building processes in the context of developing countries. It also supports the framing of the theory in Chap. 2 above. Generally, infrastructure plays a central role in a country's economic welfare. For instance, Chotia and Rao (2015) argue a reliable source of energy permits companies to function more efficiently; a transport network enables producers to move goods to consumers, and the provision of schools offer the foundation for more highly-skilled workers of the future. In short, better access and quality infrastructure permit an economy to be more efficient, improving its productivity and raising its long-term growth rate and living standards (Chotia & Rao, 2015; Rhodes, 2018; Rammelt, 2018). Moreover, infrastructure and its impacts on social welfare, sustainability, and economic growth have been given a great deal of attention today. Therefore, there is widespread consensus that infrastructure is a key dimension of global growth and that its effects reach deep into the larger economy, with vital and complex implications for social progress (Chotia & Rao, 2015; Walter, 2016).

Therefore, a review of the literature on the issue of regional disparity in infrastructure development has been debated for some time (Anderson & O'Neil, 2006). Various arguments have been provided as to why policymakers seeking to promote infrastructure development should care about equity, either because larger equity is considered an objective in itself, or because it is considered a means toward some other goals, such as poverty reduction or economic growth (Anderson & O'Neil, 2006). At another level, it is recognized that one of the basic functions of the state is to promote equity. Higher equity, in turn, needs there to be more equality in at least some things, be it life chances, opportunities, capabilities, or outcomes (Anderson & O'Neil, 2006). In fact, in recent years, many emerging countries have been scaling up infrastructure investment, mostly through public spending, but also with rising participation of the private sector. However, infrastructure gaps are still great, and bridging those gaps will need tackling several problems, in terms of infrastructure equity, additional project selection, financing, and implementation (Gurara *et al*, 2017). Moreover, there are concerns about the equity of public infrastructure investment

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construction for effective nation-building processes in developing countries. These concerns are discussed in this chapter. It has conclusions.

3.1 Theory of Coordination Failure and Role of Government

As briefly reviewed in Chap.2, this section presents the view of coordination failures, their importance to developing countries, and the situations under which they take place. Thus, one issue of the modern theory of economic development approaches underdevelopment as “a coordination problem” (Hoff, 2001, p.145). It is also stated that, in modern terms, "there could be a coordination failure, where individuals' failure to coordinate complementary changes in their actions leads to a state of affairs that is worse for everyone than some alternative state of affairs that is also an equilibrium” (Hoff, 2001. P. 145).³⁸ It is argued that the failure of market-oriented reforms to make high and continued growth in developing countries the recognized agreement that such improvements ought to be complemented by complementary policies (Rodríguez-Clare, 2005). Thus, there are three strategies to complement these reforms which are macroeconomic policies to decrease the region's high exposure to weakness/crisis, institutional and ‘microeconomic’ reforms to enhance the ‘business climate’ and deliver better fundamentals for the market economy to increase growth, and third, microeconomic or ‘competitiveness’ policies that embrace a wide range of government interventions to permit markets, sectors, and regional states to take benefit of the opportunities gave by market-oriented reforms (Rodríguez-Clare, 2005). This paper considers all the three strategies, although it mainly focuses on the third strategy. In this case, where the coordination failure includes the government, it is generally referred to as a ‘government failure’ including the required activities to enhance sector-wide productivity and to ensure public goods or infrastructure equity (Rodríguez-Clare, 2005).

³⁸ Hoff, K. (2001), Beyond Rosenstein-Rodan: The Modern Theory of Coordination Problems in Development, the International Bank for Reconstruction and Development / The World Bank...The role of government-Rosenstein-Rodana argued that there could be coordination "from above" when government planned the process of industrialization. In contrast, most recent scholars recognize that there is no such thing because government is pan of the endogenous set of institutions to be explained (see Dixit 1996 and Basu 1997, 2000). Moreover, governments fail even in democracies, just as markets do. But a positive development of recent years is to try more limited interventions to harness the spillovers among agents, and to try to sequence policy reforms in a way that makes it more likely for good equilibria to emerge. Modern theory radically broadens our notion of spillover effects. It shows that in many cases even the set of equilibrium prices has public good properties.

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Thus, government intervention is expected to overhaul “the supposed coordination failure, such as cluster-based targeting and infrastructure development is so widely practiced not because of scientific merit, but for political motivations” (Glavan, 2007, p. 15). This is because, first, the federal government is hugely involved in funding, granting agreement, and regulation. Second, infrastructures incline to be, at least supposedly, open to everybody albeit regularly above a definite cost threshold. Third, there are substantial beneficial ‘spillovers’ that drive beyond the different users. It is these benefits that advocate the definition of merit goods in that they are considered by society to be adequate value that they ought to be delivered to all. Therefore, the market alone is in many cases inadequate that may need some form of public provision (Rubin, 2006; PolcyLink, 2013; WBG, 2016; Ashenafi, 2017; Seid *et al*, 2016).

Glavan (2007) argues that “coordination is possible and profitable in a free market system. State intervention is responsible for the systematic misallocation of resources (discoordination), in general, and for poverty traps in particular” (Glavan, 2007, p.1). So “poverty traps” happens when agents fail to coordinate their activities to attain the optimal allocation of resources like infrastructures. An attempt is also made to consider the spillover effects associated with infrastructures. Alternatively, the place-based policy might lead to development in a place, for example an infrastructure allocation, potentially acting as a coordination instrument (Duranton & Venables, 2019). Henceforward, coordination with transparency and accountability are crucial for infrastructure equity.

Moreover, positive development of recent years is to attempt more restricted interventions to harness the spillovers and strategic complementarity among agents and to attempt to sequence policy reforms in a way that makes it more likely for good equilibrium to emerge (Hoff, 2001; Cunningham & Kwakkel, 2009). However, there are many misguided incentives in the private sector. There are also different misguided incentives in the public sector in developing countries too. In relation to this issue, a misguided government cannot correct the misguided private sector (Hoff, 2001). This resembles the current situation of Ethiopia. Therefore, infrastructure planning is also likely to undertake different forms in different contexts, so plans need to be based on economic, social, and geographical realities and aspirations, rather than any pre-established blueprint to promise a successful outcome (UNCTAD, 2018). Moreover, the design and execution

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of an infrastructure plan should take into account a country's stage of development, existing infrastructure, industrial capabilities, and expansion plans, urban versus rural divides, levels of policy ambition, existing infrastructure institutions and their coordination, availability of new financial, technical or other resources and the existence of political and managerial capacity for effective implementation (UNCTAD,2018). According to UNCTAD (2018), infrastructure planning that fits broadly into a national economic development strategy would include the following elements:

- a vision for the infrastructure equity in the long term in the context of the broader national industrial development strategy;
- a consistent time frame to allow for coordination of infrastructure planning with other goals of development planning including infrastructure equity;
- a life-cycle analysis that allows for feedback and improvements and that takes into consideration broader economic and social benefits (access, poverty alleviation, etc.);
- flexibility to respond to possible technological forecasts and potential disruptions or to path changing contingencies such as the need to promote green technologies as a result of climate change;
- a systemic approach that addresses sectoral interdependencies; and,
- Coordination between different government levels and departments.

3.2 Public Investment in Infrastructure and Knowledge Gap

An economy's knowledge and technology base, embedded in its people and institutions, primarily governs that economy's productivity (Okoh & Ebi, 2013; Walter, 2016). Moreover, the role of knowledge as an intellectual asset seems to be prominent in creating a roadmap toward the optimum allocation of infrastructure resources, formulating strategies, and their effective implementation (Walter, 2016; Sing & Kumar, 2017). In relation to this point, as mentioned by Gurara *et al* (2017), in a recent contribution, Calderon *et al.* (2015) estimated that a 10% increase in infrastructure delivery increases output per worker by about 1% in the long run. Therefore, an emerging consensus in the empirical literature is that, under the right circumstances, an adequate supply of infrastructure can help encourage growth in the Sub-Saharan Africa region (Calderon *et al*, 2018; Rammelt, 2018).

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UNCTAD (2018), government policy ought to target those sectors with forwarding and backward linkages in terms of its impact to mobilize, channel and accomplish resources, and capabilities in ways that support a more virtuous growth circle (UNCTAD, 2018). For Example, some types of infrastructure (such as roads and telecommunications) have a greater impact on productivity than others (e.g. air transport or sewage). Thus, for the development of linkages, it matters in which infrastructure investments are prioritized. Nevertheless, various obstacles to infrastructure project preparation have been identified in recent years, including lack of coordination; lack of funding to cover the project preparation costs, which could be between 3 percent and 12 percent of total project costs; lack of institutional and human capacity for planning, project appraisal and preparation; overly rigid and myopic budgeting, which can limit multi-year costing and inclusion of large and long-term projects; a disconnect between decentralized project planning and overall fiscal targets and plans; and lack of a robust public investment management process to deal with the complex interplay between politics and planning in developing countries (Dang & Sui Pheng, 2015; UNCTAD, 2018).

3.3 Issues of Infrastructure Development in Developing Countries

Broadly, infrastructure investment is widely recognized as the main driver of economic development, while the quality, quantity, and accessibility of economic infrastructure in less developed countries lag considerably behind those in advanced economies (Okoh & Ebi, 2013; Nuramoa & Haupt, 2015; Gurara *et al*, 2017; Rammelt, 2018; Dethier & Moore, 2012). According to Dethier and Moore 2012 and Nuramoa and Haupt (2015), researches both on theoretical and empirical aspects of economic infrastructure support the idea that investment in economic infrastructure drives economic growth in less developed countries. However, progress in improving infrastructure in developing countries has been slow. Therefore, scaling up infrastructure investment is widely seen as a key pillar in national development strategies in low income developing countries (LIDCs) (Estache & Fay, 2009; Flyvbjerg, 2007). Although planning tools have recently been developed, there are deficiencies in the capacities required for using these tools (Okoh & Ebi, 2013; Dang & Sui Pheng, 2015). Hence, tackling deficiencies in planning and policy-making capacities of governments can play a central role in determining the equity of public infrastructure investments in less developed countries (Okoh & Ebi, 2013). From the literature review on government planning, especially in the area of infrastructure development, the following

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issues can be found attributed to a lack in the infrastructure planning and policy-making process inequitable way in developing countries.

3.3.1 Issues in Institutional Capacity in the Infrastructure Sector

“Capacity building” encompasses the principal features of three stages which are traditional institutional development, governance, and the micro-economics of institutions in developing countries (Bhagavan & Virgin, 2004). As well, capacity building for institutional effectiveness comprises a number of resources, including money, time, and the energy to see it through (Joshi & Narkhede, 2007; Claussen, 2011). As mentioned in Chap. 1, several studies revealed that low-income countries have relatively weak public investment management institutions and that improving those institutions could increase considerably the efficiency of public investment (Gurara *et al*, 2017; Rammelt, 2018). This suggests that strong institutions that can serve as intermediaries for broadly engaging a range of participants on regional equity action are critical for raising interrelationships and supporting change like ensuring infrastructure equity and nation-building (Blackwell & Fox, 2004).

Moreover, productive capacity is outlined broadly as the natural resource potential, gathering of human capital, and the institutions that facilitate inclusive and sustainable economic growth (Okoh & Ebi, 2013; Shiferaw, 2017). Since policymaking and planning for infrastructure is a multi-actor process, fostering an innovative institutional capacity that coordinates energies and resources is considered as one of the causes of infrastructure development (Okoh & Ebi, 2013; Dang & Sui Pheng, 2015). However, there are a number of institutional weaknesses of the planning processes of most developing countries in the infrastructure sector like for example, Vietnam, and like also Ethiopia, including the poor communication between the planning authority and the day-to-day decision-making process of government; deficiency of interaction between political leaders and planners with non-governmental actors; incompetent and unqualified civil servants; including bureaucratic and complicated administrative systems to name a few (Dang & Sui Pheng, 2015).

Furthermore, current issues pertaining to the capacity that domestic construction firms in developing countries are facing include the poor level of equity and efficiency, and quality of work; poor level of entrepreneurship and professionalism; and resources shortages, especially in construction technology, management, and finance (Okoh & Ebi, 2013; Hwang & Ng, 2013).

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Thus, improving the capabilities and resources of local construction firms is necessary for achieving these development goals in developing countries (Wells & Hawkins, 2010). In addition, Hwang and Ng (2013) have identified the key challenges of infrastructure investment such as the tension between conflicting interests; failure to balance objectives; and, knowledge issues (Hwang & Ng, 2013). Accordingly, a central problem that is generally encountered is the inability of local “actors” to preserve, strengthen and make proper use of existing institutional capacity in developing countries (Bhagavan & Virgin, 2004). Therefore, these challenges stem from the lack of clear understanding around capacity building, little attention or endeavors to the framing of capacity building initiatives, lack of appropriate support for effective activities, and mixed evidence supporting capacity building outcomes (Claussen, 2011). Following that, based on the above general issues, the problems of HRM, organizational/administrative structure, organizational systems and frameworks, and infrastructure funding have been explained as follows.

A. Human Resource Management (HRM)

Human capital comprises the knowledge, skills, and health that people accumulate over their lives, enabling them to realize their potential as productive members of society (WBG, 2018; Chotia & Rao, 2015). Thus, the Global Competitiveness Report (GCR) (2018) described that the overall level of expertise of the labor force and the quantity and quality of education is very crucial. For example, the notion of educational quality is continuously evolving, significant-quality factors today comprising such as ‘developing digital literacy, interpersonal skills, and the ability to think critically and creatively’ (Schwab, 2018). Moreover, the human capital status of any nation will directly impact and positively related with economic and social indicators such as GDP, income per capita, the balance of trade, life expectancy, literacy rate, level of industrialization, and the quality of infrastructural provisions (Chikwe *et al*, 2015). Human capital can also have a great influence on political stability, national peace, and harmony as well as the prevailing attitudes (Joshi & Narkhede, 2007; Claussen, 2011). Additionally, it is critical that individuals and institutions build the capacity in planning, land use, and fiscal issues necessary to be active in regional infrastructure equity decisions (Blackwell & Fox, 2004).

Meanwhile, one of the greatest challenges of HRM today is to create human resource (HR) capabilities that increase and sustain institutional performance in the infrastructure sector (Joshi &

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Narkhede, 2007). Therefore, from the infrastructure development point of view, unforeseen infrastructure planning outcomes can first be explained by the lack of capability for estimation and monitoring of rates of return of projects, as well as limitations of forecasting methods and appraisal techniques; insufficient data; intrinsic problems in predicting the future; lack of experienced forecasters; and external audits on whether policies and projects meet objectives (Joshi & Narkhede, 2007; Flyvbjerg, 2007; Todaro & Smith, 2009; Dang & Sui Pheng, 2015). In addition, the main challenges of human capital development in less developed countries like Nigeria are low ratings in human capital indices, brain-drain, underemployment, and poor remunerations (Aluko & Aluko, 2012; Chikwe *et al*, 2015).

It is also stated that human capital development and inequalities are the other important factors in developing countries. Several of the most vital externalities grow gradually through time as human (and social) capital changes at diverse speeds in diverse places (Duranton & Venables, 2018). These fluctuations are mainly hard to measure but are surely significant. Lagging regions might lose excessively more skilled labor than unskilled labor as well as in professions such as education and health (Duranton & Venables, 2018). Generally, to measure the impacts of HRM on institutional performance, Katou (2008) has used the following factors: HRM Policies; HRM Outcomes; Business strategies; Organizational performance; and, Controls. Thus, the problems and challenges faced with workplace diversity can be turned into a strategic institutional asset if an institution is able to capitalize on the various talents (Joshi & Narkhede, 2007). Moreover, empowering is a mutual influence which is also very crucial to infrastructure development. Research and human capital development, for instance, in Nigeria are faced with enormous challenges. These challenges embrace such as inadequate funding, lack of equipment facilities and material, lack of awareness, and lack of implementation of research results (Aluko & Aluko, 2012; Chikwe *et al*, 2015).

As mentioned in Chap. 2, human capital investments have become more and more significant as the nature of work of infrastructure development has grown in response to rapid technological change (WBG, 2018). More importantly, human capital investment has been one of the important pillars of intervention by the Ethiopian government to foster long-term capabilities of the country and to deal with rampant poverty (Seid *et al*, 2016). However, HRM policy is not effectively

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implemented; employees have low performance in terms of productivity and effectiveness; they are not well trained and skilled professional to accomplish their job successfully; and, they do not hold suitable work experience for accomplishing their job successfully in the infrastructure sector in Ethiopia (Tiruneh, 2011; AfDB, 2011; Asfaw, 2019).

B. Organizational/Administrative Structure

Organizational structure is the formal arrangement of jobs within an institution, and the most important formalization tool of an organization is the organizational structure chart and organization guide (Ahmady *et al*, 2016). The six basic elements in the institutional design are work specialization, departmentalization, the chain of command, the span of control, centralization-decentralization, and formalization (Robbins & Coulter, 2012). Moreover, institutional structure denotes the way that the institution arranges people and jobs so that its work can be achieved and its goals can be met (Elsaid *et al*, 2013; Ahmady *et al*, 2016). Additionally, Elsaid *et al* (2013) have mentioned that institutional structure types can be categorized into functional, divisional, and matrix structures. Whereas, Ahmady *et al* (2016) have also discussed that there are different types of social structures which are simple, functional, multidivisional, matrix, hybrid, network, and bureaucratic structures. Both have their own strengths and weaknesses. For example, the signs of the poor institutional structure are low productivity, unequal workload, and unclear lines of communication, lack of teamwork, slow decision-making, and lack of innovation (Elsaid *et al*, 2013). However, Robbins and Coulter (2012) stated that what that appropriate structure depends on four contingency variables: the organization's strategy, size, technology, and degree of environmental uncertainty. Thus, an organization's structure should facilitate goal achievement (Tiruneh, 2011; AfDB, 2011; Asfaw, 2019). Therefore, relevance, effectiveness, efficiency, and sustainability need to be considered in developing countries (Rocchigiani & Herbel, 2012). Likewise, according to the researcher's experience³⁹, the current institutional structure of Ethiopia in the most organization of the infrastructure sector is most likely the mechanistic organization which is rigid and stable that includes a high specialization, a clear

³⁹ Desalegn Ambaw (2019), practical experience in the infrastructure sector in Ethiopia, State Minister (Ministry of urban development and construction from 2010-2015, and Ministry of transport from 2015-2017).

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chain of command, rigid departmentalization, and narrow spans of control, high formalization, and centralization.

C. Organizational System and Frameworks

Organizational systems and frameworks are processes that can measure trends and track the progress of the infrastructure sector to meet the demands of a vibrant economy. Thus, “an institution’s framework is made up, on the one hand, of formal and explicit rules, regulations, policies, etc., and on the other, of informal and implicit norms and values, that govern the working of the institution” (Bhagavan & Virgin, 2004, p. 3) which includes different categories of stakeholders. In relation to this, Cunningham and Kwakkel (2009) identified seven key categories of actors which are financiers, citizenry, multinational corporations, governmental actors, landowners and developers, and non-governmental organizations. Cunningham and Kwakkel (2009) also argued that infrastructure develops as a negotiation process between actors. As a result, institutions emerge as sets of rules, structures, and common systems and frameworks for managing these actor processes, and for enforcing binding agreements. The actor-centered institutionalize approach recognizes the importance of both actors and institutions. The coordination of these actors needs system design and selection of institutions that need network collaborations (Koppenjan, 2008). However, the effects of systems and frameworks’ collaboration are diverse, they are not always easy to grip, they often lack clear measures for evaluating them and they give rise to disagreements (Koppenjan, 2008).

As challenges in managing infrastructure continue to increase, a technique to assess changes in the system is needed (Oswald *et al*, 2011). Based on several management approaches, five guiding principles are being used to make outstanding enhancements in institutional performance. These are measurements/benchmarking, employee involvement, leadership, process improvement, and customer focus (Potocki & Brocato, 1995). However, not every institution attempting to apply these values is successful. What is needed for success is that these values be understood and applied as a unified system of management? In addition to the above, performance measurement of asset management arrangements remains a poorly assumed area both in terms of industrial exercise as well as academic research (Wang & Parlikad, 2014). Finally, other concerns involve institutional and legal weaknesses in infrastructure constructions (Koppenjan, 2008). This may lead to a redefinition of the nature or level of service provision or infrastructure assets or the

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development of innovative public projects in Ethiopia (Tiruneh, 2011; Asfaw, 2019). This indicates that there is a lack of strong organizational systems and frameworks in the infrastructure sector in Ethiopia. Practically, the Ethiopian government has established infrastructure sectors' coordinating agency.

D. Infrastructure Funding

Government capital budget and the involvement of private investment is minimal in developing countries (World Bank, 1994). Moreover, old-style methods of financing infrastructure through budgetary provisions and execution by direct contract award have confirmed to be insufficient and most often unimplemented creating a financing gap for the execution of infrastructure projects in developing countries (Cunningham & Kwakkel, 2009; Emenike, 2015). Therefore, infrastructure finance is among the most complex and challenging areas in 'the global financial architecture' (Walter, 2016; Emenike, 2015). Accordingly, infrastructure in LIDCs is largely delivered by the public sector; private participation is mostly directed through PPPs (Gurara *et al*, 2017). Grants and concessional loans are a vital source of infrastructure funding in LIDCs, while the complementary role of bank lending is still restricted to a few countries (Gurara *et al*, 2017). Consequently, bridging infrastructure gaps would need a comprehensive set of actions to enhance the efficiency of public spending, mobilize domestic resources and support from development partners, and crowd in the private sector (Rauniyar & Kanbur, 2010; Emenike, 2015; Gurara *et al*, 2017). While the government is an important force for change, improving economic opportunities and outcomes at scale and over the long term requires the full engagement and participation of the private sector (Treuhft, 2016). It is good if the investment in all cases is a mix of public- and private-sector capital formation (Walter, 2016).

Moreover, the above technical factors, failures of the planning process could be explained by the political factor (Flyvbjerg, 2007; Oyedele, 2012; Dang & Sui Pheng, 2015). Political leaders and government bureaucrats can use infrastructure investment construction as an instrument for securing political positions or competing for scarce funds. Therefore, deficiency of commitment of political leaders and government bureaucrats to national goals, as opposed to personal interests, may possibly make the planning of infrastructure and decision-making politicized rather than rationalized. In addition, powerful groups with a vested interest can make pressure to shake the planning that works for their own interests (Oyedele, 2012; Dang & Sui Pheng, 2015). Hence, it

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is vital to investigate the impact of public capital investment on infrastructure and its impact on economic growth in less developed countries (Nuramo & Haupt, 2015). Although Ethiopia's total investment in infrastructure is among the greatest in Sub-Saharan Africa, to touch its infrastructure targets, the country still requires an important increase in its infrastructure funding amounting to more than 40 percent of its GDP and a cautious investment handling (Foster & Morella, 2011). Even when these resources are mobilized, they are often spent in a very inefficient way. Slow progress reflects a combination of insufficient and inefficient spending both in capital expenditures and in operations and maintenance in developing countries (Dethier & Moore, 2012; AfDB, 2011).

3.3.2 Issues in Infrastructure Governance

Ethnic-interest tension and politicization are common things in democratic governance in developing countries, for example, in Nigeria (Oyedeke, 2012). This is also true in Ethiopia. Those countries which are struggling with poor governance, which results in a lack of public accountability and transparency as well as the absence of clear laws, independent courts, and well-functioning administrative and regulatory agencies (OECD, 2015; OECD, 2017). In fact, this is mainly personal well-being and sector governance biases such as populism including short-term power-hunt (“power through democracy”); patronage (power through undemocratic mechanisms); industry-friendliness (“legal money-hunt”); and, corruption (“illegal money-hunt”) (Benitez *et al*, 2012, p. 6-7). The inconvenient truth is that governance gaps form the greatest impediment to developing, financing, and implementing basic physical infrastructure projects in the developing countries (roads, telecommunication, and electrical power supplies) (Oyedeke, 2012; Walter, 2016; OECD, 2017). Moreover, the link between weak governance and a lack of economic progress is clear. Each year, Transparency International (TI) surveys more than 175 countries and ranks them in its Corruption Perceptions Index (CPI). A poor score indicates extensive bribery, an absence of prosecution or punishment for official corruption, and public institutions that fail to reply to citizens’ needs (TI, 2015). An excessively great amount of the most corrupt states are in Africa, plus key regional players such as Nigeria which ranked 136 of the 167 countries in the 2015 CPI (Walter, 2016). Furthermore, based on expert opinion from around the world, the CPI measures the perceived levels of public-sector corruption world-wide. The CPI practices a scale of 0 (highly corrupt) to 100 (very clean).

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No-country marks perfectly, however. Many less corrupt countries still suffer from the muddy decision-making processes, harbor unlawful finance or have weak law enforcement (TI, 2017). The rank of Ethiopia from 180 countries is 35 which is from the category of highly corrupted countries. This shows that corruption has a great effect on infrastructure governance in the country. Therefore, policy-making and infrastructure planning relates to the deficiency of transparency and accountability. Independent quality checks and peer reviews on forecasts and planning results by independent review bodies and the scientific and professional community are not adequate. The deficiency of penal systems to execute penalties on those that consistently and deliberately produce deceptive forecasts is also attributable to the accountability problem (Flyvbjerg, 2007; Oyedele, 2012; Dang & Sui Pheng, 2015). It follows that, based on the above general issues, intergovernmental collaboration and coordination, decision-making process, land acquisition and right of way framework, and political commitment and partnership have been explained as follows.

A. Intergovernmental Relations/Collaboration and Coordination

Watts (2008) discussed the importance of processes for the collaboration of intergovernmental such as extensive consultation, coordination, and cooperation between governments (federal and regional states, and inter-regional state relations). Watts (2008) added that there are two significant functions: (a) conflict resolution; and, (b) a means of adapting to changing situations including ‘cooperative versus competitive federalism’. Generally, Watts (2008) also disclosed that federations are considered simultaneously by ‘elements of cooperation, collaboration, coordination, collusion, competition and conflict coexisting and changing over time’. Moreover, conceptually, intergovernmental relations (IGRs) deal with relations between different levels of government, which always suggests topics of a political and administrative nature (Palermo & Alber, 2015; Abrucio *et al* 2015). And then, in federalism, IGRs are institutionalized and regulated by procedures. As such ties involve spheres of authority and power the resulting type of arrangement may encourage more ‘negotiation, more bargaining, and more horizontal cooperation, or it may set up conflicts concerning vertical and hierarchical relationships’ (Watts, 2008; Abrucio *et al* 2015). Therefore, it is important to identify the relationship pattern in each political arena with their groups of players and included interests.

Equally important, collaborations across sectors, across neighborhoods, and across jurisdictions are essential for moving the regional infrastructure equity agenda (Blackwell & Fox, 2004; Gerber

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& Loh, 2014). For instance, there is a great requisite to better realize regional equity issues, especially, for rural communities, and make connections to rural constituent units. Furthermore, collaboration is essentially spatial. Although these are clear provisions in most constitutions of federal states, the emergence of conflict always waits in the corner (Olaiya, 2016). According to Olaiya (2016), events over the years, for example, in Nigeria's federation have shown the improper over-dominance of the Federal Government in relation to IGR and lack of efforts by the constituent units to seek sustainable resources have united severally and jointly to weaken the existing mechanisms and institutions for intergovernmental policy coordination. There are also evidences of selective adherence to tenets of federalism, which is anchored on cooperative interactions of the interested party ending to mutual suspicion that has continued to heat the polity (Olaiya, 2016).

From the Ethiopian Context, Fiseha (2009) stated that IGR, after all, is aimed at enhancing ‘shared-rule without undermining self-rule’. Fiseha (2009) also mentioned that the system of IGR has vertical as well as horizontal dimensions. In some cases, IGR in the vertical sense is stretched to cover federal-local as well as regional state-local relations. Horizontally, it discusses with interstate, inter-local relations. Fiseha (2009) also indicated that the system of IGR in Ethiopia to the extent that it depends heavily on party machinery, and which deteriorates the government institutions. Meanwhile, two notions should be treated separately in dealing with federalism which is IGR and coordination. IGR is crucial for federations, even though they also present in unitary countries. Coordination is a broad concept applied to IGRs as well as to public organizations at the same government (Palotti, 2019). Finally, one possible disadvantage of federalism is fragmentation. Hence, vertical relations (federal-regional states) and horizontal relations (regional states-regional states) should be clearly stated by law (Fiseha, 2009). This may avoid fragmentation and confusion in Ethiopia’s current situation.

B. Decision-Making Process

Infrastructure development demands much more transparency (including open data) to inform better investment decision-making process across stakeholder groups and regional states (Bowditch & Noble, 2017). Moreover, infrastructure governance covers the entire life cycle of the asset, but the most resource thorough activities will typically be the planning and decision-making phase for most infrastructure assets (Mansuri & Rao, 2013; ISU, 2017; OECD, 2015). However, in contemporary societies, the decision-making process has become an

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extremely complicated tasks. Decisions are made by an increasing number of actors vested with different legitimacies beyond the mere political/electoral one. These actors are arrayed both vertically (levels of government) and horizontally (parliaments, governments, agencies, courts, administrations, interest groups) (Palermo & Alber, 2015). Thus, the traditional institutional decision-making process is without a doubt no longer sufficient to cope with contemporary complexity challenges as there are politicized decision-making (Goel, 2015). Moreover, the organizational decision-making process involves the proper and efficient implementation of strategic plans and methods to achieve the desired objective (Itanyi *et al*, 2012). Finally, the distinction of social and work effects and disturbing events of variables that characterize naturalistic decisions is useful to study and measure naturalistic decision-making processes (Lizarraga *et al*, 2009). Therefore, leadership/managers should think about the three key contingency variables of environment, technology, and people, before making an independent decision (Itanyi *et al*, 2012). Accordingly, decision-making management requires the control of human resources, environment, and material resources (technology) to achieve an optimum objective.

C. Land Acquisition and Right of Way Framework

Investment in infrastructure development such as road, airport, and hydropower development for a public purpose is very important for the development of any country and needs a huge quantity of land (WDR, 2006; Ghimire *et al*, 2017). Broadly, land acquisition processes pass through a spectrum from compulsory acquisition procedures that forcibly procure land from landowners and provide them with a predetermined compensation package, to consultative processes that involve negotiations with stakeholders (Mahalingam, 2011). Therefore, land governance principles such as public participation, access to information, transparent procedure, and stakeholder interaction are critical for delaying the infrastructure development projects (Ghimire *et al*, 2017). In many developing countries, land acquisition is considered one of the major barriers to governments' plans to develop infrastructure (Ghimire *et al*, 2017; Arul vikram & Murali, 2015). Moreover, lack of law enforcement to regulate the price of land acquired for infrastructure projects is regarded as the major cause of this problem (Ghimire *et al*, 2017; Dang & Sui Pheng, 2015; Arul vikram & Murali, 2015). Besides, corruption, defined as the abuse of public power for private benefit, is one of the main problems faced by developing countries (Churchill *et al*, 2013).

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In other ways, major impacts of corruption in infrastructure can lead to poor construction, limited occupational safety, and low returns to government infrastructure investments (Nordin *et al*, 2011; Dang & Sui Pheng, 2015; Arul vikram & Murali, 2015). Therefore, corruption in construction projects can reduce the efficiency, effectiveness, and equity of infrastructure allocations (Nordin *et al*, 2011; Dang & Sui Pheng, 2015; Arul vikram & Murali, 2015). In countries, for example, Indonesia, Nigeria, and India based on public opinion, land acquisition is carried out and compensation is provided to the affected people. Whereas, the compulsory acquisition is carried out in various countries like Malaysia, Bangladesh for their infrastructural development (Arul vikram & Murali, 2015). Whereas, Ghimire *et al* (2017) indicated that, from the international point of view, different countries (China, India, Malaysia, and Nepal) have different legal instruments, a procedure for land acquisition and land valuation approaches depending upon the social, political and economic conditions of the country. Then, the overall gap identified is the implementation of land governance principles such as access to information, public participation, and transparent procedure in land acquisition, valuation, and compensation processes (Ghimire *et al*, 2017).

When governments compulsorily acquire land, they have an obligation to ensure that the process is completed in an equitable and transparent manner (FAO, 2009; Arul vikram & Murali, 2015). Therefore, the land is a key issue in network infrastructure. For such a case, public land is essential to the grid of network infrastructure needed to support urban life (Walter, 2016). When one considers the case of Ethiopia, under the constitution of Ethiopia (1995), Article 40 (3) says “the right to ownership of rural and urban land, as well as of all-natural resources, is exclusively vested in the State and in the peoples of Ethiopia. The land is a common property of the Nations, Nationalities, and Peoples of Ethiopia and shall not be subject to sale or to other means of exchange”. According to this article, every citizen has the right to acquire and use the land, but impossible to sell. Article 40 (8) also states that “without prejudice to the right to private property, the government may expropriate private property for public purposes subject to payment in advance of compensation commensurate to the value of the property”. The constitution of FDRE also provides that, “the government may expropriate private property for public purpose subject to compensation, which is equivalent to the value of a property under Article 40(5)”.

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Moreover, under the land policy of Ethiopia, land needed by the government for development work may become the subject of compulsory acquisition. The enabling legislation is the proclamation to deliver for the expropriation of land-holdings for public purpose and reimbursement of compensation (Proc. No. 455/2005). Currently, this proclamation is under revision. However, 455/2005 provided for compensation for property located on land and permanent improvement to such land equal to the value of labor and capital expended. But in practice local governments are not compensating for functioned such as land clearance, irrigation ditches, and terracing, stating that the productivity approach reflects these investments. In addition, no compensation is paid for indigenous trees and communal land (Tenna, 2015). Public purpose is widely exercised in Ethiopia, as well as for private commercial purposes, contrasting other countries, and has no right to appeal the “purpose” of the expropriation as Proc. No. 455/2005. Meanwhile, land expropriation in Ethiopia encountered resistance from the farmer because of unfair compensation and lack of exercise before and after compensation (Tenna, 2015). This is in contradiction to the Ethiopian Constitution (1995) article 44.⁴⁰ Finally, Lie and Mesfin (2018) added that what makes things not as good as in Ethiopia is that land is in the hands of the state as the government exercises total accountability for how land is allocated and prohibits the private sale of land. Although, these criticisms need further investigations in Ethiopia.

D. Political Commitment and Partnership

Political commitment is also central to democratic political action, and partisanship is crucial to sustain and enhance political commitment (Ypi, 2016). However, the challenges of infrastructure development in third world countries are many (Dethier & Moore, 2012; Oyedele, 2012). Due to the wide gap between provision and needs, the leadership lessons are in an unsettled situation in all sectors, for example in Nigeria (Oyedele, 2012). If one cares about political commitment, the best way to promote it is to allow it to be shaped and further developed in associative practices of shared political projects (Treuhft, 2016). Furthermore, the development of infrastructure includes a long-range vision that sustained commitment from the government is critical to maintaining the development of a concrete strategy and subsequent actions. As a result, a deficiency of political commitment has direct impacts on the implementation of infrastructure development plans in an

⁴⁰ Ethiopian constitution (1995), Article 44 Environmental Rights, 1. All persons have the right to a clean and healthy environment; and, 2. All persons who have been displaced or whose livelihoods have been adversely affected as a result of State programs have the right to commensurate monetary or alternative means of compensation, including relocation with adequate State assistance.

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equitable manner (Oyedele, 2012; Dang & Sui Pheng, 2015). Besides, the literature on development planning highlights that the wide gap between plan formulation and plan implementation in most developing countries could be attributable to a lack of political will on the part of top leaders and high-level decision-makers. Lack of political commitment could also be the result of political discontinuity. Political inconsistencies at the federal level and between different tiers of governments could also have adverse effects on the implementation of the projects. Meanwhile, the lack of political consensus goes together with the lack of a high-powered government institution that provides an effective mechanism for implementing national infrastructure plans (Oyedele, 2012; Dang & Sui Pheng, 2015).

3.3.3 Issues in Infrastructure Equity

More physical infrastructure investment such as roads will bring countries and regions closer to the world markets and decrease regional disparity (Fan & Zhang, 2002). Lack of access to electricity, mobile phones, and the Internet limits the potential earnings of modern accessibilities and facilities in developing countries (World Social Report, 2020). However, investments in infrastructure in developing countries may bring about aggregate benefits, the distribution of those benefits cannot be easily ignored (Castells & Sole-Olle, 2006; Rammelt, 2018). Hence, it necessitates an intentional focus on eliminating inequities and barriers and making accountable and catalytic investments to promising that lower-wealth residents that are living in safe, healthy, opportunity-rich localities which reflect their culture; link to ownership and economic opportunities; and have a voice and impact in the decisions that shape their localities (Treuhart, 2016; Rammelt, 2018). Moreover, one can describe uneven infrastructure development as a market failure. Government intervention may be called upon to address this problem (Schultz, 2017). But, formulating a feasible policy response to uneven economic growth in infrastructure first means properly recognizing the cause or causes of uneven economic development (Schultz, 2017).

Therefore, applying regional equity values and policies can map an equitable course for future development and investment decisions, helping to build a nation of inclusion and broad opportunity (Blackwell & Fox, 2004). However, current state and local practices continue to reinforce these regional disparities in developing countries. Specifically, there is a problem in

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infrastructure equity in Ethiopia, especially in the road and electric sector (Kanth and Geiger, 2017). Then, based on the above general issues, equal opportunity in infrastructure, social/distributive justice, national and regional infrastructure competitiveness, spatial intervention/planning and citizen/stakeholder/public satisfaction have been explained as follows.

A. Equal Opportunity in Infrastructure

In the famous *Theory of Justice*, Rawls (1971) articulated two principles of justice in which the first principle indicates ‘fair equality of opportunity’ meaning equal claim by all to basic rights and liberties, and the second principle (‘difference’ principle) means that ‘greatest benefit to the least-advantaged members of society’ (Rawls, 1971, p. 47). As also discussed in Chap. 1, WDR (2006) has also defined equity in terms of two basic principles (Equal opportunity and Avoidance of absolute deprivation in outcomes). WDR (2006) indicated that the equal opportunity principle is conceptually simple as circumstances at birth should not matter for a person’s chances in life. But to measure inequality of opportunities is much harder. However, unequal economic opportunities lead to unequal outcomes and reinforce unequal political power. Unequal power forms institutions and policies that incline to nurture the persistence of the initial circumstances (WDR, 2006). But, the fairness (or equity) of a specified distribution of accomplishments (for example, incomes, or utilities) cannot be judged by perceiving only the degree of inequality present in that distribution (Ferreira & Peragine, 2015; Bodislav, 2012; Mahler & Ramos, 2017). Moreover, distributive judgments now need a prolonged informational basis. Ex-ante disparities, and only those disparities, ought to be removed or compensated for by public intervention (Pignataro, 2010). Thus, it needs a measure of concrete effort, which, because the effort is biased by situations, cannot be an uncooked effort (Roemer & Trannoy, 2013). A general approach to dividing up disparities into those that could be justified and those that cannot is by implementing the principle of equal opportunity (UNESCO-UIS, 2018) are crucial. As well, Brunori *et al*, (2013) stated that:

Widespread agreement on the basic principle of what equality of opportunity refers to inequalities due to circumstances beyond individual control are unfair and should be compensated for, while inequalities due to factors for which people can be held responsible (sometimes called “efforts”), may be considered acceptable. But this broad concept can be interpreted in a number of different ways, some of which have been shown to be mutually inconsistent (Brunori *et al*, 2013, p.2).

However, it is possible to measure basic opportunities or services such as access to electricity; access to roads; and, access to telecommunication by using the human opportunity index or

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composite infrastructure index (Chotia & Rao, 2015). Regional equity framework also reflects four arenas for action-living near regional opportunity, connecting people to regional opportunity, encouraging equitable public infrastructure investment, and making all neighborhoods stable, healthy, and livable-to appreciate the vision of national and regional equity (Blackwell & Fox, 2004). Moreover, economic opportunities are strongly shaped by access to infrastructure. As in the case of land, more equal access to infrastructure would be good for equity and will often be good for growth (WDR, 2006). This requires addressing difficult financing issues, constraints that limit the poor's ability to access infrastructure, and major accountability issues through institutional designs that support a more equitable response to needs. Besides, infrastructure development during colonial times was concentrated on building, for example, transportation from resource sites to a port (WDR, 2006). Whereas, today the center should be the people.

B. Social/Distributive Justice

The framework of the social justice study mainly deals with concerns of distribution (Tyler & Smith, 1995).

According to Tyler and Smith (1995), social justice includes the following six questions:

whether judgments about justice and injustice shape people's feelings and attitudes-relative deprivation, equity, retributive justice, and procedural justice... which criteria people use to determine whether or not justice has occurred ...how people respond behaviorally to justice or injustice once they decide it has occurred... why people care about justice-The social justice motive from two broad theoretical perspectives-social exchange and social identification model...when people care about justice... how justice concerns originate-Three perspectives-justice judgments represent a basic innate or unfolding human concern...justice concerns develop out of personal experiences with others.... justice concerns which develop through cultural socialization (Tyler & Smith, 1995, p. 2).

The Basic Social Justice Orientations (BSJO) scale measures justice attitudes in relation to central 4 principles of the delivery of benefits and burdens in a society (Liebig *et al*, 2016).⁴¹ The BSJO scale is an eight-item scale that measures promise with the “Equity” (just if the benefits and burdens in question are allocated according to individuals’ current individual contributions and efforts), “Equality” (the allocation and distribution of benefits and burdens are just if everyone is allocated the same share), “Need” (benefits are allocated according to people’s individual needs), and entitlement (benefits and burdens should be allocated on the basis of specific entitlements that are themselves based on ascriptive characteristics (e.g., social origin, sex) or on status characteristics that have been acquired in the past (e.g. occupational status) which is unlike in the case of the equity principle) (Liebig *et al*, 2016). The other is distribution principle which is also distinguishing as three dimensions of justice attitudes (order-related attitudes-relating to rules or

⁴¹ Liebig, Stefan; Hülle, Sebastian; May, Meike (2016), the Working Paper introduces the "basic social justice orientations" scale for measuring social justice attitudes... The BSJO scale was developed to create and provide a valid instrument for measuring the four order-related justice attitudes—equality, equity, need, and entitlement—that would take the form of a short, eight-item scale for time-efficient use in large-scale population surveys.

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norms, procedure-related attitudes-concerning decision-making process, and outcome-related attitudes-reflecting assessments of specific results) (Liebig *et al*, 2016). Liebig *et al* (2016) also stated that there are four justice ideologies which are “Ascriptivists” (the view that human beings are to be held responsible for their social actions); “Egalitarianism/ the state” (wish for maximum equality); “Individualists/the market” (only achievers are rewarded with success); and, “fatalistically” (that denies them justice) (Liebig *et al*, 2016). Accordingly, the above principles and ideologies have been considered in this study, specifically equity, and statism/egalitarianism respectively.

Therefore, “social justice” is a fundamental element of the legitimacy and stability of any political community and regional states. Whereas, distributive justice involves the use of ethics concepts and criteria to determine how scarce resources should be divided among people, groups, organizations, communities, and regional states, (Tischler & Kroll, 2014)⁴². McLaughlin and Baker (2007) have also identified five keys dimensions’ in which people can be equal or unequal in contemporary societies are “Respect and recognition”; “Resources”; “Love, care and solidarity”; “Power”; “Working and learning”. Moreover, by considering Rawls’ two rules of distribution-“the absolute equal distribution of basic liberties and political rights”, and the “difference principle” of socio-economic justice (Giebler and Merkel (2014, p. 84), Giebler and Merkel (2014)⁴³ have also identified (based on different scholars thought) indicators to measure social justice. There are three steps in this process of validation that are “Developing principles” (Equal distribution of primary goods and equal opportunity in developing capabilities), deriving single dimensions such as poverty prevention, public compensation, labor, intergenerational justice, etc., and finding indicators for measuring these fundamental dimensions of social justice

⁴² Tischler, D. and Kroll, C. (2014), Social Justice in the EU: A Cross-national Comparison, Social Inclusion Monitor Europe – Index Report, Bertelsmann Stiftung. This report focuses on the conditions for a socially just society. The question of whether a society can be deemed socially just depends significantly. This report focuses on the conditions for a socially just society. www.social-inclusion-monitor.eu

⁴³Giebler and Merkel (2014), Measuring Social Justice and Sustainable Governance in the Organization for Economic Cooperation and Development (OECD). Principles (Equal distribution of primary goods and Equal opportunity in developing capacities)-Seven Dimensions: Poverty prevention, education, labor, Public compensation, Income distribution, ntergenerational justice and discrimination; Seven Items.

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such as poverty rate, social cohesion, unemployment rate, environmental policy, the national debt (Giebler & Merkel, 2014), etc., which are workable in developing countries.

Furthermore, Tischler and Kroll (2014) have also identified and discussed the Social Justice Index's six dimensions which are poverty prevention; equitable education; labor market access; social cohesion and non-discrimination; health; and, intergenerational justice. Inequality also occurs through social, political and economic inclusion, and exclusion (Gupta *et al*, 2015). There is now considerable evidence that, for example, road transportation is strongly complementary to health and education achievements. Thus, the supply side limitation is compulsory and school enrolments are low (Rauniyar & Kanbur, 2010). Finally, it is also vital to distinguish social and legal justice. Social justice is fairness between an individual's activities and rewards that one receives from his/her community or society. Whereas, legal justice is equal treatment of individuals by their state, appropriate relationship between individuals and their state (Coninck *et al*, 2013). However, there exists a low level of social cohesion (i.e. the willingness of members of the society, specifically the elites to cooperate with each other in order to prosper) in Ethiopia today. In relation to social justice, infrastructure equity, the poverty, and unemployment rate are analyzed in this study. See Chap.8.

C. National and Regional Infrastructure Competitiveness

GCR (2018) stated that better-connected geographic areas have generally been more prosperous. Well-built infrastructure drops transportation and transaction costs and enables the movement of goods and people and the transmission of information within a country and across borders. It also guarantees access to power and telecommunication-both essential circumstances for contemporary economic activity (Schwab, 2018). However, competitiveness is not a zero-sum game between countries. It has to be attainable for all countries (Schwab, 2018). But, historically, it was a zero-sum game that a country could only enhance its competitiveness at the expense of another country (Delgado *et al*, 2012). Delgado *et al* (2012) also added that a framework that highlights three broad and interconnected drivers of central competitiveness are political institutions and social infrastructure, monetary and fiscal policy, and the microeconomic environment. Hence, countries with great global investment attractiveness (i.e., low factor costs relative to competitiveness), such as China and Singapore, have developed rapidly. In contrast to this, countries with little global investment attractiveness (high factor costs relative to competitiveness), like Greece, Italy, and

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Spain, have indicated their prosperity to be unmanageable (Delgado *et al*, 2012). Moreover, no country has achieved sustained growth without entrance to global markets, a global investment, and global know-how (Rauniyar & Kanbur, 2010; Ketels, 2016).

Meanwhile, Iarossi (2013) has presented a new approach to assess competitiveness at the regional state level, for instance, the competitiveness ranking among 37 Nigerian states at the macro-level, and classify the most significant policy reforms likely to raise competitiveness in a locality, and has designed a composite indicator to measure it. The author also stated that this study is significantly different from others. This is because it measures competitiveness at the subnational level; it allows for non-constant compensability of indicators; and, it is able to prioritize among policy reforms. Iarossi (2013) has also focused on microeconomic factors that are related to, for example, physical infrastructure. In relation to these, there is a low level of infrastructure access across regional states in Ethiopia. There is, for instance, low road density in the country for global competitiveness which can be measured by kilometers of road per 1,000 square kilometers of land (road connectivity index 0-100 (best), the score is 32). There is also a lack of quality of roads that affects regional/ national competitiveness which can be measured by paved roads (quality of roads 1-7 (best), the score is 37.8).

There is low electrification access or rate % population in the country that can be measured by the percentage of the population with access to electricity (electrification rate % pop is 40.4). There is also low electricity quality that can be measured by electric power transmission and distribution losses % output in the country (86.2). Moreover, there are medium mobile-cellular telephone subscriptions per 100 populations in the country (0 to 100 scale, 49.7). There are also low fixed-broadband internet subscriptions per 100 populations in the country (0 to 100 scale, 1.1). There are low internet users % population in the country (15.4) (Schwab, 2018). However, the incumbent government of Ethiopia's economic strategy for competitiveness embodies a series of policy trade-offs that prioritize public infrastructure investment and constrain the private sector (WBG, 2017). Moreover, there is a lack of ensuring infrastructural links and mobility to enhance competitiveness across the regional states in Ethiopia (Ministry of Urban Development & Housing of Ethiopia (MoUDH), 2015). Besides, the question is how the growing inequalities can be managed within Ethiopia. Therefore, the focus of the study, here, is the importance of physical infrastructure in

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national, international, and global competitiveness for any country, especially which is very important for Ethiopia.

D. Spatial Intervention/Planning

Inequalities/inequities linked to the location is also known as “spatial inequalities” or “the rural-urban divide” that could be “extreme between rural and urban areas, especially in developing countries” (World Social Report, 2020, p. 109). The function of comprehensive spatial planning at a national/regional level is to endeavor to implement the principles of spatial planning in accordance with the underlying vision of sustainable spatial growth (Turowski, 2002). The other point is an internal divergence between urban and rural areas, and between regional states, more generally, which tracks unfair development of infrastructure across these divides has become a disturbing aspect of recent growth experience (Rauniyar & Kanbur, 2010; World Social Report, 2020). However, there is a major warning to drawing direct connections between, for example, rural roads and inclusive development. This relates to a larger issue of the balance between demand-side and supply-side interventions in achieving inclusive development (Rauniyar & Kanbur, 2010; World Social Report, 2020). Therefore, it is very relevant to have spatial data infrastructures that will help to facilitate access to and effective use of geospatial data for decision-making processes (Makanga & Smit, 2010). Geography or spatial dimension matters. Regional inequalities/inequities within countries are often higher than inequalities/inequities among countries (World Social Report, 2020).

From a theoretical perspective, Kim (2008), argued that, generally, spatial inequality is the net effect of the equilibrium of forces of concentration and dispersion. Moreover, Kim (2008) stated that regional inequality is mainly determined by the location decisions of the state. Thus, place-based policies (PBP)-such as special economic zones, treatment of lagging regions, etc. - are an integral part of development policies which are often very expensive and they need those choices to be made between places. These choices are mainly severe in developing countries as constrained resources and the unevenness of many public investments in infrastructure mean that, of

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requirement, some places are served with roads, power, telecommunications, industrial parks, airport, and universities, others (Duranton & Venables, 2018).⁴⁴

If the above path is not in place, then and their growth will fail. These considerations are predominantly severe in developing countries. This is partly because the economic situation is one of the rapid changes in all compliments as well as spatial. And also for the reason that the cost of making poor location decision-making might be higher which needs coordination, and the cost of coordination failure is relatively becoming much greater (Duranton & Venables, 2018). This is a common characteristic of developing countries, related to developed countries when they are at comparable phases of growth (Kim, 2008). However, Ethiopia today is characterized by two contrasting aspects which are poverty and economic growth. These aspects are spatially distributed. Poverty is more noticeable in the rural hinterlands (Lie & Mesfin, 2018). In general, access to opportunities and resources like infrastructure has a clear spatial measurement, i.e. “people in rural areas are worse off than urban populations” (World Social Report, 2020, p 112). Thus, poverty and inequalities are indeed tangible and exacerbated by proliferating urbanization and unemployment rates (Lie & Mesfin, 2018). For example, the urban unemployment rate at the country level in Ethiopia is 19.1% (Male 12.2% and female 26.4%) (CSA, 2017/18). The spatial disparity is a dimension of overall disparity, but it has added importance when regional divisions and spatial align with political and ethnic tensions to weaken social and political stability (WDR, 2009).

Certainly, the case for policy interventions to ensure a more spatially equitable allocation of infrastructure and public services is needed. Meanwhile, intergovernmental collaboration is fundamentally spatial. Thus, to think spatially, various ingredients should be required- accessibility, greater proximity, agglomeration economies that are created by close and strong economic collaboration and coordination., expectations of future returns, first-mover problem-no

⁴⁴ Duranton, G. and Venables, A. J. (2018), Place-Based Policies for Development Policy, World Bank Group. Place-based policies – such as transport improvements, special economic zones, and treatment of lagging regions – are an integral part of development policy. They are frequently very expensive and they require that choices be made between the places at which policy is implemented. Choices are particularly stark in developing countries as constrained resources and the lumpiness of many public investments mean that, of necessity, some places will be served with roads, telecommunications, power and other public services, before others. Informing these difficult choices with systematic ex ante appraisal of projected policies is complex because of two distinctive features of place-based policies. The first is that place-based policies are typically expected to deliver two types of benefit. One is the direct effect; e.g. a transport improvement saves time and vehicle operating costs. The other is indirect; the transport improvement may induce private sector investment, job creation, and higher productivity.

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one needs to move to a new place while unclear about its future growth, coordinated undertaking by a group of firms might resolve the problem, but usually, there is coordination failure, and a further component of spatial economics is the role of the price and wage adjustment in safeguarding regional competitiveness when and where coordination failure makes it problematic to launch alternative economic centers) (Duranton & Venables, 2018). Although, the outcomes of PBP are inherently uncertain, but selections have to be accomplished (Duranton & Venables, 2018). It is also noted that a particular PBP is not likely to be the ‘first-best’ way to address market failures. The theory of policy targeting articulates that the central determinants of market failure ought to be identified and then addressed by the targeted policies (Duranton & Venables, 2018).

Furthermore, there is a lack of preparing spatial planning policy to a national coordination framework of equitable infrastructure to ensure the delivery of public services and to strengthen the economic capacity of the regional states in the country. Additionally, there is a lack of restructuring and implementing alternative solutions from spatial planning pilot projects and others in an exemplary manner in the country. There is also a lack of mediating and settling conflicts in the course of federal state and regional planning procedures with the participation of local governments and cities as well as the citizens. Moreover, there is a lack of taking account of increasingly competing between private and public interest uses in open spaces, e.g. cultural landscapes (MoUDH, 2015). This brings spatial inequality across different geographical areas in the country. The major causes of spatial inequality include adverse agro-climatic conditions, institutional failures, and poor infrastructure. Finally, if one looks at disaggregated regional state realities instead of the aggregate national picture and if one examines the service delivery and non-income or non-expenditure parameters, there are important inequality challenges in Ethiopia (Kedir, 2015), which needs special intervention and planning in the country.

E. Citizen/Stakeholder/Public Satisfaction

Understanding the process of citizen/stakeholder trust is a precondition for successful stakeholder management (Asfaw, 2019). However, the authorities’ understanding of infrastructure stakeholders is limited, because they do not regularly examine the stakeholder valuation of the infrastructure (Hietbrink, 2012; Chatzoglou *et al*, 2014). This study has considered that SERVQUAL (stands for Service Quality) provides technology for measuring and managing service quality (SQ) (Buttle, 1996; Nyangarika, 2016). SERVQUAL has five dimensions:

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reliability; assurance; tangibles; empathy; and, responsiveness (Buttle, 1996; Chatzoglou *et al*, 2014; Nyangarika, 2016). Such an approach will enhance the general knowledge about citizens' expectations and, therefore, allow policymakers to take necessary measures towards meeting their actual needs (Chatzoglou *et al*, 2014; Nyangarika, 2016). More specifically, corruption, weak accountability systems, and a lack of responsiveness on the part of government are often stated as the basis of the growing disillusionment of citizens with their governments in Ethiopia (Terefe, 2014; Asfaw, 2019). Therefore, there is a lack of willingness to help customers' responsiveness, reliability, assurance, empathy, and effectiveness in the infrastructure sector in Ethiopia. Terefe (2014) also stated that institutionalization of participation in the planning of public service delivery and strengthening the independent institutions including social accountability initiatives need to be consolidated in Ethiopia. This is because when stakeholder-led infrastructure is a reality, the country is more likely to be better managed by infrastructure solutions that are scaled, timely, and feasible (Bowditch & Noble, 2017).

3.3.4 Issues in Nation-building Process

As reviewed in Chap. 2, Connor (1972) acknowledged that there are two possibilities for the theory of “nation-building”. The first one is those who do not give serious attention to “ethnic diversity” by saying that “most states are ethnically homogeneous” or that ethnic diversity poses no serious problems to integration. The second one is those who bother about ethnic diversity. However, according to Connor (1972), the former possibility does not reflect reality. Thus, nation-building refers to a more abstract process of emerging a shared sense of identity or community among the various groups making up the population of a particular state (Linz, 1993; von Bogdandy & Wolfrum (eds.) (2005); Dinnen, 2006; Hippler (Ed.), 2004, 2005; Stefan *et al*, 2011; Hundara, 2017). Above and beyond, nations stay together when citizens share enough values and preferences and can communicate with each other (Alesina & Reich, 2015; Hundara, 2017). Therefore, worries about “failed” and “fragile states” have put state- and nation-building decisively on the academic and policy agenda. This is also of utmost common in non-academic circles, mainly in the donor circles, media, and amongst NGOs (de Walle and Scott, 2009). Actually, most African states have these common characters which are multiethnic; all failed to restore and sustain their original African identities; inhibit incomplete state formation; invariably have undemocratic, authoritarian, and detractor governments; practice ethnic-based tensions and conflicts (Fiseha, 2006; Hundara, 2017). Hippler (Ed.), 2004, 2005) stated that:

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Nation-building is a painful, contradictory, and complex process that tends to promise success more when the population affected perceives practical improvements in its actual living circumstances and implicitly or explicitly associates these with the nation-building process. If living conditions deteriorate further or stagnate at a low level, the legitimacy of every political project which the population regards as being responsible for this will suffer. A lack of legitimacy could, theoretically, be compensated for by compulsion for a time, though this is not desirable and cannot be sustained over the long term. Nation-building is accepted or at least tolerated when it arouses hope for a better future and there are at least some credible indications of this – otherwise, it can easily be perceived as something alien, enforced, artificial or threatening. There is then a danger of the resulting dissatisfaction providing strength for alternative political models (of a secessionist, ethnic or religious nature) at the expense of the integration process (Hippler (Ed.), 2004, 2005, p.185).

Currently, Ethiopia fully shares these features. And then, based on the above general issues, rule of law, democratic/public accountability, shared national identity, sustainable and inclusive growth in relation to state-and nation-building have been explained as follows.

A. Rule of Law

Domingo (2009) has suggested a framework that develops a theoretical/conceptual map around three overlapping but distinct components or “pillars of rule of law”, all of them are serious to securing legitimacy for governance and effective state- and nation-building. Domingo (2009) acknowledged the following 3 points about the rule of law which are crucial for developing countries including Ethiopia:

- It is about the degree to which there is political will and institutional capacity to endorse accountable government which links to the extent to which those in power are controlled effectively by a pre-established and widely acknowledged set of rules of political engagement;
- It is about the capacity of the state to defend and provide the rights of citizens, however, these are clear, but preferably in line with international human rights promises and reflecting an inclusive social contract;
- It is about the state’s ability to enforce the law and defend its citizens through the delivery of security against diverse forms of threat.

Moreover, the World Justice Project (WJP) Rule of Law Index delivered new data on nine concepts or factors of the rule of law which are limited government powers, order and security, absence of corruption, open government, effective criminal justice, fundamental rights, regulatory enforcement, access to civil justice, and informal justice (Botero & Ponce, 2017-2018). Botero and Ponce (2011) also stated that there has been an increased interest in the rule of law as an assurance of stability, order, and economic development. This is because different rule of law paths relates to different combinations of power relations and resource distribution (Domingo, 2016).

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However, the rule of law is compromised by a lack of accountability, impunity, and corruption, which most Africa Union member states mentioned as obstacles (largely due to inadequate implementation) to sustainable development, governance, and democracy consolidation (Cordenillo & Sample, 2014).

Furthermore, the Ethiopian Constitution (1995) Article 25 about the right to equality reads that “all persons are equal before the law and are entitled without any discrimination to the equal protection of the law. In this respect, the law shall guarantee to all persons equal and effective protection without discrimination on grounds of race, nation, nationality, or other social origins, color, sex, language, religion, political or other opinions, property, birth, or another status”. But, based on the above constructs or factors of rule of law, Ethiopia has got 0.33 scores, which is below the standard as all scores range between 0 and 1, where 1 signifies a higher adherence to the rule of law (Botero & Ponce, 2011). In the 2017-2018 WJP evaluation, Ethiopia has also got 0.38 scores. Her rank is 107 out of 113 countries in rule of law (Botero & Ponce, 2017-2018). From this one could raise that, for example, government powers are not effectively limited by independent auditing and review; there is the use of public office for private gain; not properly sanctioned for misconduct; lack equal treatment and lack of publicized laws and government data availability; government regulations are not effectively enforced which leads to weak contract administration: over budgeting, delays, corruption, etc., in the infrastructure sector (Abebe, 2012; Lie & Mesfin, 2018).

In short, there is a lack of good governance due to incompetent leadership for better infrastructure equity in the country. Thus, the rule of law has long been an aspiration of the Ethiopian people (Salih *et al*, 2018). There should also be a domestic as well as international pressure for a “full-fledged state of rule of law” in Ethiopia which has so far been unorganized, incoherent, and insignificant (Abebe, 2012). Moreover, the “traditional value of loyalty, honesty, obedience, and respect for authority are giving way for breach of trust and dishonesty” (Asfaw, 2019, p. 25). This is because a lack of citizens’ institutional trust can lead to low public confidence and low legitimacy of governments (Asfaw, 2019).

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B. Democratic/Public Accountability

Well-functioning accountability instruments are believed to provide incentives for governments to work in the best interests of citizens (Jelmin, 2012). Accountability lies at the core of a healthy democracy in developed countries, unlike developing countries. Therefore, the failure of accountability in developing countries to have pace results in accountability gaps in some public services; shortage of information on public services' performance; and, a lack of accountability for the overall objectives of government (Guerin *et al*, 2018). As reviewed in Chap. 2, Siegle (2012) has also highlighted six significant focal areas where the expectations of public accountability are highest which are the degree to which policies are equitable and inclusive, use of public funds, independence of the judicial sector, de-linking economic prospects to political allegiances, a level playing field in the process of competing for political power, and avoiding the deployment of the coercive capacity of the security sector for political ends (Siegle, 2012). Moreover, norms of corruption, cronyism, inequity, and illegitimacy are established in less developed countries (World Bank, 2009). And then, the focus areas are that more equitable, transparent, and participatory institutions create encouragements for investment in public goods and services that produce more broad-based and consistent development (Siegle, 2012). This results not only in a more equitable and efficient allocation of public resources such as infrastructure but a more equitable allocation of opportunity.

Siegle (2012) also summarized that media, information, and communication technology, civil society groups, and external actors also play critical early roles in enhancing accountability and shaping political will. It is also stated that unless other societally-based accountability measures can be mobilized in the intervening, the momentum for reform is difficult to sustain in developing countries. Jelmin (2012) also indicated that an issue that would need further attention and research is how social and political actors could interact to make governments accountable, and how such cooperation can be encouraged in developing countries. However, in relation to this, it is stated that the government media (electronic and print) is a less popular national institution in Ethiopia (Asfaw, 2019), which needs further improvement.

C. Shared National Identity

Ethnically divided societies come into conflict specifically over the issue of “national” vs. “group identity” (Anderson, 2013), which is mostly difficult to resolve. The building and maintenance of national identities are now and always has been lively, and contested issues (Dinnen, 2006).

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Connor (1972) stated that the essence of a nation is not tangible. It is psychological, a matter of attitude rather than of fact. Connor (1972) added that what is basically involved in an ethnic conflict is the difference of basic identity which reveals itself in the “us-them” syndrome. Thus, cultural assimilation need not mean psychological assimilation. Gellner (1983) also stated that the state has certainly emerged without the help of the nation. Some nations have certainly emerged without the blessings of their own state. As a result, identity is a concept unique to human beings (Gelisli, 2014). Gelisli (2014) stated that there are two components that constitute identity, i.e. the first one is ‘recognition and identification’ while the second one is the ‘sense of belonging’ (Gellner, 1983; Gelisli, 2014). Whereas, a nation is the name of a community of people who share ‘history, territory, common myths and historical memory, public culture of a mass, a common economy, and common legal rights and duties’ (Connor, 1972; Gellner, 1983; Gelisli, 2014).

Moreover, Gelisli (2014) added that national identity is an expression of belonging to national culture. In addition, language, religion, flag, history, homeland, government, lifestyle, architecture, music, customs, and traditions are important elements of national identity. National identity is closely interrelated with other geostrategic, ethnic, social, economic, political, etc. identities. Therefore, when national identity is well-thought-out, it is naturally essential to study the ethnic and general history, political and economic situation, social structure, and geography of a country. Consequently, identity is a reality experiencing constant change and repeated in the historical process (Gelisli, 2014). Furthermore, identity has different “components” of identity, such as state of mind of belonging to one’s own ethnic-group, personal affiliation, practices, patterns of association, and so on. These components may be provisionally specific and change with a context in diverse ways (Nandi & Platt, 2012).

D. Inclusive and Sustainable Growth

Inclusive development first performed in publications of the Asian Development Bank (ADB, 2007) as a strategy towards equity and empowerment based on poverty reduction; human capital, social capital and gender development; and, social protection (Rauniyar & Kanbur, 2010). Moreover, inclusive growth is a distinct concept that advances equitable opportunities to every section of society (Tilak, 2015). In addition, Gupta *et al* (2015) and (Tilak, 2015) identified that inclusive development focuses, first, on human material, social-relational and cognitive/psychological well-being; Second, inclusiveness focuses attention on the poorest,

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vulnerable and the most marginalized or disadvantaged people; Third, inclusiveness includes the knowledge and aspirations of local people in the development process and enhances their participation in decision-making; Fourth, inclusiveness suggests affordable access to civic facilities and basic infrastructure including roads, education, energy, etc.; Fifth, a wide-ranging approach calls for taking contexts into account- the local level; Sixth, it is serious to look at the sectors within which the poor, marginalized and vulnerable work, and to stretch this attention at both local and global level; and Seventh, inclusive development calls for participatory approaches in governance and for capacity building; this implies non-discriminatory and equal opportunities for participation in society (Gupta *et al*, 2015; Tilak, 2015) .

In other ways, the Commission on Growth and development (2008) also describes inclusiveness as a notion that incorporates equity, equality of opportunity, and protection of the people mostly the weaker sections in market and employment transitions; it is an indispensable component of any successful growth strategy (Tilak,2015). It is a growth strategy with highlighting not only the delivery of economic gains but also the vulnerability, security, empowerment, and sense of full participation that people may appreciate in social life (World Bank, 2006). Therefore, inclusive growth policies are anticipated to the purpose of the creation of a ‘society for all’ (Tilak, 2015).

Inclusive growth represents growth that generates decent jobs, gives opportunities for all sections of society, especially socially excluded groups, and distributes the income and non-income gains from prosperity more equally across society (Rauniyar & Kanbur, 2010). According to AfDB (2018), ensuring sustained, sustainable and inclusive growth through industrial structural transformation requires investments in economic and other infrastructure such as:

- Information and communication infrastructure, plus broadband infrastructure-the information superhighway on which the global digital economy is being built;
- Energy infrastructures;
- Road infrastructures;
- Other infrastructure sectors- airport, Infrastructure for health care, education, and skills development, etc.

Therefore, infrastructure is crucial for inclusive and sustainable growth. Worthy infrastructure has an effect on growth directly and indirectly (AfDB, 2018). Moreover, spending on infrastructure,

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especially, rural infrastructure is a policy tool available to governments to develop their objectives (Rauniyar & Kanbur, 2010). For example, the World Bank (2009) notes that a 10% increase in broadband penetration increases GDP growth by 1.4% in developing countries, on average. Moreover, the availability of infrastructure may help to attract investment, deepen markets, and generate agglomeration economies through attracting productive capacity to a specific location (World Bank, 2009). The other critical point is the relationship between rural infrastructure and inclusive development. Indeed, rural infrastructure is also a causally determining factor of inclusive growth, providing that equitable allocation of infrastructure is given attention at the same time (Rauniyar & Kanbur, 2010).

van Gent (2017) also discussed that while most Sub-African nations have recorded high and continued economic growth over the past decade (which is maintained by strong economic growth, the amount of people living in poverty has fallen from over 50% in 1981 to less than 45% in 2012), a great number of poor and disadvantaged people have remained exclusive from the benefits of this progress. Meanwhile, many African countries (Côte d'Ivoire, Djibouti, Ethiopia, Mozambique, Rwanda, and Tanzania) are among the fastest-growing countries in the world with growth between 6 percent and around 10 percent (van Gent, 2017). Van Gent (2017) added that there should be a transition towards more sustainable, equitable, and inclusive development in Sub-Saharan Africa. Therefore, one of the critical dimensions of the inclusiveness of growth is the access of the population to economic infrastructure (i.e., electricity, roads, and information and ICT). Generally, to measure inclusive and sustainable growth, it mainly focuses in the areas of growth, creative employment, and economic infrastructure; income poverty and equity, as well as gender equity; human competences; and social protection (McKinley, 2010).

Although the current system features citizen engagement mechanisms such as grievance redress, there is a lack of a culture of debate and dialogue with different stakeholders, the emergence of which will be crucial to inclusive growth and development in Ethiopia (WBG, 2017). Ultimately, equal access to services, markets, and a policy environment that does not discriminate against certain location(s) or regional states, ethnic groups, and/or women is a fundamental ingredient of the structural transformation in Ethiopia (Kedir, 2015). Finally, the following diagram (Fig. 3.1) shows factors affecting the equitable allocation of infrastructure investments and the nation-building process from the above analysis.

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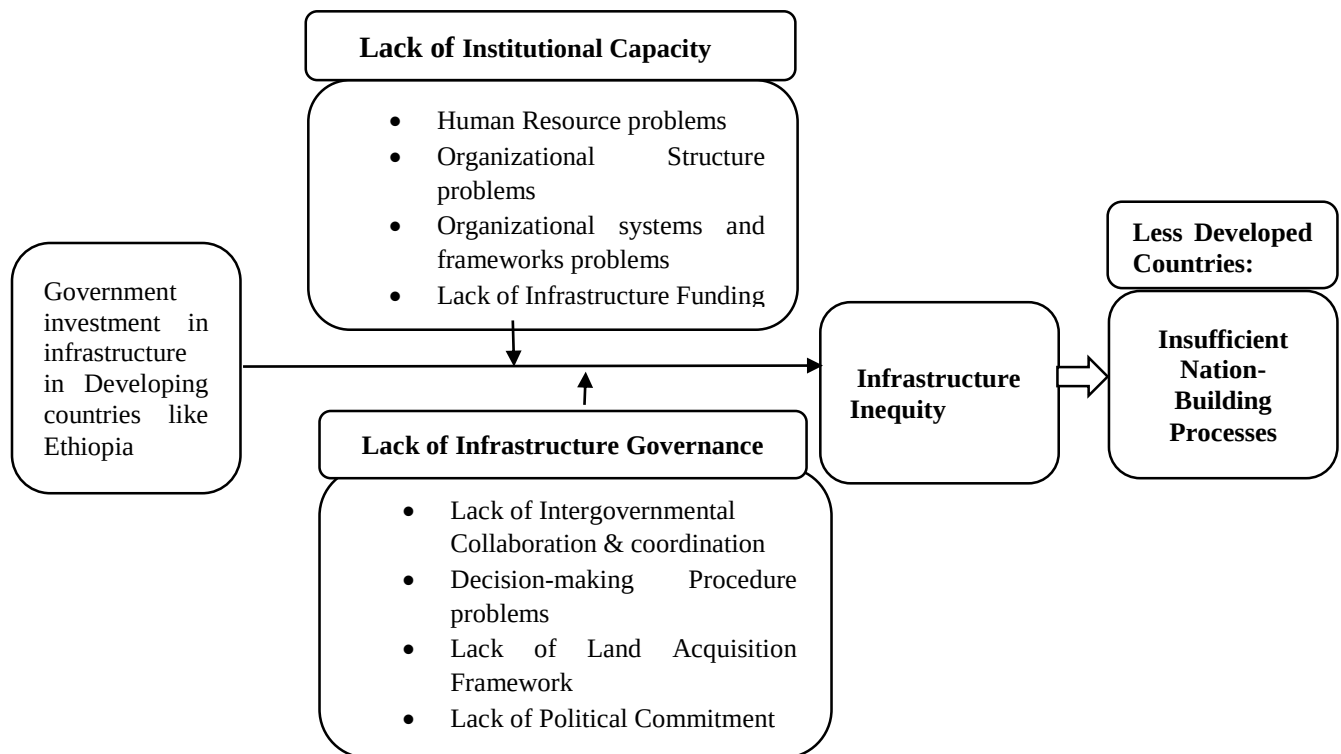


Figure 3. 1 Factors affecting the equitable allocation of infrastructure investments and the nation-building process in Developing Countries

Note: Adapted from Giang Dang • Low Sui Pheng (2015), infrastructure investment in developing economies: the case of Vietnam

3.4 Conclusions

As considered earlier in the study, there is literature on the relationship between investments in infrastructure and nation-building, including the national economy as a whole. The objective of investments in infrastructure is to stimulate economic growth and thus state-and nation-building processes in developing countries including Ethiopia. To meet the huge demand for infrastructure, increasing infrastructure investment is more encouraged in developing countries. Moreover, the provision of infrastructure investments in construction is also used by governments in many developing countries as a tool for employment generation, increased work for local firms, and subsequently poverty alleviation and economic growth. As a result, public infrastructure investments in less developed countries have been increasing. However, empirical evidence has publicized that these development objectives might not be realized as expected due to the high regional disparity in infrastructure distribution and the quality of administering these public investments. Several studies have also found that the high regional disparity in infrastructure

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distribution and quality of public infrastructure investments could be characterized by a lack of planning and policy-making process (Flyvbjerg 2007; Dang & Sui Pheng, 2015).

In addition, there are issues about the implementation of infrastructure development plans that could affect the equity and efficiency of public infrastructure investments. This highlights the importance of bringing these issues in both planning and implementation processes together and looking at them through the role of the government as coordinator and facilitator of overall economic development. A number of issues/problems are identified, notably politicized decision-making; transparency and accountability problems; institutional weaknesses in decision-making; lack of political commitment in the implementation of infrastructure development plans; corruption issues in infrastructure allocation and construction; problems in land acquisition, etc. Consequently, in order to improve the equity of government funding invested in infrastructure to support economic development and nation-building process in Ethiopia must be assessed and improved.

More importantly, the path forward is not easy and the scope for increasing public investment in LIDCs is rather limited, although the wide range of investment ratios indicates that many nations may have some room for scaling up. Over the last two years, public debt levels have increased, external financing situations have tightened, and growth opportunities have weakened for the LIDCs. These trends bring a challenging situation for the investment of infrastructure in developing countries (Gurara *et al*, 2017). Gurara *et al* (2017) have identified that more widely enhancing infrastructure in LIDCs is subject to several challenges and needs a coordinated set of measures that include:

- Mobilizing domestic resources for public investment by rising tax revenue and streamlining and rearranging expenditures;
- Developing access to concessional external financing;
- Increasing local capital markets;
- Reinforcing the institutional and regulatory framework to enlarge private sector involvement in the delivery and financing of infrastructure investment, maintained by multilateral development banks and development finance institutions.

Additionally, if a country or government should wish to address inequity, unfair or uneven development then it needs to develop a strategy and investment policy that will answer the above problems (Schultz, 2017) (see Fig. 3.1 above). Basically, this chapter also served as a base for questionnaire survey preparation and strengthened framing the theory. Lastly, this study needed a methodology, method and research design. Hence, the research methodology of the study is undertaken in Chapter 4.

CHAPTER 4

RESEARCH METHODOLOGY

Introduction

The chapter discusses the research methodology used in the study. As reviewed above, equity in infrastructure distribution is a very complex issue due to the varied audiences and personal experience. Meanwhile, there are various measures, but the field is still young and the study should not assume that single composite indices would necessarily offer the most useful information. The qualitative or quantitative approach, each by itself, is insufficient to best explain the research problem and the strengths of both qualitative and quantitative research (and its data) have given the best understanding. Generally, a mixed-method is selected for complementary objectives that a single method could not accomplish. Therefore, the mixed-method required more resources than the single-method and is, more expensive, more time-consuming, and required more human resources (Creswell, 2009; Creswell, 2014; Hancock, 1998).

In relation to research methodology, according to Creswell (2014), there are four philosophical worldviews (post-positivist, constructivist, transformative, and pragmatic). The post-positivist assumptions have characterized the old-style form of research, and these assumptions grasp true more for quantitative research than qualitative research. Post-positivists grasp a deterministic philosophy in which causes govern special effects or outcomes. Constructivism or social constructivism (often united with interpretivism) is such a perspective, and it is classically seen as a method of qualitative research. Social constructivists rely on that individuals pursue an understanding of the world in which they live and work. Individuals change subjective meanings of their experiences-meanings focused toward certain objects or things (Creswell, 2009; Creswell, 2014).

Whereas, a transformative worldview grasps that research analysis needs to be intertwined with politics and a political transformation agenda to challenge social oppression at whatever levels it occurs. Pragmatism as a worldview arises out of actions, circumstances, and values rather than predecessor conditions (as in post-positivism). There is a worry with applications-what works-and answers to difficulties. Instead of focusing on methods, researchers emphasize the research problem and use all approaches available to know the problem that underpins for mixed methods studies (Creswell, 2009; Creswell, 2014). As the study has chosen to use mixed methods for the

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study, pragmatism unlocks the door to several methods, diverse worldviews, and diverse assumptions, as well as diverse procedures of data collection and analysis. And hence, it has pragmatic goals for the solutions of social difficulties (Sarantakos, 1993). Finally, the study used time series analysis, composite infrastructure index (CII), Partial Least square-structural equation modelling (PLS-SEM) for quantitative analysis, and thematic content analysis (TCA) for qualitative analysis, and it has conclusions.

4.1 Research Design

The selection of research design mainly depended on the research objectives and hypotheses and questions. As the study focused on infrastructure equity and nation-building process, it usually used the mixed-use of data (e.g. surveys, document review, interviews and focus group discussions) to deliver a stronger basis for analysis and interpretation of related government policies (Creswell, 2014; Dang & Sui Pheng, 2015). Generally, the following mixed research methods were used: both prearranged and evolving methods; both open- and closed-ended questions; many forms of data drawing on all possibilities; numerical and text analysis; and across databases explanation (Creswell, 2014). Thus, the study used explanatory (flexible design) and descriptive (rigid design) study type for quantitative and qualitative data, respectively (Kothari, 1990; Jones, 2009; Creswell, 2014).

As mentioned above, the study used a mixed research approach because investigating the research problem demanded both quantitative and qualitative data to arrive at reliable and valid conclusions. Thus, the study began with a broad survey in order to generalize results to a population and then, in a second phase, focused on qualitative, open-ended interviews to collect detailed views from participants to help explain the initial quantitative survey (Creswell, 2014; Hancock, 1998). In addition, the type of mixed-method approach depended upon four factors which were triangulation, priority, timing, and mixing.

Therefore, the data were gathered sequentially in this study, the quantitative data gathered first then the qualitative followed and the implementation was in phases. This was because the study collected quantitative data from a vast number of people which were 904 participants (typically a sample representative of a population) first. Then, the qualitative data were explored to increase the understanding through a second phase with participants at the site and to converge or confirm findings from different data sources. The two databases were kept separate but connected; for

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example, in this two-phase project that began with a quantitative phase, the analysis of the data and its results were used to identify participants for qualitative data collection in a follow-up phase. This is because the survey of quantitative and physical infrastructure through time series data (Phase I) gave a clear hint for the next qualitative studies (Phase II). In this situation, the quantitative and qualitative were connected during the phases of research. And then, the study embedded a secondary form of data within a larger study having a different form of data as the primary database. Thus, the secondary database delivered as a supporting role in the study (Creswell, 2009; Creswell, 2014; Hancock, 1998). See Figure 4.1.

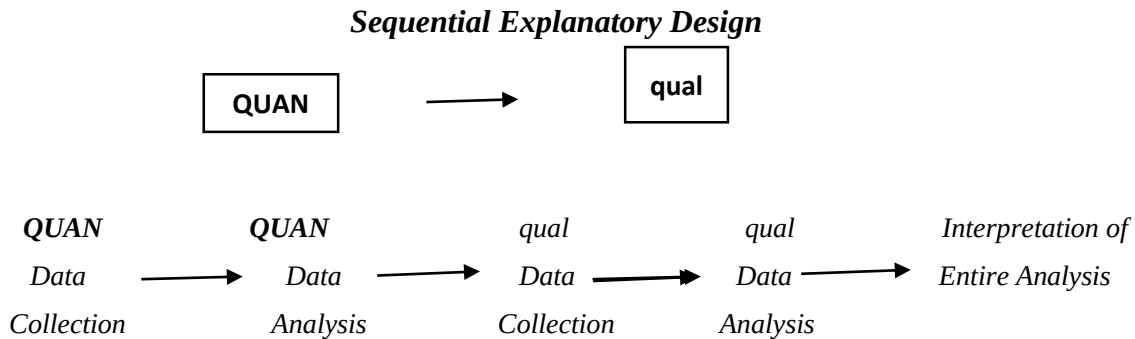


Figure 4. 1 Sequential Design

Source: Creswell (2009)

4.2 Type and Source of Data

In this study, the primary sources and unit of analysis (regions and institutions) for quantitative were randomly selected higher officials, policymakers, contractors, and consultant's associations managers, World Bank and UNDP Ethiopia representatives, federal and regional infrastructure institutions managers, middle-level managers and senior experts. Likewise, the primary sources and unit of analysis (institutions and individuals) for qualitative data were purposively selected higher officials, policymakers, contractors and consultant's associations' managers. The secondary data sources were the Ministry of Finance and Economic Cooperation, Ministry of science and higher education, national plan commission and Central Statistics Authority (CSA), Ethiopian federal roads authority, Ethio-Telecom, Ethiopian electric utility/power, Industrial Park Corporation, and airports. Therefore, the study used a multidimensional data sources in a systematic manner to collect data from relevant stakeholders.

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Moreover, data triangulation (for instance, inter-methods triangulation) was undertaken to ensure the consistency of the data under different contexts. The study generally used a triangulation technique to certify that the explanation was rich, robust, wide-ranging, and well-built. It rested upon the acceptance that a single method could never adequately explain the phenomenon. Using multiple methods helped to facilitate a deeper understanding (Sarantakos, 1993; Pandey & Patnaik, 2014). As mentioned by Pandey and Patnaik (2014), four types of triangulation were identified by Denzin (1978) and Patton (1999) which are methods triangulation; triangulation of sources; analyst triangulation; and theory/perspective triangulation. Thus, analyst triangulation and theory/perspective triangulation were applied in this study. And then, primary data (interviewing and questionnaire) were collected from primary sources and secondary data (documents such as publications, records, research reports, and service records) gathered from secondary sources (Kothari, 1990).

4.3 Target Population, Sample Design, and Sampling Methods

Target population and sample design

The study selected only 1037 (39%) from the 2688 population for the study purposes. Thus, the sample was truly representative of population features without any bias so that it resulted in valid and reliable conclusions (Kothari, 1990). And then, the sample design was endorsed by the study taking into attention the nature of the inquiry and other interrelated factors (Kothari, 1990). Moreover, the study used deliberate sampling which is also known as “purposive” or “non-probability” sampling for this study which included convenience sampling techniques (Kothari, 1990; St. Mary’s University, 2012). As indicated above, the study typically used mixed methods which included the sample of qualitative participants in the larger quantitative sample, because the study ultimately made a comparison between the two databases and they have more or less similar results, the better is the comparison (Creswell, 2014).

Sample Size Determination

To select the required sample size, the study used multi-stage stratified random sampling techniques (Kothari, 1990). Samples were selected from each group proportionately using systematic random sampling techniques in which the process required that the measures of the population list (the sampling frame) were prepared numerically. If the sample size is n and the total population sizes are N , then the study divides by n to get r (an interval of sampling). Hence,

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the first sample randomly selected from the first r names in the serially numbered sampling frame (for each of the groups should be identified) including spatial sampling (Sarantakos, 1993). From this chosen name every r^{th} individual was selected at evenly spaced interval until the researcher reached the total sample size n (Kothari, 1990; St. Mary's University, 2012).

Therefore, in order to select the appropriate sample size, the study used the formula developed by Krejcie and Morgan, (1970) with a sample size determination system for each of the strata with the consideration of 95% confidence interval as a present. The study selected this sample size determination method because it is one of the best methods in determining the sample size in the probability sampling method. Generally, this sampling method involved multi-stage stratified random sampling techniques of 2688 population (from relevant federal and regional government institutions (road, telecommunication, electricity, etc.), civil societies, and non-governmental institutions) for representing a sample of 1037 which represented the population. The study considered desirable as the population was a small and known characteristic which was studied intensively.

From the heterogeneous list of offices, primarily the study categorized them into homogeneous groups such as federal government offices, regional government offices (Oromia, Amhara, Tigray, and Benshangul/Gumuz) and civil society, bilateral and multilateral offices. From them, the study took unites of the study from each level and proportionally allocated through every category for quantitative research. Moreover, the board members, expertise, director-general, minister, state minister, bureau heads, and advisors were selected purposively to conduct a qualitative researching method like Key Informant Interviews (KIIs) and focus group discussions (FGDs). See sample size in Annex 1.

Measurements (Variables)

The issues this study addressed are institutional capacity, infrastructure governance, the equitable distribution of infrastructure, and the nation-building process in nine regions and two city administrations in Ethiopia. To address these issues, the purpose of the study is examining institutional capacity (human capital; organizational structure; infrastructure systems and infrastructure funding); infrastructure governance (decision-making procedures; intergovernmental collaboration and coordination; land acquisition framework; and, political

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commitment and partnerships); the relationship with infrastructure equity (equal opportunity; social justice; national competitiveness, spatial intervention and citizen satisfaction); and, nation-building processes (rule of law; democratic accountability; shared national identity, inclusive and sustainable growth) across the regional states in Ethiopia.

As disclosed in Chap 2, it is crucial to identify dependent and independent variables (Kothari, 1990; Creswell, 2014). Therefore, in this study, the independent variables are institutional capacity, infrastructure governance, and infrastructure equity. The mediating variables are both infrastructure governance and infrastructure equity which are both dependent and independent. The nation-building process is the dependent variable (Hair, 2017). Hence, the purpose of this two-phase (sequential mixed methods) is to obtain statistical, quantitative results from a sample and then followed up with a few individuals to explore or probe those results in more depth (Dawson, 2002; Hancock, 1998).

In the first phase, trend analysis and quantitative research hypothesis addressed the statistical impacts and the interrelationship of institutional capacity, infrastructure governance, and the equity of infrastructure for nation-building across regions in Ethiopia, the federal government, nine regional states, and two city administrations. The quantitative survey was conducted in the federal and four regional government institutions. In the second phase, qualitative interviews and FGDs used to probe significant quantitative results by exploring aspects of the infrastructure equity with a few political leadership, civil servants, and civil society at Addis Ababa and four regional governments including their capital cities.

4.4 Quantitative Methodology (Phase I)

4.4.1 Quantitative Data Collection

A. Time Series/Cross-Sectional Survey

Due to the trouble of getting data on the alterations in variables over time in most developing societies in Africa, Asia, and as well as Latin America (Huntington, 1971), this study does not use longitudinal analysis (which includes “the study of a sample on more than one occasion” (Sarantakos, 1993, p. 6)), but time series. It is mentioned that time series is “a technique for analyzing time series data, or variables that continually changes with time” (Bhattacharjee, 2012). It is a sequence of observations that are arranged according to the time of their outcome (Falk, 2012; Baltac, 2015). Thus, time series analysis is about what has happened to a series of data points in the past and attempting to predict what will happen to it in the future (Wei, 2006; Baltac, 2015).

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A time series, in general, is supposed to be affected by four main components, which can be separated from the observed data. These components are a trend, cyclical, seasonal, and irregular components (Baltac, 2015). These steps involved plotting the data, possibly transforming the data, identifying the dependence orders of the model, parameter estimation, diagnostics, and model choice (Shumway & Stoffer, 2011).

A time-series survey of public infrastructure investments used to explore the extent to which the infrastructure is equitably used in Ethiopia for the last 20 years. The Time Framework was from 1996/1997 to 2017/2018. The choice of the time period was determined by four main factors. First, Ethiopia experienced a turning point in the early 1990s by wide-ranging reforms (for example, the approval of the new constitution in 1995 and the establishment of nine regional states and two city administrations) due to government changes. This had a considerable impact on the rate of economic growth and to become one of the fastest-growing countries in Africa. Second, during this period, there was a policy change in infrastructure policies and development by allowing the private sector in infrastructure construction. Third, in 2017/18, the Ethiopian government conducted a mid-term evaluation of its second Growth and Transformation Plan (GTP II). And fourth, it was relatively possible to obtain coherent and reliable data on relevant infrastructure variables for the chosen time period where the data on Monthly Per Capita Consumption Expenditure (MPCE) could be found from the five rounds of Consumption Expenditure Surveys conducted by Ethiopian CSA. Data such as the Gini coefficient, GDP, and other relevant data were collected from the Ministry of Finance and Economic Cooperation and National Planning Commission of Ethiopia. Other sector-specific data were also collected from each sector (Ministry of transport, Ethiopian road authority, Ethiopian electric utility/power, and Ethio-Telecom, Airport enterprise, Industry Park, and Ministry of science and higher education about universities, etc.) through reports and documents review.

Therefore, there were three empirical study options for this study. The first option was that this study explores as one opportunity by comparing hypothetically optimal allocations of core infrastructures with observed allocations to generate a measure of costs of political influence, which is the experience of Nigeria (Ayogu, 2000). As a second option, by testing the impact of infrastructure development on (in) equity in Ethiopia, the Gini coefficient used as the dependent variable. There is an experience to compute the Gini coefficient per state by using the data on

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MPCE in India, which is anticipated from unit-level records of the periodical family consumer expenditure studies of national sample surveys. It is a ranking of states according to Gini and Infrastructure Availability (Bajar & Rajeev, 2015). The study used this to measure whether the impact of infrastructure on (in) equity differs for particular regional states. Data for electricity consumption (kWh per capita), surfaced road density (km of surfaced road per sq. km of geographical area), Teledensity (per people), and per capita, social expenditure incurred by the government were compiled from each infrastructure institutions and CSA of Ethiopia depending on the available data. In another way, infrastructure can be measured either in terms of investment towards a particular service or in terms of the physical quantity of the accesses available to the end-users. The study employed the physical infrastructure with their respective weights to construct the Composite Infrastructure Index (CII) (Asian Development Bank/The World Bank, 2005; Calderon *et al*, 2018; Bajar & Rajeev, 2015). Due to relatively infrastructure data availability and the ability for the ranking of states, the study has chosen by mixing the second, and the third options that have been explained above.

Moreover, using a theoretical framework that shows the relationship between economic growth and infrastructure provided in the literature to build the infrastructure indices, Calderon and Serven (2004) followed Alesina and Perotti (1996) and Sanchez-Robles (1998) and applied Principal Component Analysis (PCA) to disaggregate infrastructure indicators; their synthetic indices were given by the first Principal Component of the underlying variables. Calderon and Serven (2004) built the aggregate index using data from the telecommunication sector (telecom density per 100 populations, mobile networking capacity and fixed and data line service network capacity), the power sector (capacity usage per MW per region and per 1 million population and substation coverage based on a number of population), and the transportation sector (the length of the road-in km. Per sq. km. of an area). Besides, Ghosh and De (2005) used PCA to choose the best set of infrastructure indicator variables, which can best exemplify the state-wise infrastructure status.

Therefore, PCA is a multivariate numerical technique used to decrease the number of variables in a data set into a lesser number of ‘dimensions’. PCA works best when asset variables are interrelated, but also when the distribution of variables differs across cases. It is the assets that are more inequitably distributed between regional states that are assumed more weight in PCA. Variables with low standard deviations (SDs) would convey a low weight from the PCA; for

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example, an infrastructure asset which all regional states own or which no regions own (i.e. zero SD) would exhibit no disparity between regions and would be zero weighted, and so of slight use in distinguishing infrastructure status in a region to region. Therefore, the study, as a first step, carried out descriptive analyses for all the variables, looking at means, frequencies, and standard deviations. The descriptive analysis could notify decisions on which variables to comprise in the analysis, and highlight data management issues, such as “coding of variables and missing values” (Vyas & Kumaranayake, 2006; Akanbi, 2013; Chakamera & Alagidede, 2016; Chotia & Rao, 2015).

In SPSS/STATA, when specifying PCA, the user is given the choice of deriving eigenvectors (weights) from either the correlation matrix or the covariance matrix of the data. If the raw-data has been standardized, then PCA would apply the co-variance matrix. As the study standardized the data, and they are therefore not articulated in the same units, the study runs the analysis using the correlation matrix to ensure that all data have equal weight. For example, the road density is a quantitative variable and has greater variance than the other binary variables, and would, therefore, dominate the first Principal Component if the covariance matrix was used. From an interpretation of the results point of view, the output from a PCA is a table of factor scores or weights for each variable. Generally, a variable with a “positive factor” score is related to higher infrastructure status, and conversely, a variable with a “negative factor” score is related to lower infrastructure status. Thus, PCA is used for comparison across regional states or settings (such as urban/rural), or overtime, provided the separate indices are calculated with the same variables (Vyas & Kumaranayake, 2006; Akanbi, 2013; Chakamera & Alagidede, 2016).

The debate about the use of PCA reflects the fact that principal components are artificially constructed indices. Critics of PCA argue that the technique is arbitrary, that the technique of selecting the number of components and the variables to include is not well defined. The empirical basis for the technique rests on whether the first principal component can predict infrastructure status. This is entirely dependent on the nature of data and the relations between variables that are being considered, the validity of the variables included, and also their reliability (Vyas & Kumaranayake, 2006; Akanbi, 2013; Chakamera & Alagidede, 2016). But, by referring to McKenzie (2003), Vyas and Kumaranayake (2006) stated that there are a number of theoretical questions of interest in which wealth disparity is more significant than consumption or income variation, so an asset-based inequality measure may be preferred in empirical tests. However, it is up to the

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user to bear in mind that PCA is best considered as a summary empirical method. In other ways, it is also vital to consider the structural equation modeling-partial least square (SEM-PLS, software 3) approaches (Monecke & Leisch, 2012; Kwong & Wong, 2013; Hair et al, 2017), which are explained in the next section.

In addition, equity concerns fall into the classification of indirect or wider impacts of infrastructure projects which are problematic to assess by a conventional cost-based analysis (CBA) approach (a method wherever the benefits of an assumed project are weighed compared to the costs of the project) (Macharis *et al*, 2008; Thomopoulos *et al*, 2009). The planned method contributes towards the aim of improved accountability in the decision-making process, which of course is not only pertinent to infrastructure projects but to other settings too (Macharis *et al*, 2008; Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013). An interchange of experiences using such combined assessment frameworks is beneficial for other disciplines. Such incorporated frameworks are eventually lead to enhanced assessment methods and well-supported decision-making processes (Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013). Multi-Criteria Analysis (MCA) has been developed as a multi-objective decision-making method which is mainly appropriate in circumstances when a single-criterion method (like CBA which has certain technical limitations including the fact that all effects have to be articulated in monetary terms as not all project effects may be easily monetized) is not capable to offer the necessary combined appraisal framework.⁴⁵ MCA is frequently used in government to explain those methods which do not depend on mainly on monetary assessments. With this technique, various criteria could be taken into consideration simultaneously in a complex situation like equity. The method is considered to support decision-makers to incorporate the diverse options, including the opinions of the actors/stakeholders concerned, into either a retrospective or prospective framework (Thomopoulos *et al*, 2009). Thus, the participation of the decision-makers in the process is a fundamental part of the method. These features are desirable qualities of a technique used to measure equity thoughts (Thomopoulos *et al*, 2009).

MCA could also be used to have a comparative evaluation of alternative infrastructure projects or varied measures. It is stated that MCA has been used in several disciplines to evaluate infrastructure project effects, especially social and environmental ones (Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013).

⁴⁵ Thomopoulos *et al* (2009), Incorporating equity considerations in transport infrastructure evaluation: a proposed methodology...Among the most commonly used MCA methods are: (a) factor rating methods, (b) multi-objective mathematical models, (c) Analytic Hierarchy Process (AHP), (d) REGIME, (e) ELECTRE family of methods, and (f) multi-attribute utility methods, (h) others. P. 354.... MCA is a response to the need for an acceptable compromise solution between the diverse objectives of various stakeholders/actors involved in the decision-making process... AHP is considered appropriate in this context, as it is based on three basic principles which qualify for most assessment criteria of large transport infrastructure projects: (i) decomposition, (ii) comparative judgments, and (iii) synthesis of priorities. In addition, it is a systematic procedure organizing the basic rationality of a decision problem (Tsamboulas et al., 1999), which is closely related with equity considerations as the rationale of such decisions has to be organized and prioritized a priori (Thomopoulos *et al*, 2009).

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This is relevant when measuring equity concerns in the infrastructure sector. There are also criticisms of multi-criteria analysis that weights should be attributed to each criterion, carrying out subjectivity and it is actually time-consuming and complex. However, it adds transparency to the evaluation as decision-makers are needed to reflect and express their preferences based on the policy objectives (Macharis *et al*, 2008; Thomopoulos *et al*, 2009). This study uses a multi-criteria analysis method that endeavors to address some of these criticisms. The advanced is stretched in terms of the interrelationships between composite indicators and multi-criteria analysis techniques including multi stakeholder analysis (Macharis *et al*, 2008; Thomopoulos & Grant-Muller, 2013). Thus, the use of a multi-criterion outline for composite indicators in an overall is pertinent and applicable in this study. See Fig. 4.2, below, and Chap. 7, 8, and 9.

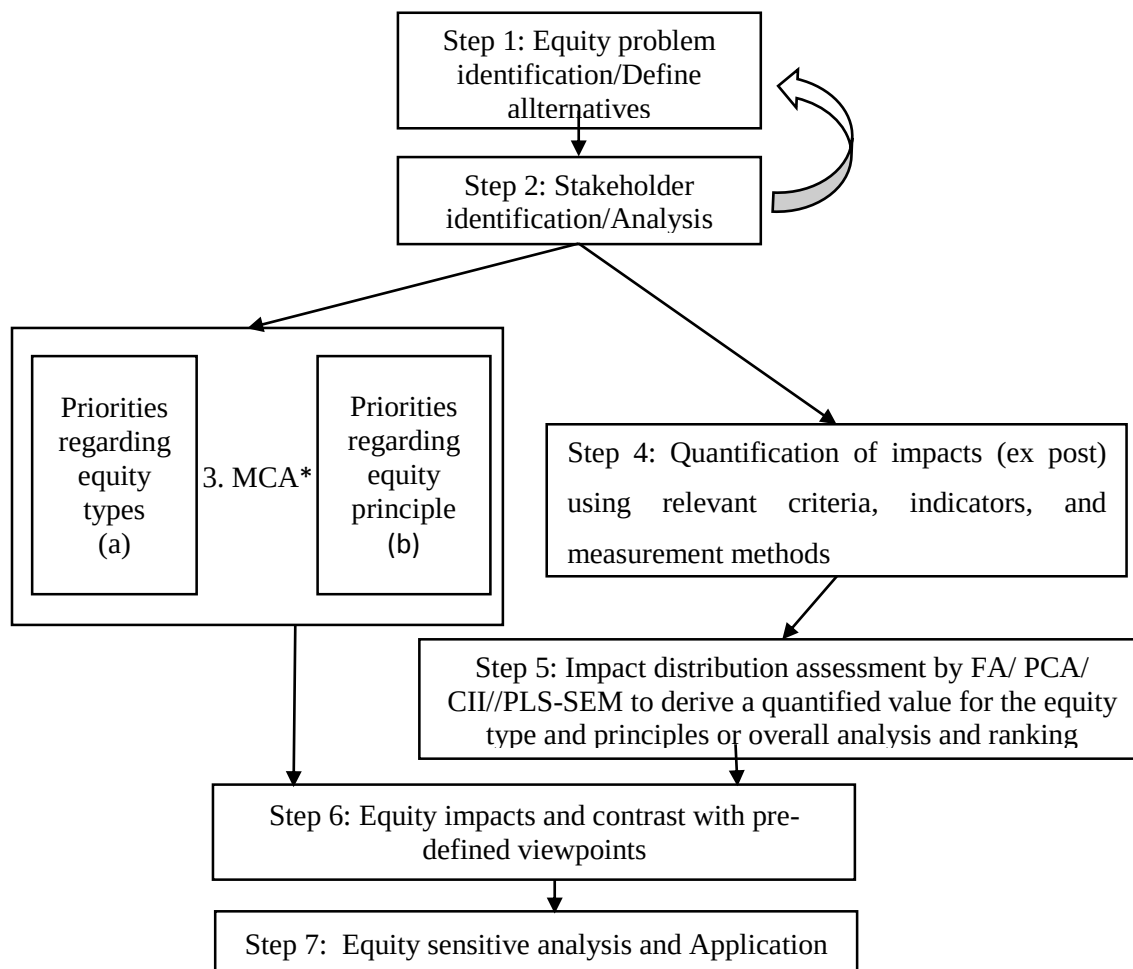


Figure 4. 2 Methodology for a multi-stakeholder/actor, multi-criteria analysis

Source: Adapted from Macharis, C., Witte, A.D., and Ampe, J. (2008), the Multi-Actor, Multi-Criteria Analysis Methodology (MAMCA) for the Evaluation of Transport Projects: Theory and Practice and Thomopoulos, N., Grant-Muller, S., and Tight, M.R. (2009), Incorporating equity considerations in infrastructure evaluation: a proposed methodology

Note: MCA* - It identifies a set of objectives and then pursues to recognize the trade-offs between those objectives for diverse policies or for diverse ways of realizing a given policy.

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As shown in Fig. 4.2 above, in Step 1 the equity objectives are identified, based on Ethiopian constitution (1995), policy documents (like GTP I & II), and stakeholder interviews or focus groups. During step 2, the group of decision-makers is identified, together with additional stakeholders like World Bank and UNDP Ethiopia representatives, who may not be straight or institutionally involved in the decision-making process. Steps 1 and 2 are noticeably related and are conducted in parallel. Step 3 delivers a significant input for step 6 which is a key step of the technique. By using PCA/ CII and questionnaires including the stakeholders' perceptions, judgments, and viewpoints on equity types and equity principles are provoked. Steps 4 and 5 are conducted simultaneously in order to quantify the equity effects of the project. This task comprises identifying measurable indicators for equity types and then collecting indicator data. In step 5, the values of those indicators are used to measure project effects and impact distribution on several socio-economic groups, communities, or regions, depending on the objectives and data available. Step 6 establishes the analysis of results, which encompasses deriving the eigenvalue and factor loadings of the variance-covariance matrix and conveying the individual weights to the indicator values made by step 5. Finally, an equity analysis is conducted using existing software applications (SPSS/STATA, when specifying PCA, and SEM-PLS software PLS 3, when determining the interrelationships of the constructs and measured indicators) that are used in various steps to enable the assessment processes.

Lastly, it is specified that it has been established and verified to date within ex post infrastructure project consideration. It is also indicated that it similarly has the potential for use in evaluating project equity effects under ex ante assessment (Thomopoulos *et al*, 2009).

B. Questionnaire Survey

A questionnaire is considered as the heart of a survey operation (Kothari, 1990; Creswell, 2014). The questionnaires, in this study, have also included questions which provoke information directly interrelated to the study topic. Each question delivers information about the specific aspect of the subject. These enquiries could be independent of each other, or connected to another enquiry (Sarantakos, 1993, p. 162). Hence, it was very carefully constructed. There are three basic types of a questionnaire –closed-ended, open-ended, or a combination of both (Dawson, 2002; Kabiron, 2018). In this study, a combination of both used. It is explained that the content of the questions is clearly the most vital element of the construction of the questionnaire or the interview guide

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including relevance, symmetry, clarity and simplicity, language lucidity, attitude, suggestive questioning, and “presuming questions are not permitted”, etc. (Sarantakos, 1993, p. 170- 171).

Therefore, the questionnaire survey questions were adapted from different relevant kinds of literatures (which have almost greater than 0.7 Cronbach’s alpha reliability (Cronbach, 1951; Tavakol *et al*, 2011; Bonett & Wright, 2014)) in this study to explore the key variables or factors limiting the equitable allocation of public infrastructure investments for nation-building by concerned parties (Dang & Sui Pheng, 2015) (see Chap. 3). The sample included government officials, middle-level managers, experts, Civil societies (consultants and contractor’s associations) as well as bilateral and multilateral representatives involved in policy-making and planning, and delivering as well as in utilizing infrastructure. A structured questionnaire was used to gather the data in this study. It was designed with an open-ended question, thus not limiting the respondents’ choice of answers. The drawbacks of this type of questionnaire were that responses were time-consuming, coding was difficult, and more effort from the respondents was required (Creswell, 1998).

As indicated above, the stratified random sampling type of sampling method used as the population was heterogeneous. i.e. every element of the population did not match all the characteristics of the predefined criteria which includes federal and regional states higher officials and experts as well as bilateral and multilateral representatives. So, the sub-groups were formed that were homogenous i.e. all the elements within a group contained the same kind of characteristics. Common criteria used for stratification were ethnicity and institutional missions. The sample was selected from each stratum randomly. Using the proportional allocation technique the sample size of a stratum was made proportional to the number of elements present in the stratum (Alvi, 2016). The method used in this study was that a list of all the elements of each stratum was required. The list was exhaustive. The participants were then selected from each stratum through say, for example 5th, was selected at random then every 10th was selected.

Likert-type Scales

The other point that the study used was the “summated scales (or Likert-type Scales)” for this study. Thus, summated scales consisted of a number of statements that expressed either a favorable

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or unfavorable attitude in the direction of the specified object to which the respondent was requested to react. As the study used multidimensional constructs, theoretical confirmation in confirmatory factor analysis was complicated. Such situations have led some authors to recommend only the use of positive items. Others also recommend the scale combining positive and negative items (Salazar, 2015). The scale combining positive and negative items were used in this study. Therefore, the respondent presented her or his agreement or disagreement with each statement in the questionnaire (Kothari, 1990). Thus, the respondent responded in one of the following ways using verbal-numerical scale, each response rate marked or circled by the relevant number: (1) strongly disagree, (2) disagree, (3) undecided, (4) agree, and (5) strongly agree (Kothari, 1990; Sarantakos, 1993).

Pilot Testing

Pre-field methods: Expert groups were the only testing method discussed here which did not involve the respondents. Senior subject-matter experts who have experience with potential problems of questions and/or questionnaires from other surveys. The objective of these expert groups was to evaluate the questionnaire for potential problems for either interviewees or respondents. Usually, these reviews were piloted early in the questionnaire preparation process. There are two ways of conducting expert groups: (1) by the structured discussion on each question, with a standardized coding scheme or (2) in the form of a not formally structured discussion on each question, but without a standardized coding list (Brancato *et al*, 2005). The second way was applied in this study. The plan was seven practitioners and professionals. However, the actual was 11 participants. Their suggestions and comments were included in the questionnaires. Thus, the five-stages of questionnaire design and testing are applied in the questionnaire development (see Figure 4.3).

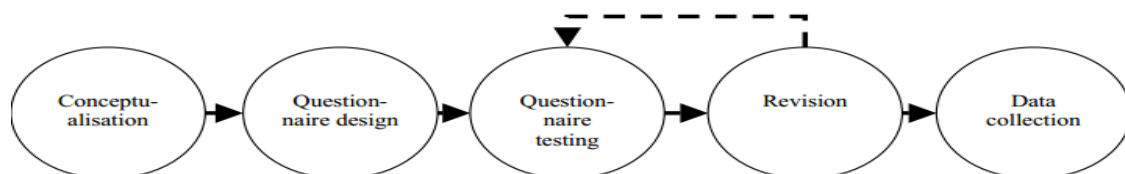


Figure 4. 3 The five-stages of questionnaire design and testing

Source: Brancato *et al* (2005), Handbook of Recommended Practice for Questionnaire Development and Testing in the European Statistical System, European Commission.

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Filed test: Before using the survey method, it is always wise to conduct a pilot survey for testing the questionnaires (Kothari, 1990). As stated by Chaudhary and Israel (2017), there is no prescribed sample size for a field test; many researchers advise sample sizes from 10–25 (Sheatsley, 1983) to 20–50 (Sudman, 1983), but the final sample size choice was made by the study grounded on available time and budget to convey the field test. Thus, the pilot test was conducted with randomly selected 25 sample respondents who were excluded from the main study (see Table 4.4 below). Participants of pilot testing commented and edited the questionnaire. Thus, the respondents' relevant comments included in the questionnaire.

C. Quantitative Data Quality Assurance

I. Reliability

Reliability and validity are two central elements in the evaluation of the measurement device (Tavakol *et al*, 2011). Alpha was established by Lee Cronbach in 1951 to deliver a measure of the internal consistency of a test or scale; it is stated as a number between 0 and 1 (Tavakol *et al*, 2011). Cronbach's alpha reliability (Cronbach, 1951) is one of the most widely used measures of reliability in the social and organizational sciences. Cronbach's alpha is referred to as a measure of "internal consistency" reliability. (Tavakol *et al*, 2011; Bonett & Wright, 2014). Cronbach's alpha was calculated to measure both the item-total correlation and inter-item correlation. The inter-item correlation was greater than 0.3 used as a cut point, indicating that the items are closely related to measure similar behavior, perceptions, and attitude of the respondents. However, the widely-accepted social science limit is that alpha ought to be 0.7 or greater than a set of items to be measured on a scale. In this study, the reliability results greater than the norm 0.7 was applied. Therefore, in principle, alpha ought to be calculated for each of the notions rather than for the whole test or scale. A maximum alpha value of 0.90 has been suggested (Tavakol *et al*, 2011). If one does otherwise, the reliability of the items is at best probably low and at worst unknown. Besides, Cronbach's alpha does not provide reliable estimates for single items (Gliem & Gliem, 2003).

Reliability Test

According to Kothari (2004), a measuring instrument is reliable if it delivers consistent results. A reliability coefficient (alpha) higher than or equal to 0.7 was considered acceptable. That means the formulated questions in the questionnaire were capable to meet the objective of the study

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(Kothari, 2004). To that end, the study had conducted pilot tests on 25 respondents after drafting the questionnaire to meet all the validity and reliability standards. However, the test was done as follows. Thus, copies of the questionnaire were distributed to 25 respondents as a pilot test. Then, the reliability test conducted by the study proved that all the indicators/items or attributes of the pilot questionnaire had been reliable since the results of the test were higher than 0.7 as indicated in Table 4.4. Hence, the test results generated by all the variables used in this study were reliable enough for data analysis as their alpha value was greater than 0.7 i.e., the coefficient was statistically acceptable. In a similar manner, the Cronbach's alpha value for indicator variables suggested that the data collected through these questionnaires were reliable and used for further statistical analysis (see Table 4.1).

Table 4. 1 Reliability Statistics

Variables	Cronbach's Alpha	Based on No. of Items
Standardized Items		
Lack of Human resource management	0.732	8
Lack of Organizational structure	0.722	6
Lack of Organizational systems and frameworks	0.796	9
Lack of Infrastructure fund	0.708	6
Insufficient Institutional capacity	0.796	31
Lack of Intergovernmental/stakeholders collaboration and coordination	0.710	7
Lack of Decision-making process	0.709	5
Lack of Land acquisition framework/right-of-way	0.741	6
Lack of Political commitment	0.709	7
Lack of Infrastructure governance	0.851	25
Lack of Equal opportunity in infrastructure	0.818	5
Lack of Social/distributive justice	0.810	8
Lack of National and regional infrastructure competitiveness	0.704	8
Lack of Spatial intervention/planning	0.784	8
Lack of Citizen/stakeholder public satisfaction	0.755	6
Lack of Infrastructure equity	0.896	35
Lack of Rule of law	0.703	8
Lack of Democratic/ Public accountability	0.757	7
Lack of Shared national identity	0.703	6
Lack of Inclusive growth	0.723	6
Inadequate Nation-Building process	0.800	27
Overall	0.932	118

Source: Survey data, 2019

II. Validity

Establishing the validity of measures was the major focus of the research (Lehmann, 1988; Mertens, 2015). This study assumed the most commonly applicable kinds of validity, namely: Discriminant and Convergent Validity. These jointly examined both the measurement model (convergent and discriminant validity) and the structural model (Lehmann, 1988). See Chap. 9.

Validity Test

According to Kothari (2004), validity denotes the extent to which the instrument measures what the researcher(s) actually need to measure. In order to ensure the quality of this study, the content validity of the instruments of the research was checked. As mentioned above, 11 senior subject-matter experts had participated. Their suggestions and comments were included in the questionnaire. The content validity was also verified by the advisors, who looked into the relevancy of the questions and the scales of measurement. Peer discussion with other researchers was also conducted; since it is another way of checking the relevancy of the questions. This was done to decide whether the developed instruments measure what it meant to measure and also to check the clarity, length, structure, and wording of the questions. This test helped the study to get valuable feedback to modify some items.

D. Questionnaire Survey Data collection

The survey was divided into two parts. The first part was used to examine the perceptions of the equitable distribution of infrastructure for supporting economic growth and subsequently nation-building process among the actors and stakeholders involved. From the literature review, the government's investments in infrastructure construction play an important role in providing quality and extensiveness of infrastructure networks that integrate the national market and connecting it at low cost to markets in other countries and regions. However, the results found in the majority of infrastructure projects were cost overruns, benefit shortfalls, and waste (Flyvbjerg, 2007). Based on the literature review, the outcomes of the equitable allocation of public investments in infrastructure in the planning and implementation of infrastructure development were described as poorly selected and poorly executed infrastructure investments and ultimately a waste of national resources. As a result, to provoke the perceptions of the achievements, respondents were asked to rate against a five-point Likert scale, from "strongly disagree" to "to strongly agree" about the occurrence of these unexpected outcomes. See the questionnaire in annex 2.

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Table 4. 2 List of Federal Institutions

Name of Institutions	Position of the Respondents				Total
	Higher officials	Middle level management	level Experts		
Ministry of transport	1	2	11		14
Ethiopian road authority	2	4	43		49
Ethio-Telecom	3	3	22		28
Ethiopian Electric Utility	2	6	33		41
Ethiopian electric power	2	4	32		38
Ministry of Finance	1	3	21		25
National development and planning commission	1	2	17		21
Ministry of urban development and construction	1	6	23		30
Office of house of federation	1	1	3		5
Airport enterprise	1	1	4		5
Ministry of science and higher education	1	1	11		13
Industry park authority	1	1	7		9
Ethiopian research institute	2	5	3		10
Prime minister's office	1	0	0		1
Federal integrated infrastructure coordination agency	1	1	12		14
Total	21	40	242		303

Source: Survey data, 2019

Table 4. 3 List of Regional Government Institutions (Oromia, Amhara, Tigray and Benshangulgumuz)

Name of Institutions	Position of the Respondents				Total
	Higher officials	Middle level management	level Experts		
Road Bureau	13	10	56		79
Finance and Economic Cooperation Bureau	15	28	61		104
Planning Commission	4	9	60		73
Regional Administration Office	52	0	0		52
Region Telecommunication	12	10	93		115
Region Electric Office	23	7	88		118
Total	119	64	358		541

Source: Survey data, 2019

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Table 4. 4 Lists of Civil society and Multilateral Organizations

Name of the Institution	Higher	Middle level	Experts	Total
	officials	management		
Ethiopian Contractors Association	7	122	0	129
Consultant Association	3	56	0	59
World Bank (Infrastructure Sector)	3	0	0	3
UNDP (Infrastructure sector)	2	0	0	2
Total	15	178	0	193

Source: Survey data, 2019

As listed above, the population of the survey included professionals in government authorities as well as firms engaged in the infrastructure sector. Since all major government authorities are headquartered in Addis Ababa, almost half of the questionnaires were delivered to higher officials and professionals in Addis Ababa. Questionnaires were directly delivered via the researcher with the exception of the World Bank and UNDP Ethiopia which was via email. It is said that mail delivery can save time and cost, while personal delivery can increase the response rate (Alston and Bowles 1998; Jackson 2006). For this study, in order to increase the response rate and ensure the accuracy of answers, questionnaires were directly delivered to higher officials and professionals for federal institutions in Addis Ababa through personal delivery. Similarly, the remaining questionnaires were delivered to higher officials and professionals in four regional states of Ethiopia (Oromia, Amhara, Tigray, and Benshangulgumuz) via personal delivery.

4.4.2 Quantitative Data Analysis

After the data had been collected, the study goes to the task of analyzing them. The analysis of data involved a number of closely interrelated operations such as the establishment of classifications, the application of these classifications to raw data through coding, tabulation, and then drawing numerical inferences (Kothari, 1990. In brief, the study examined the gathered data with the support of numerous statistical measures). The quantitative and qualitative databases were examined separately in this approach. Then, the quantitative results used to plan the qualitative follow-up. One important area was that the quantitative results could not only inform the sampling procedure but it could also point toward the types of qualitative questions to ask participants in the second phase (Creswell, 2014). Data analysis also included both quantitative (factor analysis and

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structural equation modeling) and qualitative (thematic content analysis) methods ((Tavakol *et al*, 2011; Schumacker & Lomax, 2010; Hair et al, 2017).

A quantitative data were analyzed using two approaches: descriptive statistical techniques including mean value, standard deviation, variance, and correlation coefficients which were used to analyze the data; and basic inferential statistics, such as Structural Equation Modelling (SEM) analysis to determine the existence of significant variations and/or associations among variables considered in the study ((Bhattacharjee, 2012; Hair et al, 2017). Thus, time series, factor analysis, and advanced SEM type correlation and variance analysis subsequently were discussed as follows.

A. Time Series/cross-sectional Analysis

The data are collected at more or less one moment in time ('cross-sectional') or not over a period of time, repeatedly observing or interviewing the respondents ('longitudinal'). An overall comprehensive index of infrastructure, the Composite Infrastructure Index (CII), is calculated for each Ethiopian regional state by using the Principal Component Analysis technique. In order to analyze the regional disparities/inequities between states in terms of infrastructure, the regions are ranked based on the calculated CII (Chotia & Rao, 2015). The Africa Infrastructure Development Index (AIDI) also provided the combined and relative information on the status and development of infrastructure in African nations. Population size was used for Electricity and telecommunication subscriptions (phone & internet), while the road network size was used for gravel and paved roads (AfDB, 2013). See Chap. 8 Table 8.16 for CII results.

B. Factor Analysis

Factor Analysis used to identify the dimensions of the test as used for smart PLS, which are statistical software (Kothari, 1990; Tavakol *et al*, 2011). Moreover, the developments have been accompanied by the release of Smart PLS 3, which implements many of these latest extensions is highly user-friendly software (Hair et al, 2017). Given correlations among a number of surface attributes drawn from a particular domain, it is possible to determine, from the pattern of correlations, the number of common factors operating and something about their nature (Tucker & MacCallum, 1997). Thus, further data analysis of the study involved the analysis of 120 items, 17 indicator variables, and 4 construct variables in order to identify key factors affecting the equity of government-funded infrastructure. Among interdependence techniques, factor analysis and SEM are useful for studies focusing on variables rather than on cases or respondents (Hair et al, 2010). Factor analysis is more appropriate in analyzing the structure of variables by reducing a

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large number of items into a smaller set of indicator factors (Tucker & MacCallum, 1997; Hair et al, 2010).

More importantly, there are basically two types of factor analysis: Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). CFA starts with a hypothesis about how many indicator factors there are and which items load on which indicator factors. EFA, in contrast, does not indicate a measurement model initially and usually needs to identify the measurement model. CFA is applied to test whether measures of the construct are related to a researcher's understanding of the nature of the construct. As such, the objective of CFA is to compute whether the data confirm the fit of the hypothesized measurement model. This hypothesized model is based on theory or previous analytic research (Dang and Sui Pheng, 2015). Thus, a blueprint is developed, questions are written, a scale determined, the instrument pilot tested, data collected, and CFA completed (see Chap. 9). Measures that are greatly correlated (either positively or negatively) are likely affected by the same factors, while those that are relatively uncorrelated are likely affected by different factors (DeCoster, 1998; Hair et al, 2017).

In general, the study used CFA as it was studied whether the specified set of constructs was influencing responses in a predicted way to its measures of institutional capacity with the relations to infrastructure governance, infrastructure equity, and nation-building process. CFA is the more powerful technique than EFA because CFA allowed the study to test its hypotheses about the factorial structure of observed variables. Moreover, when the interrelationship among the items is not known, it is indicated to use EFA, but when the interrelationship is tested and the factors and related items are known, CFA is indicated to be used. In CFA, if the unacceptable model fit is found, an EFA can be performed (Bandalos & Finney, 2010; Buyukoztork, 2002; Kline, 2011; Nazim & Ahmad, 2013). Thus, during the literature review and pilot test, the relationship was tested and the factors and related items were known, CFA is used in this study.

C. Structural Equation Modelling (SEM)

SEM is a statistical technique that aims to discover the core factors from empirical data and assess the interrelationship between these factors (its relationship to multivariate data analysis) (Nazim & Ahmad, 2013; Phiakoksong *et al*, 2013; Hair et al, 2017). SEM evaluates how well a theory in the form of a model fits data. Models also involved a number of interrelated variables and included latent variables (constructs or factors), which could not be measured directly, along with other

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variables that are directly-measured (the observed, measured, or indicator variables). Therefore, SEM denotes a more and more popular group of statistical methods that estimate the interrelationships among observed and latent variables on the source of the variances of a given set of observed variables (Watson, 2011; Hair et al, 2017). More specifically, variables, whether they are observed or latent, can also be defined as either independent variables or dependent variables in SEM. An understanding of these basic models helped in understanding SEM, which combines path and factor analytic models (Schumacker & Lomax, 2010).

Basically, there are two types of SEM: covariance-based SEM (CB-SEM) and partial least squares SEM (PLS-SEM; also called PLS path modeling), which are second-generation techniques than other factor analysis techniques, which are first-generation. CB-SEM is mainly used to confirm (or reject) theories (i.e., a set of systematic interrelationships between several variables that can be tested empirically). It does this by determining how well a suggested theoretical model can guess the covariance matrix for a sample data set. In contrast, PLS-SEM is primarily used to develop theories in exploratory research. It does this by focusing on clarifying the variance in the dependent variables when probing the model, and its use across a variety of disciplines (Schumacker & Lomax, 2010; Monecke & Leisch, 2012; Kwong & Wong, 2013; Hair et al, 2017).

Path models are diagrams used to visually show the hypotheses and variable interrelationships that are surveyed when SEM is applied. A PLS path model comprises two elements: First, there is a structural model (also called the inner-model in the context of PLS-SEM) that signifies the constructs (“circles” or “ovals”). The structural model also shows the interrelationships (paths) between the constructs. Second, there are the measurement models (also denoted to as the outer-models in PLS-SEM) of the constructs that show the interrelationships between the constructs and the indicator variables (“rectangles”). There are also two sorts of measurement models: one for the “exogenous latent variables” (i.e., those constructs that clarify other constructs in the model) and one for the “endogenous latent variables” (i.e., those constructs that are being clarified in the model) (Monecke & Leisch, 2012; Kwong & Wong, 2013; Hair et al, 2017). Therefore, path models test more complex models than regression models (Schumacker & Lomax, 2010).

Moreover, two categories of a theory are essential to prepare path models: structural theory and measurement theory. The former identifies how the constructs are interrelated to each other in the

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structural model, while measurement theory identifies how the latent variables (constructs) are measured. Whereas, structural theory displays how the latent variables are interrelated to each other (i.e., it displays the constructs and the path relations between them in the structural model) (Monecke & Leisch, 2012; Hair et al, 2017). Measurement model requirements are quite flexible. Generally, there are two ways to quantify unobservable variables. One approach is referred to as a reflective measurement, and the other is a formative measurement. PLS-SEM can manage reflective and formative measurement models as well as single-item measures without extra requirements or limitations. Model complexity is commonly not a question for PLS-SEM. As long as proper data meet minimum sample-size requirements, the complexity of the structural model is essentially unlimited (Hair *et al*, 2017; Wang *et al*, 2015). This study considered the context with reflective measurement only.

As discussed above, between CB-SEM and PLS-SEM, the latter is more appropriate to examine the multiple interrelated dependence relationships in this study given its prediction orientation. Similar to CB-SEM, PLS-SEM assessment of the theoretical model consists of two approaches. The first approach, evaluation of measurement model, engages the evaluation of the reliability and validity of measured indicators representing latent constructs such as indicator reliability/outer loadings, convergent validity, internal consistency reliability/composite reliability, and discriminant validity are valid and reliable. The second approach, evaluation of the structural model, involves the assessment of parameter estimates representing the structural relationships among latent constructs (such as the coefficient of determination (R^2), Path coefficient (β value) and T-statistic value, Effect size (f^2), the Predictive relevance of the model (Q^2), and Goodness-of-Fit (GOF) index are the key standards for evaluating the inner structural model) (Monecke & Leisch, 2012; Hair et al, 2017).

It also includes mediation (indirect specific effect and total effect) and multi-group analysis including hypothesis testing. Specifically, they are confirmatory when testing the hypotheses of existing theories and concepts and exploratory when they search for patterns in the data in case there is no or only little prior knowledge on how the variables are related (Hair et al, 2017). Thus, as the theory of the institutional capacity with relation to infrastructure governance and equitable allocation of public investments in infrastructure and nation-building is less developed, the PLS-SEM model is used in this study. Because, specifically, PLS-SEM has several advantages over

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CB-SEM in many circumstances usually meet in social sciences research such as when sample sizes are small or when complex models with many indicators and model relationships are estimated. However, PLS-SEM ought to not be observed simply as a less stringent substitute to CB-SEM but rather as a complementary modeling approach to SEM. If correctly applied, PLS-SEM indeed can be a silver bullet in many research situations (Hair et al, 2017). However, there are several restrictions of PLS-SEM. In its basic form, the technique cannot be computed when structural models comprise loops or circular interrelationships between the latent variables. Early extensions of the basic PLS-SEM algorithm that have not yet been implemented in standard PLS-SEM software packages, however, enable the handling of circular relationships.

Furthermore, since PLS-SEM does not have an established global goodness-of-fit measure, its use for theory testing and confirmation is generally limited (Hair et al, 2017). Measurement is the practice of assigning numbers to an indicator variable grounded on a set of rules. One cannot directly measure abstract concepts such as satisfaction or trust. However, one can measure indicators or manifestations of what one has agreed to call satisfaction or trust, for example, in a brand, product, or company. Specifically, when concepts are difficult to measure, one approach is to measure them indirectly with a set of indicators that serve as proxy variables. Each item represents a single separate aspect of a larger abstract concept (Monecke & Leisch, 2012; Kwong & Wong, 2013; Hair et al, 2017). Thus, the following PLS-SEM algorithm which is adapted from Dang and Sui Pheng (2015) is used for this study. See Chap. 2 Figure 2.1 the conceptual model or Chap. 9 Figure 9.1 the tested model.

The PLS-SEM is accompanied by the release of Smart PLS 3, which implements many of these latest extensions is highly user-friendly software which is the newest version of the most widely applied PLS-SEM software—SmartPLS 3 (Faul; Erdfelder; Buchner; Lang, 2009; Ringle & da Silva, 2014; Hair et al, 2017). Therefore, the study decided to use PLS-SEM as the theory is less developed in infrastructure development, especially infrastructure equity state-and, nation-building processes.

The other point is data distribution. Normal distributions are generally necessary, specifically when working with CB-SEM. Whereas, PLS-SEM usually creates no assumptions about the data distributions. To assess whether the data follow a normal distribution, the study applied statistical

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tests. In addition, the study examined two measures of distributions—skewness and kurtosis which allowed assessing to what extent the data deviated from normality (Hair et al., 2017). *Absolute* skewness and/or kurtosis (two measures of distributions) values of larger than 1 are telling of non-normal data (Hair et al, 2017). A general guide for skewness is that if the amount is larger than +1 or lower than –1, this is a sign of a skewed distribution. For kurtosis, the general guide is that if the amount is larger than +1, the distribution is too peaked. Likewise, a kurtosis of less than –1 specifies a distribution that is too flat (Hair et al, 2017). As the distributions displayed skewness and kurtosis that exceeded these guidelines, the result is considered non-normal data. Hence, there is also a lack of normality in variable distributions that could distort the results of multivariate analysis. This problem is much less severe with PLS-SEM, but the study examined PLS-SEM results carefully as distributions deviated from normal.

Moreover, missing data are often a problem in social science research because many projects obtain data using survey research. Missing data occurred when the respondent either purposely or inadvertently failed to answer one or more question(s). When the amount of missing data on a questionnaire exceeded 15%, the observation is typically removed from the data file. Indeed, the observation was removed from the data file even if the overall missing data on the questionnaire did not exceed 15% (per observation). For example, if a high proportion of responses are missing for a single construct, then the entire observation is removed (Hair *et al*, 2017). As a rule of thumb, Hair *et al* (2017) recommended using mean value replacement when there are less than 5% values missing per indicator. Moreover, outliers were identified before running PLS-SEM. and in most instances, the offending responses were removed from the data set.

D. Fit Index Criteria in SEM (Fit/Reject)

Root Mean Square Error of Approximation (RMSEA) is correlated to residual in the model. RMSEA values range from 0-1 with a smaller RMSEA value signifying better model fit. Acceptable model fit is showed by an RMSEA value of 0.06 or less (Hu & Bentler, 1999; Sivo *et al*, 2006; Hooper *et al*, 2008; Cangur & Ercan, 2015). In Chap. 9 Table 9.5 presented that this study model's RMSEA is 0.06, which revealed that this study model has a good fit. Whereas, Normed Fit Index (NFI) equal to 0.861 is also measured. Hence, the NFI results in a value between 0 and 1. The closer the NFI to 1, the better the fit (Chen, 2007).

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As well, the most usually used alternative approach in this context is qualitative evaluation, which is normally conducted at a project level. It might comprise in-depth interviews, focus groups, opinion surveys, investigation of socio-demographic data, or a combination of qualitative approaches. Even if these approaches are seen as less vigorous by some, their use indicates the importance of equity consideration in infrastructure assessment and the perceived requisite for all stakeholders/actors taking part in the planning and decision-making process to distinguish the principal issues and theory (Thomopoulos *et al*, 2009).

4.5 Qualitative Methodology (Phase II)

4.5.1 Qualitative Data Collection

A. In-depth Interviews

Qualitative research is a naturalistic approach that tries to study things in their natural settings (Sarantakos, 1993; Hancock, 1998; Rubin & Rubin, 2005). It seeks to understand, as completely as possible, the phenomena under study which is in this case, infrastructure equity with relation to nation-building is a very complex issue (Pandey & Patnaik, 2014). This qualitative research method involved the use of qualitative data, such as in-depth interviews, document review, and FGDs, in order to understand and explain the equitability of infrastructure development in Ethiopia. In-depth interviews are one of the main methods of data collection used in qualitative research (Sarantakos, 1993; Hancock, 1998; Creswell, 1998; Rubin & Rubin, 2005; Brouneus, 2011). Thus, there are 5 important features of the in-depth interview. The first key feature of the in-depth interview is that it is planned to combine structure with flexibility. A second key feature is that the interview is interactive in nature. Thirdly, the study used a range of reviews and other procedures to attain the depth of answer in terms of penetration, exploration, and explanation. Fourthly, the interview is generative in the sense that new knowledge or thoughts are created (Creswell, 2009; 2014; Brouneus, 2011). Finally, these key features together mean that qualitative interviews were conducted face-to-face.

Moreover, the success of the interview depends, to a large extent, on the personal and professional qualities of the individual interviewer (Sarantakos, 1993; Eritchi & Elewis, 2003; Rubin & Rubin, 2005). For the qualitative data, the study employed the purposive and sometimes snowball sampling technique (Sarantakos, 1993; Creswell, 2009) to identify participants with unique perspectives or those who could offer in-depth insight to explain results variances. A structured interview was employed in the study that has a clear purpose and contains open-ended questions.

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In-depth interviews were conducted to examine how to resolve the issues found in the survey. Therefore, the population of interest for in-depth interviews were key higher officials, planners, policy-makers, and key players from the non-governmental sector. Subsequently, whenever appropriate respondents were asked how the use of the institutional capacity building and infrastructure governance are impacting infrastructure equity and nation-building, and how these should be resolved. The interviews were recorded and fully transcribed to help the study to recall the narrative responses for review and discussion thereafter. Original tape recordings were kept for checking original meanings and contexts whenever necessary.

Meanwhile, determining sample size for interviews is difficult. Creswell (1998) suggested a sample size from 5 to 25. By referring to the researchers' experiences, Malterud *et al* (2015) indicated that a purposive sample of 6 to 10 participants with diverse experiences might, therefore, provide sufficient information power. However, there are no specific rules to be followed for qualitative inquiry. Since in-depth interviews in this study mostly involved describing with depth and in detail, the current challenges of equity in infrastructure development in Ethiopia and response approach from respondents' experiences, nearest to the maximum sample size that the research targeted at was 23. 10 purposely selected federal institutions with 10 individuals were identified for an in-depth interview. There was also an in-depth interview from purposely selected four regional governments in four institutions (regional president office, road, electric, and telecommunication) with 13 individuals (Oromia, Amhara, Tigray, and Benshangul/Gumuz) with a total of 23 individuals. From these 23 individuals, 18 (8 federal and 10 regional) were interviewed. Moreover, the interview was conducted and transcribed in Amharic (the transcript writing includes every idea enunciated, but omits unrelated content, unnecessary repetitions, and mistakes). The interviews were tape-recorded and systematically analyzed using content analysis techniques. The study results are based on an analysis of the next data sources: In-depth interviews, and assessment of pertinent documents. Thus, the transcription was translated into English. The above procedures were also applied for the FGDs.

Thus, the key informants were selected based on their previous and current positions and longtime experiences from each sector suitable to the subject matter in person. The researcher requested the key informants to informally discuss the subject-matter of the study with the aim to gather detailed data relevant for this study. All informants were asked the same open-ended question to determine

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the practice and challenges of infrastructure equity with an emphasis on the principles as per the law of the land, the roles of key actors or policymakers in practice, the participation, and approaches to the infrastructure decision-making process. They were also asked to explain the possible factors that have both positive and negative impacts on the effects of infrastructure equity on the nation-building process (Kaso *et al*, 2018). Moreover, as the plan was to digitally record the interview, it was appropriate to ask for permission to do so. When the interviewees felt comfortable with this, it was useful to take notes in parallel, of details and observations that helped the study remember specific passages when the researcher later listened to the interview for transcribing. When the interviewees did not feel comfortable with recording, taking good notes were all the more important (Brouneus, 2011).

B. Focus Group Discussions (FGDs)

In addition, in-depth interviews, some relevant FGDs, and document analyses were involved. Three obvious factors that affected the ability to plan focus groups are ethical concerns, budget issues, and time constraints (Hancock, 1998; Morgan, 1997; Rubin & Rubin, 2005; Brouneus, 2011). Combining both practical and substantive considerations helped to clarify the basis for the rule of thumb size of the group that specified range of 6 to 10 (Morgan, 1997; Krueger, 2002; McLafferty, 2004). It was practically possible 3 to 6 participants in each focus group due to their different personal reasons. As the FGDs results were more or less similar to the individual interview, one group in each region were adequate for saturation. Then, FGDs were conducted in 4 cities out of 8 (one City in each of four regions: Oromia (Adama), Amhara (Bahir Dar), Tigray (Mekelle), and Benshangul/Gumuz (Assosa)). Moreover, the city administration office was the center of the focus group. In addition, it included the representatives from the road, telecommunication and electric institutions, and advisors, planners, and experts from the administration offices. Some of the participants were also representatives from city councils.

4.5.2 Qualitative Data Quality Assurance

To address credibility, the study followed Lincoln and Guba's (1985) four criteria to assure the trustworthiness of the data that are collected through the interview guide. According to Lincoln and Guba (1985) and Shenton (2004) trustworthiness involves establishing: credibility, transferability, dependability, and conformability. The following techniques are used by this study to ensure credibility: prolonged engagement; triangulation; peer debriefing; member checks; and

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thick description; to ensure transferability: thick description; to ensure dependability: inquiry audit; and, to ensure conformability: triangulation to decrease the influence of investigator bias in this qualitative research. Moreover, the study has also chosen to focus on validity strategies that are frequently used by the qualitative researcher: prolonged engagement, triangulation, peer review/debriefing, clarifying researcher bias, member checking, thick description, external audits, etc. (Creswell, 2007). Reliability can be enhanced as the study obtained detailed field notes by employing a good-quality tape for recording and by transcribing the tape (Creswell, 2007, p.2007-2009; Rubin & Rubin, 2005). In addition to this, the study considered the criteria for trustworthiness across research paradigms and designs that are social validity, adequacy of data, and adequacy of interpretation (Morrow, 2005; Sousa, 2014). Therefore, the study used these criteria to ensure qualitative data quality.

4.5.3 Qualitative Data Analysis

A. Thematic Content Analysis (TCA)

Qualitative data are analyzed using thematic content analysis, quotes, codes, and themes (Miles & Huberman, 2014; Rubin & Rubin, 2005; Hancock, 1998). It is used to investigate classifications and existing themes (patterns) that link to the data (Anderson, 2007; Ibrahim, 2012). While sorting and naming themes required some level of interpretation, “interpretation” was kept to a minimum. The researcher’s own feelings and thoughts about the themes or what the TCA themes are signified are largely irrelevant to a TCA (Anderson, 2007; Ibrahim, 2012; Rubin & Rubin, 2005).

Moreover, thematic analysis is appropriate for the following situations as the study used a mixed approach: data interpretation, inductive approaches, analysis 2 of different steps of data and coding and categorizing (Ibrahim, 2012). However, Miles and Huberman (2014) stated that some qualitative researchers put main energy into data collection for weeks, months, or even years and then give up from the field to “work over their notes”. They accept as true. But, this is a great mistake. So, they advise interweaving data collection and analysis from the very start. This approach was used in this study. Besides, open coding was first assigned to data masses to detect reoccurring patterns. From these patterns, similar codes were gathered together to create a smaller number of sorts or pattern codes. Then, the relationships with each other were created to prepare higher-level analytic values for proposition, assertion, hypothesis, and/or theory development (Miles & Huberman, 2014), including categories (constructs), a set of codes (concepts), and relationships using content analysis (sentiment analysis-a method used to capture people’s attitude

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or opinion toward the phenomenon) based on observed empirical data, hereafter the description (Bhattacharjee, 2012). Although this methodology of qualitative data collection and analysis was mainly used in Chap. 9, it was also used for the analyses of the general overview chapters (3, 5, and 6) accordingly.

4.6 Discussion and Interpretation

By using the mixed methods, the study interpreted the follow-up results in a discussion section of the study. This interpretation followed the form of first reporting the quantitative, first-phase results, and then the qualitative, second phase results. However, this design then employed a third form of interpretation (how the qualitative findings help to describe the quantitative results) (Creswell, 2014). The process of interpretation triggered new questions which in turn led to further researches (Kothari, 1990). Therefore, discussion and interpretation are used both qualitative and quantitative findings which are discussed and interpreted together. Qualitative data are provided additional justification for quantitative findings. Figure 4.4 below also displayed the research design of the study.

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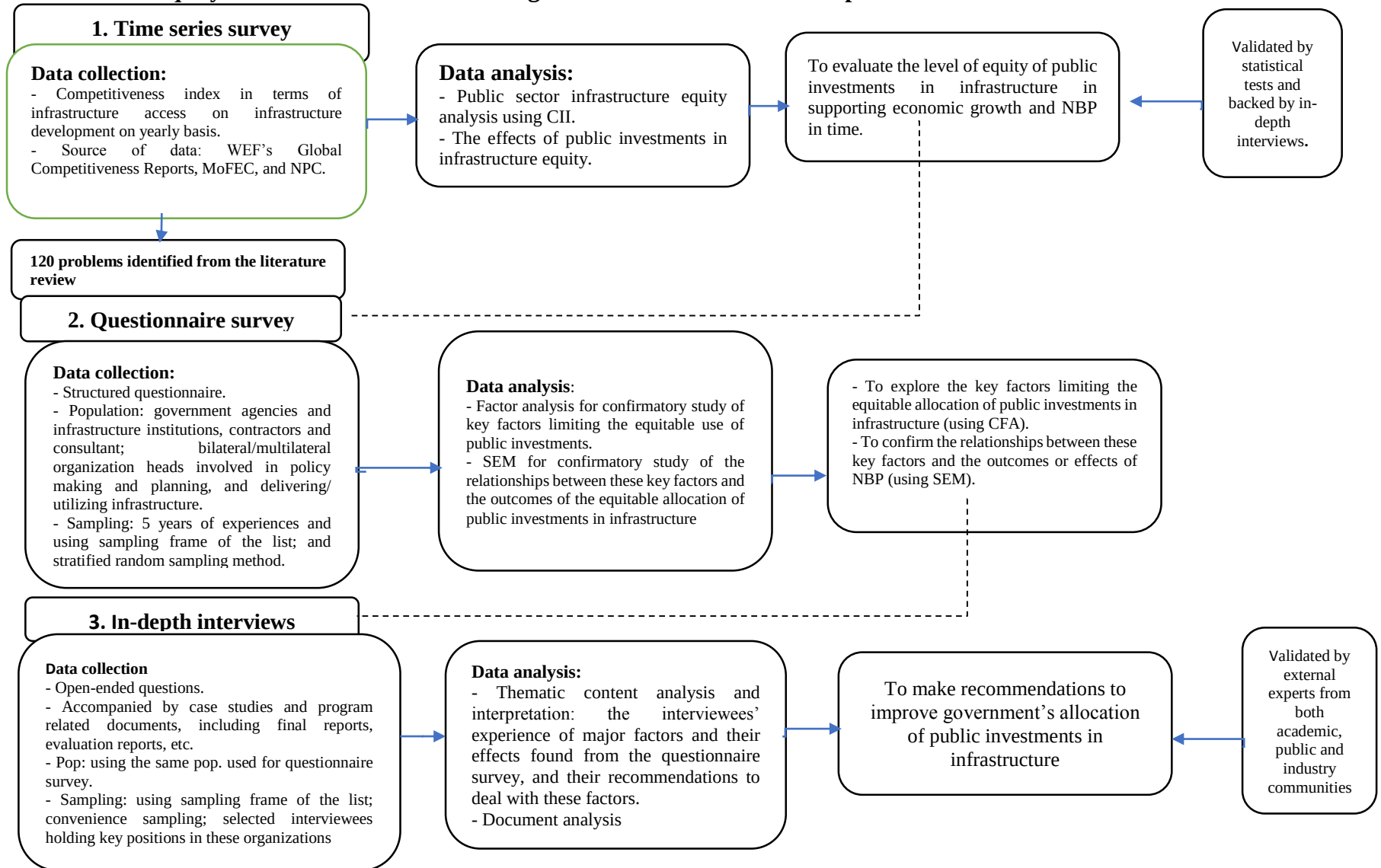


Figure 4. 4 Research Design

Source: Adapted from (Dang and Sui Pheng, 2015)

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4.7 Two-stage validation

The first stage of validation involved quantitative validation via statistical tests applied to the research hypothesis. Various statistical tests are carried out throughout the data analysis, including the tests of significance of the correlation between groups of factors and the tests of the reliability and validity of the measurement model and the structural model. These tests are explained in Sec.9.2 and 9.3 in Cha. 9. The second stage of validation involved the qualitative validation in Sect. 9.8.

4.8 Ethical Considerations

Ethics is a standards of conduct specified as group or profession (Webster's New Collegiate Dictionary, 2006). The ethical norms might vary from one culture to another, and here, this study means that the ethical standards which are used to scientific research (Sarantakos, 1993; Bhattacharjee, 2012). This being a mixed-method study, the researcher has to interact deeply with the participants and the advisors, thus entering their personal domains of values, weaknesses, individual learning disabilities, and the like to collect data. Scholars remind researchers that they should always remember that while they are doing their research, they are in actual fact entering the private spaces of their participants. Justifiably, this raises numerous ethical issues that ought to be addressed during, and after the research had been accomplished (Brouneus, 2011). Creswell (2003) states that the researcher has a duty to respect the needs, rights, morals, and wishes of the informants. Hewitt (2008) has also identified components of the ethical research relationship such as rigor, rapport, respect for autonomy, avoidance of exploitation, and confidentiality. Therefore, becoming aware of those values, attitudes, and attributes that impact interpersonal relationships within the research context is necessary for attempting to understand the effect that such preconceptions and behavior will have.

Scholars also list different issues that researchers ought to reflect when analyzing data. They are warning researchers to be aware of the following (informed consent; avoiding harm and risk; honesty and trust; privacy, confidentiality, and anonymity; informed consent; voluntary participation and harmlessness; disclosure; and analysis and report) before, during, and after the research has been conducted (Sarantakos, 1993; Brouneus, 2011; Bhattacharjee, 2012). It is also forbidden to plagiarize, falsify or fabricate data, research procedures, or data analysis (Bhattacharjee, 2012). Therefore, the study has considered all these factors.

One of the normally unexpected concerns relating to ethical issues is cultural sensitivity (Brouneus, 2011; Bhattacharjee, 2012). The relation between the researcher and the subject during the interview was

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considered in terms of the values of the researcher and cultural aspects. Therefore, appropriate steps were taken to adhere to strict ethical guidelines in order to uphold participants' privacy, confidentiality, dignity, rights, and anonymity (Sarantakos, 1993; Brouneus, 2011; Bhattacharjee, 2012). Thus, ethically-informed decision-making has been taken place at all stages when planning to conduct in-depth interviews in the research: from the research design and data gathering to the analysis of data and presentation of results. In addition, the next issues relate to “ethical standards” in “professional practice” such as truthfulness in data gathering and data handling; pertinent research methodology; suitable interpretation of the data; exact reporting; fabrication of data is misbehavior; and, falsification of data is misbehavior (Sarantakos, 1993).

4.9 Conclusions

The selection of research methodology is discussed in this chapter. The methods and approaches used in this study have adopted both quantitative and qualitative analyses. The type of research design, method of sampling, data collection and processing, and the choice of statistical and data analysis techniques used in this study are examined. The types of research designs adapted in this study included time-series survey, questionnaire survey, and in-depth interviews and FGDs. The major steps of the research designs are shown in Fig.4.4 above. These methods are complementary to each other in order to gather information and provided insights into the current issues and the impacts of infrastructure equity on the nation-building processes in Ethiopia. Finally, in relation to the literature review and the research objectives above, and as basic principles and directions for the next chapters, an overview of some of the concepts of federalism and nation-building process from the perspective of institutional capacity, infrastructure governance, and equity are investigated in Chap. 5.

CHAPTER 5

INSTITUTIONAL CAPACITY, INFRASTRUCTURE GOVERNANCE, AND EQUITY FROM THE PERSPECTIVE OF FEDERALISM AND NATION-BUILDING PROCESS IN ETHIOPIA

Introduction

The purpose of the chapter is to examine some practice of institutional capacity, infrastructure governance, and equity from the perceptive of federalism and state-and nation-building processes in comparison with international and national practices. First, it describes the concepts and perspectives of federalism including contemporary federalism. Second, it also considers the nation-building process including ways to establish political relationships in a country, the formation of Ethiopia's federation, and state-building vs. nation-building processes. Third, it explains the nation-building process from the perspectives of institutional capacity in the infrastructure sector, and ways to effective institution building. Fourth, it also describes the state-and nation-building processes from the perspectives of infrastructure governance which includes the governance challenges in the infrastructure sector in developed countries, and infrastructure governance in Africa and Ethiopia. Finally, it briefly considers the nation-building process from the historical perspectives of infrastructure equity in Ethiopia, and then it concludes.

5.1 Concepts, Perspectives, and Paradox of Federalism

5.1.1 Concepts of Federalism

The influential effort at defining federalism was made by Wheare in his 1946 work *Federal Government* (Law, 2013), which has formed the foundation of the modern literature on the concept of federalism and has remained today the most common point of departure for scholars working in the field. Wheare (1946) also defined “the federal principle” as the method of dividing powers, i.e. the federal and regional governments are ‘each, within a sphere, co-ordinate and independent’ (Law, 2013). Meanwhile, according to Elazar (1991), there are 3 vital federal experiments in the history of humanity to date which were/are the Israelite tribal federation which is described in the Bible was the first to use federal principles in their internal organization to the present day (more than 3000 years go); the second was the Swiss confederation (700 years ago); and, the third was the United States of America as the first superpower (200 years ago).

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Elazar (1991) also added that, since its beginnings, political science has acknowledged 3 significant ways in which polities come into existence which are conquest (force, in the words of Federalist Number 1); organic development, for the federalist, accident); and, covenant (choice) - the deliberate coming together. Elazar (1991) also stated that federalism principles are worried about the combination of “self-rule and shared-rule”. Thus, the modest possible definition of federalism is “self-rule plus shared rule” (Elazar, 1991, 1994).

Wheare (1963) has also identified factors to desire and operate, and factors to desire to separate, which are pre-requirements of a federal government. According to Wheare (1963), “factors to desire and operate federal government” (Wheare, 1963, p. 37) are a sense of military insecurity and of the consequent need for the common defense; a desire to be independent of the foreign power, and a realization that only through union could independence be secured; a hope of economic advantage from the union; and, issues of leadership, of skill in propaganda, and negotiation can make all the difference between an active desire for union and stagnation are among others. Whereas, “factors that produce the desire to separate” (Wheare, 1963, p. 37): previous existence as distinct colonies or states (previous history as independent states/ Past history); divergence of economic interests (Economic loss); geographical factors such as distance (Geographical Isolation); and, dissimilarities of social (including political) institutions (Wheare, 1963; Burgess, 2006; Cameron, 2009). Currently, these are also the challenges of Ethiopia, for example, ‘divergence of economic interests’ including infrastructure equity.

Moreover, it is very crucial to overview some issues about the way to peace. Elazar (1994), in his book, “federalism and the way to peace”, the word “federal” is originated from the Latin *foedus*, which means “covenant”. Federalism derived from the Latin word *foedus* referring to a “treaty or an agreement” (Aliyu & Mohammed, 2018). Elazar introduced that “the air is full of promise, which we must transform into fulfillment” (Elazar, 1994, p.5). According to Elazar, to reach that fulfillment a government must address: “people’s minds; their cultures; and, their institutions”-one of the most promising vehicles to addressing all three are “a federal idea” (Elazar, 1994, P.5). What is critical is that “federalism involves both a set of attitudes and a set of institutions that, through constitutional means, can establish those means to transform those attitudes into instruments of self-governance” (Elazar, 1994, P.5). Therefore, federalism is the practical application of the covenantal way to the organization of political authority and power. Although, “It is very difficult to transform learnings for power-sharing towards self-rule and shared rule; what we would consider federal principles and practices, unless there is first of all the concept

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of civil society” (Elazar, 1994, p. 109), which is also crucial to Ethiopian federalism. While there has been some significant discussion of this issue above, it would be wrong to conclude that a consensus or a satisfactory conclusion has been reached on the subject of federalism (Cameron, 2009). Moreover, federalism is currently exposed to several interpretations and definitions by scholars, political thinkers, and scientists (Aliyu & Mohammed, 2018).

5.1.2 Perspectives on Federalism

As mentioned above, it is believed that not all adhere to a developmental interpretation of federalism. In addition to the model, there are essentially three other broad schools of federal thought in the concept of federalism-“the democratic, economic, and administrative models of federalism” (Advisory Commission on Intergovernmental Relations (AC-IGR, 1981).⁴⁶ It is stated that while these three perspectives usually overlap in various treatments of federalism, each is rationally distinct to a substantial degree. In general speaking, “the democratic perspective argues that federalism contributes to democracy and liberty. The other schools maintain that federalism promotes economic or administrative efficiency respectively” (AC-IGR, 1981, p.5). Therefore, it is necessary to establish such kind of advisory commission in Ethiopian federalism to solve, for example, ethnic conflicts, boundary disputes among regions, etc., which needs to critically evaluate and benchmark other federal countries.

Moreover, Law (2013) noted that a key novel feature here is the lighting of two distinct federal models rather than just one. These arrangements, single state and multi-state, in which sovereignty is agreed to reside in either the parts or the whole, in numerous peoples or in one people, maybe named respectively the ‘federal union of states’ and the ‘federal state’ (Law; 2013; Kumar, 2014). Law (2013) also established definitions of the four intermediate political structures identified by extracting the relevant features of each form, as follows:

A confederation of states is a multi-state political system in which there is a division of powers between two levels of government and the general government is subordinate to the regional governments. A federal union of states is a multi-state political system in which there is a division of powers between two levels of government of equal status. A federal state is a single state political system in which there is a division of powers between two levels of government of equal status. A system of devolved government is a single state political system in which there is a

⁴⁶ Advisory Commission on the intergovernmental Relations (AC-IGR, 1981) , The Federal Role in the Federal System: The Dynamics of growth, The Condition of Contemporary Federalism: Conflicting Theories and Collapsing Constraints, A-78. This commission in the American Federalism was envisioned that, in the presentation of its duties, will: carry together representatives of the federal, state, and local governments for the thought of common difficulties . . . ; inspire discussion and study at an early stage of evolving public problems that are likely to need intergovernmental cooperation; and, endorse, within the framework of the Constitution, the most necessary delivery of governmental functions, responsibilities, and revenues among the numerous levels of government, etc.

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division of powers between two levels of government and the regional governments are subordinate to the general government (Law,2013, p.E-105).

Therefore, according to Law (2013), the root of the problem would seem to lie in the lack of well-established contours to the federal concept at the present time. Thus, there is a lack of comprehensive gratitude for the meaning and definition of federalism that signifies a severe weakness that requires urgent attention (Law, 2013). In another perspective, Palermo (2019) states that:

The two main issues that kept scholars busy for the past decades –conceptualization and definition of federalism and institutional aspects –are decreasing in their significance. Scholars are finally accepting that there is no universal agreement on what federalism means... In fact, federalism is at the heart of one of the most pressing challenges in the history of mankind: how to order public life and how to limit, organize and regulate power in a way that guarantees freedom and efficiency, unity and plurality, autonomy and coordination. But precisely for this reason, it can be seen in different ways, under different disciplinary angles, taking different features into account and producing very different outcomes (Palermo, 2019, p.6).

Hence, it is indicated that “one of the instruments to deal with them is federalism but alone are no longer sufficient to make federalism relevant in the twenty-first century” (Palermo, 2019, p.6). As a result, the perspective on federalism can be concluded that the challenges are very complex, and it is different in nature and vary from country to country.

5.1.3 The Paradox of Federalism

According to Elazar (1994), in the latter half of the 20th century, “there was the development of two powerful, thoroughly interdependent, but distinct and contradictory political trends in the direction of integration and disintegration” (Elazar, 1994, p. x). Therefore, Elazar (1994) stated that, at the end of the Cold War, there has been a new and dangerous era of fragmentation, ethnic conflict, and heightened nationalism worldwide. Thus, the promise of peace has been unfulfilled. Meanwhile, “the paradox of federalism is about whether self-rule exacerbates or accommodates ethnic divisions” (Erk & Anderson, 2009, p.192). Based on this situation, one can see the paradox of federalism. However, territorial recognition of minorities through the adoption (or strengthening) of federalism may automatically appear to be the best way to manage ethnic, linguistic, and border conflicts but, in the long run, such recognition continues and reinforces the differences between groups/regional states and offers minority nationalists

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with the institutional tools for eventual secession, i.e. intensifying the “us vs. them” mindset’ (Erk & Anderson, 2009).⁴⁷ This seems the current issue in Ethiopia which is discussed below.

According to Erk and Anderson (2009), although, no magic formula for settling the paradox is yet extracted, there are useful paths to discover. Erk and Anderson (2009) proposed three dimensions of this issue which are the political will of the subunits and their institutional and societal capacity; federal institutional design codified in the constitution; un-codified economic (economic disparity across regional states-especially if it corresponds to ethnocultural distinctiveness which can increase secessionism in a federal system) (Erk & Anderson, 2009). For example, complaint at economic (or cultural or political) injustices forms a will to secede that is stated through accessible institutions and is intended to right the perceived incorrect (Erk & Anderson, 2009). However, Erk and Anderson (2009) stated that one must be equally doubting the conclusion that federalism should be avoided at all costs because of its propensity to encourage challenges to central states. Cameron (2009) also reminded that, despite its limitations, sometimes federalism might be the only tool available. Moreover, Fiseha (2012) also considered that “even on a normative level, if there are certain factors related to a territorially grouped and politically salient mobilized diversity in a polity, it seems there is little choice other than federalism to manage it” (Fiseha, 2012, p.436). If one considers the case of Ethiopia, after years of centralized rule that underlined unity since 1991 Ethiopia has implemented a federal system that aims at ‘accommodating diversity’ (Fiseha, 2012).⁴⁸ However, it is now actually exacerbating regional/ethnic-based conflicts in Ethiopia today as there is a lack of equality, for example, infrastructure disparity is raised as a case.

⁴⁷ Erk, J. and Anderson, L. (2009), the Paradox of Federalism: Does Self-Rule Accommodate or Exacerbate, Ethnic Divisions? *Regional & Federal Studies*, 19:2, 191-202.....the study of the secession-inducing and secession-preventing features of federalism: First, the political will of the secessionists and their capacity to mobilize to this end; secondly, the characteristics of federal institutional/constitutional design; and, thirdly, economic and sociological uncoded factors that have a bearing upon these questions.

⁴⁸ Fiseha, A. (2012), Ethiopia's Experiment in Accommodating Diversity: 20 Years' Balance Sheet, *Regional & Federal Studies*, 22:4, 435-473. Since 1991 Ethiopia has adopted a federal system that aims at accommodating diversity.....whether Ethiopia's experiment with federalism is achieving the promised goal of managing diversity or whether it is exacerbating conflicts.....The federation's biggest risk is its entanglement with the ruling party, its reliance on soft institutions of democracy and narrowly based institutions of power sharing..

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5.1.4 The Condition of Contemporary Federalism

As stated above, potential disadvantages of federalism are the duplication of work and lack of coherence; additional operating costs; increasing regional discrepancies of wealth, resources, and outcomes; harmful economic competition between subnational units; judicialization of politics; potential exclusion of minorities; the strengthening of local elites who misuse power; ineffective governance because of a lack of capacity; and, instability and threats to democracy (Bulmer, 2017). If one considers Ethiopian federalism, for example, according to Fiseha (2006), there is a lack of efficient and effective institutional setup for the implementation of federal laws in addition to the fact that the system of IGRs in Ethiopia as it is in its “infant stage”. However, in the 21st century, federalism has become a more relevant subject because this is an era of an assertion of by different ethnic groups/regional states in public participation which is mainly fulfilled by a federal set (Vasudeo, 2019).

Moreover, Inman and Rubinfeld (2014) provided three alternatives for consideration which are economic federalism, cooperative federalism, and democratic federalism. Thus, the devolved structure of firm economic federalism might be economically inefficient. If so, one must look to supplementary institutions (i.e. intergovernmental negotiating and national government decision-making) to see if one might yield enhanced efficiency performance for the public sector (Inman & Rubinfeld, 2014). Whereas, cooperative federalism offers for a bargaining environment that inspires *all local jurisdictions*, or subsets of these jurisdictions, to come together to collectively offer public goods with significant economies or to draw from the tap agreements that adopt the economic consequences of spillovers (Inman & Rubinfeld, 2014). The third one is democratic federalism. Rather than a single elected president for deciding pure public goods such as infrastructure or allowed spillovers as in economic federalism or total representation of all jurisdictions as in cooperative federalism, democratic federalism allows for a *partial representation of the citizens* of local governments through multi-jurisdiction elections of representatives to the national government (Inman & Rubinfeld, 2014). Inman and Rubinfeld (2014) stated that the choice of an “optimal” federal constitution hinges on the relative importance one places upon the potentially competing values of efficiency, democracy, fairness, and personal liberties and rights. They also added that trade-offs appear inevitable (Inman & Rubinfeld, 2014). Hegemer and Buhler (2013), by citing Gabriele Stauner, stated the Bavarians’ historical experiences of federalism which have noteworthy messages for those that are exercising federal systems like Ethiopia:

For Bavarians, federalism is not just an abstract constitutional principle, but is also a part of the practicalities of life and an attitude to political and social challenges that is deeply anchored in our awareness.... For us, federalism is an

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answer to globalization and its tendency towards standardization in all areas of life. Against this we set regional diversity and respect for differences. To master the challenges of the future better, people need a firm basis to give them strength and self-confidence.... Federalism for us means competing for the best ideas and solutions. Comparing ourselves to other states and regions gives us an incentive to position our home country even better: in industry, in the system of education, in expanding infrastructure, in internal security and in many other political fields of action.....Federalism for us, however, also means solidarity.... Our aim, however, is to correct this system of redistribution, which in recent years has become out of balance. After the system has been reorganized, the aim will again be to help others to help themselves and specially to provide a stronger incentive for competition among the Lander.... One important basic idea for us is the principle of subsidiarity. Every problem should be solved at the lowest political level possible. Only when joint solutions appear sensible and necessary at a higher level should the appropriate course of action be taken at that level (Hegemer & Buhler, 2013, Gabriele Stauner, i-iv).

It is also stated that the federal system of Germany always works on correcting the system of redistribution, which in present time has been becoming out of balance (Hegemer & Buhler, 2013). Although, it needs critical assessment based on the current situation of the country, democratic federalism seems suitable for federal countries like Ethiopia. Thus, based on international and regional experiences, it is also possible to consider the Ethiopian federalism.

5.2 The context of Ethiopian Federalism

States of the world have developed through diverse courses of state formation (Hundara, 2017). Ethiopian federalism has its own advantage of being a better model for developing countries by holding together and giving a new idea of ethnic federalism for multi-diverse ethnic countries (Vasudeo, 2019). Regarding Ethiopia federalism, Fiseha (2006) has explained that the history of Ethiopia is an arguable issue as “it was not an inclusive state and history” (Fiseha, 2006, p. 30). It is also “full of strife between forces of centralization, on the one hand, local governors urging for decentralization and autonomy on the other” (Fiseha, 2006, P. 31). In relation to the federal system, the other important historical feature of Ethiopia is the Ethio-Eritrean Federation (1952-1962) which was a noteworthy political factor in Ethiopia history. Italy ruled Eritrea as a colony from 1890 until 1941 when British forces took over. France, the United Kingdom, the Soviet Union, and the United States sent a commission of Investigation to Eritrea, but they were not able to agree on the matter. Hence, the question of the disposal of Eritrea was submitted to the General Assembly for its recommendation. On Nov. 21, 1949, the General Assembly of the United Nations founded the United Nations Commission for Eritrea, consisting of five members (Burma, Guatemala, Norway, Pakistan, and South Africa) to visit Eritrea and to determine more fully the following issues (Haile, 1994): ‘The wishes and wellbeing of the population of Eritrea; The significance of peace and security in East Africa; and, The rights and claims of Ethiopia based on historical, geographical, ethnic or economic reasons, embracing, in particular, Ethiopia’s legitimate need for adequate access to the sea’.

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Meanwhile, on Sept. 15, 1952, the Constitution was adopted unanimously by Eritrean Assembly and the government of Eritrea and its federation with Ethiopia came in to being. The General Assembly of the United Nations had accepted the report of the commissioner. However, the federation also ended on Nov. 15, 1962, when the elected Eritrean Assembly unanimously voted for its dissolution and declared full reunification with Ethiopia (Haile, 1994). This termination of the federation triggered a very long-time war for about thirty years. After overthrew the Derg regime, Fiseha (2006) raised one critical issue which was everybody's concern in Ethiopia at that time. This was that what would be the fate of Ethiopia in 1991, Continuity, or Reversal? Which was a departure from the past that brought a decisive solution for nationality questions? During the Transitional government (1991-1994), there was a charter which used as a legal framework, and Eritrea became a sovereign country. After that, the new constitution came in to effect on August 21, 1995, and the end of the transitional government and the charter, and Ethiopia as a landlocked nation started a federal form of government to date (Fiseha, 2006; Hundara, 2017; Gizachew, 2019). The other point is that "there is a clear distinction between 'federation' and 'federalism'. A federation can be defined as a type of state, and federalism as a means to promote it" (Burgess, 2006, p. 47). Fiseha (2006) also described that the difference between federalism and federations by referring to different scholars as federalism is an ideology (political philosophy), whereas, a federation is a political system (institution). It is also included that there may be "federalism without federations", but there cannot be "federations without some matching variety of federalism" (Fiseha, 2006).

The other issue raised is whether the Ethiopian federation is "coming together" or a "holding together" (Fiseha, 2006). However, Fiseha argued that it seems both aspects of "coming together" and "holding together" (Fiseha, 2006, 2012). He also mentioned that, according to ethnolinguistic criteria, it implies the coming-together type of federation. This looks the choice, reflection, and covenant, through the launch of "nations, nationalities and people" of equals on an equal basis by agreements reflecting understanding and consent. According to Fiseha (2012), "there are also 'holding together' features, and it could be an exaggeration to say that Ethiopia is a federation built from its nationalities" (Fiseha, 2012, p.446). However, Ethiopia is a federation recognized from a formerly unitary state, and the regional states (unlike those in the United States) did not exist as states before the federation (Fiseha, 2012). However, one can see two methods to federalism: a 'coming together' federalism in which previously independent countries unite into a federal state, and a 'holding together' federalism in which a previously unitary (like Ethiopia) state pursues a federal solution to the problems of scale and diversity (Bulmer, 2017; Hundara,

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2017; Ashindorbe, 2019). Therefore, according to Fiseha (2012), Ethiopia's choice for cultural federalism is a step in the right direction, but its success stands on many factors' which are: 1) the existence of a political will; 2) the establishment and strengthening of the several institutions; and, 3) the protection of minorities in the constituent units (Fiseha, 2012). It is also noted that the first time Ethiopia announced "ethnic federalism", it was based on ethnicity. This is a new concept of federalism, not just for Ethiopia but for the whole Africa (Vasudeo, 2019). Moreover, it is also stated that "Ethiopia's experiment with "ethnic federalism" offers some insights for other federations with significant ethnic, religious, and linguistic diversity" (Watts, 2008, p. 49). Although its future prospects remain doubtful (Anderson, 2013).

Moreover, Fiseha (2012) has identified that the federation is also facing some challenges and it is here that a lot of flexibility and dynamism are required. The mentioned issues are the following which are 'boundary disputes, 'inter-ethnic' conflicts and the pitfalls of a referendum; the position of minorities in the regional states; federalism and party politics, and federalism and the challenges of the transition to multi-party in Ethiopia; and, lack of freedom of the press and the role of civil societies' (Fiseha, 2012). However, all these critical issues were raised by Fiseha (2012), but the government Ethiopia and the then ruling party (EPRDF) didn't give enough attention by time. Besides, in contemporary times, the significance of federal procedure particularly in multi-ethnic societies is for two reasons. The first is to house diversities and demands of ethnic groups. The second is to keep the territorial integrity of the state through the union of ethnic groups as it averts (resolves) or mitigates ethnically inspired conflicts and thereby can certify stability in states (Hundara, 2017). Whereas, lack of housing of diversity could lead to conflicts and pose danger for a union, predominantly, in multicultural federal systems like Ethiopia (Mengie, 2016). Hence, the EPRDF state-building policies, strategies, and approaches like "revolutionary democracy", "developmental state", "dominant party system" and "centralization tendency of governance' had deteriorated Ethiopia's federal experiment, decentralization, and conflict resolution (Hundara, 2017). However, both state-and nation-building processes in Ethiopia are in crisis today. It is also important to consider the limitations of federal countries like India. Thus, one important weakness of institutional design and the federal process is clearly the lack of effective mechanisms for a coordinated interest aggregation of states versus the Central government of India (Kumar, 2014). This is the critical limitation of Ethiopia. Even though the federal structure of Ethiopia is valued for its empowerment of diverse ethnic groups (particularly 'historical minorities'), both the federal and regional constitutions are criticized regarding the recognition and protection of the rights of 'non-territorial

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residents' of regional states (Gizachew, 2019). Thus, the place of 'non-indigenous people's right to political participation in the regional states remained unclear. This is also a critical limitation of Ethiopia.

Fiseha (2006) also stated that it is true that if an opponent controls the political space, there might be many possible scenarios. As it is said it is difficult to foresee, for instance, the force that will hold the states together, particularly in case centrifugal forces dominate the political scene. It is also said that there are those who argue that once the ruling party (EPRDF) loses control of the federal system, the federal system will become weak (Fiseha, 2006). It is also mentioned that there is such type of experience in other federations (Fiseha, 2006). There is actually a paradox in the Ethiopian constitution between "constitutional form and reality". However, ethnic federalism is highly relevant to the current debate on the political reform process (Salih *et al*, 2018). Salih *et al* (2018) also stated the debate as follows:

The debate is energized by a) Ethiopianists who spouse Ethiopianness and shun the current ethnically-based federalism. b) Secular federalists who opt for a genuinely democratic federal (or confederal system) and c) sub-nationalists who opt for the continuity of the current ethnically based-system of government in fear of being dominated by the larger ethnic groups, mainly Oromo and Amhara. The supporters of ethnic federalism are inclined to use Article 39 of the 1995 Ethiopian Constitution, which allows for self-determination, as a bargaining chip vis-à-vis the larger ethnic groups. This debate is located within the passionate and most divisive debate on constitutional reform (Salih *et al*, 2018, p.9).

Thus, in this regard, the federal government has the potential to do so as it combines elements of national shared-rule and regional self-rule in Ethiopia (Hundara, 2017; Teshome & Zahorik, 2008). Accordingly, a federation needs formal institutions and principles of IGR to handle such problems amicably in Ethiopia (Mengie, 2016). In other ways, ethnic-based federalism has been a building block of the Ethiopian state since it was created in 1995 (Faleg, 2019). However, the current context of Ethiopia seems the following. Faleg (2019) described that:

It includes ethnically defined national citizenship, self-determination on an ethno-linguistic basis as enshrined in the constitution, as well as ethnically defined political representation and decision-making at all administrative levels and related policies. Initially promoted by the ruling coalition as the solution to hold a multi-ethnic country together, its implementation degenerated so as to undermine the very foundations of the Ethiopian state, for three main reasons. First, ethnic conflicts that had plagued Ethiopia did not disappear with the new federal system, but were transferred from the national to the regional or district levels, pushing ethnic groups to become more and more competitive to expand their control over land, resources and administrative budgets. Second, despite the facade of a federal system, a strongly centralized decision-making structure and state bureaucracy, controlled by the EPRDF, characterized Ethiopia's politics, with few powers devolved to the local level. Third, the existence of a *de facto* one-party state was at odds with the initial commitment to deliver multi-party elections. The public space was instead firmly in the hands of the EPRDF (Faleg, 2019, p. 3).

Currently, the coalition of EPRDF had been dismissed, and a "new ruling party" called "Prosperity Party (PP)" has been established by including ODP, ADP, and SEPDM and the five affiliated parties and by excluding TPLF. Therefore, both state-and nation-building processes are crucial in Ethiopia today. These are elaborated in some detail as follows. See more in Chap. 6.

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5.3 Nation-Building Process

5.3.1 Ways to Establish Political Relationships in a country

As mentioned in section 5.1 above, Elazar (1994) has identified only three ways to establish “political relationships”. The first one is “by conquest or force”, which is contrary to the achievement of peace. The second is “through organic development or by accident”, which may sometimes lead to domestic peace, or it may lead to continuing wars between states in following their respective myths and ambitions. Thus, it is not to be depended upon in its highly interdependent world as a vehicle for achieving peace. The third way is “through reflection, choice, and covenant”, through the organization of communities of equals on an equal basis by agreements reflecting understanding and consent (Elazar, 1994, p. 12-13). Thus, democracy needs to grow out of covenant or reflection and choice. From these and other evidence, it is stated that “as instead of increased unity and cohabitation among Nigerians especially the middle and low classes, the society is further fragmented along ethnoreligious and sectional lines consequent of which is further fragmentation of Nigerians, increased volatility and chances of conflicts” (Aliyu & Mohammed (2018, p.9). If one considers since 1995, for example, the Ethiopian ways to establish political relationships, it seems the second way “through organic development or by accident”, which is in a fragile situation.

5.3.2 State-Building vs. Nation-Building

As mentioned in Chap. 2, it is very relevant to reconsider the two terms of ‘state-building’ and ‘nation-building’, which remains ‘imprecise and contested’. ‘State-building’ is seen as the task of constructing functioning states capable of satisfying the vital features of modern statehood. Whereas, ‘nation-building’ refers to a more abstract process of emerging a shared sense of identity or community/regional states among the various groups/regional states making up the population of a particular state (Linz, 1993; Dinnen, 2006; Hippler (Ed.), 2004, 2005).⁴⁹ Thus, distinguished in this way, Dinnen (2006) and Hippler (Ed.), 2004, 2005) articulated that ‘state-building’ emphasizes the practical task of capacity building or consolidation of state institutions, while ‘nation-building’ is more focused on the character of relationships between citizens and their state. In contrast to this, ‘state-building’ establishes state-nation (s) in which the state that creates diversity and democracy possible as opposed to ‘nation-building’ which needs to make one nation (nation-state) without due thought of diversity (Linz, 1993; Watts, 2008;

⁴⁹ See Dinnen, S. (2006), Nation-building, Australian National University, Canberra. Nation-building – Conceptual and Definitional Challenges.

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Hundara, 2017; Hippler (Ed.), 2004, 2005).⁵⁰ Stefan *et al* (2011) separated, in their survey, for example, the eleven longstanding federations into those closest to the state-nation end (Switzerland, Canada, Belgium, Spain, and India) and those states closest to the nation-state end (Germany, Austria, the United States, Australia, Argentina, and Brazil).⁵¹ However, in its more general sense, Dinnen (2006, p. 3) stated that “nation-building implied and encompassed state-building”. Besides, at the same time, both processes are significant elements in any post-conflict re-building process (von Bogdandy & Wolfrum (eds.) (2005).

Therefore, there are three models of national unity in the nation-building process (First model: imperium/absolute power/; Second model: a cultural homogeneous nation of the modern age; and, Third model: pluricultural integration) (Hippler (Ed.), 2004, 2005). However, nowadays, the nation-state model is becoming unable to meet the needs of a global order due to the rise of multicultural societies (Linz, 1993; Hippler (Ed.), 2004, 2005; Stefan *et al*, 2010). Because of this, it is the time of ‘the rise of the state-nations’ (Stefan *et al*, 2011) or Third model: pluricultural integration (Hippler (Ed.), 2004, 2005). According to Hippler (Ed.), (2004, 2005), the most vital democratic innovations for transforming conflicts and securing peace in ‘divided societies’ are concordance (for example, settling of ethnic differences through the forming of coalitions and commitment to cooperation between the elites), local representation, federalism, and cultural autonomy. It is also indicated that it would be better, rather, to endeavor for the pluricultural integration of the late modern age, which does not favor ethnic categories in its assurances of democratic status over other criteria of oppression or marginalization (Linz, 1993; Hippler (Ed.), 2004, 2005).

Hippler (ed.) (2004, 2005) also identified that the performance criteria for successful nation-building process which are centrality and extent; association with other issues on the agenda; connecting with the experiences of target groups; narrative familiarity; and, flexibility and openness to change. For example, federalism and the flexible provisions for inclusion of new member states, the asymmetrical status of different states, and the multi-tier federalism in some of the states which are necessary features of the

⁵⁰ See Linz, J.J. (1993) State building and nation building, *European review*, Vol. 1, No. 4, 355-369, Wiley & Sons, Ltd. The difference between state building and nation building which are two overlapping but conceptually different processes.

⁵¹ See Stepan, A., Linz, J.J and Yadav, Y. (2011), *Crafting State-Nations: India and Other Multinational Democracies*, the Johns H Comparative Theory and Political Practice. *Do We Need a “State-Nation” Model as Well as a “Nation-State” Model? Two Ideal Types of Democratic States: “Nation-State” and “State-Nation”*. ' P. 8, Table 1.1,

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building of India as a state-nation including robust political institutions (Stefan *et al*, 2011). Moreover, Stefan *et al* (2011) have two major conclusions regarding India's political arrangement with its sociocultural diversity: India is not a classic nation-state; and, India has sustained to create a functioning, democratic state-nation, as opposed to French style (19th century) nation-state which might be dangerous for the 21st century. This is a practical experience for Ethiopia. In relation to this, Linz (1993) stated that:

In this context, leadership becomes decisive. In a transition, demands and rhetoric can escalate rapidly in confrontation, destroying moderation and the ability to negotiate to peaceful and democratic solutions. The building of a new type of democratic liberal state that incorporates the nation that challenged its former centralized nation-state conception might generate a new state-nation compatible with nations under its rule. A democratic, the multinational, multicultural, multilingual state is possible. However, this does not mean that there will not be continuous conflicts... (Linz, 1993, p. 367).

Linz (1993) indicated that the building of multi-national states is complex but not impossible if the two central ideas ('that every state should strive to become a nation-state and that every nation should aspire to become a state') are abandoned. Therefore, as Ethiopia is a multinational and multicultural nation, it seems that it has been attempting to build a state-nation in Ethiopia. Hence, it is significant to consider state-nation policies (Nested-set of policy) which are 'an asymmetrical' (the differentiation of status and rights between the regional states of a federal system, i.e. "de jure" (emerges out of deeply rooted historical factors, and is often a response to the existence of pluri-national diversity, but not "de facto" (variations (commonly observable in most federations) in size and wealth of constituent units, geography, population, economic development, etc.)), "holding-together" federal state, but not a symmetrical (work unproblematically only in states that are nationally homogeneous), "coming-together" federal state or a unitary state; Both individual rights and collective recognition or the recognition of "collective rights" alongside "individual rights"; Parliamentary instead of presidential or semi-presidential government; Polity-wide and "centric-regional" parties and careers; Politically integrated but not culturally assimilated populations; Cultural nationalists in power mobilizing against secessionist nationalists; and, a pattern of multiple but complementary identities' (Stefan *et al*, 2011), which raises "value pluralism" as a principle to be incorporated in federal structures, and could be used a process of building a multinational democratic state-nation in Ethiopia. Hence, it is not the homogeneity of these features that is relevant, rather the acknowledgment of heterogeneity and enabling inclusion (Linz, 1993; Hippler (Ed.), 2004, 2005). Democracy, and more concretely federal democracy including consociational democracy, can serve to integrate such a society. State-nation policies could work only in democratic circumstances (Stefan *et al*, 2011). These authors have also remarked that a distinguishing political institution of the state-nation ideal type is federalism, definitely asymmetrical federalism, although

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Ethiopian federalism is symmetrical. Moreover, any state-building process (the erection of public institutions not necessarily enjoying acceptance) and even more so any nation-building process (to a large extent an indigenous process of identity formation) needs vast efforts in order to be successful. It is often presumed that strong leadership might support a country to organize the necessary resources (von Bogdandy & Wolfrum (eds.) (2005).

Moreover, Elazar (1994) considered that why federalism failed. He identified five reasons: The federal arrangements were imposed from outside without ever having any series internal support; The absence of federally include political cultures; Lack of sufficient common interests; Unbalanced federal arrangements also rarely succeed; and, Lack of resources, etc., for example, the Ethiopian federation has suffered from both of the above defects. Elazar also considered why federalism succeeded. He mentioned the following reasons: Federal systems have worked where they have served to manage ethnic or inter-communal conflict; The second element leading to the successful adaptation of federal principles and arrangements is the substitutions of government by an elite in place of government by a single strong man; The availability of resources, both human and material; and, The existence of political culture in favor of federalism which encourages unity in diversity (both “self-rule” and “shared-rule”) (Watts, 2008). It is vital to consider the pattern of federal arrangements identified by Anderson (2013) as follows: “federalism needs democracy”; “ethnic federations have a high death rate”; “federacies have a low failure rate”; and, “ethno territorial federations have a high survival rate” (Anderson, 2013, p. 257-267). It is also indicated that ethno territorial federations are more fruitful than ethnic federations (Anderson, 2013). Hence, ethno territorial federations could be considered as one alternative to Ethiopian federal system as there is no “potentially dominant ethnicity”, or “*Staatsvolk*” (Anderson, 2013, p. 275).

Furthermore, Elazar added that Africa has even fewer brakes on the centralization of powers in the hands of strong men. Asia, on the other hand, tends to foster rulers by elites, which is less incompatible with a federal arrangement. Finally, Elazar raised “forces opposing federalism” as follows: the forces opposing federalism are on behalf of centralization and those seeking fragmentation; and, Ethnic nationalism is probably the strongest force against federalism. This is the current issue in Ethiopia. Meanwhile, a new form of governance which is “Open Method of Coordination” that should help to reform policies of the member states by establishing an effective process of mutual learning about appropriate public policies’, in which “best practices” are identified, and policy recommendations are directed to the member states

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in EU (Kerber & Eckardt, 2007).⁵² The second is the concept of “Laboratory Federalism” which sees the experimentation with new policies and the following possibility of mutual learning about superior policies as an essential characteristic of federal systems. In laboratory federalism, learning takes place through a purely non-centralized process of experimentation with different new policies which leads to mutual learning (Kerber & Eckardt, 2007), which is also vital for Ethiopia.

According to Hundara (2017), there are debates as to whether federalism is the means and/or the end to state-building, the author believes that federalism is both a means to state-building and the end in itself. Consequently, Hundara (2017) described that:

State-building is a process that integrates the disparate groups, peoples, and nations together. It also determines the relation as well as makes the state represents all these different groups structurally and institutionally. Put differently, building unity without undermining diversity through the carefully negotiated terms that are acceptable to all on national issues. Hence, vertically all groups have the same perception and belongingness to the state as well as horizontally there are symmetric relations. Even if there are rough horizontal relations among the groups, the vertical function remains pivotal to experience successful state-building (Hundara, 2017, p. 4-5).

In other ways, it is also stated that “the absence of a coherent civil society capable of exercising some degree of accountability towards weak post-colonial states in poly-ethnic societies continues to be one of the greatest obstacles to the stability of emergent nation-states” (Dinnen, 2006, p.3). Moreover, Dinnen (2006) also mentioned that most of today's ‘failed’ states are a product of the changes in colonial history. However, there have been some cases where the colonial experience helped foster national identity in the post-independence period. An example would be India's experience of a lengthy period of colonial rule under the British. This contributed to India's sense of itself as a single, unified political space (despite subsequent religious partitioning) (Dinnen, 2006). When one considers the Ethiopian nation-state formation, it is completely different from other colonized Third World countries, with the exception of the Ethio-Eritrea Case, as Ethiopia is never colonized. There was a monarchical state from the 1890s to 1974. There was also a military regime which was called Derg from 1974 to 1991. Since 1991 to date, it is a federal state. Currently, there is a lack of peace in the country due to ethnicized conflict and infrastructure disparity, for instance. Thus, Ethiopia has become a theatre of conflict.

⁵² Kerber and Eckardt (2007), Policy Learning in Europe: the open method of coordination and laboratory federalism.....the European Union (EU) introduced ‘a new form of governance (Open Method of Coordination; OMC) which should help to reform policies of the member states by establishing an effective process of mutual learning about appropriate public policies’, in which “best practices” are identified, and policy recommendations are directed to the member states..... the concept of ‘laboratory federalism’ sees the experimentation with new policies and the ensuing possibility of mutual learning about superior policies as an essential characteristic of federal systems”. For more precise analysts of how policy innovations are generated and how mutual learning takes place within multi-level systems of jurisdictions, it is useful to differentiate between three kinds of horizontal transmission mechanisms between jurisdictions.

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Besides, “key infrastructure planners and providers in conflict scenarios must know the underlying motives and causes for the original conflict, who controls the Infrastructure, and how infrastructure development could inadvertently fuel conflict” (Mashatt *et al*, 2008, p.4). Therefore, it is clear that economic development, as well as infrastructure development, could not effectively proceed without first attaining a minimum level of security (Mashatt *et al*, 2008). However, infrastructure development is the basis of a sustainable economy and a resource to achieving broader nation-building goals. Providing basic facilities is critical to security, governance, economic development, and social well-being. In conflict-sensitive environments like the East Africa region, the situation of infrastructure is often a gage of whether society will ill-advised extra into violence or make a peaceful transition out of the conflict cycle (Mashatt *et al*, 2008). The rapid restoration of essential services, such as road, telecommunication, and electricity, assists in the perception of a return to normality and contributes to the peace process (Mashatt *et al*, 2008). In contrast, the empirical result indicated that the interaction between institutional quality and infrastructure investment on economic growth was insignificant (Okoh & Ebi, 2013). Finally, Hundara (2017) identified three state-building scenarios in Ethiopia as follows:

There are 3 state-building scenarios. First, state-building is not a technical process of strengthening governmental institutions (preferably institutional building) rather it is basically about state-society relations the psychological attachment of the citizens to the physical state and the government. Second, state-building is primarily an endogenous process and subject to multiple factors. Thirdly, state-building is a dynamic process with three interrelated elements: political settlement among elites, survival functions, and expected functions of the state to earn actual and perceived legitimacy and bring about stability (Hundara, 2017, p. 4).

Currently, the third scenario is happening in the context of Ethiopia. And then, the study also briefly assesses the perspectives of institutional capacity on the nation-building process.

5.4 The Perspectives of Institutional Capacity of the Infrastructure sector on the Nation-Building Process

5.4.1 Why are Some Countries Much Poorer than Others?

Acemoglu and Robinson (2008) arguably raised that the most important questions in social science worry the causes of cross-country variances in economic development and economic growth. And, they also raised the following questions: Why are some countries much poorer than others? Why do some countries achieve economic growth while others stagnate? And to the level that one can expand some answers to these questions, and the next ones: what can be done in order to encourage economic growth and increase the living standards in society? They argued that the main basis of differences in prosperity across countries are “differences in economic institutions”. They described that:

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Economists have long recognized that output per capita in society is intimately related to the amount of human capital, physical capital, and technology that workers and firms in that country have access to. Similarly, economic growth is related to the ability of a society to increase its human capital, physical capital, and improve its technology. In this context, technology is construed broadly; technological differences refer not only to differences in techniques available to the firms but also to differences in the organization of production, implying that some countries will be able to use their resources more efficiently. Nevertheless, differences in human capital, physical capital, and technology are only proximate causes in the sense that they pose the next question of why some countries have less human capital, physical capital, and technology and make worse use of their factors and opportunities. To develop more satisfactory answers to questions of why some countries are much richer than others and why some countries grow much faster than others, we need to look for potential fundamental causes, which may be underlying these proximate differences across countries. Only by understanding these fundamental causes, we can develop a framework for making policy recommendations that go beyond platitudes (such as “improve your technology”) and also minimize the risk of unintended negative consequences (Acemoglu & Robinson, 2008, p.1).

Therefore, Acemoglu and Robinson (2008) indicated that “the main determinants of cross-country changes in income per-capita is differences in economic institutions” (Acemoglu & Robinson, 2008, p.25). Therefore, it is pertinent to examine the relationship between infrastructural investments, institutional quality, and economic growth (Okoh & Ebi, 2013). Realizing collective results needs a robust institutional capacity to deliver the necessary checks and balances to the exercise of power, to recommend laws and guarantee their enforcement, to inspire social justice, and to ensure the efficient use of public funds and the accountability of officeholders (Bourgon, 2010). In relation to this, building institutional capacity has been an emphasis on governments and societies for several decades and, certainly, centuries. Moreover, institutions that commit and demonstrate an improving culture, management of specific opportunities, and risks, including employee performance, and incentives, are probably more likely to fit with a “stewardship ethos” (Bowditch & Noble, 2017). More importantly, a new balance requires new capacity, new insights, and new knowledge that complement what has come before. Besides the above, institutional analysis suggests that government authorities or structures can affect development (Schultz, 2017). For example, “a choice of governmental structure such as a federal system breaking up an area into regions may produce uneven development because of fragmented governmental policies or costs of working with governments” (Schultz, 2017, p. 184). Moreover, it is stated that an institutional analysis also indicates that governments can affect location decisions “via a host of public policy initiatives”, for example, infrastructure investments (Schultz, 2017). And then, what are institutions?

5.4.2 What are Institutions?

What are institutions? As cited by Okoh and Ebi (2013), World Bank (1989) defined the institution as an entrepreneur who binds materials and human resources and changes the social-cultural settings of people through good policies for the achievement of rapid growth and development. This means that

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institutional functions comprise decision making, institution, and structural preparations, policy formulation and implementation, information flows, effectiveness, and efficiency of leadership and the relations between government officials and the public (Okoh & Ebi, 2013). It accords to the public authorities an indispensable and actually active role in founding the economic environment and defining the distribution of assets and benefits (Okoh & Ebi, 2013). Meanwhile, according to Bhagavan and Virgin (2004), institutional capacity comprises competence (ability), resources, and structures. This also means that infrastructure investment-economic growth links could be influenced by institutional quality in a country (Okoh & Ebi, 2013). Hence, it is pertinent to study the collaboration of investment of infrastructure and institution quality in the context of Ethiopia's economic growth path.

Furthermore, Acemoglu and Robinson (2008) also stated that:

Douglass North (1990, p. 3) offers the following definition: "Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction." Three important features of institutions are apparent in this definition: (1) that they are "humanly devised," which contrasts with other potential fundamental causes, like geographic factors, which are outside human control; (2) that they are "the rules of the game" setting "constraints" on human behavior; (3) that their major effect will be through incentives (see also North, 1981) (Acemoglu & Robinson, 2008, p.2).

Based on the above conception, Acemoglu and Robinson (2008) stated that institutions can vary between societies for the reason that of their formal methods of collective decision-making (democracy vs. dictatorship) or because of their economic institutions (entry barriers, the security of property rights, the set of contracts accessible to businessmen). Moreover, they stated that they may also vary because a given set of formal institutions are anticipated to and do function in a different way; for example, they may vary between two societies that are democratic because the delivery of political power lies with diverse groups or social classes, or because in one society, democracy is anticipated to collapse while in the other it is consolidated. They also stated that this wide definition of institutions has both "advantage and a curse". It is said that it is an advantage because it enables one to get started with theoretical and empirical researches on the role of institutions without getting delayed by classifications. It is also said that it is a curse because unless one can follow it up with a better understanding of the role of specific institutions, one has learned only little (Acemoglu & Robinson, 2008).

Meanwhile, as discussed in Chapter 2, Fukuyama (2011) argued that there are 3 basic types of institutions that established a political order: "the state, rule of law, and mechanisms of accountability". Acemoglu and Robinson (2008) also added that, for instance, in the case of Africa, "promoting democracy and accountability and checks and balances" will almost certainly lead to better economic policies and

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institutions. Moreover, countries do reform their institutions and change from situations of stagnation to rapid growth. It is said that “it can hardly be denied, for example, that the rapid take-off of growth in China after 1978 was a result of policy and institutional reforms” (Acemoglu & Robinson, 2008, p.26). It is also stated that a piecemeal approach may be dangerous. Often one may see the symptoms, but they are quite the symptoms of deeper causes. Thus, dealing with the symptoms other than causes may backfire (Acemoglu & Robinson, 2008).

Furthermore, there are successful reforms. There are countries that do reform their institutions and move onto different development paths. For examples that come to mind from the post-World War II development experience include Taiwan, China in the late 1950s; Singapore, the Republic of Korea, and Botswana in the 1960s; and Chile, Mauritius, and China in the 1970s. There have been important historical occurrences of reform as well. As is also well known, Botswana, a small, tropical, landlocked country in sub-Saharan Africa has had the fastest average rate of economic growth in the world. So, what explains Botswana's success? At a proximate level Botswana has been aided by large quantities of diamonds, yet in general natural resources are not associated with successful economic outcomes in Africa (Acemoglu & Robinson, 2008). It has also had very good macroeconomic and microeconomic policies and ranks at the same level as Western European countries “in terms of indices of governance and corruption” (Acemoglu & Robinson, 2008). Now, it is good to consider what has been done about Ethiopia’s institution reform in the 21st century, and the ways to effective institution building.

5.4.3 What about Ethiopia’s Institution Reform in the 21st Century?

What about Ethiopia’s institution reform in the 21st century? Tiruneh (2011) identified that the acceptance and backing of organizational strategy by staff members, for example, in Southern Ethiopia was under plain challenge, the practice of assessing and updating the strategies with respect to the external and internal situation was limited. Furthermore, it is mentioned that public organizations lack the competency in forecasting the current and future human resource requirements; and the link between the mission and human resource planning seems to be very miserable. It is also mentioned that public sector organizations lack human resource training and development policy, the training programs in the public sector have been planned without properly bearing in mind the skill requirements and/or shortage of employees in the organizations (Tiruneh, 2011). According to Tiruneh (2011), there seemed inadequacy and provision of the vital infrastructure in a wide portion of the public organizations, external

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linkages were established in order to support performance; however, it is not sure whether the relations contributed efficiently and effectively to the organization's goals and mission (Tiruneh, 2011).

Actually, Tiruneh (2011) indicated that public sector organizations, in general, have to try to find new and ever more effective ways of making considerable progress toward their missions, and this wholly requires developing institutional capacity that intended at nurturing an internal process development that attempts to enhance an individual, groups and/or organization's ability to accomplish, solve problems and manage current challenges in order to achieve the desired outcomes. Similarly, institutions of the government are about efficient delivery of public services, good governance, and other services such as education; infrastructure; employment programs; personal safety, and access to justice to the society (Hundara, 2017). Thus, there is a weak institutional implementation capacity in Ethiopia. For example, there is considerable risk in the management and implementation of WBG-financed projects due to the inexperience and weak capacity of some line ministries and authorities, as well as limited ability to deliver technical support to beneficiary communities, particularly in the regional states, Woredas and Kebeles (Tiruneh, 2011; WBG, 2017; Asfaw, 2019). Therefore, increasing the institutional capacity and responsiveness of the governments are key in supporting development goals such as infrastructure development in Ethiopia (WBG, 2017). However, there is weak institutional capacity, particularly at lower levels of government, which is a challenge in Ethiopia. This is intensified by high staff turnover due to inadequate incentives, among other factors. Overall, there is a shortage of highly skilled manpower, including technicians and engineers in the infrastructure sector (Tiruneh, 2011; AfDB, 2011; Asfaw; 2019), which is in contrast to article 43 sub-article 4 in the Ethiopian constitution (1995).⁵³

5.4.4 Ways to Effective Institution Building

The capacity building embraces both the micro-institutional process spoken by the capacity of “individual institutions” and the macro-institutional one named for by a “cluster of institutions” (Bhagavan & Virgin, 2004). Hence, the core worry of institution-building activities is to expand the effectiveness and capacity of formal institutions (Moore *et al*, 1995). The main point here is to focus on a clearer understanding of institution building, and concepts related to it, and mechanisms of institution building, in order to make the concepts useful tools in the context of Ethiopia. However, according to

⁵³ Ethiopian constitution (1995), Article 43 the Right to Development, Sub-article 4. The basic aim of development activities shall be to enhance the capacity of citizens for development and to meet their basic needs.

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Inman & Rubinfeld (2014), in a federal system, there are two important dimensions to economic efficiency. The first is inter-jurisdictional efficiency which includes the appropriate distribution of individuals and other resources among various jurisdictions. The second is intra-jurisdictional efficiency which needs a choice of public happenings which satisfies the collective request within a given jurisdiction, measured the inclination to pay for those activities for all individuals within that jurisdiction (Inman & Rubinfeld, 2014).

However, the choice of the proper jurisdiction to be accountable for a government activity comprises a trade-off-the bigger the jurisdiction the less likely that there will be inter-jurisdictional inefficiencies, but the more possible that the political course will lead to intra-jurisdictional inefficiencies (Inman & Rubinfeld, 2014). This is a typical situation in the federal process of Ethiopia. Therefore, Inman and Rubinfeld (2014) recommend strengthening institutional decentralization with its pros and cons. Moreover, it is about strengthening the relationship between the state, and society, and developing effective ways of mediating this relationship (Hundara, 2017). Specifically, this is currently a challenge in the case of infrastructure development and state- and nation-building processes in Ethiopia. Next to this, this chapter also considers the effects of infrastructure governance on the nation-building process.

5.5 The Perspectives of Infrastructure Governance on the Nation-building Process

5.5.1 What is Infrastructure Governance?

First of all, what is governance in infrastructure? By the infrastructure governance is meant:

The processes, tools, and norms of interaction, decision-making, and monitoring used by governmental organizations and their counterparts with respect to making infrastructure services available to the public and the public sector. It thus relates to the interaction between government institutions internally, as well as their interaction with the private sector, users, and citizens (OECD, 2015, p. 2)

Therefore, as mentioned in Chap. 1, infrastructure is the backbone of economic capacity, but it also influences directly on human development, social inclusion, environmental sustainability and so infrastructure development is a central concern of both citizens and governments, which is the case regardless of the stage of development of a country, or of the dominant economic culture and practice (OECD, 2015). More importantly, infrastructure services such as energy and road are critical inputs in production chains, the availability, and quality of which govern both the quantity and price of outputs (OECD, 2015; OECD, 2017). However, stakeholders' interests can be very different and can include some stakeholders who may actively oppose any change to the asset (Bowditch & Noble, 2017). The problem is how can one go about identifying the elements of good infrastructure governance? OECD

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(2015) has identified that the answer will, in its broadest sense, importance on good governance in terms of good planning, budgeting, project assessment and evaluation, transparency, accountability, and regulation. It is also said that it will also demand a strengthening of the entire institutional architecture of government in order to bring the right strategic infrastructure on time, within budget, and in a way that orders the confidence of all interested parties (OECD, 2015).

5.5.2 The Governance Challenges in the Infrastructure Sector in OECD member countries

What are the governance challenges in the infrastructure sector in detail? OECD (2015) has identified the governance challenges which are listed below to a varying extent cut across the life-cycle of the infrastructure asset, but will usually play a fundamental role at a particular time of the asset:

- Weak ability for planning a strategic vision for infrastructure weakens the development of a sustainable development plan;
- Infrastructure influences communities-without well-accomplished consultation good projects may weaken;
- The coordination challenge - a multiplicity of actors across levels of government may eventually collapse a good project;
- The skills challenge with regard to the life-cycle of infrastructure;
- Uncertainty with respect to revenue flows and sources through the life-cycle of the infrastructure asset can result in a deficiency of confidence in the project's affordability;
- Infrastructure decisions incline to be assured by administrative boundaries rather than pertinent functional economic ones;
- The deficiency of data and evidence on service delivery performance makes it problematic to use assessment instruments well;
- Adverse incentives provided by regulatory frameworks might create suboptimal investment selections;
- Unbalanced or troublesome regulatory frameworks can prevent long-term decisions and weaken sound decision-making from both public and private actor;
- Infrastructure procurement is open to corruption;
- Political and business cycles issues strongly influence the phases of infrastructure;
- Categorizing, pricing, and allocating risks between public and private parties could be difficult.

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Generally, there is “no single formula for federal governance, advocates of different federal arrangements emphasize different values, and perhaps it is the values and objectives of federal solutions to political problems that need to be clarified than federalism itself” (Kincaid, 2011, P. 243). Inman and Rubinfeld (2014, p.3) also stated that “not surprisingly, no one form of governance is clearly dominant in its ability to efficiently allocate national resources” such as infrastructure. It is also stated that there are other values that must be weighed in the balance too as political participation and democracy, economic fairness, and the protection of personal liberties and rights (Inman & Rubinfeld, 2014). Moreover, Kincaid (2011) also mentioned that, more generally, by promoting “unity without homogeneity”, a federal arrangement seeks not only to enhance liberty but also to foster “innovation and adaptation” to change.

5.5.3 Infrastructure Governance in Africa

Generally, from a political and economic governance point of view in Africa, the principal questions of interest are as follows: What does one know about citizens’ demands for economic and political governance in Africa? How are public institutions currently performing in terms of meeting those demands? What are examples of policy initiatives leading the way in achieving results in Africa? (AfDB *et al*, 2017). According to AfDB *et al* (2017), the most recent data available on governance in Africa showed growing demands for better economic opportunities and more accountability with respect to public policies (AfDB *et al*, 2017). It is also stated that priorities for businesses include better access to electricity, financing, and competition policies. According to AfDB *et al* (2017), regarding the policy-making processes, key challenges remain in most countries.

- Commitment to accountability within significant policymaking institutions is still lower than citizens’ expectations. The same is true of the performance of public administrations;
- Opinion surveys showed inadequate trust in important political institutions and lead policy agencies, in particular concerning their commitment to ensuring a transparent policy arena.

However, it is also considered that recent policy initiatives showed good examples of achieving results in public service delivery (AfDB *et al*, 2017). These are:

- African nations are taking the reform of their business situations seriously;
- Regulatory reforms and digital innovations are improving the effective allocation of public resources while enhancing the delivery of services;

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- A few new creativities are presently targeting to address business development priorities.

Looking forward, stronger accountability and oversight processes will be decisive in identifying and solving cross-cutting challenges (AfDB *et al*, 2017). It also mentioned that good oversight can also help decrease institutional fragmentation and duplication of effort across governments. According to AfDB *et al* (2017), the motivations behind protests have been recorded and analyzed in detail which is about 33% from 2014-16 were job-related issues, such as salaries, working conditions, and unemployment. It is also said that protests around political issues mostly consisted of demands for more accountability from public officials and a desire to replace the governing leadership (AfDB *et al*, 2017) (see Figure 4.1 below), which is also a challenge to the government of Ethiopia too.

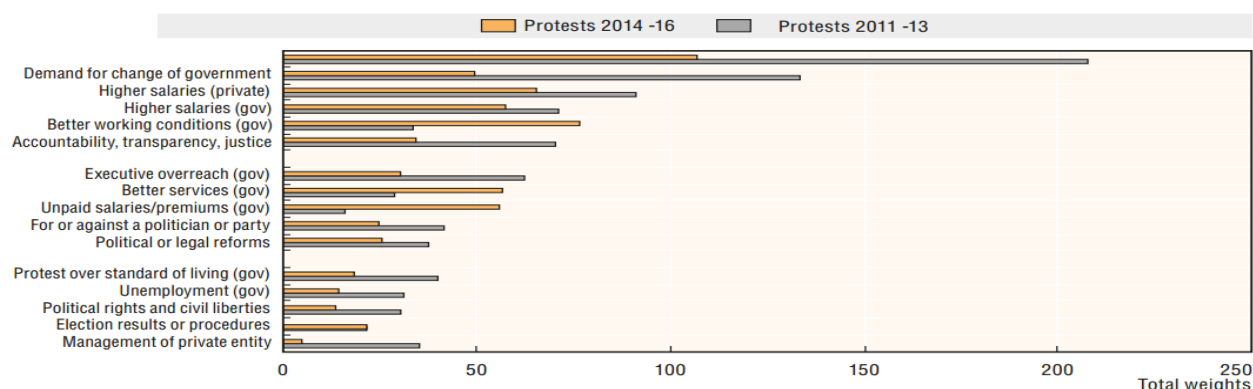


Figure 5. 1 Top 15 drivers of public protests in Africa, 2011-13 versus 2014-16

Source: African Development Bank, Organization for Economic Co-operation and Development, United Nations Development Program (2017), African Economic Outlook 2017: Entrepreneurships and Industrialization, <http://dx.doi.org/10.1787/aeo-2017-en>.

Note: Public protests refer to strikes and any demonstration with political, economic or social motives. Each event is weighted by its duration and by an intensity score based on the number of protesters.

In addition, African Economic Outlook (2018) which is prepared by AfDB examined the macroeconomic development and structural changes in Africa. Actually, it focused on the need to develop Africa's infrastructure and its challenges. Thus, it stated that:

Africa must industrialize to end poverty and to generate employment for the 12 million young people who join its labor force every year. One of the key factors retarding industrialization has been the insufficient stock of productive infrastructure in power, water, and transport services that would allow firms to thrive in industries with strong comparative advantages (AfDB, 2018, p.63).

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Moreover, the low infrastructure stock in Africa affects the low growth of various countries on the continent (AfDB, 2018). Here, it is very important to identify factors clarifying the low infrastructure delivery in Africa: weak institutional frameworks, legal, and regulatory; weaknesses in infrastructure planning and project preparation; corruption and governance; and, infrastructure shortages are not exceptional to Africa (AfDB, 2018), which are also the challenges of the infrastructure sector in Ethiopia.

5.5.4 Infrastructure Governance in Ethiopia

There is an infrastructure governance problem in Ethiopia. The government of Ethiopia has restated its commitment to strengthening the capacity of institutions in Ethiopia. However, inadequate infrastructure is a major limitation to growth and poverty reduction in Ethiopia (NPC, 2016). Moreover, poor infrastructure services raise the cost of doing business, eroding competitiveness, and limit access to markets, both domestic and foreign (AfDB, 2011). According to Asfaw (2019), currently, in Ethiopia, most of the public institutions and the laws related to good governance face the following challenges:

Such as one-party dominated politics, as exhibited in the legislature; inadequate result in decentralization efforts; government-controlled media; underdeveloped civil society lacking conducive environment to flourish; an unimpressive record of human rights protection by the government, and lack of transparency. The inadequate administrative capacity of the government is also manifested in poor human resource planning, implementation, recording and supervision, corruption, poor financial management, and weak coordination and perpetual reorganization of institutions (Asfaw, 2019, p. 25).

Moreover, there is a gap between the principle and practice of policy formulation in the infrastructure governance in Ethiopia in which few government officials on the top are the key actors. Whereas, the people and other stakeholders have limited participation in the process. Thus, the process is a less consultative, exclusive, and top-down process in Ethiopia (Kaso *et al*, 2018), which is in contradictory from the constitution of Ethiopia (1995) Article 43 sub-article 2.⁵⁴ Following that, the study considers the effects of infrastructure equity on the nation-building process.

5.6 The perspectives of Infrastructure equity on the Nation-Building Process

It is also very important to discuss briefly the history of inequity in infrastructure in the state-building of modern Ethiopia. For instance, Zewde (2002) argues that the infrastructure and industry distribution was limited to the Addis Ababa-Adma-Dredawa belt and other areas to extract resources. Italian occupation

⁵⁴ Ethiopian constitution (1995), Article 43 the Right to Development, Sub-article 2. Nationals have the right to participate in national development and, in particular, to be consulted with respect to policies and projects affecting their community.

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was also brought remarkable development especially on a road that facilitated the Haileselassie regime to centralize power by the swift mobilization of the central army wherever opposition erupts. Tibebe (1996) also draws two aspects of inequity in his terms, ‘national oppression’ 1) oppressed regions like the south of Addis Ababa and 2) the neglected regions which the central government never reacted to it like Afar, Somali, Gambella, and Benishangul. Thus, the Ethiopian perception of infrastructure equity involves an idea of fairness. Based on stakeholder consultation, there is a sense of a historical imbalance across regional states (predominantly with regard to federal capital spending). For many citizens/stakeholders, equity means that these imbalances ought to be corrected across regional states in Ethiopia (Harris *et al*, 2019). This is because equity is constitutional in the Ethiopian context.⁵⁵ Although it is not implemented accordingly. See Chaps. 7, 8, and 9.

Therefore, as reviewed in Chap. 2, Calderon & Serven (2004) indicated that not only does infrastructure raise growth, but that when addressing the three dimensions (quantity, quality and access) adequately, it also lowers inequality, making infrastructure *quality*, and *access* an important topic to add on public political agendas which is crucial for nation-building. According to Estache and Fay (2009, p.24), “with the reemergence of economic geography, infrastructure needs are being examined with a spatial twist: the question is no longer simply “how much” but also “where”.” They also indicated that the answer to that second question is even more problematic than the first, for two reasons. First, the most promising study is for now mostly theoretical. Second, spatial development policy debates are often politically charged, with advocacy often prevailing over rationality. Hence, deciding where to invest is as hard as or harder than deciding how much to invest (Estache & Fay, 2009). For example, infrastructure, particularly transport, is seen by most policymakers as critical in efforts to help disadvantaged regional states become more attractive to investors: improved connectivity is usually seen as a key to allowing peripheral regional states to better integrate the domestic or international economy (Estache & Fay, 2009).

From the literature review, the relationship between economic growth and infrastructure is multiple and complex, because not only does it influence production and consumption directly, but it also generates many direct and indirect externalities, and comprises large flows of expenditure thereby creating extra

⁵⁵ Ethiopian constitution (1995), Article 89, Economic Objectives, sub-article 1. Government shall have the duty to formulate policies which ensure that all Ethiopians can benefit from the country’s legacy of intellectual and material resources.

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employment (World Bank, 1994; Ghosh & De, 2005). Hence, “change in public capital structure is one of the important factors affecting the long-term behavior of a country” (Ghosh & De, 2005, p.1024). However, unlike the developed nations, the imbalanced distribution of basic infrastructure amenities across diverse regions within an LDC may commonly be so extensive as to invalidate the operation of the law of diminishing returns in specific regions (Ghosh & De, 2005). Diminishing returns happen when “the more of activity is undertaken, the lower is the value of doing still more” (Duranton & Venables, 2018, p. 5). Ghosh and De (2005) also summarized their major findings in India as follows: First, the inter-state disparity in per capita income among Indian states has been rising significantly over the last quarter-century. Second, inter-state inequalities in economic and social infrastructure amenities have continued at an alarmingly high level over the same period. Third, economic and social infrastructure services have been verified to be highly important factors in determining the inter-state level of development. Fourth, no considerable change has been noted in the nature of the relationship between per capita income and infrastructure variables in the post-reform period, although there seems to be an upward shift of the implicit trajectory representing the states in an infrastructure-income plan. Finally, states with higher development expenditures have also attracted higher industrial private capital during the period of globalization. These are good indicators to study the infrastructure sector in Ethiopia.

Meanwhile, infrastructure policy failures are particularly hardest on the poor, i.e. access and affordability problems (Estache & Fay, 2009). First, the failure to deliver for universal access has, of course, hurt the poor most. Second is through the failure to come up with tariff designs consistent with the poor’s cash flows and ability to pay (Estache & Fay, 2009). They also stated that all this implies that poverty was not addressed carefully in the regulatory and other reform packages. Moreover, they also indicated that by stressing on the heterogeneity of the infrastructure business which is problematic to make specific conclusions for any given sub-sector or country (Estache & Fay, 2009). They indicated, first, the basic debates have not changed much over the previous 25 years or so and they center on two core questions:

- Who should be in charge of the sector: the government or the private sector; the federal government or the subnational governments; independent regulators or politicians?
- Who should pay for the services: the users, the taxpayers, or in some cases the donors?

According to Estache and Fay (2009), there are plenty of variations and refinements around the above two questions, driven by the relative importance given to the concern for efficiency, equity, financial

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viability, and accountability. Estache and Fay (2009) also explained that, although a lot of learning has taken place on how to address those questions, some of the basic answers are still lacking due to the lack of objective data on the sector. Moreover, Rudolph (2013) raised that, to know the connection between democracy, federalism, and distributional factors, the question ascends why federal institutions are built in the first place (Hegemer & Buhler, 2013). By citing Whatts (1998) and Imman (2007), and following Hooghe and Marks (2009), Rudolph (2013) considered three aspects that incline to “lead to the adoption or non-adoption of federal institutions” (Hegemer & Buhler, 2013, p.19). These are: “group identities and ethnic fractionalization are a major driver of federal movements around the globe” focusing on “a calming of ethnic conflicts through increased regional self-determination” for the adoption; “distributional factors at the national level are one prominent explanation for the non-adoption of federal institutions”, “induced by the struggle for resources; questions of ethnic and religious identity are influencing the working and design of federal institutions”; and, “the gradual adoption of federal institutions as long as increased efficiency in public goods provision is in the focus of the respective polity” in the cases of India, Pakistan or Myanmar (Hegemer & Buhler, 2013, p. 18-19), in which, in relation to infrastructure equity, the “distributional factors” need to be considered in the case of Ethiopia. Kincaid (2011) also emphasized that “mobility and choice” underlying values of efficiency, innovation, and equity that have frequently been possessed by federalism in more recent years.

Finally, quality measures are not always straightforward. It is mostly surveyed that gather qualitative measures like those in the Global Competitiveness Report (GCR) by World Economic Forum (WEF), where perception is highly responsible for values obtained. However, there are some objective measures used for quality terms that are limited like the share of paved roads in the transport sector or the percentage of supply and transmission losses in electricity in the energy sector (Cantu, 2017). Quantity measures and quality measures are mostly used in growth and productivity research (Cantu, 2017), to check the disparity of infrastructure in a given country for the right state- and nation-building processes.

5.7 Conclusions

Generally, Ethiopians are further divided and especially in recent times between federal and regional states, and among regional states over the nature of federalism. While some believe that the current situation might lead to the break-up of the country, others feel that failure to grip the same will jeopardize the unity and political future of Ethiopia. This is because Ethiopian federalism has suffered from a lack of proper understanding and implementation of the constitution and the federal system which has to a

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large extent contributed to disaffection and indifference among Ethiopians. This has resulted to slow and poor planning, decision-making, and implementation, democratic accountability, shared national identity, unnecessary societal fragmentations, and particularistic feelings, etc. Even though, there is an opportunity for a peaceful resolution of the fundamental issues defining the national question and the future form of government structure (democratic federalism, ethnic federalism, or con-federalism) (Salih *et al*, 2018). Therefore, much is needed from both the leaders and the led, and the people at large for Ethiopia to attain the valued levels of federalism (as federalism is a nation-building device) and national development.

Therefore, the three starting points for state-and nation-building processes are a noticeable improvement of actual living conditions e.g. in the economic, social, and personal security domains; structural reforms in individual sectors e.g. infrastructure, fiscal system, education systems, legal system; and, integration of the overall political system e.g. through national political parties, strengthening civil society, discourses relating to society as a whole, elections and parliaments, balance between centralized and federal political elements (Hippler (Ed.), 2004, 2005). Moreover, the best way is to build the capacity of the institutions, ensuring infrastructure governance and equity in the infrastructure sector across regional states in the country. Based on the concepts of federalism and state-and nation-building processes, the overview of economic and political development including infrastructure development in Ethiopia is examined in Chapter 6. This is also specifically needed to investigate the role of each institution, infrastructure governance, and equity from the perspective of political and economic development in Ethiopia.

CHAPTER 6

INFRASTRUCTURE GOVERNANCE, EQUITY, AND NATION-BUILDING PROCESS FROM THE PERSPECTIVE OF POLITICAL AND ECONOMIC SITUATIONS IN ETHIOPIA

Introduction

The purpose of the chapter is to investigate the political-economic development, infrastructure development, and nation-building processes in Ethiopia. First of all, Ethiopia is widely known as “a country that succeeded in defeating Western colonial domination in the African continent. Ethiopia is the second-largest country in Africa (next to Nigeria) in terms of population size and is highly multicultural and multi-religious. It is home to more than 80 “nations, nationalities, and peoples”, as defined by the Constitution (1995). Thus, Ethiopia is a multicultural country and multilingual that constitutes 80 nations and nationalities which is located in the horn of Africa. The country is divided into nine regions (Oromia, Amhara, SNNP, Tigray, Somali, BenshangulGumuz, Afar, Gambella, and Harari) and two administrative cities (Addis Ababa and Diredawa). The capital city that is the largest city is Addis Ababa. Since Ethiopia started its economic reforms in 1991, the country is one of the largest least developed countries (LDCs) in Sub-Saharan Africa, with a population of about over 100 million people (Shiferaw,2017; Bishaw & Melesse, 2017). While the language is “a key defining feature of each group, clan (as in the lowland states of Afar and Somali), provincialism/regionalism (as in the Oromo, Tigray and Amahara regional states) and religion are also important factors in intergroup and intra-group relations” (Fiseha,2012, p.438). It is also stated that “the country was reorganized again after the overthrow of the military regime in 1991 with a view to ensuring self-rule for the major nationalities” (Fiseha, 2012, p.438)

Moreover, Ethiopia, Addis Ababa, has also developed as a regional hub and is home to key international organizations. The African Union (AU), set up as a successor to the Organization of African Unity in 1999, has its headquarters in Addis Ababa, which hosts the heads of more than 54 member states at the annual summit, with permanent staff residing in the Ethiopian capital year-round. It also serves as a counterpoint to the headquarters of the United Nations of Economic Commission for Africa, set up in 1961. Both organizations help to ensure that Addis is firmly entrenched as a continental - and international - meeting place (Deloitte, 2014).

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Therefore, the chapter delivers an overview of economic development in Ethiopia over the past decades. Moving forward, the country faces new challenges in economic development and nation-building process. In relation to this, policymakers and academics have long considered a sufficient supply of infrastructure services to be vital for economic development (Calderon & Serven, 2014). They reviewed the latest theoretical and empirical literature on the impacts of infrastructure development on growth and income distribution. They also identified that the empirical literature has used several econometric methodologies on time-series and cross-section macro and microeconomic data to test for the impacts of infrastructure development. However, as discussed in Chap. 2, these empirical investigations face challenging issues of measurement, identification, and heterogeneity. Hence, the emphasis is placed on the roles of infrastructure construction in economic development and nation-building process, and how well the development of these sectors is complementary to each other in Ethiopia. In addition, the chapter provides an understanding of Ethiopia's planning process at the national level, and major tasks of government authorities related to infrastructure planning and development. And then it concludes.

6.1 Ethiopia's Geo-Political Situations and Political Economic Overview

6.1.1 Ethiopia's Geo-Political Situations

Ethiopia is found in the horn of Africa, bordering Sudan and Eritrea in the north, South Sudan in the west, Djibouti and Somalia in the east, and Kenya in the south. Moreover, Ethiopia is a large, land-locked, and diverse country. Located in the horn of Africa, Ethiopia covers over an area of 1.1 million km². With a projected population of about over 100 million, out of which 80.5% are rural dwellers, Ethiopia is the 2nd most populous country in Sub-Saharan Africa (Seid *et al*, 2016; Ayalew *et al*, 2016; World Bank, 2018a). Besides, Ethiopia is a multi-ethnic country, with ethnic groups playing the main role in the country's political and economic power structures. The country has 4 main ethnic regions: Oromo (34.4%), followed by Amhara (27%), Somali (6.2%), Tigray (6.1%), and others (26.3%). The major religions in the country are Ethiopian Orthodox (43.5% of the population), Muslim (33.9%), Protestant (18.5%), Traditional (2.7%), and others (1.4%) (Deloitte, 2019). Despite previous progress, a historic legacy of underinvestment still bears its mark as more than half of the adult population is uneducated, and the country's infrastructure shortage remains one of the largest in the world. However, Ethiopia is undergoing a faster demographic transition than the rest of Africa, with a fast-rising working-age population that presents both challenges and opportunities (more than 60% of the population is under 25 years of age) (World Bank, 2018a).

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Ethiopia's international relations are also considered here. According to Deloitte (2014), Ethiopia's position in the anxious Horn of Africa region gives it a particular strategic advantage with the United States, which views it as a key ally. At the same time, it is explained that Chinese influence has reinforced over the years, with increasing trade and extensive aid. For example, it is also mentioned that Chinese companies have invested in infrastructure projects but also in light manufacturing, focusing on sectors that are being prioritized by the Ethiopian government, such as leather and textiles. Ties with most of Ethiopia's neighbors have strengthened too, thanks to the country's participation in multilateral organizations such as the AMISOM peacekeeping mission in Somalia and the proposed African Mechanism for Police Cooperation (Deloitte, 2014).

Cross-border infrastructure programs (currently Ethio-Djibouti railway and electricity connection) have also served to strengthen links. These also comprise a water pipeline to Djibouti including the implementation of Ethiopia's hydropower potential, which will feed into a regional power pool. However, the dam-building program presents some challenges, mainly due to the tension put on relations with Egypt given the encounter to relating to rights to the Abay/Nile that is exemplified in the development of the Grand Renaissance Dam (Deloitte, 2014). Currently, relations between Ethiopia and Eritrea has been dramatically improved. The challenges with Egypt in relation to Grand Renaissance Dam have been attempted to be resolved. The following (Fig. 6.1) is the administrative regional states of Ethiopia and her neighbors.



Figure 6. 1 Administrative Regions of Ethiopia

Source: Lie and Mesfin (2018), Ethiopia: A political economy analysis

Note: Map provided courtesy of the UN office for the coordination of humanitarian affairs. The boundaries and names shown and the titles used on this map do not imply official endorsement by the United Nations.

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6.1.2 Ethiopia's Brief Political Situations

As it has great relevance for infrastructure equity and state-and nation-building processes, it is good to consider the political circumstances of Ethiopia. For centuries, Ethiopia was ruled by a highly centralized monarch. The last monarch was Emperor Haile Selassie who had the throne in 1931. After a popular uprising in 1974 which used the political vacuum, a provisional administrative council, known locally as the Derg or committee, was set up. Historically, after more than 2 decades of civil war, the effects of which were exacerbated by international conflicts with Somalia (1977 and 1998) and Eritrea (1999), Ethiopia has appreciated more than a decade of peace. Thus, the coming of the EPDRF government was a landmark for starting democracy and good governance in the country; though, the problem of governance is still prevalent in the country (Kebede, 2015).

Although Ethiopia has a multiparty democracy, in exercise, there is little opposition to the EPRDF, which won more than 90 percent of the vote in the 2010 elections, up from just under 60 percent in 2005. In addition, the death of Meles Zenawi in 2012, first elected as prime minister in 1995 and who effectively had led the country for more than 20 years, had brought some uncertainty over who would lead the coalition after the federal elections arranged for 2015. It was not assumed that acting PM Hailemariam Desalegn would be put forward as the EPRDF candidate. However, the consensus was that political stability, in the form of a solid coalition government led by the EPRDF, had been made good (Deloitte, 2014). But, PM Hailemariam Desalegn resigned at the end of 2017. A new Prime Minister (Abiye Ahmed) came to power in April 2018, during one of Ethiopia's worst political and social crises in decades, which had forced the government to announce a state of emergency twice in three years. Since his appointment, the Prime Minister has taken courageous steps to reestablish peace with Eritrea subsequent two decades of conflict, and his administration has unlocked new political space for dialogue, released political prisoners, actively engaged in regional diplomacy, lifted bans on political parties and media outlets and publicized a range of economic reforms intended to revitalize the Ethiopian economy by strengthening the role of the private sector (World Bank, 2018b; Mukundu, 2018; Faleg, 2019). However, these transformations have not happened without turbulence. Insecurity and ethnic-tensions have been deteriorating, leading to an unprecedented crisis of internally displaced persons (IDPs), and Abiy's moves to dismantle the old order have weakened the Ethiopian state (International Crisis Group (ICG), 2019; Faleg, 2019; Deloitte, 2019). Moreover, Faleg (2019) argued that:

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While the implementation of reforms launched by the current leadership has the potential to deliver progress on democracy and growth, the outcome of the transition depends on a set of factors (domestic, economic, and external), which in turn delineate three possible avenues: spiraling instability and relapse into conflict, gradual stabilization, and democratization, or a mix of democratization and turmoil (Faleg, 2019, p.1).

Despite initial hopes and the positive impact of Abiy's reforms, the security situation has not improved. Ethnic tensions and displacement of people linger as "ethnic groups have kept conflicts alive in many border areas of the country in pursuit of greater self-determination and autonomy under a reformed federal system" (Faleg, 2019, p. 3). ICG (2019) has identified that four "fault lines" are especially dangerous. The first upsets across Oromia, Abiy's home state, who believes the premier should do more to the improvement of the region's interests. The second is a disagreement between the Oromo and the Amhara leaders who angered by ODP's statement that the federal capital should be under Oromia's control. The third is related to a bitter disagreement between Amhara and Tigray politicians due to the two territories (Welkait and Raya) that the Amhara claim Tigray seized in the early 1990s. The fourth includes the disagreement between Tigray leaders and Abiy's government due to the dismantling of a political system "they constructed". Moreover, infrastructure, and industrial development contribute to inter-ethnic tensions (Faleg, 2019). In other ways, Ethiopia's experience with its revolutionary democracy and the developmental state has brought remarkable economic results, but serious concerns continue with regard to the political space, human rights, and democracy (Lie & Mesfin, 2018). From this one can suggest that there is a mix of democratization and turmoil scenario in Ethiopia today which is the result of lack of IGR, rule of law, shared national identity, etc. in the country. However, a state could be a cohesive/innovative state, predatory/redistributive state, and neither a cohesive nor predatory state (Hippler (Ed.), 2004, 2005; Dinnen, 2006). The current situation of Ethiopia seems a predatory state.

Lastly, PM Abiy dissolved the four blocks and merging them, ODP, ADP, and SEPDM plus five parties of the emerging regions (Afar, Benishangul-Gumuz, Gambella, Harari, and Somali), into a new party, the Prosperity Party (PP). Tigray leaders refused to join the new party (ICG, 2019). Opponents observe this change as inching away from "ethnic federalism" toward a system based on "territory" but not "identity". Meanwhile, some argue that ethnic federalism protects Ethiopia from its own history of coercive centralism and cultural homogenization. Moreover, the recent violent killing and wounding of people in Oromia, and Amhara-Oromo fighting at several universities, have "sharpened tensions" (ICG, 2019). Currently, Ethiopia is in a fragile political situation.

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6.1.3 Ethiopia's Brief Economic Situations

Since the early 2000s, Ethiopia has been setting development plans with the aim of achieving broad-based, accelerated, and sustained economic development so as to eradicate poverty. Economic growth greatly strengthened since 2005 at slightly above 10% per annum in the following 10 years, allowing per capita GDP to grow at nearly 8% annually. Such achievement has made of Ethiopia a mark of economic shift in Africa (Shiferaw, 2017). As mentioned in Chap. 2, the development plans include the Sustainable Development and Poverty Reduction Program (SDPRDP, covering 2002/03-2004/05), the plan of accelerated and sustained to End Poverty (PASDEP, covering 2005/06-2009/10), GTP I, covering 2010/11-2014/15) and GTP II, covering 2015/16-2019/20) (Jalles d'Orey & Prizzon, 2017). While the Ethiopian economy has shifted to a better growth trajectory since 2003/04, the average growth rate was around 11 percent between 2005/06 and 2009/10, outpacing the growth target of 7 percent (base case) and 10 percent (high case). However, as economic growth moderated in the previous few years, the average growth rate was slightly lower than the target of 11 percent during 2010/11-2014/15 and was expected to be below the target by 3 percentage points during 2015/16-2019/20 (UN-ECA, 2018). Specific figures fluctuate, but the past decade has seen strong economic growth, and the government aims to make Ethiopia a middle-income country by 2025 (Jalles d'Orey & Prizzon, 2017; Lie & Mesfin, 2018). The GTP II (2016-2020) sets out directions and priorities to implement this strategy. Its scope is dual: to achieve an annual average real GDP growth rate of 11% within a stable macroeconomic environment (Jalles d'Orey & Prizzon, 2017). Currently, Ethiopia is achieved with a GDP per capita of US\$890 (Deloitte, 2019).

As mentioned above, regarding economic development, according to UN-ECA (2018), the economic performance of Eastern Africa has been inspiring in recent years, with an average annual growth rate of 6.5% between 2012 and 2016- much better than the African average and even overtaking East Asia. UN-ECA (2018) also mentioned that the people of the region receive better education, live longer and healthier, and appreciate a better quality of life compared with just a 'generation ago'. These positive results are mainly attributable to enhanced state capacity, as governments in the regional states have reconstructed their institutions after the 'lost decades' of the 1980s and 1990s. Where state action has been effective, signs of progress have been largest. In spite of the positive developments, there are a number of challenges looming on the horizon. Economic growth was slightly changed in 2017, at 5.5 percent, with a modest acceleration to 5.9 percent being forecasted for 2018 (UN-ECA, 2018).

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Moreover, the Ethiopian economy is greeted internationally. Selectively merging the concepts of a developmental state and a market economy, the government's GTP pursues to transform the country from an agricultural-based economy into a manufacturing hub through the Agricultural Development Led Industrialization (ADLI) initiative. While a growing economy and a green economy are often understood as being at balances, the government seeks to meet its economic development goals in a sustainable manner through its Climate Resilient Green Economy (CRGE) creativity (Lie & Mesfin, 2018).

However, Ethiopia is the world's poorest countries but has attained substantial progress in social, economic, and human development over the previous decade. With the capita income of US\$691 (2015), Ethiopia, a growing economy with a population of over 100 million located in the conflict-affected Horn of Africa region, was experiencing an extraordinary process of political and economic change. Meanwhile, Ethiopia remains the most equal country in the world, with a Gini coefficient of 0.33 in 2015, gender inequalities are profound, and a combination of cultural norms and socioeconomic disparity greatly upsurges the risks faced by women. Ethiopia's growth has been determined by public investment and agricultural growth. The government has sustained high levels of public investment which has driven strong growth in agriculture and services (Jalles d'Orey & Prizzon, 2017; World Bank, 2018b).

Generally, there is a broad consensus that the rapid economic growth in Ethiopia since 2000 is largely determined by public infrastructure investment (World Bank, 2009). These have included not only the expansion of road networks but also the construction of hydroelectric power plants and transmission lines, airports, telecommunication systems, health and education facilities, and most recently railways. For instance, a series of Road Sector Development Programs (at a cost of more than \$7bn during 1997-2010) have significantly upgraded road accessibility (Shiferaw, 2017; Jalles d'Orey & Prizzon, 2017). This is because the primary goal of the Ethiopian government, as a developmental state, was to eradicate poverty by delivering economic growth and transforming the structure of the economy (Deloitte, 2014). Public infrastructure investment has been at the heart of the country's economic strategy, and Ethiopia has been able to attain a substantial expansion of electricity, railway, road, and telecom infrastructure, financed by national and external public borrowing. However, the private sector investment climate remains suppressed (Jalles d'Orey & Prizzon, 2017; World Bank, 2018a).

As a final point, Ethiopia's achievements in the economic sphere are all the more impressive when considered alongside the ground covered with respect to human development indicators - such as health

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and education, poverty reduction, and infrastructure enhancements, as well as “institutional” infrastructure or governance (Deloitte, 2014; IMF, 2018). Currently, the other driver of change in Ethiopia is an ideological change from a state-centered doctrine of economic development to liberalization and a free-market economy, aimed at fixing Ethiopia’s economic troubles (Faleg, 2019). However, the liberal approach of the current leadership does not involve an immediate or full withdrawal of the government from the economy, but it does expose Ethiopia to market competition in ways that were unthinkable a few years ago under the previous regime (Faleg, 2019). Finally, an important element to consider is the sustainability of the economic reforms and liberalization plan promoted by the incumbent government in the deficiency of a political deal among main ethnic groups or regional states (Faleg, 2019). All the above political-economic descriptions are very important for the analysis of infrastructure equity and the state-and nation-building processes in Ethiopia.

6.2 A Brief History of Equitable Infrastructure Development in Ethiopia

Infrastructural development in Ethiopia largely associated with the mobility of the imperial royal court from place to place. In the formation of modern Ethiopia, one of the documented perhaps the first in its length, the road was constructed during the time of Emperor Tewodros II from Debre Tabor to Maqdala to transport huge locally manufactured cannons and other firearms to check the British expedition. As Addis Ababa emerged as the political, economic, cultural as well as social center of Ethiopia, the development of infrastructure and other services by the help of modern machinery began to appear. In this case, the most remarkable one was the construction of a railway connecting the capital Addis Ababa to Djibouti during the time of Emperor Menelik II. The expansion infrastructure development was witnessed especially road construction was during the second Ethio-Italian war and the subsequent five-year occupation. This was not only contributed to the development of new towns but also facilitates the centralization policies of Hailesilassie since the central government able to undertake easy and fast regulations of matters in the provinces which formerly inaccessible and took the time (Tibebu, 1996). The Addis Ababa-Djibouti railway also one of the major infrastructural achievements of modern Ethiopia. Most of the towns with industrial establishments were erected along and both sides of this railway. Markakis (1978) stated that:

Along the eastern section, of the railway, Dre Dawa has developed into one of the most important towns, at the western end the towns of Akaki, Debre Zeit, Mojo, and Nazret from the urban-industrial complex with Addis Ababa which contains most of Ethiopian’s modern economic establishment. (Markakis, 1978 p. 161).

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As mentioned in Chap. 4, the distribution of industries also followed this line extended from the Addis Ababa-Mojo-Nazret industrial belt to Awash Valley Sugar factories and Dre Dawa (Tibebu, 1996; Zewde, 2002). This intensity of distribution is also still the case that most of the industries are concentrated around Addis Ababa and the eastern corridor. Moreover, the history of telecommunication facilities in Ethiopia dates back to 1894 with the construction of a telephone line between Addis Ababa and Harar during the reign of Emperor Menelik (Harris *et al*, 2019). Hence, Ethio Telecom is one of the earliest public telephone suppliers in Africa (Harris *et al*, 2019).

Currently, as mentioned above, Ethiopia is the fastest-growing economies in the world with an average growth rate of above 10.9% for the last decade and this drive is predictable to remain at a rapid pace over the next 5 years (AfDB; UNDP, 2014). Out of the 10.9% growth, the service sector, agriculture, and industry contributed 5.4, 3.6, and 1.7 %age points respectively (World Bank, 2016). Specifically, Ethiopia has given a high priority to public infrastructure development in its national strategy (GTP II 2016-2020), especially for roads, telecommunication, and energy (Jalles d'Orey & Prizzon, 2017). As discussed in Chap. 2, infrastructure comprises all main networks (systems of public facilities, sets of fixed assets or structures) that support economic and social activity, including those associated with power, ICT, and transport (roads, and air) (Prudhomme, 2004; IMF, 2018; Rammelt, 2018). This definition is mainly based on the Classification of Function of Government in the government finance statistics manual of International Monetary Fund. Thus, this functional classification agrees on defining infrastructure as asset types classified by purpose in the economy. As such, infrastructure assets are by nature long-lived capital assets. Researchers reach an agreement that the relationship is heterogeneous and infrastructure types, heavily dependent on the countries, and periods under study (AfDB, 2018). Moreover, infrastructure allocation is becoming increasingly more complex and multifaceted. Especially, as citizens or stakeholders contact proliferate and grow more unstructured through social media, and take place outside the sponsored channels or traditional boundaries in, for example, social media and digitally-based information delivery which leads to political instability (Bowditch & Noble, 2017).

More importantly, in the heart of rapid technological change, political polarization, and fragile economic recovery, it is serious that one should assess, define, and implement new pathways to growth and prosperity. With productivity, the most significant determinant of long-term growth and income is the new Global Competitiveness Index (GCI). There are 12 pillars of competitiveness. There is also a total of 98 indicators in the index, which originated from a combination of data from international

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organizations including from the WEF's Executive Opinion Survey. These are prepared into 12 pillars in the GCI, reflecting the amount and complexity of the drivers of productivity and the competitiveness ecosystem. These are institutions; infrastructure; ICT adoption; innovation capability; health; skills; product market; labor market; financial system; market size; business dynamism; and macroeconomic stability (Schwab, 2018). See Table 6.1 below.

Globally, the average score is 60.0. Between the US (85.6, 1st) and Chad (35.5, 140th) there is an extensive range of performance across regions and countries. North America and Europe are, joined home to 7 of the 10 most competitive economies. The Pacific region and East Asia and, home to the other 3 top 10 economies, attains the highest median score (72.6) among all regions, ahead of North America and Europe (70.8). At the other end of the spectrum, 17 of the 34 sub-Saharan African economies considered are among the bottom 20 globally, and the region's average is a low 45.2, less than halfway to the frontier (Schwab, 2018). According to various GCR published by the World Economic Forum (WEF) (Schwab, 2018), the score of Ethiopia is 44.5, and its rank is 122 out of 140 (see Table 6.1). It is below the global average (60.0) and more or less equal to the average of sub-Saharan Africa (45.2). Therefore, the weaknesses of infrastructure in Ethiopia are holding back the country from further economic development. In the GCR (2018), among the major competitiveness indicators, Ethiopia's infrastructure remained the biggest drag on the country's further economic development (see Table 6.1), which is 45.5 and 120 out of 140.

Therefore, Ethiopia's poor infrastructure is regarded as the major constraint to further development of trade and international economic integration of the country. It is evident that PPPs have not been initiated in key sectors such as electricity, road transport, and telecommunications (UNDP Ethiopia, 2015). Yet, selected infrastructure that can be delivered by PPP would be explored and the arrangement would be executed to promote private sector participation in infrastructure delivery (UNDP Ethiopia, 2015). However, with regard to economic infrastructure, the international and regional goals and targets of the post-2015 development agenda and Agenda 2063 are mainstreamed in the national goals and targets of GTP II of Ethiopia (NPC, 2016). Moreover, it is notable that while investments in infrastructure development have recently increased, the quality of the infrastructure system of Ethiopia has not improved very much (NPC, 2016). Thus, the country's experience in the construction of large-scale infrastructure projects has proved to be very problematic which could have a significant effect on infrastructure governance and equity. Actually, there is no concrete evidence about infrastructure equity

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across regions in Ethiopia from government organizations or from academia. It stated that a number of countries are still paying only “lip service” to the equity agenda (Salmi, 2018). This issue is further discussed in Chap. 7 and 8.

Table 6. 1 Global Competitiveness Score of Ethiopia in 2018

No_	Index Component	Score *	Rank/140	Best Performer
1	Pillar 1: Institutions 0-100 (best)	44.9	116	New Zealand
2	Pillar 2: Infrastructure 0-100 (best)	45.5	120	Singapore
3	Pillar 3: ICT adoption 0-100 (best)	16.0	138	Korea, Rep.
4	Pillar 4: Innovation capability 0-100 (best)	68.0	113	Multiple (31)
5	Pillar 5: Health 0-100 (best)	56.0	113	Multiple (4)
6	Pillar 6: Skills 0-100 (best)	32.6	135	Finland
7	Pillar 7: Product market 0-100 (best)	41.0	135	Singapore
8	Pillar 8: Labor market 0-100 (best)	54.6	98	United States
9	Pillar 9: Financial system 0-100 (best)	46.0	126	United States
10	Pillar 10: Market size 0-100 (best)	54.6	63	China
11	Pillar 11: Business dynamism 0-100 (best)	47.9	125	United States
12	Macroeconomic stability 0-100 (best)	26.5	127	Germany
	Average	44.5	122	

Source: Based on Schwab (2018), Global Competitiveness Report, Researcher's Work

*1 = * Scores are on a 0 to 100 scale, where 100 represents the optimal situation or 'frontier'.

More specifically, in order to support the efforts to accelerate rapid and sustainable growth, it was planned to increase the power generating capacity of the country from 2000MW in 2009/10 to 8000MW by the end of the plan period. In terms of delivery, total electricity generating capacity reached 4,180MW by 2014/15 and the average performance of all power projects stood at 52%. The Grand Ethiopian Renaissance Dam (GERD) (6000 MW), Gilgel Gibe III HEPP (1870 MW). Besides, among the on-going power projects, the GERD Project and Genale III (254 MW) have been completed 40% and 65%, respectively. On the other hand, problems of service delivery, delay in rehabilitation of old lines, lengthy institutional reforms are some of the problems observed in the power sector that deserves proper attention in GTPII (NPC, 2016).

During the GTPI execution period, the total length of the power transmission line augmented from 11,440 km in 2009/10 to 16,018 km (against the target of 17,000 KM) in 2014/15. The extra newly built

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transmission line was 4,578 km. During the plan period, 40,929km power distribution lines were built (against the target of 132,000Km). Consequently, the total length of power distribution lines has increased from 126,038km in 2009/10 to 166,967 km by 2014/15. As a result, electricity service coverage from 41% in 2009/10 to 60% in 2014/15. In 2009/10, about 2.03 million customers accessed electricity service. This figure increased to 2.31 million in 2014/15 (NPC, 2016).

During the GTP I period, the regional and federal road network has augmented from 48,800 km in 2010 to 63,604 km (with a net increase of 14,804 km) in 2015. In addition to this, 46,810 km of all-weather Woreda roads have been built. As a result, the total road network of the country has more than doubled during the GTP I period reaching 110,414 km by the end of the plan period. As a result, the proportion of rural Kebeles connected to all-weather roads increased from 39% in 2009/10 to 76% by 2014/15 and the average time required to reach the nearest all-weather roads declined from 3.7 hours to 1.7 hours (NPC, 2016).

Moreover, huge investment has been made so as to acquire the latest technology and expand the services in the telecom sector. As a result, accessibility and quality of telecommunication services have improved. With regard to accessibility, the number of customers of all kinds of telecom services increased from 7.7million in 2009/10 to 39.8 million by 2014/15. During the same period, the number of mobile subscribers augmented from 6.7 million in 2009/10 to 38.8 million by 2014/15. The share of rural Kebeles with access to telecom facilities (within 5km radius) augmented to 97 percent by 2014/15 from 62.1percent in 2009/10. The other important accomplishment in the telecom sector, during the GTPI period, was the introduction of 3.75G and 4G internet networks with the capacity to provide facilities to 60 million customers (NPC, 2016).

6.3 Infrastructure Related Indicator Compared to other Eastern African Countries and Selected Global Regions

Since a proper infrastructure system is recognized as crucial for Ethiopia to sustain the high economic growth and nation-building process, infrastructure has been highly included in the national development plans. An integrated index can be located in the GCR published annually by the WEF. Besides separate indices for different types of infrastructure, the WEF uses a composite index for assessing the competitiveness of each country in terms of infrastructure development. However, the improvement of infrastructure development in Ethiopia remains slower than other regional countries, including its neighbor Kenya and Rwanda. She is relatively better than Burundi and Uganda in the eastern African

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countries. Other Eastern African Countries do not have available data in the global competitive report in 2018. Ethiopia's infrastructure ranked 120th out of 140 countries surveyed in the GCR (Schwab, 2018). The comparison of the quality of the overall infrastructure of Ethiopia and some neighboring countries has been summarized as follows. See Table 6.2.

Table 6. 2 Comparison of overall infrastructure of Ethiopia and some neighboring countries

No_	Country	Rank/140	Score*	Best Performer
1	Sudan	n.a	n.a	Singapore
2	South Sudan	n.a	n.a	>>
3	Kenya	105/140	54.8	>>
4	Djibouti	n.a	n.a	>>
5	Somalia	n.a	n.a	>>
6	Uganda	121/140	43.2	>>
7	Burundi	132/140	36.6	>>
8	Rwanda	115/140	50.8	>>
9	Eritrea	n.a	n.a	>>
10	Ethiopia	120/140	45.5	>>

Source: Based on Schwab (2018), Global Competitiveness Report, Researcher's Work

*1 = * Scores are on a 0 to 100 scale, where 100 represents the optimal situation or 'frontier'.

According to the GCR (Schwab,2018), rankings of overall infrastructure, road connectivity index and the quality of roads, efficiency of air transport infrastructure, electrification rate and electric power transmission and distribution losses, mobile-cellular telephone subscriptions, and internet users of Ethiopia were among the lowest in the world and regarded as Ethiopia's competitive disadvantages. However, Ethiopia has a relatively competitive advantage in the efficiency of air transport and Mobile-cellular telephone subscriptions/100 population. See Table 6.3.

Table 6. 3 Rankings of infrastructure quality of Ethiopia

	Indicator	Value	Score	Rank/140
1	Quality of overall infrastructure 0-100 (best)	-	45.5	120----x
2	Road connectivity index 0-100 (best)	32.0	32.0	123---x
3	Quality of roads 1-7 (best)	3.3	37.8	103---x
4	Efficiency of air transport services 1-7 (best)	4.0	50.2	93---√

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5	Electrification rate% pop	40.4	40.4	121---x
6	Electric power transmission and distribution losses% output	17.3	86.2	107---x
7	Mobile-cellular telephone subscriptions/100 pop	59.7	49.7	130---√
8	Internet user's % pop.	15.4	15.4	127---x

Source: Based on Schwab (2018), Global Competitiveness Report, the Researcher's work

Note: x—competitive disadvantage; √—competitive advantage.

Generally, Africa's infrastructure stock is low, particularly in electricity. More than 640 million Africans have no access to electricity, giving an electricity access rate for African countries at just over 40%- the world's lowest (AfDB, 2018). Per capita consumption of electricity in Sub-Saharan Africa (excluding South Africa) is 180 kWh, in contrast to 13,000 kWh per capita in the United States and 6,500 kWh in Europe. Access to electricity is essential not only for achieving health and education outcomes but also for dropping the cost of doing business and unlocking economic potential, creating jobs (AfDB, 2018). Insufficient access to modern energy causes hundreds of thousands of deaths each year due to the usage of wood-burning stoves for cooking; handicaps the operations of hospitals and emergency facilities; compromises educational achievement, and drives up the cost of doing business. So, energy access for all is the key driver of inclusive growth, because it creates opportunities for women, youth, and children in urban and rural areas (AfDB, 2018). However, Africa's energy potential, particularly renewable energy, is vast, yet only a fraction is engaged (AfDB, 2018).

Based on preliminary results, it is expected that Africa's investment needs for infrastructure overall will be in the range of \$ 74–\$104 billion a year (AfDB, 2018) (Table 6.4). One can also estimate the investment needs of Ethiopia that are a very huge amount of money per year.

Table 6. 4 Preliminary figures on investment needs (\$ billions)

Infrastructure sub-sector	Target by 2025	Annual cost	Notes
Power	100% urban electrification 90% rural electrification	35-50	New deal on Energy target by 2025
Information and communication Technology	Mobile universal coverage 50% population within 25 Km of a fiber backbone	4-7	

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	Fiber to home/ promises internet penetration rate (10%).		
Road and other transport sectors (air, rail and port)	80 % preservation; 20% development	35-47	Preservation: Maintenance and rehabilitation Development: Upgrading and new construction
Total		74-104	Preliminary figures

Source: Adapted from African Development Bank (2018), Macroeconomic development and structural change.

The Africa Infrastructure Development Index (AIDI), produced by (AfDB), serves three main objectives: To evaluate and monitor the status and improvement of infrastructure development across the continent; to support in resource distribution within the framework of AfDB replenishments, and to contribute to policy discourse within and outside of the Bank. The AIDI has four main components: electricity, transport, ICT, and water and sanitation. These components have a direct or indirect effect on economic growth and productivity. A data reduction method generates a single index, normalized to lie between 0 and 100. Thus, the higher the value of the index, the better a country's readiness in meeting its infrastructure needs for development (AfDB, 2018). However, in the updated version, there is an extensive difference among African countries in their infrastructure gap, with a range of more than 90% between the country at the top of having good infrastructure (Seychelles) and the country at the lowest (Somalia). The countries at the top are mostly from North Africa, with a few from Southern Africa. The rest of the continent is in very bad shape. There is a high correlation between inequality in assets and the infrastructure index, suggesting that improving infrastructure leads to inclusive growth as well. Therefore, the low infrastructure stock in Africa indicates the low expansion of many countries on the continent (AfDB, 2018). Based on AfDB (2018) data, Ethiopia is the lowest in the Africa Infrastructure Index. She only exceeds Congo Democratic Rep., Eritrea, Chad, South Sudan, Niger, and Somalia from the list. Partly due to this lack of investment in infrastructure building, Africa's infrastructure lags that of other regions on quantity, affordability, and quality (AfDB, 2018). Table 6.5 presents summary data on access to infrastructure for selected regions worldwide (AfDB, 2018).

Table 6. 5 Infrastructure access data for selected global regions

Indicators	Africa	Asia	Europe	Latin America
Transport				

Source: Adapted from African Development Bank (2018), Macroeconomic developments and structural change.

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Paved road density (Km of paved road per 100 Km2 of land area)	2	25	122	3	Note 1: AfDB statistics and World Bank WDI database.
Information and communication technology					
Fixed broadband subscription per 100 pop.	1	6	15	9	
Mobile cellular subscriptions per 100 pop.	73	85	119	115	
Power					
Electricity per capita (KWh)	572	1930	3355	2116	
Electricity access (% of total population)	46	88	100	97	

database.

Note 2: Data were for 2013.

Finally, if, for example, one considers two indicators from Table 6.5 above, i.e. electric access (% total population and mobile-cellular telephone subscriptions/100 population, Ethiopia's access to electrification rate % population is 40.4 which is nearer to the average of Africa (46). But, it is below Asia (88), Europe (100), and Latin America (97). Whereas, Ethiopia's access to mobile-cellular telephone subscriptions/100 population is 49.7 which is below the average of both Africa (73), Asia (85), Europe (119), and Latin America (115) (see Table 6.3 above about Ethiopia). Although Ethiopia's total infrastructure investment is among the maximum in Sub-Saharan Africa, to touch its infrastructure targets, the country still requires a noteworthy increase in its infrastructure funding amounting to more than 40 percent of its GDP and a careful investment handling (Foster & Morella, 2011). Thus, surveys showed that infrastructure constraints are responsible for an estimated 50% of the productivity handicap encountered by Ethiopian firms (Foster & Morella, 2011).

6.4 Government Planning Processes and Highlights of these Plans in the Infrastructure Sector

Government capital budget and the involvement of private investment is minimal in developing countries (World Bank, 1994). Hence, it is imperative to investigate the impact of public capital investment on infrastructure and its impact on economic growth in developing countries (Nuramo & Haupt, 2015). However, Ethiopia has made substantial investments in infrastructure over the previous decade (AfDB, 2016). To deal with future infrastructure demand, the commission of National Planning and Development (CoNDP), Ministry of Finance (MoF), the Ministry of Transport (MoT), Ministry of Urban Development and Construction (MoDUCo), Ministry of Irrigation, Water and Electric, Ministry of Industry and Ministry of Innovation and Technology (MoIT) have developed numerous plans to invest in national and major road, railway, airport, electric and telecoms projects to 2020 in the GTP II. The

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huge efforts commenced so far to expand economic infrastructure has already begun to pay off in terms of economic growth and development. However, there are still infrastructure deficits that need to be bridged. Bridging the infrastructure deficits call for huge financial investment the bulk of which is in foreign currency. The delivery of infrastructure also faces challenges of limited availability of skilled and competent manpower and organized implementation capacity in general. As a result, the country will continue to at least partly rely on external capacity in the short and medium-term in the delivery of large infrastructure projects (NPC, 2016; AfDB, 2016).

Therefore, the economic infrastructure development plan which is aimed at meeting the infrastructure need of the economy is a key milestone towards the achievement of Ethiopia's vision of becoming a lower-middle-income country by 2025. Road, airport, energy, and telecom infrastructure will be expanded with the aim of attracting investment, opening new market opportunities, reducing the price of commodities, creating a competitive market environment to speed up regional economic integration (NPC,2016; AfDB, 2016). GTP II supports the significance of infrastructure development (Deloitte, 2019). Thus, the required infrastructure to support rapid economic growth and structural transformation need to be fulfilled. Highlights of these plans consist of the following:

- Roads: In GTP II, the total road length is planned to increase from 110,414 km in 2014/15 to 220,000 km by 2019/20. It is planned to upgrade 560 km trunk roads, 3,765km (fair to good) from 70% in 2014/15 to 80% by 2019/20. Besides, it is planned to increase the ratio of asphalt (paved road) roads from 13% in 2014/2015 to 16% by 2019/20;
- Electricity: a) Increase the power generating capacity of the country from 4,180MW in 2014/15 to 17,208MW by 2019/20; of which, 13,817MW is planned to be generated from hydropower; b) Increase the energy production capacity of the country from 9,515.27GWH in 2014/15 to 63,207GWH by 2019/20; c) Increase electricity coverage from 60% in 2014/15 to 90% in 2019/20; d) Increase the number of consumers from 2.31million in 2014/15 to 6.955million by 2019/20; e) Increase the total length of power transmission lines from 16,018km in 2014/15 to 21,728km by the end of 2019/20; out of which, to increase the high voltage 500kv gridline to 1,240km, the 400kv gridline from 1,397km in 2014/15 to 2,137km by 2019/20, the 230kv/132kv and 66kv gridline from 13,383km in 2014/15 to 18,351km by 2019/20. By so doing, the current power interruption and power loss problem will be mitigated significantly; f)

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Increase per capita energy consumption from 86KWH in 2014/15 to 1,269KWH by the end of 2019/20; g) Reduce power loss from 23% in 2014/15 to 11% by the end of 2019/20;

- Telecoms: In the ICT sector, the major targets are to increase computer users, improve the equitable distribution of computer users, and expand the ICT manufacturing industry. In the telecom subsector, it is planned to increase mobile subscribers, broadband internet and data users, narrowband internet and data subscribers of a fixed telephone from 38.8 million, 1.91 million, 7.53 million, and 0.838 million in 2014/15 to 103 million, 39.1 million, 16.9 million and 10.4 million by 2019/20, respectively. It is also planned to increase mobile service penetration rate from 43.9% to 100%, increase telecom density from 10.5 % to 54%, increase internet and data density from 3.3% to 10%, increase international link capacity from 27.9 Gbs to 1485 Gbs, maintain mobile service coverage at its current level of 81% during the same period;
- Airport: Increase the number of airports from 20 in 2014/15 to 25 by 2019/20;
- University: To further expand access to higher education, 11 new universities will be established during the GTP II period. Accordingly, it will focus on the development of university teachers, and on equipping research, laboratory, and workshop facilities to ensure the quality of higher education;
- Industrial Parks: the “three-layer circle” conceptual plan for the layout of industrial parks as follows:
 - The first layer of industrial parks will be set up in and around two chartered cities, Dire Dawa and Addis Ababa;
 - The second layer of industrial parks will be set up in 6 cities within the radiation scope of Dire Dawa and Addis Ababa, which are Nekemte, Jimma, and Adama of Oromia, Dese (Kombolcha) of Amhara, Awasa of SNNPR, and Jijiga of Somali;
 - The third layer of industrial parks will be set up in Mek’ele, Asayita, K’ebri Dehar, Gambela, Abela, Adgirat, Asosa, and Bahir Dar.

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In relation to the above long-term plan, the main question is to what extent the infrastructures are and will be equitably allocated across regional states in Ethiopia. These issues are investigated in detail in Chap. 7, 8, and 9.

6.5 Infrastructure Construction in Relation to Economic Growth and The Role of National Professional Organizations in Ethiopia

Ethiopia has transformed its economy from being an agricultural-based economy to a services-driven one. The services sector accounts for 42 percent of GDP, followed by agriculture and industry at 32 percent and 26 percent, respectively (Deloitte, 2019). According to UNDP Ethiopia (2018), AfDB (2016), and Seid *et al* (2016), real GDP growth was 10.9 percent in 2016/17 up from 8.0 percent in 2015/16, as agricultural value-added grew by 14.7 percent in Ethiopia. Public investment in key infrastructure sectors has made important contributions to GDP growth (Prudhomme, 2004; Seid *et al*, 2016). In recent years, Ethiopia has made noteworthy advancement in infrastructure development performing relatively well when compared with other low-income countries (Foster & Morella, 2011). Moreover, the industry sector has been the fastest-growing sector over the previous few years, due to infrastructure developments (Deloitte, 2019). It was mentioned that the main contributor to the growth was the industry sector contributing 4.4 percentage points, followed by services 4.0 and agriculture 2.5 percentage points (UNDP Ethiopia, 2018). The construction industry has taken over the services as the major contributor to growth in 2016/17. Construction currently accounts for 71.4% of the industry sector, making it the largest industrial activity in Ethiopia (Deloitte, 2019). Over the years, the construction sector has recorded robust growth, owing to public infrastructure expenditure. The sector expanded by an annual average of 30% for the past five years, predominantly driven by projects related to road, railway, dam and residential expansion (Deloitte, 2019). The contribution from the industry sector mainly came from the construction sub-sector. The contribution of the industrial sector has significantly increased in the previous four years, the major economic activity being the construction sector while the contribution of the manufacturing sector is still low. GDP was US\$ 80.0 Billion and per capita GDP was US\$ 863 in 2016/17. IMF's estimated the growth to be 8.5 percent for 2017/18 (UNDP Ethiopia, 2018).

In fact, in recent years, several developing countries have been scaling up infrastructure investment, commonly through public spending, but also with growing participation of the private sector. For example, high public investment in Ethiopia reflects the government's national development agenda with a focus on infrastructure. With this intensive effort, public investment went up from 12% of GDP in 2009

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to 22% in 2015-“among the highest levels in the world-and private investment also rose” (Gurara *et al*, 2017; Seid *et al*, 2016). However, infrastructure gaps are still huge, and bridging those gaps will need tackling numerous problems, in terms of extra financing and project selection and implementation (Gurara *et al*, 2017; Seid *et al*, 2016).

The scaling-up has benefited the economy, but worries about “debt sustainability” are increasing (Gurara *et al*, 2017). In spite of the growth dividend of high investment (real GDP increased at an average rate of 10% per year between 2010 and 2015), the ratio of “public debt” to GDP is on the increase. Both domestic and external “public debt” stood close to 30% of GDP in 2015 and were expected to increase further with the implementation of GTP II. The 2015 “debt sustainability” analysis raised the risk of “debt distress” from low to medium (Gurara *et al*, 2017; Seid *et al*, 2016; Jalles d’Orey & Prizzon, 2017; Faleg, 2019). Moreover, the relation between the amount of public infrastructure investment (the input) and the quantity and quality of infrastructure in a country (the outputs and the outcomes) is not very tight and, although many aspects may contribute to this differences, or variance in investment efficiency are likely one of them (Gurara *et al*, 2017; Jalles d’Orey & Prizzon, 2017). More importantly, according to Nuramoa and Haupt (2015), researches both on theoretical and empirical aspects of economic infrastructure support the idea that investment in economic infrastructure drives economic growth in developing countries like Ethiopia.

Concerning the role of National Professional Organizations, clients and governments ought to work on mechanisms to attract and retain capable professionals and work jointly with the associations and universities (Zewdu, 2016). Another important factor that can increase influence on the equitable allocation of public infrastructure investments is building the capacity of indigenous contractors and consultants. From this perspective, it is plausible to argue that civil society is an advantage for infrastructure governance by creating and energizing popular participation, consultation, inclusion, and accountability (Salih *et al*, 2018). Meanwhile, other concerns by professional organizations involve institutional and legal weaknesses in infrastructure construction, as well as obsolescence of building regulations, inconsistent law and regulations, ineffectiveness in the implementation of existing statutes and codes, and bureaucracy informal procedures connecting to project planning and approval, construction administration and permissions (Ministry of Urban Development and construction (MoUDCo), 2015). Thus, to extract the full long-term benefits of infrastructure investment, it must have

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a stronger framework so that all individual agencies (public and private) have a shared commitment to the betterment of the system (network) of infrastructure (Bowditch & Noble, 2017).

6.6 Infrastructure Investment Planning and its Project Implementation Capacity

Throughout the years, Ethiopia has developed its infrastructure largely through public investments (Deloitte, 2019). As mentioned above, following investments and other policy interventions, economic activities have shown signs of a shift from the agriculture sector to the services and construction sectors (Seid *et al*, 2016; Deloitte, 2019). The public sector is expected to hold an important financing role while the private sector can help in meeting the very significant desires associated with infrastructure construction, operation, and/or to some extent financing in sectors such as telecoms, energy generation, and transport services (Estache & Fay, 2009). This evolution is actually perceived around the world, in developed as well as in less developed countries. From the global perspective, as cited by Ayalew *et al* (2016), the Centre for Economic Performance at the London School of Economics (LSE) in the UK on management exercise that based on 3 aspects (talent management, lean operation, and performance management) informed that ‘Latin American and Africa countries are performing less’ which was conducted on 33 countries around the globe as well as 7 African countries. Ayalew *et al* (2016) indicated that, according to this report, Ethiopia was the second from the last followed by Mozambique as compared to all the 33 nations in the studies and that of the 7 nations representing Africa. Besides, by citing Mengesha (2004), Ayalew *et al* (2016) also identified that ‘the Ethiopian construction industry can be viewed in six distinct periods for its evolution’, which is useful for the next analysis. The followings are the history of the Ethiopian construction industry. See Table 6.6.

Table 6. 6 Summary of Ethiopian Construction Industry six distinct periods

Pre 1968	Foreign Company Domination	This was a period where almost all construction activities in the country were commenced by International Construction Companies.
1968-1982	Emergence of small scale domestic construction companies	A period that inspires private sector development, which results in formation of small-scale domestic construction companies in the country
1982-1987	Parastatal Companies domination	This period was known as parastatal company domination period since the government has taken the private construction company that was founded earlier and those state-owned construction firms undertook almost all construction activities.

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1987-1991	Fragmentation of Phases	During this period design services and construction phases was announced as a separate phase to Ethiopian construction industry.
1991-2001	Era for Re-emergency of privatization	The year 1989 brings another change in government with completely different policies that re-emerge private-sector development. As a result of this a number of private construction companies were founded in the country and started taking parts in many construction activities.
Since 2001	Emergency of capacity building and Integration	Realizing the performance and capacity limit of domestic firms, which begins to be involved in some projects, the government has introduced the concept of capacity-building and integration in 2001.

Source: Ayalew *et al* (2016), Assessment on performance and challenges of Ethiopian Construction Industry.

Regarding project implementation, over the past 27 years, the government of Ethiopia (GoE) has approved a number of infrastructure investment projects. However, a study showed that in Ethiopia only 8.25 percent of projects have been finished to the originally targeted completion date, and the remaining 91.75 percent delayed 352 percent of its contractual time (Koshe & Jha, 2016). Ayalew *et al* (2016) indicated that cost, time, and risk management as the main challenging issues for professionals in handling their day to day's activities. Thus, low quality, time, and cost-effectiveness of infrastructure construction in Ethiopia thus not only resulted in a huge waste of resources and under-capacity performance of infrastructure in short term but also severely affected the economic development in the long term. Accordingly, Zewdu (2016) also suggested that measures shall be taken for the top 5 known delay causing factors such as mismanagement, cash flow problem, inappropriate planning, slow decision making, and late distribution of material and equipment. Specifically, in the energy and telecom sectors, the dialogue should address issues such as tariff reform, restructuring of the electricity supply industry to allow for private sector participation, ensure the viability of sector institutions, and promote independent regulation (AfDB Group, 2011). Moreover, there is also an indication that more investment desires to be put in electricity and communication to spur a country's economic growth (Nuramo & Haupt, 2015). In the roads sector, the core issues revolve around institutional capacity for managing an expanding road network, strengthening funding bases for operations and maintenance, and developing contracting capacity (AfDB Group, 2011).

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6.7 The Role of Government Institutions in Infrastructure Equity in Ethiopia

6.7.1 FDRE House of Federation (HoF)

The Ethiopian constitution (1995) pre-amble says that “we (the Ethiopian, nations, nationalities, and People) are convinced that to live as one economic-community is necessary in order to create mutually supportive and sustainable conditions for ensuring respect for our freedoms and rights and for the collective promotion of our interests”. Besides to this, proclamation No. 251/2001 (by referring to article 62 sub-article 4 and 6) Article 3 sub-article 4 reads that “the House of Federation promotes the equality of the peoples of Ethiopia enshrined in the Constitution, and promote and consolidate their unity based on their mutual consent”; sub-article 6 also reads that “the House of Federation determines the division of revenues originated from joint Federal and State tax sources and the subsidies that the federal government might deliver to the States (House of Representatives, 2001). Therefore, this institution has its own role in determining the budget distribution formula including its follow-up the implementation of plans in an equitable way. This institution has also a significant impact on infrastructure allocations with the relation to the Block Grants and Special Purpose Grants and with the respect to Public Bodies regarding the formalization of allocation guidelines across the regions in Ethiopia. Actually, the HoF has evaluated the allocation of infrastructure by each infrastructure institution across regions in Ethiopia. Hence, the HoF indicated that there is a lack of infrastructure equity across regional states in Ethiopia.

6.7.2 National Planning and Development Commission (NDPC)

The mandate of the NPC is to prepare five years (midterm) national development plans and fifteen-year long term perspective plans, as well as conducting evaluations of the execution of the plans including the infrastructure sector. The Commission essentially serves as the secretariat of the government in the implementation of GTP II. With its vested powers and duties ranging from assessing the factors of production required to realize the targeted annual economic growth to formulating overall macroeconomic and sectoral targets, and plan implementation matrix by line ministries at the regional and federal levels, the Commission plays a pivotal role in demonstrating the role of the state (NPC, 2016). With the NPC and CSA (which is under its supervision) regarding strengthening the analysis of equity in the planning process and guaranteeing the availability of regional state representative data for future studies on equity. Therefore, it has a duty to ensure the equity of infrastructure allocations across

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regions in Ethiopia. But, NPDC did not evaluate infrastructure equity across regions in Ethiopia. Although, this issue has constitutional guarantees (Ethiopian constitution, 1995).⁵⁶

6.7.3 Ministry of Transport (MoT)

MoT engages in the state management of roads, railway, maritime, and airway transportation for the whole country. The development of major transportation sub-sectors is administered by separate authorities, including Ethiopian Road Authority (ERA); Ethiopian Railway Authority; Ethiopian Maritime Authority; and, Ethiopian Civil Aviation Authority and Ethiopian Airlines and Airport enterprises; and, other relevant institutions. Therefore, strategies, master plans, long-term plans, five-year plans, annual plans, national programs, and projects for the development of major transportation subsectors, including transport infrastructure, are studied and prepared by these administrations. The Department of Planning and evaluation under MoT is responsible for compiling these plans as well as evaluating plans and investments in transport infrastructure within the Ministry's authority (Ministry of Transport, 2019). It is good to note that although the MoT is responsible for the sector and for the Road Sector Working group, the ERA was considered by the stakeholders to be a powerful institution (Jalles d'Orey & Prizzon). MoT also has a role in the allocation of airports. Although it is not official, MoT has endeavored to evaluate infrastructure equity. And it mentioned that there is no such equity problem in the road sector.

6.7.4 Ministry of Urban Development and Construction (MoUDCo)

In addition to urban development, MoUDCo regulates the construction sector, especially contractor, consultant, and client relations in Ethiopia. Under MoUDCo, the government established the Construction Regulatory Authority which is established in order to assume uniform state management of the construction industry in the whole country. The authority is the state administration in charge of regulatory matters in construction management and planning. More specifically, the major functions of the authority are to implement policies, set construction standards, norms and rules, design processes and regulations, systems of limits, technical and economic criteria, limits of costs of investments and construction consultancy, and regulations for specialized construction work. The authority also oversees state management of standards of quality, produces guidelines for the operation of construction

⁵⁶ Ethiopian constitution (1995), Economic, Social and Cultural Rights Article 41 Sub-articles 3. Every Ethiopian national has the right to equal access to publicly funded social services; and, 4. The State has the obligation to allocate an ever increasing resources to provide to the public health, education and other social services.

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engineering and consultancy enterprises, and implementation of the regulations on management of investment and construction (MoUDCo, 2015). MoUDCo didn't officially mention anything about infrastructure equity across regions in Ethiopia.

6.7.5 Ministry of Innovation and Technology

Technological innovation and adoption are playing a critical role in providing the goals laid out in the GoEs GTP II (NPC, 2016). Innovation is now widely recognized as a major engine for productivity growth. "Innovation" implies technologies or policies that are new to a given country context or society (ITU, 2016; NPC, 2016). The government's strong initiative to foster the innovation eco-system in Ethiopia is crucial, but it requires a lot of coordination among stakeholders. Promoting innovation for the Ethiopian economy, which requires more resources and redistribution of resources to policy implementation and relevant action plans articulated in the Science, Technology, and Innovation (STI) policy. Also, policies for innovation cannot be deliberated in isolation. They must take into account the entire innovation ecosystem, market failure affecting the development of inclusive innovations, and the roles played by different agents in the generation, transfer, and dissemination of innovations for the country's development (NPC, 2016; WBG, 2017). The role of the government should be focused on the creation of functioning innovation infrastructure. The major role ought to be to support, facilitate, incentivize and leverage the strengths of all stakeholders in order to build sustainable inclusive solutions with important outreach at maximum efficiency with the least possible problem on the public resources including contributions from the private sector, the research and academic community, NGOs, and global partnerships (WBG, 2017). The department in charge of the telecom sector is the Department of Telecommunications. More specifically, the department oversees policies, standards, strategies, master plans, development plans, and programs in such areas as telecom, Internet, as well as wave transmission and emission. Planning of network expansion in telecom, Internet, wave transmission, and emission are also part of the functions of Ethio-telecom (ITU, 2016; NPC, 2016).

Meanwhile, Ethio-Telecom is a State-Owned Enterprise (SOE) and remains the sole supplier of telephone and internet services in the country. Ethio-Telecom reports to the Public Enterprises Assets and Administration Agency (PEAAA) and is currently supervised by the Ministry of Innovation and Technology (MINT). A new proclamation to regulate the telecommunication sector in the country (the Communications Service Regulation Proclamation) is currently being approved. The proclamation also begins to launch the Ethiopian Communications Regulatory Authority. The proclamation has been

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appraised, passed by the council of Ministers, and Parliamentary approval is pending (Harris *et al*, 2019). The ministry didn't officially mention anything about infrastructure equity across regions in Ethiopia.

6.7.6 Ministry of Irrigation, Water, and Electric

The Ministry of Irrigation, Water and Electric mission is to play an important role in the socio-economic development of Ethiopia through the development and management of its water and energy resources in a sustainable way, through the delivery of quality and equitable supplies throughout the whole country and by contributing significantly to food security and foreign currency revenue (Ministry of Irrigation, Water and Electric, 2012). It engages in the state management of Irrigation, Water, and electricity for the whole country. The development of the electric sub-sectors is administered by two separate authorities including Ethiopian Electric Power; and Ethiopian Electric Utility. More importantly, the GoE has a monopoly over the energy sector, with the main SOEs being Ethiopian Electric Power and Ethiopian Electric Utility⁵⁷. The Ministry of Water, Irrigation, and Electricity is responsible for overseeing these authorities, but it is noted that its role is rather limited (Jalles d'Orey & Prizzon). So, the ministry didn't say anything about infrastructure equity across regions in Ethiopia.

6.7.7 Ministry of Science and Higher Education (MoSHE)

The MoSHE, established by proclamation number 1097/2018 in October 2018, is responsible to lead the development of science, higher education including the technical and vocational education and training (TVET) in Ethiopia (MoSHE, 2018). The ministry mentioned that there is no university allocation problem across regional states in Ethiopia.

6.7.8 Ministry of Industry

The ministry's mission is to expand and promote the development of the industry by making a conducive enabling environment for the development of investment and technological capacity of the industry sector by rendering efficient provision and services to the development investor (Ministry of Industry, 2019). Generally, in a present Ethiopian political system, plans, and policies are ready at national and regional levels where national policies are prepared by the federal government and within the federal

⁵⁷ EEP bulk sells the electricity it generates to three big types of purchasers: big industries such as industrial parks, export-oriented firms and EEU. EEU is in turn responsible for selling electricity to households and smaller businesses. EEU is also responsible for expanding access to rural areas as part of the Universal Electrification Access Project (UAEP).

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government following the formal procedure of policymaking (Kaso *et al*, 2018). However, the ministry didn't mention anything about the fairness of industry parks allocation across regional states in Ethiopia.

6.8 Assessing Nation-Building Processes in Ethiopia

6.8.1 The Status of Capacity Building and Good governance

Under GTP, the government is putting emphasis on capacity building and skills development. The key guiding principle of capacity building activities was: ensuring a developmental political economy and achieving the development and good governance outcomes of GTP I (2010/11-2014/15) in Ethiopia. Accordingly, capacity building activities were undertaken in order to improve the implementing capacity of political leadership, civil service, and the justice sector (NPC, 2016). In addition to these, ownership of the developmental and good governance agenda ultimately rests with the citizens of Ethiopia. The determining actors and forces of executing the GTP are also the citizens. Besides, GTP II emphasizes the indispensable role of the private sector in this process and the necessity of capacitating it further (Seid *et al*, 2016). Thus, emphasis should be given in GTP II (2015/16-2019/20) that the political leadership and the civil servant should endeavor in an incorporated manner with the public to bring about important change in implementation capacity and guaranteeing good governance in Ethiopia (NPC, 2016).

In the GTP, the government of Ethiopia has reaffirmed its commitment to strengthening the capacity of democratic institutions in Ethiopia. Moreover, since 1996 the government has done a comprehensive civil service reform program planned to improve performance and strengthen accountability and transparency (Kebede, 2015). However, there are risks posed by a narrowing democratic space, which could undermine the sustainability of the country's development process (AfDB Group, 2011). If one discusses good governance in one way or the other, there should be a democracy. The reason is that democracy and good governance share many values and principles in common. For example, democratic governance encourages the rule of law, transparency, accountability, respect for human rights, and civic participation all of which are not only essential for securing economic productivity, equitable distribution, and state legitimacy but also signify the existence of good governance (Kebede, 2015). During GTP I period in Ethiopia, it was planned to bring about a significant change in good governance just like in socio-economic development. It was also understood that the first and foremost principle of good governance is ensuring public participation.

In order to encourage effective implementation of the development and good governance agenda sustainably and thereby ensure an equitable benefit of the public from the resultant outcomes, concerted

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efforts were made to promote direct participation of the public in an organized manner in the development and governance processes. In order to strengthen direct public participation further in the development and good governance processes in a sustainable manner, a system has been established whereby communities, mass-based organizations, and professional associations would be engaged in the decision-making processes at all levels (NPC, 2016). Moreover, governance includes the judicial and legal system, the electoral and parliamentary system, political parties, the media, the private sector, and Civil Society Organizations (CSOs, which comprise non-governmental organizations/NGOs and community-based organizations/CBOs) (Bhagavan & Virgin, 2004). Although vast efforts have been done by the government, governance performance and democratic system could not reach a consistent stage of development in Ethiopia as there are lots of reasons for the low achievement of good governance in the country. These are poverty and high rate of illiteracy; absence of effective checks and balances; and, the absence of democratic culture in the country's long history to name a few (Kebede, 2015).

6.8.2 The Status of Democratic System

A. Public Participation

Decentralization was also initiated as part of broad-based efforts to improve the effectiveness of the federal and regional states in public service delivery and to encourage the democratization process (Kebede, 2015). In addition to direct public participation, indirect public participation through the election of representatives is crucial for building a democratic system. Based on the outcomes of the elections, the houses of people's representatives or councils were established at various levels (federal, regional, zonal, *woreda*, and *kebele*). Strengthening the capacity of institutions accountable to the House of Peoples Representatives (HoPR), i.e.; the Institute of the Ombudsman, the Human Rights Commission, and Office of the Auditor General have to play their own role in strengthening the democratic system. In GTP II in Ethiopia, the promotion of direct organized participation of the public would be given due attention to further strengthen the democratic system (NPC, 2016). Moreover, to reduce corruption and engage citizens in decision-making in Ethiopia, citizens' voices must be reflected, per the democratization objectives articulated in GTP II (WBG, 2017), which is lacking in practice. Because of this, political stability, peace, and security is an overwhelming aspiration of all Ethiopians

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today (Salih *et al*, 2018; Deloitte, 2019). Therefore, public participation is not implemented properly in Ethiopia. Even though it is guaranteed by the Ethiopian constitution (1995) article 89 sub-article 6.⁵⁸

B. National Consensus

GTP I in Ethiopia envisaged the promotion of national consensus around fundamental national agendas in order to deepen the democratization process and accelerate the realization of Ethiopia's vision of the Renaissance. It was understood that strong national consensus has been established around the key provisions of the constitution, the significance of the fight against poverty and accelerating broad-based development, ensuring sustainable peace, respecting diversity, positive image building, and expansion of social and economic infrastructure development. Clearly, a consensus around these fundamental issues would contribute to a sustainable and stable democratic system. However, there is a lack of national consensus in Ethiopia today. The gains in building a national consensus would further be consolidated (NPC, 2016; Salih *et al*, 2018). However, it was very significant to give great attention to the clarity and understanding of the constitution and federal system to build a strong national consensus.

C. Multi-Party Democratic System

The constitution ratified in 1995 established a multicultural federation based on ethnonational representation, transforming Ethiopia from a centralized state into a federal one (Faleg, 2019). Previously, the government had tried to carry out its responsibilities ensuring free, fair, and democratic elections conducted during the GTPI period in Ethiopia. Emphasis will be given in GTP II to sustain the positive result in strengthening the multi-party democratic system (NPC, 2016). However, according to Faleg (2019), the antithesis is true in the federal system of Ethiopia.

Despite the multi-party nature of the EPRDF as a ruling alliance, it was the TPLF, under the leadership of Meles Zenawi that dominated the Ethiopian political scene for two decades. It confined political power to a very small circle representing a minority group in the ruling coalition and progressively caused a *de jure* multicultural, federal democracy to regress to the margins of a *de facto* centralized, authoritarian rule. Unfulfilled federalism fuelled ethnic cleavages and conflicts, while party loyalty and a rent system undermined the premises of shared economic development. These contradictions became increasingly unmanageable over time and exploded in 2014 (Faleg (2019, p. 2).

Moreover, opposition political parties seem to have a low level of trust in society (Asfaw, 2019). According to Asfaw (2019), the reasons for negative sentiment towards political parties in Ethiopia are

⁵⁸ Ethiopian constitution (1995), Article 89, Economic Objectives, sub-article 6. Government shall at all times promote the participation of the People in the formulation of national development policies and programs; it shall also have the duty to support the initiatives of the People in their development endeavors.

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their structural weakness, mainly their low level of institutionalization, their absence of internal democracy, lack of vibrant differentiation, their low level of membership, high level of fragmentation and organizational instability. In addition to these, “many parties are more distinctive in ethnic, religious or regional terms than in ideological ones” (Asfaw, 2019, p. 30). More importantly, if the multi-party system and the democracy in Ethiopia have to prosper, it is noteworthy that there should be institutionally and pragmatically strong political parties (Sete, 2018; Asfaw, 2019). Thus, it is equally important that there should be internally cohesive, sustainable, and predictable political parties (Sete, 2018; Asfaw, 2019). Moreover, this can be true if political parties manage to become internally democratic (Sete, 2018; Asfaw, 2019).

D. Media

The media infrastructure is of particular significance for the nation-building process (Hippler (Ed.), 2004, 2005). The media is another institution that plays an energetic role to further strengthen the democratic system (Siegle, 2012). Hence, it was planned to strengthen the capacity of the media, expand its accessibility, and ensure the rights of citizens for access to a reliable source of information for the public (NPC, 2016). Although the media contributed its part for improved national consensus, strengthening the democratic system and image building as a whole, there are still capacity gaps in its accessibility, modernization, and competence (NPC, 2016; Mukundu, 2018). Thus, due emphasis needs to be given to reinforce the capacity of the media and communication to play their vital roles in building and strengthening the democratic system in Ethiopia. More importantly, there is a consensus that the ongoing reform process in media is irreversible, and society is determined to move away from the politics of the previous. However, Ethiopian society yet remains divided on the quality and sustainability of the ongoing political transformation. Meanwhile, media actors and the government should agree that media professionalism remains a key issue, more so the skill capacity of journalists (Mukundu, 2018).

According to Mukundu (2018), the Broadcasting Regulatory Authority stated that Ethiopia has diverse languages, political views, and cultures that must all find a platform for expression in the mainstream media. Furthermore, according to Mukundu (2018), all aspects of the media environment in Ethiopia are structured around the five following categories: 1) A system of regulation favorable to freedom of expression, pluralism, and diversity of the media; 2) Plurality and diversity of media, a level economic playing field and transparency of ownership; 3) Media as a platform for democratic discourse; 4) Professional capacity-building and accompanying institutions that reinforce Freedom of Expression, pluralism, and diversity; and, 5) infrastructural capacity is sufficient to backing independent and

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pluralistic media. More importantly, the state should aspire to nurture democratic norms, the media should be recognized as a form of public discussion and debate, a source of information about citizens' concerns and the operations of government, and a voice for the voiceless (Siegle, 2012; Salih *et al*, 2018). However, according to Wazema Radio (2018), the private press has been struggling to survive and the road ahead is full of challenges. It indicated that one of the tactics the government uses to weaken the press is to starve them of crucial income by discouraging government agencies from advertising. Moreover, some businesses are also afraid to advertise in media perceived as critical of the government and have been threatened by intelligence operatives for doing so. Then, it concluded that the future of the Ethiopian press is hanging by a thread. Finally, it is stated that the government media (electronic and print) is a less popular national institution in Ethiopia (Asfaw, 2019). It is also indicated that only 51% of the research population said they had trust in it. In general, media plays a potentially important role in shaping the public trust in governing institutions (Siegle, 2012; Asfaw, 2019). Thus, media is the icon of democracy.

6.9 Prospects of Ethiopia

The significant improvements that Ethiopia has made over the previous 15 years (in terms of macroeconomic stability, growth, the development of hard and soft infrastructure, decreasing poverty, and enhancing the quality of life of ordinary Ethiopians) have contributed to making the enabling environment that business (whether domestically-owned or foreign) needs to boom and prosper (Deloitte,2014). This environment is still a work in improvement, and the investments planned in the framework of the then GTP I (2010/11-2014/15) and the current GTP II (2015/16-2019/20) is planned to stimulate further success, while in many cases they express business opportunities (Deloitte,2014). Meanwhile, investors from a wide range of countries have already established operations across a range of sectors, especially in the Industrial Parks. Some of these investments have already altered the structure of Ethiopian exports; others will gradually alter the very structure of the economy, as the manufacturing sector matures. Ethiopia's growth "miracle" had shown a great change by making the soft and hard infrastructure that will empower business success, by playing better to the country's comparative advantages in trade, and by guaranteeing both political and macroeconomic stability (Deloitte, 2014).

More importantly, the current political environment in Ethiopia offers opportunities for increasing the democratic space relative to where it was after having a very great effect on political opening which succeeded since April 2018 (Salih *et al*, 2018). Currently, Ethiopia's transition has shown hope at home

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and abroad but also has “dangerous and divisive forces” (ICG, 2019). Therefore, the Ethiopian incumbent government should take the following measures: reducing conflict risks from the Party Merger Plan; calming tensions in Oromia; addressing Tigray alienation; decreasing election risks and setting up a national dialogue; and, international partners ought to use financial aid and technical support to keep Ethiopia from economic shocks (ICG, 2019). Besides, Ethiopia has long been an anchor state in the Horn of Africa. Many are watching its “delicate transition” to a potentially more open era with great hope. Ethiopian leaders and their foreign partners should increase their efforts to avoid a “breakdown” and maintain the country to a better future (ICG, 2019).

6.10 Conclusions

Over the last 20 years, Ethiopia has made significant development progress to become the fastest-growing economies in Africa. It is noticeable that investments in infrastructure development in Ethiopia have heavily been improved over the previous decades. Though, the level of infrastructure development has not been improved correspondingly. The infrastructure system in Ethiopia is still regarded as the major factor holding back further development of international economic integration of the country. In Ethiopia, a considerable portion of public investments goes to infrastructure construction. All major Mega infrastructure projects are planned at the federal level. As reviewed earlier, the centralized planning process in Ethiopia is complicated and gray. Although the process is described as consultative, the actual participations of related actors such as regional states, contractor and consultant associations, universities, and the influence of these consultations are not clear. Therefore, from the literature review, poorly selected, uneven, and disjointed infrastructure investments in Ethiopia would result from lack of transparency and accountability, institutional weaknesses in planning, corruption, politicized decision making including the inadequate capacity of estimating and monitoring rates of return which is also negative impacts on nation-building processes. Reviews of the construction sector in Ethiopia have shown the low quality, time, and cost-effectiveness of infrastructure construction, which would result in the poor performance of infrastructure systems and waste of national resources in the short term including affecting economic development in the long term. Equally important, the equitable allocation of public infrastructure investments could also be affected by a number of issues in the execution of infrastructure development plans. This suggests the equity factor in infrastructure construction cannot be neglected which are analyzed in Chaps.7, 8, and 9. Now, the analysis of the infrastructure equity issues in industrial parks, airports, and universities across regional states in Ethiopia is investigated in Chapter 7.

CHAPTER 7

INFRASTRUCTURE EQUITY ISSUES IN THE INDUSTRY PARKS, AIRPORTS, AND UNIVERSITIES ACROSS REGIONAL STATES IN ETHIOPIA

Introduction

The purpose of the chapter is to investigate the equitable allocation of industrial parks, airports, and universities in Ethiopia. Thus, this chapter examines the equity issues in the industrial parks, airports, and universities across regional states in Ethiopia as they contribute to the economy (job opportunity, decreasing poverty), improves quality of life, enhances efficiency and effectiveness. Firstly, this chapter assesses the Industrial Parks Development in Ethiopia which is becoming an instrument of rapid industrialization that accelerate economic transformation, foster manufacturing industries, encourage and attract both foreign investors and domestic. Industry Park Development Corporation's (IPDC's) mandates are preparing the master plan, develop and/or administer Industrial Park (IP) in different location of Ethiopia, serve as industrial parks land bank and lease or sell IP, and promote extensively the benefits of Industrial Parks and basic infrastructure "for private developer up to redline" (IPDC,2018). Hence, the study evaluated the equitability of Industry Parks based on the physical infrastructure and budget allocation across regions in Ethiopia.

Secondly, the chapter has assessed the allocation of airports across regions in Ethiopia. Generally, the main mission of Ethiopian airports is to provide safe and world-class airport service to passengers, airlines, and other parties through the provision of the best infrastructures and facilities that meet international standards and Ethiopian air transport needs (Ethiopian Airport Enterprise, 2018). Thus, the study evaluated the equitability of airport allocation across regional states in Ethiopia based on the number of airports per region per 1 million population and distance in kilometers between two airports within a region in the country. Thirdly, this chapter also assessed the allocation of the university across regions in Ethiopia. The key objective of the Ethiopian higher education, as stated in Article 4 of the 2009 proclamation, is to prepare a knowledgeable, trained, and attitudinally advanced graduates in facts with the demand-based proportional balance of fields and disciplines so that the country intends to become worldwide competitive that targets at improving the economic standing of a country by considering its international comparative advantage using a mix of economic and human capital policies (Ministry of Education,2009).

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Therefore, the study evaluated the equitability of university allocation across regions in Ethiopia based on the number of universities per region per 1 million population and distance in kilometers between two universities within a region in the country. Besides, the study also assessed the course allocation between universities which are below a 100 km radius within a regional state. It is also crucial to note that investment in terrestrial network infrastructure (roads and rails) is much higher than that in airports. As well, investment in network infrastructures is mostly funded from the budget, whereas investment in airports is practically funded from user fees in the developed world in practice, but at least in principle in developing countries. This bigger interest in the demand aspects for non-network modes, together with the circumstance that point-to-point infrastructures, not like network modes, does not need any investment in the space/area lying between two nodes, resulting in a diverse pattern of investment distribution (Albalade *et al*, 2012). In principle, it may also apply in industrial parks and partially in university allocation in Ethiopia. That is why this chapter focuses only on industrial parks, airports, and universities as an elementary evaluation (Small-scale) due to their distinct features, and by excluding road, electricity, and telecommunication infrastructures which are dealt with in Chap. 8 in a relatively large-scale. Finally, the interviews and FGDs results of the distribution of University, Industry Park, and Airport in Ethiopia have been described in detail in Chap. 9 sec. 9.8.6 and 9.9.5 respectively. The chapter has its own conclusions.

7.1 Industrial Policy Theory and Practice, and Industrial Parks allocation in Ethiopia

Introduction

Industry policy is back on the growth agenda nowadays due to its contribution to the economy be it through employment opportunity, technology transfer/innovation, efficiency, and effectiveness, etc. A number of countries in the less developed world and especially Ethiopia has shown a transformed interest and started to re-establish industry policy (Gebreeyesus, 2013; Rodrik, 2008). Actually, in less than three years, many industrial parks were constructed, launched, and opened for operations in Ethiopia. Thus, this section evaluated the industrial policy and industrial park allocation across regions in Ethiopia. Finally, the survey result revealed that, from the beginning, there is a lack of equitable allocation across regional states in the country.

7.1.1 The Strong Case for Industrial Policy from a Theory perspective

From a theory perspective, industrial policy is very thought-provoking. But it is very difficult in practice. According to Rodrik (2008), the “new” growth theory, which is often used to brighten the performance

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of developing countries, is based heavily on externalities in knowledge and in new-good creation. It is important to consider the definition of industrial policy. Industrial policy may be defined as ‘a strategy that includes a range of implicit or explicit policy instruments selectively focused on specific industrial sectors for the purpose of structural change in line with a broader national vision and strategy’ (Oqubay 2018, p.2).⁵⁹ Poor countries stay poor because markets do not work as well as they could to raise the structural transformation that is needed (Rodrik, 2008; Maio, 2008; Wade, 2015). This is a typical case in Ethiopia’s structural transformation from agriculture to industrialization. Moreover, Rodrik, (2008) stated that nations such as the Republic of Korea and economies such as Taiwan, China have industrialized not by suddenly improving their institutions, but by coming up with policies that overcame the market difficulties that their investors encountered in modern tradable industries. In both instances, governments engaged in active industrial policies in the sense of providing public inputs that differentially benefited particular economic actors (Rodrik, 2008; Maio, 2008). According to UNCTAD (2018), industrial policies have become pervasive. UNCTAD’s worldwide survey of industrial policies showed that, over the past five years alone, at least 84 countries -both developed and developing, accounting for about 90% of global GDP-have implemented formal industrial expansion strategies. Currently, the same policies have been implemented in the industrial sector in Ethiopia. Now, there are diverse industrial policy methods across the global world such as special economic zone. The principle objective (political or economic, the main focus in this study is the political aspect) of a special economic zone is to attract investment and create jobs (Duranton & Venables, 2018).

Maio (2008) also indicated that four important points for industrial development in developing countries. First, industrial policies are necessary for take-off and long-run growth. Second, the degree of effectiveness of industrial policies varies a lot. Third, there are no ready-to-wear policies. Four, ‘initial’ conditions and comparative advantages can be created. According to Maio, this is not an easy task and it is not a short process but this should not surprise. Therefore, this needs a Global Value Chains (GVCs) integration and upgrading, growth of the knowledge economy, a build-up of sectors which are linked to sustainable growth goals, and competitive positioning for the new industrial revolution (NIR)

⁵⁹ See Oqubay A. (2018). Industrial Policy and Late Industrialization in Ethiopia, Working Paper Series N° 303. The Ethiopian People’s Revolutionary Democratic Front (EPRDF) had initially targeted agriculture as the key driver of post-war economic take-off (1995–2015) but increasingly pursued the development of the manufacturing sector as the prime driver of sustained economic growth and structural transformation post 2010.

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(UNCTAD, 2018). In spite of this, most countries should forget about industrial policy, as they are likely to make a mess of it while trying to compete with Korea (Rodrik, 2008; Wade, 2015).

Moreover, modern industrial policies comprise a variety that spans GVCs, the knowledge economy, and the NIR (UNCTAD, 2018). Therefore, contemporary industrial policies, “be they of the build-up, catch-up or NIR-driven variety”, require to incorporate a number of design features in pursuit of countries’ development objectives. These include openness, sustainability, NIR readiness, and inclusiveness” (UNCTAD, 2018, p.165). And then, investment policy choices must be directed by these design criteria and by the prerequisite for policy coherence, effectiveness, and flexibility. These three basic models of industrial development strategies-build-up, catch-up, and NIR-based strategies-use investment policy instruments with different emphases (Rodrik, 2008; UNCTAD, 2018). Although there is a strong case for industrial policy, in theory, it is very critical to focus on industrial policies in practice and new themes (see Table 7.1) for the transformation of industrialization in developing countries like Ethiopia.

Table 7. 1 Evolution in industrial policies and new themes

	Until the 1970s	The 1980s – 1990s	Modern industrial Policies	
			The 2000s and ongoing	Recent/emerging themes
Key features/themes	-Industrialization and structural transformation	-Stabilization, liberalization, laissez-faire	-Knowledge economy -GVCs	-NIR -Sustainable development
Policy goals	-Creating markets, diversification	-Market-led modernization	- Specialization and increased productivity	-Modern industrial ecosystem development

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Key elements	-Import substitution - Infant industry protection -Sector development - Gradual and selective opening to competition	-Limited government involvement -More horizontal policies -FDI opening -Exposure to competition	- Targeted strategies in open economies -Enabling business environment -Digital Development (IT) and ICT diffusion -Participation in global production networks -FDI promotion combined with the protection of strategic industries -SME support -Skills development	- Innovation in production (OT) -Learning economy -SDG sector development -Public-private knowledge/tech development institutions -Acquisition of foreign technology -Entrepreneurship development
Policy environment	-High political legitimacy for national development strategies	-Low political legitimacy for interventionist development strategies -Limitation to policy space through international commitments	- Regained legitimacy for national development strategies - Moderate policy space in selected areas	- More policy space in new fields - More emphasis on inclusiveness

Source: United Nations Conference on Trade and Development (UNCTAD) (2018), World Investment Report 2018: Investment and New Industrial Policies, United Nations.

Note 1: UNCTAD, adapted from Andreoni (2016).

Note 2: ICT = information and communication technology, IT = information technology, OT = operational technologies, SME = small and medium enterprise, GVCs= global value chains, NIR= new industrial revolution

7.1.2 The Ambiguous Case for Industrial Policy from practicing perspective

From a practice perspective, industrial policy in practice is a very tough undertaking relatively in contrast to industrial policy due to the involvement of a large number of stakeholders. According to Rodrik (2008), the practical objections to the industrial policy are two points. First, there is the informational objection, which indicates that it is impossible for governments to detect with any degree of accuracy and certainty the pertinent firms, sectors, or markets that are subject to market imperfections. As cited by Rodrik (2008) and Gebreeyesus (2013), Pack and Saggi (2006), for example, provided a detailed list of informational requirements intended to suggest the impossibility of industrial policy. This criticism is often stated by saying “governments cannot pick winners,” a highly effective conversation stopper. The

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second objection is that industrial policy is an invite to rent-seeking and corruption. Once the government is in the business of delivering support to firms, it becomes easy for the private sector to demand and take out benefits that distort competition and transfer rents to politically connected entities. Entrepreneurs and businessmen devote their time in the capital requesting for favors, rather than looking for ways to enlarge markets and decrease costs (Rodrik, 2008). These are very critical for developing countries like Ethiopia. Meanwhile, advocates point to East Asia and argue that successful industrial policy obviously has been done. Perhaps those countries were indeed special as indicated.

Regarding African experiences in industrialization, promoting industrialization is high on African governments' policy agendas which is mainly to create new labor-intensive industries (AfDB *et al*, 2017). However, African countries have tried to industrialize in the past which is often with little success (AfDB *et al*, 2017). Therefore, industrialization strategies demand innovative approaches. African countries must join new opportunities and challenges, which other regions did not have to face. These include i) the modern industrial revolution enhancing automation in industrial production, ii) the changing economic environment characterized by the slow-down in global growth and by the end of the commodity super-cycle, and iii) the rising labor costs in East Asia (AfDB *et al*, 2017). Besides, innovative methods are also required to take advantage of the latent comparative advantages in Africa's different countries, their geographic specificities, and their unique cultural heritages. Just replicating industrialization strategies that have operated since the 1970s in North-East Asia will not serve (AfDB *et al*, 2017).

Wade (2015) also argued that the typical developmental state is only feasible today for a very small number of countries with big domestic markets. Nevertheless, a variant of the developmental state could still be viable. In other ways, relatively rather than putting industrial policies in theory by governments, it is better to understand how these policies can be implemented in a smart way is very crucial (Ramdoo, 2015). Moreover, according to UNCTAD (2018), industrial policy is a continuous work in progress for countries at all levels of growth. It is stated that industrial policy packages evolve with a country's level of development and production capabilities, as well as with the implementation of modern technologies in industrial value chains (UNCTAD, 2018).

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7.1.3 Institutional Design Features for Industrial Policy

According to Rodrik (2008), the details of industrial policy depend heavily on the circumstances and institutional capabilities of a country. But, there are still some general principles one can articulate about how institutions carrying out industrial policy should be designed. These principles follow from these concerns: The mandatory knowledge about the reality and location of the spillovers, market failures, and limitations that block structural transformation are diffused broadly within society; Businesses have robust incentives to “game” the government; and, The planned beneficiary of industrial policy is “neither bureaucrats nor business, but society at large” (Rodrik, 2008). Rodrik (2008) established that the first of these requires that industrial policy be “embedded” within society. The second calls for strong safeguards against bureaucratic capture (“carrots and sticks”). And the third necessitates accountability. Thus, the question is that to what extent the above principles are correctly implemented in industry parks development in less developed countries like Ethiopia to ensure equitability across regional states that are evaluated below.

7.1.4 Experiences in Industrial Park Management in Ethiopia

Ethiopia has realized notable economic growth, poverty reduction, and progress in social development in the last decade and a half (UNDP Ethiopia, 2018). In Ethiopia, the industry in the contemporary sense of the term appeared as an economic entity merely at the turn of the 20th century which began to emerge in the 1920s. In resistance to neo-liberal advice, the Ethiopian industrialization strategy advocates for a strong government role to guide the private sector in the industry development process in Ethiopia, which termed as “pro-active industrial policy” (Gebreeyesus, 2013). It is also explained that the role of the Ethiopian government is infrastructure development and HRM, ownership of selective industries, and capacity building of the private sector (Gebreeyesus, 2013). UNDP Ethiopia (2018) has also stated that the National Human Development Report (NHDR) in 2018 on the topic of “Industrialization with a Human Face” is a major input to the policy dialog on inclusive industrialization in Ethiopia and in the regional state as a whole. However, the performance of the industrial sector during the Growth and Transformation Plan (GTP I) (2010/2011 to 2014/2015) showed that the sector has not been able to attain the hoped-for changes in terms of the structure of the economy as it faced with multiple challenges (UNDP Ethiopia, 2018), for example, limited management, technology and capital capacity leading to poor quality, inefficient and low productivity and challenges in competing in global markets, unreliable

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energy supply, and inadequate financial services, etc. Due to this, Ethiopia-Africa's 2nd and the world's 12th most populous country-faced deep structural limitations (Oqubay, 2018).

Meanwhile, the development and construction of Industrial Parks started in 2014 when the Ethiopian IPDC was established. The main economic and market factors that determine identification and selection of industrial parks, which are based on World Bank guidelines are Export potentials of the area/town/city; Population size of the areas; Proximity to port; Infrastructure networking; Market demand; and, Resource availability–inputs availability (Harris *et al*, 2019). But, it did not indicate the fairness issue. However, it increased momentum in 2015 with the Industrial Parks proclamation 886/2015. In less than three years, different Industrial Parks was built, launched, and opened for operations. Hawassa and Bole Lemi I Industrial Parks were launched in 2016. In 2017, Ethiopia launched two extra parks in Kombolcha and Mekele. Besides, Industrial Parks established by private investors, such as the Huajian Group which established a shoe cluster Industrial Park, are being built all over the country (UNDP Ethiopia,2018). However, according to Azmach (2019), “the industrial parks or industrial development strategy of Ethiopia did not put any special attention to location decision nor does the industrial parks establishment proclamation provide hints on location matters” (Azmach, 2019, p.46). This shows that, in addition to the economic and social impacts of the industrial parks, the government has overlooked the issue of fairness or equitable allocation of industrial parks due to corrdination failure.

What role ought the government to play in the development of industrialization in the global world? Does it need efficiency only? Equity only? Or both efficiency and equity? What is the focus of the Ethiopian government in the industrialization process? Mostly, the two primary criteria used to evaluate systems of resource allocation are economic efficiency and equity. In general, the role of a government in the industrialization process is heavily debated worldwide. Some claim that wide government involvement is key to initiate a sustainable development process, others perceive the government as an obstacle to it, pointing to the importance of government failure. Although active state intervention seems to have been a significant ingredient in the expansion of several of today's rich countries, as well as the Western European economies, Japan, including the first generation of the East Asian Tiger economies (Bjorvatn & Coniglio, 2012). As cited by Bjorvatn and Coniglio (2012), Rodrik (1995) argued that a great component of the “economic miracles” of Taiwan and Singapore should be recognized to the energetic role of the governments in executing “big-push policies” expected at avoiding coordination failures in

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investment. Indeed, the World Bank and the IMF have emphasized the need for privatization and deregulation as conditions for their continued support of developing countries.

By citing Bjorvatn and Coniglio, 2006 and Ades and di Tella, 1997, Bjorvatn and Coniglio (2012) commented that while many observers agree that, in principle, the presence of a wide variety of coordination failures as policies might be captured by “interest groups” and give rise to costly rent-seeking and for empirical evidence on industrial policy and corruption. In relation to this, Azmach (2019) clarified that there is a lack of considerations of clear rules on regulatory objectives, location decisions, investor selection, and land acquisition procedures in the industry park development in Ethiopia. More importantly, it is indicated that government intervention should be evaluated periodically, and there should be accountability and transparency in industrial parks expansion in Ethiopia. Therefore, society at large has to be clear in the course of industrial development. The selection criteria of each industrial parks in each region should be transparent to the society to ensure infrastructure equity. The bureaucrats have to be accountable to society. Besides, according to Weldesilassie *et al* (2017) report, there are a few industrial parks that already started operation, and many more are under construction and in the planning stage. Industrial parks in Ethiopia can be developed and owned by the government, foreign private developers, or jointly by both.

As one can see from Table 7.2 below, there has been used a huge amount of USD for industrial park construction so that the principles, policy, standards, and criteria of the establishment of these industrial parks should be clear to the regional states of Ethiopia. One can also see industry park allocation per fund share (percent). Oromia and SNNP have larger portions. Thus, it needs to give great attention to the equitable allocation of industrial parks from the beginning, otherwise, it may push to political instability in the country, and which also affects the nation-building processes. It also needs to decide efficiency than equity or both. Then, society has to be clear which one is the government is using, i.e., efficiency or equity or both. Although, it is stated that the construction of federally-managed industrial parks is mainly based on economic feasibility with two exceptions, Jimma and Bahir Dar. The feasibility study comprises economic, environmental, and infrastructural factors that are used to classify economic development zones under the master plan. The focus on efficiency over equity with regard to industrial parks is not contestable given the clear relation to economic growth (Harris *et al*, 2019). It is also indicated that, based on the description of equity, the major consideration for decisions around Industrial Parks are economic efficiency rather than equity-focused. It is noted that such a focus on efficiency in the allocation

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decision (rather than equity) may be good for equity in the long-term. Assuming that Industrial Parks are able to generate economic growth and tax revenue for the federal government, these tax revenue could be redistributed through social spending, which for the most part benefits the least advantaged (Harris *et al*, 2019).

In summary, it is indicated that industry development is the most misinterpreted area of government policy and practice (Rodrik, 2008). It is also mentioned that even though many of its critics recognize the positive contribution it has made in some East Asian cases (as cited, for example, Wolf, 2007), there remain large amounts of skepticism about its relevance or usefulness in other contexts (Rodrik, 2008). Thus, high-level strategy formulation that remains a paper exercise may not attain sustainable development goals. Effective implementation requires empowered and efficient institutions, built-in instruments for feedback and lessons learned, adaptive and flexible policy monitoring, and correction systems (UNCTAD, 2018). Then, institutional capacity is key for the effective and efficient formulation and implementation of industrial policies. Therefore, these central principles are the foundation of contemporary industrial policies. They should also guide investment policymakers, across the developing world.

The current distribution of federal industrial parks is provided in Table 7.2 below. As indicated in the Table, there are 3 industrial parks each in Oromia, Amhara, and Addis Ababa. There is one in SNNP, but this largest industrial park and has gained from two phases of development. Tigray and Dire Dawa have one each. The emerging regions of Gambella, Benshangul-Gumuz, Afar, and Somali do not have federally managed industrial parks at present.

Table 7. 2 Distribution of federal industrial parks across regions

	Industrial Park	Region	Start year	Budget Source	Contract (USD unless specified)	Expenditure to date (USD unless specified)
1	Hawassa	SNNPR	2015	Sheba Bond	259,311,160.84	241,773,298
	Hawassa (15%)	SNNPR	2017	Treasury	72,836,867.00	28,837,390.79
2	Mekelle	Tigray	2016	Sheba Bond	83,130,841.52	77,463,015
3	Kombolcha	Amhara	2016	Sheba Bond	83,552,782.27	78,158,121
4	Adama	Oromia	2016	Sheba Bond	133,808,386.52	105,396,349

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5	Diredawa	Dire Dawa	2016	Sheba Bond	141,292,004.37	118,011,218
6	Debrebirhan	Amhara	2017	Sheba Bond	74,346,091.33	37,544,325
7	Jimma	Oromia	2017	Treasury	72,291,366.55	60,423,531.65
8	Bahirdar	Amhara	2017	Treasury	62,843,341.13	42,675,237.19
9	Adama Hunan 15% in birr	Oromia	-	Treasury and Private	308,540,032.00	2060.14
10	Bole Lemi phase 1	Addis Ababa		IDF	240,810,000.00 (Birr)	27,549,493.73
	Bole Lemi phase II	Addis Ababa	2017	World Bank Loan	157,758,001.59	95,917,518.55
11	Kilinto	Addis Ababa	2017	World Bank Loan	249,175,403.27	145,961,353.16

Source: Harris *et al* (2019) based on IPDC Data. Note: IDF = Industrial Development Fund and is a fund ear-marked from the Treasury.

7.1.5 Perceptions of Infrastructure Sector Higher Officials and Staff about Industry Park allocation in Ethiopia

Besides the above analysis of industrial park development, the study has also assessed the perceptions of infrastructure sector staff about industry park allocation in Ethiopia. The question they were asked was that “there is no fair distribution of infrastructure development (e.g. Industry parks) in Ethiopia”. Thus, out of 904 respondents, 172 (19.03%) have disagreed and 349 (38.60%) agreed. Out of 110 respondents of higher officials, 21 (19%) have disagreed and 41 (37%) agreed. This showed that the majority of the respondents perceive that there is no fair allocation in Industry Parks across regions in Ethiopia. See Table 7.2 below.

Table 7. 3 Job Position of the Respondents and Responses

Responses	Job Position of the Respondents			Total	% age
	Higher officials	Middle level management	Experts		
Strongly Disagree	7	12	22	41	4.54
Disagree	21	54	97	172	19.03
Undecided	12	37	77	126	13.94
Agree	41	88	220	349	38.60
Strongly Agree	29	55	132	216	23.89

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Total	110	246	548	904

Source: Survey, 2019

The same question (“there is no fair distribution of infrastructure development (e.g. Industry parks) in Ethiopia”) was asked for 8 staff of Ethiopian IPDC. Out of 8 respondents, 3 (37.5%) have disagreed and 5 (62.5%) agreed. This showed that the majority of respondents perceive that there is no fair distribution of Industrial Parks across regions in Ethiopia. See Table 7.4 below.

Table 7. 4 Responses of Ethiopian Industry Park Authority’s Staffs

Institution	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Ethiopian IPDC	0	3	0	5	0

Source: Survey, 2019

In addition to the above, 94% of interviewees and all focus group discussants believed that there is no equitable allocations of Industry Parks across the regions in Ethiopia (Interview, 2019). See Chap. 9 sec. 9.8.5 and 9.9.5 respectively.

7.1.6 Conclusion

Governments, especially, the Ethiopian government should focus on the ambiguous case for industrial policy in practice as it is implementing a huge investment in Industrial Parks development in the country which needs a great debate. Currently, federal run Industrial Parks are built in the relatively bigger regions (Oromia (3), Amhara (3), Addis Ababa (2), SNNPR (1 but the largest nationally, and why it is the largest is not clear), Dire Dawa (1) and Tigray (1)). It is stated that, in relation to infrastructure equity, the Industrial Parks are mostly allocated based on economic factors, but regional distribution is also considered on an *ad hoc* basis. Besides, communication between the IPDC and stakeholders is less than optimum and needs to be enhanced, especially when validating the selection of Industrial Park to reduce perceived concerns of infrastructure inequity (Harris *et al*, 2019).

As per the researcher’s assessment, most of the respondents of the survey, even the staff of the Ethiopian IPDC’s respondents, perceived that there is no equitable allocation of Industry Parks across regions in Ethiopia. Therefore, the Ethiopian government should give great attention to both efficiency and equity equally in the country’s industrial park development. More importantly, there are also critics that the carrot and stick instruments are not transparent and accountable. There is also emerging concern that the public investment expansion is increasingly dwarfing the private sector, for example in relation to credit

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and foreign exchange availability (Gebreeyesus, 2013). Thus, a strong private sector is crucial for the effectiveness and efficiency of industrial policy the government needs. It has to prepare and implement clear standards and guidelines transparently and accountably across the country. Specifically, it is a must to make it clear to the stakeholders/regional states particularly, and the society at large.

7.2 Airport Infrastructure Equity across the Regional States in Ethiopia

Introduction

Airports are gateways to other countries and regions because they promote the continuous circulation of goods and services to service supply and distribution chains (International Civil Aviation Organization (ICAO), 2018). Airports collect, sort, trans-ship and distribute passengers, goods, and services (ICAO, 2018). In addition, the infrastructure quantities and qualities that have an impact on income inequality are airport quality (Makmuri, 2017). Therefore, this section overviews the airport infrastructure equity across regions in Ethiopia. It also assesses the equity of airport infrastructure based on 1 million population per airport and distance in km between airports within a region. Therefore, the survey result showed that there is no equitable distribution in Ethiopia.

7.2.1 Experiences in Airport Construction and Management

Major airport investments are essential to meeting the growing passenger and cargo demand (Ageland & Smale, 2017). The risks and uncertainties, particularly in relation to future aviation demand, make the decision-making process difficult. And even if such developments are agreed, it takes a very long time to build new airport infrastructure. Therefore, governments and the aviation sector, in general, are interested in examining how to improve the utilization of available airport capacity without building new infrastructure (Ageland & Smale, 2017). In the context of increasing globalization of trade, rising international flows of goods and people, and the resulting global rise in air traffic, international airports have become strategic assets for the development and attractiveness of nations (ICAO, 2018). What is true at the national level is also true at the more local scale of the areas surrounding an international airport, and whose own urban, demographic, social, economic, and environmental development is closely linked to the presence of such major equipment (ICAO, 2018).

In simple terms, air connectivity is about making travel as easy and affordable as possible, given the geographical separation involved. However, defining and measuring air connectivity is challenging (Ageland & Smale, 2017). Thus, collaborative decision-making is crucial to this. This is because the

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current synergy between airports and urban development which includes infrastructure development is governed by stand-alone policies which make difficult joint oversight activities at the local and national level (ICAO, 2018). Generally, airport capital development needs are driven by current and forecasted traffic, use and age of facilities, and altering aircraft technology, which needs airports to inform or substitute equipment and infrastructure (Federal Aviation Administration (FAA), 2018).

According to FAA (2018), to encounter the demand for air-transportation in the United States of America, airports and the national airport system should have the following attributes, for example, airports should be safe and efficient, located where people will use them, and established and upheld to appropriate standards; The airport system should care a variety of crucial national objectives, such as law enforcement, defense, emergency readiness, and postal delivery; and, The airport system should be wide, providing as many people as possible with appropriate access to air transportation, usually by having most of the population within 20 miles (32km) of a National System Planning (NPIAS) airport.

Moreover, the central government of India, for example, framed the Policy for Greenfield Airports from time to time. A Steering Committee has also been established to coordinate and monitor the several clearances needed for setting up of Greenfield airports. These guiding principles are being issued pursuant to the policy and details of the procedure to be monitored for submission, appraisal, and approval of proposals received for setting up of an airport. The Central Government may, from time to time, notify guidelines to be followed by the steering committee for grant of license to operate a green-field airport. While granting a license, the delegated body would keep these guidelines in view. Thus, the following conditions should be kept in view by the delegated body while granting a license. (a) No green-field airport would be allowed within an aerial distance of 150 Km of an existing civilian airport. (b) In case a green-field airport is proposed to be set up within 150 Km of the current civilian airport, the effect on the current airport would be inspected. Such circumstances would be decided by the Government on a “case to case basis” (Ministry of civil aviation Government of India, 2008).

Thus, airport planning is a systematic process used to create guidelines for the efficient development of airports that is related to national, state, and local goals (FAA, 2018). A crucial objective of airport planning is to ensure the effective use of airport resources in order to entertain aviation demand in a “financially feasible manner” (FAA, 2018). FAA (2018) will also evaluate whether an airport is a deliberate allocation for a public-use; distance from other NPIAS locations; the number of enplanements the airport has its prediction to have; and, the number of grounded aircraft situated at the airport.

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Concerning Africa's experiences in airport construction and management, in recent years airports have played a crucial role in keeping air traffic affordable and stabilizing operating costs for airlines in Africa (ICAO, 2018). Generally, Africa's air transport sector is the least developed but one of the fastest-growing in the world, it currently only represents some 4.5 % of the world's aviation (Shelley/Chatelin *et al*, 2016). A key factor determining the level and the future growth of continental air traffic in Africa is the extent of airline "market liberalization" (Shelley/Chatelin *et al*, 2016). Whilst, in principle, African airlines can freely introduce new routes and services frequencies and set their own tariffs, this is still largely governed by the bilateral air service agreements between countries. Although under the Yamoussoukro Decision, 44 African signatory states are required to allow free market access in terms of airline seat capacity, service frequency, and tariffs to all registered African airlines, restrictions still apply in too many circumstances (Shelley/Chatelin *et al*, 2016). As a result, route networks are often undeveloped and there is a lack of market competition leading to high fares. The main point here is what is the policy and guideline in new airport establishments in African countries. However, it is not possible to find a clear policy and guidelines for airport allocation within a country in Africa unlike India and the USA.

Regarding Ethiopia's experiences in airport construction and management, by mentioning Africa Infrastructure Country Diagnostic, Deloitte (2014) explained that, in recent years, Ethiopia has made important development in infrastructure, and its infrastructure indicators relate relatively well with low-income country peers. The country established Ethiopia Airlines (now one of the three foremost African airlines) and allied with regional air transport hubs. It is also stated that the alteration of Addis Ababa into a regional hub for air transportation, through the upgrading of Bole International Airport and inauguration of Ethiopian Airlines has been the main achievement for Ethiopia. The airline is now one of the top 3 in Africa and is increasing fast. Thus, Ethiopian Airlines is rising by 25 percent per year (Deloitte, 2014). As mentioned above, the international and regional experience showed that the new institutions must advance the national goals, particularly: Airports should be safe and efficient, located where people will use them, and developed and maintained to appropriate standards; No greenfield airport would be allowed within an aerial distance of 150 Km of a current civilian airport (Indian experience); and, The airport system should be wide-ranging, providing as many people as possible with suitable access to air transportation, normally by having most of the population within 20 miles (32km) of a national planning system of the airport (USA experience).

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7.2.2 Airport Distribution in Ethiopia

According to Ethiopian Airport Enterprise (2018), there is a lack of clear policies, standards, and guidelines on how to establish a new airport and to ensure the equitability of its allocation across the regions in Ethiopia (Ethiopian Airport Enterprise, 2018). However, population demography can be one of the criteria for the establishment of a new airport in a region within the country (FAA, 2018). Based on the population in each region and city administration and the number of airports per 1 million population, the following results have been identified. As can see from Table 7.5, airport allocations, or quota in the Oromia region are below the national average (0.2). Amhara and SNNP regions are equal to the national average (0.2). Whereas, Gambela, Diredawa, BenshangulGumuz, Tigray, Afar, and Somali regions are above the national average (0.2).

Table 7. 5 Name and number of Airports in in each Region by Airport Type or Standard

No_	Region	Population	Airport	Category/Standard	No_ of Airport/1m p.
1	Tigray	5,247,005	Mekelle	1	0.8
			Axum	2	
			Shire	4	
			Humera	4	
2	Afar	1,812,002	Semera	3	0.6
3	Amhara	21,134,988	Bahirdar	1	0.2
			Gonder	2	
			Lalibella	2	
			Combolcha	4	
4	Oromia	35,467,001	Jimma	2	0.1
			Dembidollo	4	
			Robe Goba	4	
			Nekemit*	4	
5	Somali	5,748,998	Jigjiga	2	0.5
			Gode	3	
			Kebridehar**	4	
6	BenshangulGumuz	1,066,001	Assosa	3	0.9
7	SNNP	19,170,007	Hawassa	3	0.2
			Arbaminch	4	
			Jinka	4	
8	Gambela	435,999	Gambela	3	2.3

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9	Harari	246,000	-	-	-
10	Addis Ababa	3,384,569	Bole	-	0.3
11	Diredawa	466,003	Diredawa	1	2.1
	Country Level	94,178,573	22	-	0.2

Source: Based on Ethiopian Airport Enterprise (2018), six-month performance report. Researcher's Own Calculation

Note 1: Nekemit*- Under construction; Note 2: Kebridehar**- Constructed by the Regional Government Budget

The other point that needs to be considered is that the distance in km between airports within a region has been compared as follows in Table 7.6. Actually, distance in Km between the two Airports within a region, there is no clear standard in the new establishment of airports in Ethiopia across regions (Ethiopian Airport Enterprise, 2018). It is allocated arbitrarily across the regions in Ethiopia. For example, 'building an airport in a region that has no hotels would not lead to any traffic, but hotels without a regional airport may not be profitable either' (Glavan, 2007, p. 15). From this one can understand that it needs long and short-term plans, clear principles, and policy, standards, and guidelines with relation to national and regional development plans in the equitable allocation of airports across regions in Ethiopia.

Table 7. 6 Distance in km between airports within a region

No_	Region	Airports in the region	Distance in Km between the two Airports within region	Average
1.	Tigray	Mekelle-Axum	241	197
		Axum-Shire	63	
		Shire-Humera	287	
2.	Afar	Semera	-	-
3.	Amhara	Bahir Dar-Gonder	175	285
		Gonder-Lalibela	355	
		Lalibela-Kombolcha	325	
4.	Oromia	Jimma-Demedelo	554	412.75
		Nekemit-Demedelo	324	
		Addis Ababa-Robe Goba	427	
		Addis Ababa-Jimma	346	
5.	Somali	Jigjga-Kebridehar	400	300
		Kebridehar-Gode	200	
6.	BenshangulGumuz	Assosa	-	-
7.	SNNP	Hawassa-Arbaminch	250	239
		Arbaminch-Jinka	228	

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8.	Gambela	Gambela	-	-
9.	Driedawa	Driedawa	-	-
10.	Harari	-	-	-

Source: Based on Ministry of Transport Federal Transport Authority (2015/16), Yearly magazine, form 5, number 1, Researcher's own Calculation.

7.2.3 Perceptions of Infrastructure Sector Higher Officials and Staff about Airport Distribution in Ethiopia

In addition to the above analysis of airport development, it has been also assessed the perceptions of infrastructure sector staff about airport distributions in Ethiopia. The question they were asked was that “there is no fair distribution of infrastructure development (e.g Airports) in Ethiopia”. Thus, out of 904 respondents, 172 (19.03%) have disagreed and 349 (38.60%) agreed. Out of 110 respondents of higher officials, 21 (19%) have disagreed and 41 (37%) agreed. This showed that the majority of the respondents perceive that there is no fair allocation of airports in Ethiopia. See Table 7.7 below.

Table 7. 7 Job Position of Respondents and Responses

Responses	Job Position of the Respondents			Total
	Higher officials	Middle level management	Experts	
Strongly Disagree	7	12	22	41
Disagree	21	54	97	172
Undecided	12	37	77	126
Agree	41	88	220	349
Strongly Agreed	29	55	132	216
Total	110	246	548	904

Source: Survey. 2019

The same question (“there is no fair distribution of infrastructure development (e.g. Airports) in Ethiopia”) was asked for 6 staff of Ethiopian Airport Enterprise staff. Out of 6 respondents, 2 (33.33%) have disagreed and 3 (50%) agreed. This showed that the majority of respondents perceive that as there is no fair allocation of airports in Ethiopia. See Table 7.8

Table 7. 8 Responses of Ethiopian Airport Enterprise's Staffs

Institution	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

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Ethiopian Airport Enterprise	0	2	0	3	1

Source: Survey, 2019

In addition to the above, 89% of interviewees and all focus group discussants agreed that there is no equitable allocation of airports across the regions in Ethiopia (Interview, 2019). See Chap. 9 sec. 9.8.6 and 9.9.5 respectively.

7.2.4 Conclusion

The assessments of airport infrastructure by using population per 1 million per region and distance in kilometers between airports within a region does not have similar patterns in Ethiopia. Those regional states with a higher population have a lower number of airports than with lesser populations. Besides, the distance between airports in km also does not have similar patterns. Airport officials mentioned that airports should not be established within a 100 Km radius. But, there are airports less than 100 km radius within regions, for example, between Axum and Shire (63 Km). Therefore, the government of Ethiopia should have clear policies and standards in a new airport establishment to ensure equitable allocation across regional states in the country. Otherwise, it is becoming the cause of complainants, and then it may also be a hindrance to the nation-building processes in the country.

7.3 University Infrastructure Equity across the Regional States in Ethiopia

Introduction

There is a huge higher education expansion in Ethiopia (Bishaw & Melesse, 2017). Ethiopia's higher education has revealed an inspiring quantitative advance. Indeed, to ensure sustainable development, the country is engaged in enormous investment to increase higher education institutions (Bishaw & Melesse, 2017). Over the last two decades alone, the number of public universities has grown to 46, and the regional variation in higher education involvement is gradually declining (Semela, 2011; Bishaw & Melesse, 2017). However, the road to the growth of higher education in the country is not "without limitations" (Bishaw & Melesse, 2017). Thus, this section overviews university infrastructure equity across regions in Ethiopia. The emphasis is basically about the range of equity policies devised and the level of alignment among the several tools chosen to implement these policies. It also assesses the equity of university physical infrastructure based on 1 million population per university within a region, and distance in km between universities within the region. Finally, the survey result showed that the majority of the respondent, except the internal staff of the ministry of science and higher education, believed that there is an equitable allocation of a university in Ethiopia.

7.3.1 Experiences in the Equitable Allocation of Higher Education Institutions

Education has long been recognized as a basic human right. It is a critically-important requisite for the productivity and well-being of individuals and for the social and economic growth of entire societies (Chotia & Rao, 2015). Thus, citizens can only become capable, both knowledge-wise and skill-wise, through education, and thus education gives to the development of the economy (Chotia & Rao, 2015). Because of this, the importance of equal access to education has been emphasized repeatedly in international conventions. With the agreement of the SDGs and the Education 2030 Framework for Action in 2015, equity has been engaged at the heart of the global development agenda for the first time (UNESCO-UIS, 2018). In the field of education, SDG four calls on all UN Member States to ensure equitable and inclusive quality education and endorse “lifelong learning opportunities for all” (UNESCO-UIS, 2018). It is increasingly recognized that learning levels in many countries are highly unequal (UNESCO-UIS, 2018). Available data have also shown that participation in higher education continues to be unequal from a social background perspective (Salmi, 2018).

According to Salmi (2018), research produced by UNESCO in 2016, looking across 76 mostly low-income countries, indicated that only 1 percent of the poorest 25-29-year old had accomplished at least four years of higher education, compared to 20 percent of the richest. Moreover, it is also stated that inequalities in access to higher education are augmented by disparities in success by social background. Therefore, addressing these inequalities will require sustained policy commitment at the national, regional, and global levels. However, there is limited information available in the present state of policy focus on these equity aspects (Salmi, 2018). However, equity in higher education is a front-page urgency for governments (Salmi, 2018). According to Salmi (2018), the survey conducted clearly displayed that, with the exclusion of a few fragile-states recovering from a major political crisis, equity could be a priority topic in the higher education agenda of governments. It is also established that this legitimate commitment indicates the fact that young people all over the world are strongly conscious that opportunities for social mobility and professional success are directly related to opportunities in higher education (Salmi, 2018). But policy commitment varies considerably across countries. However, beyond the “official statements” about equity, which incline to reflect usually shared principles of inclusion, a survey conducted found that a wide range of situations when it came to translating these principles into actual policies and interventions (Salmi, 2018). Salmi (2018) also stated that:

A number of countries are still paying only “lip service” to the equity agenda, meaning that, beyond the general policy statements about the expansion of access, governments do not spell out clear equity promotion strategies,

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define concrete targets to enroll and support students in vulnerable conditions, mobilize sufficient resources targeted to underrepresented groups, and put in place actions to help students complete their degrees (Salmi, 2018, p.6).

Out of 71 countries in the world, overall, only 32 percent of the countries measured have defined certain participation targets for any equity group. Many countries still apply a narrow definition of equity groups. Out of 71 countries, overall, 11 percent of the countries measured have formulated a comprehensive equity strategy. Another 11percent have explained a certain policy document for one equity group, gender, people with disabilities, or members of native groups. Out of 71 countries, less than 30 percent of countries have flexible pathways/ respect for prior learning (Salmi, 2018).

According to Salmi's (2018) survey, it would be hard to find a Minister of Higher Education anywhere on the planet who said that she/he did not care about equity. It is also mentioned that the survey of national equity policies in higher education hardly argued the surface of the problems and challenges involved in seeking to increase opportunities for access and achievement at the post-secondary level. By design, it focused on reviewing government strategies, policies, and plans but it did not touch upon the degree of effectiveness of the various policies formulated and implemented, nor did it attempt to measure their actual impact on the concerned equity target groups (Salmi, 2018). But, disparities in education not only emanate from social and economic inequalities but also contribute to a further accentuation of social and economic inequalities (Tilak, 2015). For example, probably the most important problem faced by the system of higher education in India is the persistence of disparities in access to higher-education (Tilak, 2015). In other ways, a number of educational institutes (per 10 sq. km of an area): A crucial indicator giving information about the frequency and number of educational institutes in a particular state was used in India (Chotia & Rao, 2015). Thus, a number of social disparities have been the result; socioeconomic and a lack of sufficient financial support among them (Hawkins *et al*, 2009).

From the redistribution point of view, governments sometimes allocate more public spending to historically-disadvantaged regions, in an attempt to equalize learning outcomes (UNESCO-UIS, 2018). Thus, a study on access to education worldwide showed that expansion means greater inclusiveness-essentially, more young people and those from less advantaged backgrounds attend higher education (Buckner, 2013). These show that the Ethiopian government would learn from the above international experiences.

Concerning Africa's experiences in higher education institution's equity, the establishment of higher educational institutions were in pursuit of meeting the global requirements of producing manpower that

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will serve in different capacities and contribute positively to the nation's socio-economic and political development in Nigeria (Iruonagbe *et al*, 2015). However, there are enormous problems facing the education system in Nigeria. Certainly, over the years, education in Nigeria has suffered much neglect verified in the form of insufficient funding, unpredictable policy variations; lack of infrastructure, and disruption of the school system (Iruonagbe *et al*, 2015). In other cases, at a countrywide level, for example in South Africa, the new institutions must advance the national goals for higher education, particularly enrolment growth and augmented contribution in absolute numbers and in proportion to the population demographics of the country; and, growth in teaching and academic capability in order to support "sustained national development" (Department of higher education and training of South Africa, 2012). At a regional and local level, the new institutions must build a strong academic hub in each province, considered by strong key campuses that uplift the regional emphasis on higher education, allow maximum access within the country, the province, and, certainly, internationally, contribute to the economic growth and cultural development of the individual provinces and draw on the context, individuality, and strengths of each province to advance a unique academic effort (Department of higher education and training of South Africa, 2012).

The selection of "the seat of delivery" must be based on the ability of the selected town to ensure the success of the new university, now and into the future in the Republic of South Africa. In this context, the town must provide an appropriate supporting fabric and environment for the university. The selected town must be nearby to the biggest possible population, provincially and nationally. It must have beautiful social, cultural, and recreational facilities and be able to fascinate and hold top academics. It must be economically and commercially energetic, able to simplify some student jobs and internship experience. The status and feasibility of the new institution would be improved by a town that is host to significant government institutions, research institutes, and other public entities (Department of higher education and training of South Africa, 2012).

Generally, education is the mechanism that energizes the growth and development of a nation. Some developing countries, especially in Asia, have been able to transform their economies and their people. Nations such as Japan, Korea, India, and China did not necessarily wait for the transfer of technology as detected from most African countries like Nigeria but were dedicated to a system where they fabricated copied, and adapted foreign technology through an inward-looking strategy to meet their own cultures, environment, and needs (Iruonagbe *et al*, 2015). This is where the country failed to understand that

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education must be pragmatic in nature if it is to create any meaningful effect in the life and living conditions of the people (Iruonagbe *et al*, 2015). Indeed, expansion without equity benefited the initial years of massification in Egypt. In observing Egypt's higher education policies since independence, according to Buckner (2013), Emily Cupito and Ray Langsten (2011) found that Egypt's long-standing policies to enlarge and democratize access to university have not balanced opportunity to Egyptians from lower-class backgrounds. These also show that the Ethiopian government would learn from the above African experiences.

7.3.2 Ethiopia's Experiences in Higher Education Equity/ Growth in Higher Education in Ethiopia

Historically, the introduction of higher education in Ethiopia began in the mid-1960s. However, it is only in the previous 15 years, due to the government's and development partners' commitment to prioritizing the sub-sector that access to higher education has unlocked to the broader population (Ministry of Education, 2015; Bishaw & Melesse, 2017). Moreover, contemporary higher education in Ethiopia has a short-history of a slight over 6 decades. Over the past 2 decades, there have been incredible reforms that aimed at increasing and updating the higher education subsector so that it would make significant contributions to the country's development (Woldegiyorgis, 2015; Semela, 2011; Bishaw & Melesse, 2017). The constitution of Ethiopia (1995) article 90, about social objectives, sub-article 1 and 2 read that "to the extent the country's resources permit, policies shall aim to provide all Ethiopians access to public health and education, clean water, housing, food, and social security; and, education shall be provided in a manner that is free from any religious influence, political partisanship or cultural prejudices". More specifically, the FDRE constitution strongly supports the idea of equity to ensure fairness and bring social justice and harmony (Ministry of Education, 2018). Henceforth, social inclusion, and guaranteeing reasonable distribution of educational opportunities across regional states, ethnic groups, and other deprived segments of the Ethiopian society are the basic political priorities (Semela, 2011). At the center of the political discourse, social inclusion takes a fundamental place with respect to assuring the constitutional rights of nations and nationalities (Semela, 2011). Besides, the higher education proclamation 351/2003 indicated that one of the objectives of higher education is to deliver an equitable distribution of HEIs (Bishaw & Melesse, 2017).

However, there are no documents which explain about the equitable distribution of HEIs. But, women and those from deprived regions were given special emphasis through affirmative action (Bishaw & Melesse, 2017). This is a good attempt in Ethiopian history to deliver equity in the Ethiopian higher

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education system. One of the other strategies to expand higher education and to provide regional equity of distribution of resources for educational expansion is cost-sharing through graduate tax (Bishaw & Melesse, 2017). From an access and equity point of view, in the previous 10 years, the Ethiopian government has demonstrated continued commitment to expanding equitable access to quality and relevant higher education (Seid *et al*, 2016). Private higher education institutions have also extended, realizing 98 institutions in total, accommodating around 15 percent of all student enrolment by the end of The Ethiopian Education Sector Development Program IV (ESDP IV) period (Ministry of Education, 2015). However, Ethiopia is made up of 85 ethnocultural groups, though all of them did not gain equal handling as citizens of the same country in the past (Semela, 2011).

Moreover, a large scale of expansion is possibly one of the typical features of education in Ethiopia at all levels in the previous two decades. In higher education, an extraordinary scale of expansion was started in the late 1990s and early 2000s (Woldegiyorgis, 2015; Bishaw & Melesse, 2017). Access and equity are the driving justifications for the ongoing expansion which is also considered one strategic dimension in the Ethiopian Education Sector Development Program (ESDP) (Woldegiyorgis, 2015). The higher education proclamation (HEP) stated that to ensure fairness in the distribution of public institutions and expand access on the basis of need and equity is considered as one of the objectives of higher education. This is also more assured in the ESDP which defined the establishment of new higher education institutions (HEIs) to be distributed over different regions of the country (Woldegiyorgis, 2015; Bishaw & Melesse, 2017).

Therefore, compared to two universities at the time of the transition period in May 1991, at present, there are more than 50 public universities and around 170 private-owned institutions, including institutions deemed to be universities and university-level institutions (Ministry of science and higher education, 2019). The question is that is the distribution of university fair in Ethiopia? What are the policy, the standards, and guidelines to establish a university in a region? As stated in the proclamation 650/2009, the proclamation has become essential to establish a legal system to allow institutions to impact institutional transformation, and thus be able to serve as vibrant centers of capacity building consistent with the ambitions of the peoples of Ethiopia in the perspective of globalization (Ministry of Education, 2009). In 650/2009 proclamation, article 11 (Granting the Status of a University) sub-article 1 and 2 states that 1/ an institution shall be granted the name and status of a “university” by the Ministry where: for example, a) it has a minimum enrollment capacity of 2,000 students in regular undergraduate and

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graduate program in at least three academic units larger than departments, etc. In this proclamation article 15 sub-article 1 and 2 also state that “1/ notwithstanding the provisions of Articles 11 (Granting the Status of a University) and 12(Granting the Status of a University College) of this Proclamation and without prejudice to other provisions of this Proclamation, a new public institution may be established as a university or a university college on the basis of the decision by the Council of Ministers, etc. (Ministry of Education, 2018).

In addition, it is stated that the Ethiopian higher education institutions match well with the views of those in early-stage developmental states, but with limitations of its own (Woldegiyorgis, 2015).⁶⁰ Thus, Woldegiyorgis (2015) has identified the following issues.

- There is a lack of transparency with respect to how higher education is coordinated with other development and social policies and who is responsible to oversee this coordination;
- There are inconsistencies in the documents that lead to the assertion that the different laws, policies, and strategies for higher education are set separately and independently with a very loose link among each other;
- Though technology transfer is put as one of the central ideas in education strategy and in development narratives in general, there seems to be a lack of clarity as to how it materializes and who is responsible for it to take effect;
- While different mechanisms are in principle set out as a means to finance the expansion of higher education, the huge majority of the resources come from the government budget;
- Similarly, the expansion is mainly crafted and pushed forth by the state, rather than being driven by demand (which often requires egalitarian distribution of income creating more middle class that is willing and able to invest in education and in turn attracting more private institutions to provide higher education).

⁶⁰ Woldegiyorgis, A.A. (2015), a Glance at the Ethiopian Higher Education from the Developmental State Perspective, Bahir Dar j educ. Vol. 15 No., Consultant, Independent Evaluation Group, World Bank.... Implications of the findings.... Proper and effective coordination of higher education policies and strategies with other social and development policies requires a specific institution designated responsible.

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Finally, it is indicated that the expansion seems to be led by the condition of ethnic politics where the equitable distribution of public HEIs and expanding access in all regional states has worried the pattern of the establishment of HEIs (Woldegiyorgis, 2015). Thus, the number has been highly maintained, and some HEIs have been established in remote areas where there are low facilities, and it is challenging to invite and retain qualified academic staff-meaningfully without compromising quality (Woldegiyorgis, 2015). Besides, along with the national agency, institutional capacity-building should be given priority to put in place efficient and effective institutional quality enhancement of systems (Semela, 2011).

7.3.3 University Distribution in Ethiopia

As mentioned above, the international and regional experience shows that the new institutions must advance the national goals for higher education, particularly enrolment growth and augmented involvement in absolute figures and in proportion to the population demographics of the country. Therefore, what are the policy, standards, and guidelines to establish a university in a region in Ethiopia? As per the researcher's knowledge and literature review, there is no written clear policy, standards, and guidelines on how to establish a new university in a region to ensure the fairness/equitability of its distribution across the regions in Ethiopia. However, population demography can be one of the criteria for the establishment of new HEIs in a region within the country. Based on the population in each region and city administration and the number of universities per 1 million population, the following results have been identified. As one can see from Table 7.9, University distributions, or quota in Oromia and Somali regions are below the national average (0.5). Amhara and SNNP regions are equal to the national average (0.5). Whereas, Gambela, Diredawa, BenshangulGumuz, Tigray, and Afar regions are above the national average (0.5).

Moreover, candidates from all regions have equal entrance access to higher education, as university assignments are done at the national level. However, inequities in primary and secondary education outcomes across regions might affect tertiary level access. Differential entry requirements for emerging regions aim to correct for this. There is a lack of data on tertiary level access by region of origin. Meanwhile, the larger regions have more universities, but the number of universities per 100,000 people is higher in smaller areas (Harris *et al*, 2019). However, with respect to the allocation of universities, all regions indicate that Harari should have at least one university. However, Harari is served by Universities in Oromia and Dire Dawa. The larger regions have more universities, but the number of universities per 1 million people is higher in relatively smaller regions.

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Table 7. 9 Name and number of Universities in each Region

No_	Region	Population	University	No_ of University per 1 million pop.
1	Tigray	5,247,005	Mekelle University	0.8
			Axum University	
			Adigrat University	
			Raya University	
2	Afar	1,812,002	Semera University	0.6
3	Amhara	21,134,988	Bahirdar University	0.5
			Gonder University	
			Debre Tabor University	
			Wollo University	
			Debre Markos University	
			Debere Birhane University	
			Woldia University	
			Debark University	
			Meqdele Amba University	
			Enjebara University	
4	Oromia	35,467,001	Jimma University	0.3
			Dembidollo University	
			Bulle Hora University	
			Wellega University	
			Mettu University	
			Adama Science and tec. University	
			Selale University	
			Oda Bultum University	
			Harmaia University	
			Ambo University	
			Arsi University	
			Meda Wolabu University	
5	Somali	5,748,998	Jigjiga University	0.3
			Kebridehar University	
6	BenshangulGumuz	1,066,001	Assosa University	0.9
7	SNNP	19,170,007	Hawassa University	0.5
			Arbaminch University	

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			Jinka University	
			Wolkite University	
			Wachemo University	
			Woraba University	
			Bonga University	
			Mizane Tape University	
			Wolyta University	
			Dela University	
8	Gambela	435,999	Gambela University	2.3
9	Harari	246,000	-	-
10	Addis Ababa	3,384,569	Addis Ababa Science and Tec. University	0.9
			Addis Ababa University	
			Cottebe Metropolitan University	
11	Diredawa	466,003	Diredawa University	2.1
	Country Level	94,178,573	46	0.5
	Other state owned University		Civil Service University	-
			Oromia State University	-
			Defense University	-
			Police University College	-
12	There are 170 certified private-owned higher education institutions including four Private universities (St. Mary's, Unity, Admass and Alpha University).			

Source: Based on Ministry of Science and Higher Education (2019), nine-month performance report, Researcher's Own Calculation

Likewise, the distance in km between universities within a region has been compared in Ethiopia. The data in Table 7.10 showed that there is no written clear standard in the new establishment of universities across regions in Ethiopia. It is allocated arbitrarily across the regions in Ethiopia. From this one can understand that it needs long and short-term plans, clear principles, and policy, standards, and guidelines with relation to national and regional development plans in the distribution of university across regions in Ethiopia.

Table 7. 10 Distance in km between Universities within a Region

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No_	Region	Universities in the region	Distance in Km b/n the 2 universities within a region	Average
1.	Tigray	Mekelle-Adigrat	120	135/122.3
		Adigrat-Axum	126	
		Mekelle-Raya	161/121	
2.	Afar	Semera	-	-
3.	Amhara	Debre Markos-Enjebra	148	157.2
		Enjebra-Bahir Dar	116	
		Bahir Dar -Gonder	175	
		Bahir Dar- Debre Tabor	103	
		Gonder-Debre Tabor	178	
		Gonder- Debark	103	
		Debre Tabor- Woldia	258	
		Woldia- Wollo	120	
		Wollo-Mekedela Amba	100	
		Wollo-Debre Birhane	271	
4.	Oromia	Adama-Oda Bultum	225	260.3
		Oda Bultum-Haremaya	200	
		Adama- Ambo	213	
		Ambo-Wollega	215	
		Wollega-Dembedelo	324	
		Adama-Jimma	446	
		Adama-Selale	216	
		Jimma-Mettu	254	
		Adama-Arsi	75	
		Arsi-Meda Wolabu	267	
		Adam-Bulla Hora	428	
5.	Somali	Jigjga-Kebridehar	400	300
6.	BenshangulGumuz	Assosa	-	-
7.	SNNP	Hawassa- Dila	86	149.3
		Hawassa-Wolyta	161	
		Wolyta-Arbaminch	112	
		Arbaminch-Jinka	228	
		Wolyta-Wachemo	100	
		Wacchamo-Woraba	54	
		Wachemo-Wolkite	150	
		Wolkite-Bonga	291	
		Bonga- Mizane Tape	162	

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8.	Gambela	Gambela	-	-
9.	Driedawa	Driedawa	-	-
10.	Harari	-	-	-

Source: Based on Ministry of Transport, Federal Transport Authority (2015/16), Yearly magazine, form 5, number 1, Researcher's own Calculation

In other ways, although one official from the ministry of science and higher education mentioned that there is a decision that there should be a 100 km radius between two universities as criteria, there are universities below 100 km within a region, for example, between Adama and Arsi University is 75 in Oromia region; in SNNP region between Hawassa and Dela university is 86; and, between Wachemo and Woraba university is 54 km. As there might be political purposes such as identity recognition or other economic and social purposes, it is good as the country needs many universities. However, the question is that are these universities doing differently, for example, in course allocation or duplicating the same issue? That is not the case. It has been assessed that there no clear specialized courses are given by these universities. They are not doing it differently rather they do have duplication of efforts. Thus, the state of institutional quality assurance is confirmed to be in a much weaker position to implement the provisions of Proclamation No. 650/2009 (Semela, 2011). Therefore, there are no clear principle, policy, standard, and criteria to establish a new university in a region in Ethiopia.

7.3.4 Perceptions of Infrastructure Sector Higher Officials and Staff about University Distribution in Ethiopia

In addition to the above analysis of higher education, it has been also assessed the perceptions of infrastructure sector staff about university distributions in Ethiopia. The question they were asked was that “there is no equitable distribution of educational infrastructure (e.g., University) in Ethiopia”. Thus, out of 904 respondents, 300 (33.19%) have disagreed and 255 (28.20%) agreed. Out of 110 respondents of higher officials, 43 (39.09%) have disagreed, and 26 (23.64%) agreed. This showed that the majority of the respondents perceive that there is a fair distribution of university in Ethiopia. See Table 7.11.

Table 7. 11 Job position of Respondents and Responses

Responses	Job Position of the Respondents			Total	%age
	Higher officials	Middle level management	Experts		
Strongly Disagreed	12	28	53	93	10.29

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Disagreed	43	94	163	300	33.19
Undecided	16	41	93	150	16.59
Agreed	26	55	174	255	28.20
Strongly Agreed	13	28	65	106	11.73
Total	110	246	548	904	

Source: Survey, 2019

The same question (“there is no equitable distribution of educational infrastructure (e.g. University) in Ethiopia”) was asked for 13 staff of FDRE Ministry of science and higher education. Out of 13 respondents, 4 (30.77%) have chosen undecided and 5 (38.46%) agreed. This showed that the majority of respondents perceive that there is no fair distribution of university in Ethiopia as opposed to the results of Table 7.10 above. See table 7.12 below.

Table 7. 12 Responses of FDRE Ministry of Science and Higher Education’s Staff

Institution	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Ministry of Science and higher education	1	1	4	5	2

Source: Survey, 2019

In contrast to the above, 22% of interviewees and all focus group discussants agreed that there is no equitable distribution of universities across the regions in Ethiopia (Interview, 2019). See Chap. 9 sec.9.8.5 and 9.9.5 respectively.

7.3.5 Conclusion

The assessment results of population per 1million per university and distance between universities in the regional states do not have similar patterns. Especially, no formal written guidelines are used by MoSHE in their allocation decisions, though the institution was able to verbally describe their processes (Harris *et al*, 2019). This showed that there are no clear standards and guidelines. However, the survey result showed that most of the respondents of the infrastructure sector staff perceive that there is a fair distribution of university in Ethiopia. By contrast, the majority of the respondents from the ministry of science and higher education perceives that there is no fair distribution of university in Ethiopia. Moreover, 22% of interviewees and all focus group discussants believed that there is a lack of equitable distribution of universities across the regions in Ethiopia (Interview, 2019). Therefore, the establishment of a new university in a regional state in Ethiopia needs clear principles, policies, and standards. It should

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not be arbitrarily treated in the future as it has created many grievances in the society that has brought negative impacts on the nation-building processes in Ethiopia.

7.4 Principal Component Analysis of Universities and Airports across the Regional States in Ethiopia

PCA is a dimensionality-reduction technique that is regularly used to decrease the dimensionality of enormous data sets, by changing an enormous set of variables into a smaller one that still comprises most of the information in the big set (Chotia & Rao, 2015). It seeks to pinpoint variables that are composites of the observed/measured variables. It is also used to aggregate infrastructure components such as airport, and university infrastructures which are selected so as to give a comprehensive view ((Patra and Acharya, 2011; Chakamera & Alagidede, 2016; Chotia & Rao, 2015). Hence, based on the above descriptions, to comprehend and gauge the trend and pattern of regional disparities between Ethiopian regional states in terms of infrastructure, it has been selected the indicators (for the latest time period available) listed below. This study analyzed 9 regional states and one city Administration across Ethiopia in order to evaluate their levels. The study has excluded Addis Ababa city administration (the biggest city/capital city) as it has extreme values in infrastructure. All the results were found with PCA. The calculation was done by adopting SPSS/STATA software (V=14). See Annex 4 for detailed analysis.⁶¹ It is the infrastructure assets that are more inequitably distributed between regional states that are assumed more weight in PCA. Variables with low standard deviations (SDs) would convey a low weight from the PCA; for example, an asset which all regional states own or which no regions own (i.e. zero SD) would exhibit no disparity between regions and would be zero weighted, and so of slight use in distinguishing infrastructure status in a region to region.

Therefore, the study considered the number of airports per 1million population (This tells about the number of airport distribution per 1 million population ratio): and, the number of universities per 1million populations (This indicates the total universities present in the region per 1 million populations' correspondence). The Table7.13 indicated that the number of airports per 1 million populations of the regions and the number of universities per 1million population with standardized distributions. In order to analyze the Ethiopian regional states' disparities between states in terms of these two infrastructures,

⁶¹ Chotia, V. and Rao, N. (2015), examining the interlinkages between regional infrastructure disparities, economic growth, and poverty: a case of Indian states, economic annals, Volume LX, No. 205, UDC: 3.33 ISSN: 0013-3264....In India, wide inter-state and intra-state disparities in economic and human development are posing questions about the authenticity of the growth process.... a Composite infrastructure index (CII) for the 21 Indian states by combining individual indicators pertaining to the major sectors.

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the 9 regional states and 1 city administration were classified based on the normalized distribution by adopting the following formula (Chotia & Rao, 2015). To make normalize the distribution, the formula with sample calculation are denoted as follow:

For normalization, the following formula was employed:

$$NV_{ij} = 1 - \frac{(BestX_i - ObservedX_{ij})}{(BestX_i - WorstX_i)}$$

Where:

NV_{ij} = Normalized value corresponding to the X^{th} indicator, where i = corresponding state and j = corresponding indicator;

$Best X_i$ = Best/Maximum value of X^{th} indicator, where I = number corresponding to the state (in this case values of 9 regions and 1 administrative city under the X^{th} indicator will become the i series);

$Observed X_{ij}$ = Observed/current value of X^{th} indicator where i = corresponding state and j = corresponding indicator; and $Worst X_i$ = Worst/Lowest value of X^{th} indicator.

$$NV_{ij} = 1 - \frac{(BestX_i - ObservedX_{ij})}{(BestX_i - WorstX_i)} \quad NV_{11} = 1 - \frac{(2.3 - 0.6)}{(2.3 - 0.0)} = 1 - \frac{1.7}{2.3} = 0.2609$$

Table 7. 13 University and Airport infrastructure distribution by Region

No	Region	Number of airport per 1,000,000 populations	Normality	Rank	Number of university per 1,000,000 populations	Normality	Rank
1	Afar	0.6	0.2609	4	0.6	0.2609	5
2	Amhara	0.2	0.0869	7	0.5	0.2174	6
3	Benishangul/G	0.9	0.3913	3	0.9	0.3913	3
4	Dire Dawa	2.1	0.9130	2	2.1	0.9130	2
5	Gambela	2.3	1.0000	1	2.3	1.0000	1
6	Harari	0.0	0.0000	10	0.0	0.0000	8
7	Oromia	0.1	0.0435	9	0.3	0.1304	7
8	SNNP	0.2	0.0840	8	0.5	0.2174	6
9	Somali	0.5	0.0870	6	0.3	0.1304	6
10	Tigray	0.8	0.2174	5	0.8	0.3478	4
Country Level		0.2	0.3478			0.3609	

Source: Based on Airport enterprise and Ministry of Science and higher education data, researcher's calculation, 2019

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The variance-covariance matrix, eigenvalue and factor loadings of the normalized university and airport infrastructure variables were calculated and illustrated below.⁶²

Table 7. 14 Variance-covariance matrix of univervity and airport infrastructure:

```
. factor Noofairport1000000pop NoofUnivetsity1000000pop ,pcf
(obs=10)
```

Factor analysis/correlation	Number of obs	=	10
Method: principal-component factors	Retained factors	=	1
Rotation: (unrotated)	Number of params	=	1

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.98762	1.97524	0.9938	0.9938
Factor2	0.01238	.	0.0062	1.0000


```
LR test: independent vs. saturated:  chi2(1)  =   31.49 Prob>chi2 = 0.0000
```



```
Factor loadings (pattern matrix) and unique variances
```

Variable	Factor1	Uniqueness
Noofairport~p	0.9969	0.0062
NoofUnivets~p	0.9969	0.0062

As shown in the above procedure, the analysis has primarily made the distribution normalized. It helps to avoid the variation which can occur due to a non-considered effect. Then, PCA is done. This is a systematic way of reducing a large set of factors in a narrowed manner without losing the generality. In the calculation, the eigenvalue and eigenvector composition result would get. The eigenvalue indicated about the total variance accounted by each factor. The sum of all eigenvalues would be equivalent to the total number of variables. When negative, the sum of all eigenvalues is equal to the total number of factors (variables) with positive eigenvalues.

⁶² Note 1: PCA is more useful when dealing with 3 or higher dimensional data (which is applied in Chap. 8). It is always performed on a symmetric correlation or covariance matrix. This means the matrix should be numeric and have standardized data. Normalization is important in PCA since it is a variance maximizing exercise. It projects your original data onto directions which maximize the variance.

Note 2: The terms normalization and standardization are sometimes used interchangeably, but they usually refer to different things. Normalization usually means to scale a variable to have a values between 0 and 1, while standardization transforms data to have a mean of zero and a standard deviation of 1. Standardizing the features around the center and 0 with a standard deviation of 1 is important when we compare measurements that have different units. Variables that are measured at different scales do not contribute equally to the analysis and might end up creating a bias. Standardizing a set of scores—that is, converting them to z-scores—that is, subtracting the mean and dividing by the standard deviation—indeed will not make a distribution any more or less normal.

Note 3: An eigenvalue is a number, telling you how much variance there is in the data in that direction, in the example above the eigenvalue is a number telling us how spread out the data is on the line. The eigenvector with the highest eigenvalue is therefore the principal component. EigendecompositionComputing: Eigenvectors and Eigenvalues...The eigenvectors and eigenvalues of a covariance (or correlation) matrix represent the “core” of a PCA: The eigenvectors (principal components) determine the directions of the new feature space, and the eigenvalues determine their magnitude... Geometrically, an eigenvector, corresponding to a real nonzero eigenvalue, points in a direction in which it is stretched by the transformation and the eigenvalue is the factor by which it is stretched. ... If the eigenvalue is negative, the direction is reversed.

Note 4: Factor loadings (factor or component coefficients): The factor loadings, also called component loadings in PCA, are the correlation coefficients between the variables (rows) and factors (columns). Analogous to Pearson's r, the squared factor loading is the percent of variance in that variable explained by the factor.

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In the distribution of airports, the states are divided into sound and lagging regions according to their value into the standardized data. The sound regions have a value higher than the average value (0.3478) of the normalized data including Gambela, Dire Dawa, and Benishangul; and, the lagging states have a lower-than-average value (0.3478) including Afar, Tigray, Somali, Amhara, SNNP, Oromia, and Harari. Similarly, in the distribution of universities, the states are divided into sound and lagging regions according to their value into the standardized data. The sound regions have a value higher than the average value (0.3609) of the normalized data including Gambela, Dire Dawa, and Benishangul; and, the lagging states have a lower-than-average value (0.3609) including Tigray, Afar, SNNP, Amhara, Somali, Oromia, and Harari.

Analyzing the states by the standardized data of airports; in the result, anyone can observe variations among them. Gambela has the distinction of being at the top of the list with an overall index score of 1.0000. It is 100 times the value of the region with the lowest (Zero) value of the overall development index, Harari, which has an index score of 0.0000. The difference between these two extreme overall index scores is 1.0000. The mean standardized value for all regions is 0.3478 and the standard deviation is 0.3440. This is clear evidence of dispersion or disparities between regions with respect to the standardized data.

Analyzing the states by the standardized data of universities; in the result, anyone can observe variations among them. Gambela has the distinction of being at the top of the list with an overall index score of 1.0000. It is 100 times the value of the region with the lowest (zero) value of the overall development index, Harari, which has an index score of 0.0000. The difference between these two extreme overall index scores is 1.0000. The mean standardized value for all regions is 0.3609 and the standard deviation is 0.3165. This is clear evidence of dispersion or disparities between regions with respect to the standardized data due to coordination failures and lack of equitable allocation's policies and strategies. This is also due to the lack of integrated frameworks including the lack of proper government interventions and the lack of proper understanding and implementation of the constitution and the federal system. Hence, individuals, communities, groups, and regional states that are negatively affected by infrastructure allocation policies need to be compensated (Thomopoulos *et al*, 2009).

7.5 Conclusions

Industrial policy and practice are one of the most misunderstood areas of governments. It is mentioned that even though, many of its critics recognize the positive contribution it has made in some East Asian

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cases there remain large amounts of skepticism about its relevance or usefulness in other contexts. Moreover, industrial policy and practice are an invitation to corruption and rent-seeking, and it opens the door to preferential policies whose main purpose is to transfer income to politically connected groups. For modern industrial policies to contribute towards a collaborative and sustainable development strategy, they need to be part of an integrated framework as there are coordination failures by the lack of proper government interventions. Therefore, industrial policies require effective implementation. Then, institutional capacity-building is critical for the effective and efficient formulation and implementation of industrial policies. The Ethiopian government should focus on the ambiguous case for industrial policy in practice as it is implementing a huge investment in Industrial Parks development in the country which needs a great debate. It is also crucial to give great attention to both efficiency and equity in the country's industrial park development.

Besides the above overview of industrial park development, the study has also assessed the perceptions of infrastructure sector staff about industry park allocation in Ethiopia. This showed that the majority of the respondents perceive that there is a lack of equitable allocation in Industry Parks across regions in Ethiopia. In addition to the questionnaire survey, 94% of interviewees and all focus group discussants believed that there is a lack of equitable allocations of Industry Parks across the regions in Ethiopia (Interview, 2019). See Chap. 9 sec. 9.8.6 and 9.9.5 respectively.

Likewise, major airport investments are essential to meeting the growing passenger and cargo demand. The risks and uncertainties make the decision-making process difficult. And even if such developments are agreed, it takes a very long time to build new airport infrastructure. The distribution of airports does not have the same patterns across regions in Ethiopia. Meanwhile, in the case of Ethiopia, there are no written and clear principles, policies, standard, and criteria to establish a new airport in the regional states in Ethiopia. In addition to the above overview of airport development, it has been also assessed the perceptions of infrastructure sector staff about airport distributions in Ethiopia. This showed that the majority of the respondents perceive that there is a lack of equitable allocation of airports across regional states in Ethiopia. Besides the questionnaire survey, 89% of interviewees and all focus group discussants agreed that there is no equitable allocation of airports across the regions in Ethiopia (Interview, 2019). Finally, this is clear evidence of dispersion or disparities between regions with respect to the standardized data. See Chap. 9 sec. 9.8.6 and 9.9.5 respectively.

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A large scale of expansion is possibly one of the typical features of education in Ethiopia at all levels in the previous two decades. However, the distribution of universities does not have similar patterns. Rather than oral speaking, the guidelines used for allocating expenditure by MoSHE ought to be documented and extensively distributed across government, Parliament, and Civil Society to enhance transparency in higher education spending. Therefore, it needs to prepare clear principles, policies, standard, and criteria to establish a new university in a region in Ethiopia. In addition to the above overview of higher education, it has been also assessed the perceptions of infrastructure sector staff about university distributions in Ethiopia. This showed that the majority of the respondents perceive that there is an equitable distribution of university in Ethiopia. In contrast to this, specifically, the majority of respondents of FDRE Ministry of Science and Higher Education's staff perceive that there is a lack of equitable distribution of university in Ethiopia. In addition to the questionnaire survey, 22% of interviewees, and all focus group discussants believed that there is a lack of equitable distribution of universities across the regions in Ethiopia (Interview, 2019). See Chap. 9 sec.9.8.5 and 9.9.5 respectively.

Finally, PCA analysis showed that there is clear evidence of dispersion or disparities between regional states which have negative impacts on the nation-building processes in Ethiopia. Both industrial parks, airport and university establishments do not have clear direction and criteria to ensure equitable infrastructure distribution across regions. This is also due to a lack of integrated frameworks as there are coordination failures by the lack of proper government interventions as well as deep interventions with privatization and anti-corruption programs (Hoff, 2001). As per my understanding, there is a trade-off between efficiency and equity. Currently, Ethiopians are becoming more equity sensitive than the efficiency of infrastructure distribution which needs a great effort for attitudinal changes. This is also consistent with interviews and focuses group discussion results (Interview, 2019) (see Chap. 9 sec. 9.8 and 9.9 respectively). Thus, the Ethiopian government should give more emphasis on equity using placed-based policies and principles (Duranton & Venables, 2019). Gradually, it should give equal emphasis to both. Based on this chapter's elementary analysis and experience, the study analyzed infrastructure development and economic growth in relation to infrastructure (in) equities across regional states in Ethiopia in Chapter 8 by focusing on road, electricity, and telecommunication.

CHAPTER 8

INFRASTRUCTURE DEVELOPMENT AND ECONOMIC GROWTH: ANALYZING INFRASTRUCTURE INEQUITIES ACROSS REGIONAL STATES IN ETHIOPIA

Introduction

The specific objectives of this chapter are to examine whether infrastructure decisions and spendings are equitable across the regional states in the federal government of Ethiopia by focusing on road, electricity, and telecommunication which gives emphasis on economic infrastructures. Thus, this chapter examined the primary and secondary data collected and discusses the results. This chapter also analyzed the spatial disparities in infrastructural accesses across 9 states and 2 city administration of Ethiopia and in turn, briefly assessed its impact economic growth in relation to infrastructure. This chapter starts with a study of the main measurements of global, regional, and national competitiveness of sub-Saharan Africa and Ethiopia. In most countries, federal governments have considerable policy discretion in the allocation of infrastructure investment across regional states (Castells & Sole-Olle, 2006). Thus, this study seeks to provide evidence that reflects the equity of public infrastructure investments to support economic growth and the nation-building process in time, that is, the data are collected at more or less one moment in time ('cross-sectional') but not over a period of time, repeatedly observing or interviewing the respondents ('longitudinal') as mentioned in Chap.3. Finally, the CII result exhibited that there is a lack of infrastructure equity across regional states in Ethiopia. See Table 8.16 below. The chapter has its own conclusions.

8.1 Performance Indicators of Infrastructure

The purpose of the analysis is to provide a big picture of the level of equity of public investments in infrastructure to support the nation-building process in Ethiopia (Demurger, 2001). Notably, time series availability and country coverage across the various indicators of infrastructure are not homogeneous. The indicators that are used to study the performance of infrastructure in Sub-Saharan Africa such as Telecom (Telecommunications density, Internet density, and Fixed broadband), Electricity (Generating Capacity and Access to Electricity (% people), and Road (Total road length, Paved roads (%), etc.) (Calderon *et al*, 2018). Such an integrated index, however, can be found in the Global Competitiveness

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Report (GCR) published annually by the WEF (WEF, 2018). Besides, separate indices for various types of infrastructure, the WEF uses a composite index for assessing the competitiveness of a nation in terms of infrastructure development (Schwab, 2018). Calderon *et al* (2018) have also provided a scorecard on infrastructure development in Sub-Saharan Africa over the previous decades along with three sectors (electric power, telecommunications, and road transportation) and 3 dimensions (quantity, quality, and access). Table 8.1. summarizes the indicators that are used to study the performance of infrastructure in Sub-Saharan Africa (Africa's Pulse, 2017; Calderon *et al*, 2018).

Table 8. 1 Indicators of infrastructure performance

Dimension	Telecom	Energy	Road
Quantity	– Telecommunications density – Internet density – Fixed broadband	– Electricity generating capacity	– Total road length
Quality	– International Internet bandwidth	– Energy quality (%) – WEF quality power supply	– Paved roads (%) – WEF quality of roads
Access		– Access to electricity (%)	

Source: Adapted from Cesar Calderon, Catalina Cantu and Punam Chuhan-Pole (2018), Infrastructure Development in Sub-Saharan Africa: A Scorecard, Policy research Working Paper 8425, Africa Region Office of the chief economist, World Bank Group.

Whereas, Patra and Acharya (2011) computed the Infrastructure Development Index for 16 major Indian states through Principal Component Analysis (PCA). They also mentioned that infrastructure can be measured either in terms of investment towards a particular service or in terms of the physical quantity of the services available to the end-users. Simon and Natarajan (2017) also stated that infrastructure can be measured by a composite index constructed using PCA. To measure inequality in infrastructure, coefficients of variation and Gini coefficients have been considered from the constructed infrastructure index across states in India for each year. Chotia and Rao (2015) also investigated the interlinkages between regional infrastructure inequalities, economic growth, and poverty in the 21 main Indian States. An overall wide-ranging index of infrastructure, the composite Infrastructure Index (CII), was calculated for each Indian state using the PCA technique. In order to analyze the regional disparities between states in terms of infrastructure, they were categorized based on the calculated CII. They extended their analysis by assessing the interrelationship between the CII, Per Capita Net State Domestic Product (PCNSDP),

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and poverty. Their empirical analysis also provided that composite infrastructural growth and economic growth go hand in hand. The African Infrastructure Development Index (AIDI) has been also done based on 3 main components: (i) Transport; (ii) Electricity and (iii) ICT. These components are disaggregated into indicators that have a direct or indirect impact on productivity and economic growth (Patra and Acharya, 2011; AfDB, 2013; Ashenafi, 2017).

This study employed different indicators of physical infrastructure services with their respective weights to construct the infrastructure index. Therefore, it used these and other methods for infrastructure distribution and its impact on nation-building in Ethiopia. In this chapter, it has been compared to Ethiopian states in terms of infrastructure, based on the three major sub-sectors of infrastructure. This is because the economic development of a nation depends heavily on the accessibility and ease of access to the facilities provided by these sectors. In transport, roads should be developed first. Electric and telecommunication also need consistent development and progress. Thus, the basic human requirements should have access to the resources required for a “decent standard of living” via good transport, continuous electricity from the energy, and telecommunication service. The absence of these facilities results in an alarming trend of socio-economic disparity (Patra and Acharya, 2011; AfDB, 2013).

8.2 Approaches to Measure Infrastructure (in) equity/Disparity in Ethiopia

As mentioned in Chap. 2, according to empirical analysis, Yilmaz & Cetin (2018) have claimed that infrastructure has a positive and significant impact on growth. Specifically, for the telecom and road sectors, rates of return have been assessed to be between 19-29% respectively (World Bank, 1994). Therefore, many types of research with different approaches have been performed by many scholars to test the impact of infrastructure on income inequality. The first group of researchers used a single indicator as an infrastructure proxy. For example, Fan & Zhang (2002) used an indicator of road density to measure the impacts of infrastructure on inequality in India. Whereas, the second group of researchers used several indicators to proxy for infrastructure. For instance, Bajar & Rajeev (2015) used several sectors such as roads, electricity, and telecommunication as a proxy of infrastructure to investigate the interrelationship between infrastructure and inequality in India. There is also the third group those uses several indicators and construct indices to proxy for infrastructure to overcome the high correlation that often found among various infrastructure indicators. Thus, this study has been followed the approach used (Bajar and Rajeev (2015), Patra and Acharya, 2011 and Calderon and Serven (2004, 2010, and 2014) by constructing quantitative indices to measure the multi-dimensional concept of infrastructure as a methodology. However, it has been also analyzed the impact of these various sectors of infrastructure individually to obtain a comprehensive examination of the impact of different categories of infrastructure on income inequality and equity.

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Finally, in order to construct the aggregate index of infrastructure access, it has been used data from three sectors: road sector (road density in km of road per km² of land area and pop. density), telecommunication sector (the %age of households which connected to telephone lines, %age of households which own cellular phone, and %age of households with internet access), and electricity sector (capacity usage per MW per region and per 1million population) including airport and university per population. All three infrastructure quantities enter the first principal component with almost similar weights (Makmuri, 2017). In this study, as mentioned in the literature review in Chap. 2, it has been used the physical stocks as measurement.

As mentioned above, an integrated index can be found in the global competitive report (GCR) published annually by the WEF (WEF, 2018). Besides, separate indices for various types of infrastructure, the WEF used a composite index for assessing the competitiveness of Ethiopia in terms of infrastructure development. As one can see from Table 8.2, the rank of Ethiopia in infrastructure is 120/140. In the road connectivity index, Ethiopia ranks 123/140. Moreover, in the electrification rate per % population, Ethiopia ranks 121/140. In Internet users per population %, Ethiopia also ranks 127/140.

Table 8. 2 Score and rank in infrastructure and ICT adoption in global competitiveness index of Ethiopia

No	Index Component	Value	Score*	Rank	Best Performer
1	Pillar 1: Infrastructure 0-100 (best)	-	45.5↓	120	Singapore
1.1	Road connectivity index 0-100 (best)	32.0	32.0=	123	United States
1.2	Quality of roads1-7 (best)	3.3	37.8=	103	Singapore
1.3	Airport connectivity index (United States=100)	42,696.8	49.6↓	69	Multiple (8)
1.4	Efficiency of air transport services1-7 (best)	4.0	50.2=	93	Singapore
1.5	Electrification rate% pop.	40.4	40.4↓	121	Multiple (66)
1.6	Electric power transmission and distribution losses% output	17.3	86.2 ↓	107	Multiple (9)
2	Pillar 2: ICT adoption 0-100 (best)	-	16.0 ↓	138	Korea, Rep.
2.1	Mobile-cellular telephone subscriptions /100 pop	59.7	49.7↓	130	Multiple (68)
2.2	Mobile-broadband subscriptions/100 pop	7.1	n/a	138	United Arab Emirates
2.3	Fixed-broadband Internet subscriptions/100 pop	0.6	1.1↓	115	Switzerland
2.4	Fiber Internet subscriptions/100 pop	0.0	n/a	106	Korea, Rep
2.3	Internet users % pop	15.4	15.4↓	127	Iceland

* Scores are on a 0-100 scale, where 100 signifies the optimal situation or 'frontier'. Arrows show the direction of the change in score from the preceding edition, if available.

Source: Based on Schwab (2018), World Economic Forum, The Global Competitiveness Report, the Researcher's Work

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The quality and extension of transport infrastructure (road, air, etc.) and utility infrastructure is the pillar of the global competitiveness report. The reason why it is chosen is that better-connected geographic areas have generally been more prosperous. A well-built infrastructure decreases transportation and transaction costs and eases the movement of goods and people and the transfer of information within a country and across borders. It also guarantees access to power as necessary conditions for contemporary economic activity. The other pillar in this study is the degree of diffusion of specific Information and Communication Technologies (ICTs) in a country. The reason why it is also chosen as a pillar is that ICTs decrease transaction costs and speed up information and idea exchange, enhancing efficiency and initiating innovation. As ICTs are general-purpose technologies progressively embedded in the structure of the economy, they are becoming as essential as transport and electric power infrastructure for all economies (Schwab,2018). Specifically, road, electricity, and telecommunication distributions across regions in Ethiopia are discussed as follows.

8.3 Road Distribution in Ethiopia

8.3.1 Trends of Road Network

Road infrastructure is a physical resource that road users can make use of and incorporate into their value-creation process. For the users, it is a means to an end. However, only 70% of the population in developing countries (and 33 percent in Africa) have access to an all-weather road (Dethier & Moore, 2012). According to GTP II, the GoE considers transport infrastructure to be the crucial catalyst for sustainable development and broad and inclusive growth. GTP II follows GTP I (2011-2015), in prioritizing infrastructure development; in particular, road construction and rural electrification programs. As part of its ambitious plans, GTP II aims to nearly double the length of roads in the country (up to 220,000 km, from the target of 120,000 km defined in GTP I) in 2019/20 (Jalles d'Orey & Prizzon, 2017). More physical infrastructure investment such as roads will bring the regions closer to the world markets and decreases regional disparity (Fan & Zhang, 2002).

More importantly, the roads sector is one of the priority areas of the government of Ethiopia besides agriculture, education, health, and water. It is one of the top sectors with regard to budget allocation in the country. In the period 1997-2018, Birr 231 billion worth of federal road projects were carried out. In the 2018/19-budget year, Birr 45 billion was allocated to ERA. This is near to 40% of the total federal capital budget for 2018/19, which stood at Birr 114.7 billion. This clearly signifies a high level of government commitment to road infrastructure development, which has been a priority for many years (Harris *et al*, 2019). Thus, investment in road infrastructure looks to be the main driver of economic

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growth in Ethiopia assumed the current economic structure and level of development (Harris *et al*, 2019; Nuramo & Haupt, 2015). As mentioned in Chap. 2, the Ethiopian Road Authority (ERA) stated that “road infrastructure supports and catalyzes the achievement of economic and social growth and the meeting of poverty reduction objectives” (ERA, 2007, p. 7) in Ethiopia. The rural population of Ethiopia also states that “The road is our bloodline!” (Rammelt, 2018, p.15). More importantly, road access is a significant determinant of poverty in Ethiopia (WBG, 2017). According to WBG (2017), poverty rates increase by 7 percent for every 10 kilometers’ distance from a market town. Moreover, poverty reduction from agricultural growth displays similar patterns, as poverty reduction is higher for people close to urban centers (26 percent) than those living in rural areas (4 percent). This further illustrates the role of spatial connectivity in poverty reduction: travel times to urban centers are an important variable in reducing poverty (WBG, 2017).

In 2017, Table 8.3 indicated that Diredawa, Harari, South, Oromia, and Amhara are below the national average in road density per 1000 population (0.31). Whereas, Gambela, Afar, BenshangulGumuz, Tigray, and Somali are more than the national average in road density per 1000 population. From the density per 1000 sq.km point of view, Harari, South, Amhara, Diredawa, Tigray, Afar, Oromia, and Gambela are more than the national average in road density per 1000 sq.km, (23.4). Whereas, Somali and BenshangulGumuz are under the national average.

Table 8. 3 Road Network by Region in km, 2017

Region	Asphalt	Gravel	Total	Population	Density per 1000 popn.	Area (Km2)	Density per 1000 sq. km
Afar	1,547	366	1912	1,812,002	1.06	72,053	26.5
Amhara	3,639	2604	6243	21,134,988	0.30	170,752	36.6
Benishangul Gumuz	264	487	751	1,066,001	0.70	50,380	14.9
Diredawa	35	18	53	466,003	0.11	1,559	34.0
Gambella	238	376	614	435,999	1.41	25,274	24.3
Harari	44	10	54	246,000	0.22	343	157.4
Oromia	4,476	4480	8956	35,467,001	0.25	353,690	25.3
Somali	968	1678	2646	5,748,998	0.46	350,000	7.6
South	2,592	2008	4600	19,170,007	0.24	110,932	41.5
Tigray	2,184	404	2588	5,247,005	0.49	80,000	32.4
Grand Total	15988	12430	28418	90,794,004	0.31	1,214,983	23.4

Source: Based on Ethiopian Road Authority Data, 2017/18, the Researcher’s Calculation

Note: Only federal roads and also excluding Addis Ababa.

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In 1997, Table 8.4 indicated that Direedawa, Harari, South, and Amhara are under the national average in road density per 1000 population (0.28). Whereas, Gambela, Afar, BenshangulGumuz, Tigray, Somali, and Oromia were above the national average in road density per 1000 population. From the density per 1000 sq.km point of view, Harari, South, Amhara, Direedawa, and Oromia are more than the national average in road density per 1000 sq.km (13.0). Whereas, Somali, Tigray, Gambela, Afar, and BenshangulGumuz were under the national average.

Table 8. 4 Road network by region in Km, 1997

Region	Asphalt	Gravel	Total	Population	Density per 1000 popn.	Area (Km2)	Density per 1000 sq. km
Afar	669	173	842	1,216,031	0.69	72,053	11.7
Amhara	585	3540	4125	15,205,342	0.27	170,752	24.2
Benishangul Gumuz	0	454	454	506,093	0.90	50,380	9.0
Diredawa	17	18	35	276,825	0.13	1,559	22.5
Gambella	0	258	258	199,885	1.29	25,274	10.2
Harar	5	17	22	144,136	0.15	343	64.1
Oromia	1934	4390	6324	20,589,008	0.31	353,690	17.9
Somali	0	1021	1021	3,465,152	0.29	350,000	2.9
South	320	1445	1765	1,405,441	0.15	110,932	15.9
Tigray	35	919	954	3,447,086	0.28	80,000	11.9
Grand Total	3565	12235	15800	56,454,999	0.28	1,214,983	13.0

Source: Based on Ethiopian Road Authority Data, 2017/18, the Researcher's Calculation

Note: Only federal roads and also excluding Addis Ababa.

Table 8.5 indicated that the percentage increase from 1997 to 2017 is higher in Tigray, South, Somali, Harari, Gambela, and Afar. Whereas, the percentage increase from 1997 to 2017 is lower in Oromia, Amhara, Direedawa, and BenshangulGumuz.

Table 8. 5 Percentage Increase among Regions in 2017 from 1997

Region	Asphalt	Gravel	Total
Afar	131.2	111.4	127.1
Amhara	522.0	-26.4	51.4
Benishangul Gumuz	++	7.2	65.4
Diredawa	105.9	0.0	51.4

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Gambella	++	45.7	138.0
Harar	780.0	-41.2	145.5
Oromia	131.4	2.0	41.6
Somali	++	64.4	159.2
South	710.1	38.9	160.6
Tigray	++	-56.0	171.3
Grand Total	348.5	1.6	79.9

Source: Based on Ethiopian Road Authority Data, 2017/18, the Researcher's Calculation

Since ERA reports to the Ministry of Transport (MoT), ERA received the instruction to be involved in the construction of intra-regional roads through the MoT. The main motive to involve ERA in intra-regional road construction was to ensure equity as regions have different capacities in road construction (Harris *et al*, 2019). However, the above fact does not show equity. Thus, this direction has negatively affected the equitable allocation of infrastructure across the regional states in Ethiopia. In addition, rural access is among the most vital infrastructure constrictions in rural Africa (Iimi *et al*, 2018). In Ethiopia, there is more than 120,000 km of roads, of which only 14,000 km or about 13% are paved. In recent years, the government of Ethiopia has been making noteworthy efforts to develop both key corridors and rural feeder roads. However, there are a number of feeder roads that are in poor condition. Only about 29% of the total road network is a good condition in Ethiopia. It is also indicated that the road network condition is relatively good in the northern and southern parts of Ethiopia (Iimi *et al*, 2018).

8.3.2 Evidence in Spatial Development of Road in Ethiopia

Grounded on a background note, Geiger and Kanth (2017) had written for the World Bank's 2017–2022 Country Partnership Framework in Ethiopia, and they presented their significant findings on the spatial or regional distribution of infrastructure across regions in Ethiopia. They showed that, between 2006 and 2016, the expansion in road density was focused in certain regions, particularly Ethiopia's capital of Addis Ababa, including Tigray in the North of the country and in Oromia in the center (Geiger & Kanth, 2017). Geiger and Kanth (2017) stated that economically lagging and remote regions, and Amhara Region, see lesser expansions in road density. Considering the development of roads as a proxy for the development of infrastructure, this suggested that infrastructure development has been heterogeneous across all regions. This is more or less similar to the above discussion. It also showed that road connectivity for some regions is poor, both within those regions and with other regions, with results in labor mobility, the transportation of services and goods, and for agricultural productivity as the travel

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times and distance to markets are longer. Geiger and Kanth (2017) also mentioned that, in spite of the large infrastructure investments commenced by the Ethiopian government in the previous 10 years, accessibility by road to rural areas remains low in Ethiopia. The Rural Access Index was 21.6% in 2016, suggesting that only around 22% of the rural population had access within a 2km distance of them to a “decent road” (Geiger & Kanth,2017).

Based on Table 8.6, Tekeste (2018) stated that the federal road network so far in Ethiopia, its distribution across regions has been largely “fair and balanced”. According to Tekeste (2018), one can observe, from Table 8.6, that regional states with the larger populations have a proportionately larger share of the network. He also mentioned that, for example, 32% of the federal road network is in Oromia state, while 23% of it is found in Amhara state. The SNNPR has 16% of the federal road network. Thus, Tekeste indicated that the above three states account for 71% of the total road network, indicating that the federal fiscal policy has generally supported “a dense distribution of road networks in the states with higher population sizes”. Whereas, Somali and Tigray account for 9%. The remaining four states, along with Direedawa, account for the balance of about10 %. But, the points should also take in to account the state’s population and area. When one looks at the road density per 1000 population and density per1000 sq.km point of view, this analysis has opposite results.

Table 8. 6 Distribution of road infrastructure by region and road type

Region States	Federal roads (paved and unpaved)		Regional Roads (Rural and Woreda)		Total Federal and regional Roads	
	In Km	Share in %	In Km	Share in %	In Km	Share in %
Tigray	2,588.0	9.0	3,905.0	4.5	6,493	5.7
Afar	1,916.2	6.7	1,178.0	1.4	3,094	2.7
Amhara	6,502.4	22.7	16,430.0	19.1	22,932	20.0
Oromia	9,081.0	31.6	42,491.0	49.3	51,572	44.9
Soimali	2,586.0	9.0	3,235.0	3.8	5,821	5.1
SNNPR	4,591.6	16.0	14,521.0	16.9	19,113	16.6
B/Gumuz	734.6	2.6	1,407.0	1.6	2,142	1.9
Gambela	602.0	2.1	1,941.0	2.3	2,543	2.2
Diredawa	45,0	0.2	627.0	0.7	672	0.6
Harari	52.0	0.2	379.0	0.4	431	0.4
Addis Ababa	-	-	-	-	-	-
Total	28,699	100.0	86,115.0	100.0	114,814	100.0

Source: Assefa Fiseha (ed.), 2018, Emerging Issues in Federalism and Governance in Ethiopia; **Note:** Ethiopian Roads Authority, 2018

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Therefore, from Table 8.3 above, Direedawa, Harari, South, Oromia, and Amhara have road density per 1000 population which is under the national average (0.31). Whereas, Gambela, Afar, BenshangulGumuz, Tigray, and Somali have road density per 1000 population which is more than the national average. From the density per 1000 sq.km point of view, Harari, South, Amhara, Direedawa, Tigray, Afar, Oromia, and Gambela have road density per 1000 sq.km which is more than the national average (23.4). Whereas, Somali and BenshangulGumuz have road density under the national average. In contrast to Tekeste (2018) analysis, regions with larger populations, for example, Oromia and Amhara have lower road density per 1000 population from the national average. This shows that there is no fair allocation in the road sector across regions in Ethiopia.

Generally, federally funded road construction decisions in the road sector are largely directed by 5 years of Road Sector Development Programs (RSDP) which all regions are involved in developing. Road connectivity throughout the country has notably improved. Moreover, there are guidelines used by ERA in their decision in the selection of road projects and the standard of the road to be constructed. However, such policies and guidelines are not properly endorsed and formally communicated to regional states, stakeholders, and the citizens at large. Besides, the various aspects of the guidelines are not consolidated in a single document. This has significantly contributed to the perceived disparity in the allocation process (Harris *et al*, 2019). It is actually not the only perception but also a reality.

8.4 Electricity Distribution in Ethiopia

8.4.1 Status of Electric Distribution in the Urban, Rural kebeles and Villages in Ethiopia

Best and Burke (2018) investigated whether greater electricity availability helps countries rise to faster economic growth trajectories or not. This is an important question for many developing countries that are currently prioritizing infrastructure investments. Using cross-sectional and panel regressions with national-level decade data, Best and Burke (2018) found some evidence that electricity availability has a significant effect on successive economic growth. In developing countries, more than a quarter of households have no access to electricity-with 70 percent of the African population unconnected (Dethier & Moore, 2012). Whereas about 60% of Ethiopia's population has no access to electricity and where there is grid coverage, only 60% of households are connected. About 85% of the urban population has access to electricity while only 29% of the rural population has access (Deloitte, 2019). Even though, Ethiopia has the 2nd highest electricity generation capacity in SSA after South Africa, at 4, 206 MW (Deloitte, 2019). According to GTP II, the country's installed electricity generating capacity is expected to reach 17,346 MW by the end of 2019/20, from the current level of around 4,200 MW. GTP

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II follows GTP I (2011-2015), in prioritizing infrastructure development; in particular, road construction and rural electrification programs. As part of its ambitious plans, the plan target for energy is to increase electricity service coverage from 60% (in 2014/15) to 90% in 2019/20 (Jalles d'Orey & Prizzon, 2017; Deloitte, 2019).

Therefore, electricity access is a key challenge for households and firms in Ethiopia. However, Ethiopia is the world's cleanest energy producers with 97% of its electricity generated through hydropower. Ethiopia has also enhanced electricity coverage through the grid, which is high with 60% of towns and villages covered. However, Ethiopia has the 2nd highest electricity deficit, in terms of household connections, in SSA with an on-grid access rate of 15 percent and an off-grid access rate of 10 percent. Limited access to reliable energy hinders firm performance and growth as well (WBG, 2017). Moreover, the country continues to experience energy shortages due to a drop in water levels in hydroelectric dams. This has resulted in a suspension of energy exports to neighboring Djibouti and Sudan (Deloitte, 2019). Besides, the World Bank has conducted studies in order to have electric power access for all Ethiopians in 2025. The government of Ethiopia has been implementing a plan of 65% of the population (in the household level) directly from the grid power and the remaining 35% from different power sources (off-grid) (EEP/U, 2017/18; Deloitte, 2019). More importantly, once completed, the Grand Ethiopian Renaissance Dam (GERD) is expected to be the largest hydropower plant in Africa and is further expected to generate 6,450 MW of electricity at full capacity (Deloitte, 2019). Though, Ethiopia is becoming one of the fastest-growing countries in Africa, even in the world (Ethiopian Electric Power/ Utility (EEU), 2017/18; Deloitte, 2019).

8.4.2 Substation Coverage Based on Number of Population and Capacity usage per MW per Region and per 1 million population

In Table 8.7 and 8.8, the study identified the Substation Coverage Based on Number of Population and Capacity usage per MW per Region and per 1 million population in Ethiopia. As can be seen from Table 8.7, Addis Ababa, Diredawa, Harari, Gambela, Afar, Oromia, and Tigray have additional substation coverage. However, BenshangulGumuz, Amhara, SNNP, and Somali need additional substations to ensure equity. Thus, the distribution of electricity per substation coverage is varied across the regions. Although regional household consumption is only inaccurately related to regional production as (a) some substations serve multiple regions and (b) some electricity is distributed to commercial use and not households. In other words, the existence of additional substations in a region does not infer better household electricity consumption in that region.

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Table 8. 7 Substation Coverage Based on Number of Population

No_	Political Region	Number of Population	Number of population in %age portion	Number service giving substation	Number of substation per 1 million pop.	Service Giving substation of 15/33 K. Volt Total Capacity by MVA	Based on number of population, the would be substations per each region		Based on population, the difference between the would be substations and constructed substations		Remarks
							Number	Total capacity by MVA	Number	Total capacity by MVA	
1	Addis Ababa	3,433,999	3.64%	29	8.44	1841.60	6	312.30	-23	-1529.30	Although, it needs special consideration, based on population, 23 additional substations with total capacity of 1160.31 by MVA were constructed.
2	Afar	1,812,002	1.92%	4	2.20	168	3	164.79	-1	-3.21	Based on population, one additional substation with total capacity of 3.21 by MVA was constructed.
3	Amhara	21,134,988	22.41%	27	1.28	895.7	38	1922.11	11	1026.41	Based on population, in order to have equitable distribution, 11 additional substations with the total capacity of 1026.41 by MVA need to be constructed.
4	Bensha ngul Gumuz	1,066,001	1.13%	2	1.88	37.5	2	96.95	0	59.45	Based on population, there is equitable distribution.
5	South	19,170,007	20.33%	17	0.89	868.90	35	1743.41	18	874.51	Based on population, in order to have equitable distribution, 18 additional substations with the total capacity of 1032.66 by MVA need to be constructed.
6	Drieda wa	466,000	0.49%	3	6.44	136.8	1	42.38	-2	-94.42	Although, it also needs special consideration, based on population, 2 additional substation

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										with the capacity of 94.42 by MVA were constructed.
7	Gambela	435,999	0.46%	3	6.88 27.8	1	39.65	-2	11.85	Based on population, 2 additional substation with total capacity of 11.85 by MVA were constructed.
8	Harari	246,000	0.26%	3	12.19 61.2	1	22.37	-2	-38.83	Based on population, 2 additional substation with the total capacity of 38.83 by MVA were constructed.
9	Oromia	35,534,792	37.68%	65	1.83 3647.60	64	3231.70	-1	-415.90	Based on population, 1 additional substation with total capacity of 415.90 by MVA was constructed.
10	Somali	5,748,998	6.10%	5	0.87 188	10	522.84	5	334.84	Based on population, in order to have equitable distribution, 5 additional substations with total capacity of 334.84 by MVA need to be constructed.
11	Tigray	5,247,005	5.56%	13	2.48 702.60	10	477.19	-3	-225.41	Based on population, 3 additional substations with total capacity 225.41 by MVA were constructed.
Total		94,295,791	100.00%	171	1.83 8576	171	8575.70	0	0	

Source: Based on EEU (2017) Data, Researcher's Calculation.

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As can be seen from Table 8.8, in Capacity usage per MW per Region and per 1million population, Addis Ababa, Diredawa, Gambela, Tigray, and Afar are more than the national average (32.95). However, BenshangulGumuz, Amhara, Oromia, SNNP, Harari, and Somali are less than the national average. Hence, the distribution of electricity per MW is varied across the regions.

Table 8. 8 Capacity usage per MW per Region and per 1million population.

No	Region	Capacity usage per MW	Population	Capacity of MW per 1 million pop.
1	Addis Ababa	1240	3,384,569	366.37
2	Amhara	434	21,134,988	20.53
3	Oromia	620	35,467,001	17.48
4	Tigray	186	5,247,005	35.45
5	SNNP	310	19,170,007	16.17
6	Afar	62	1,812,002	34.22
7	Benishangul	31	1,066,001	29.08
8	Harari	3.1	246,000	12.60
9	Dire Dawa	124	466,003	266.09
10	Somali	62	5,748,998	10.78
11	Gambela	31	435,999	71.10
Country Level		3103.1	94,178,573	32.95

Source: Based on EEP (2019) Data, Researcher's Calculation; **Note:** Total installed capacity is 4250, loss 27%; this is an average capacity usage that can differ from time to time.

Tekeste (2018) also analyzed the federal program under-taken by public-enterprise power and utility companies (EEP) and EEU). As Tekeste (2018) mentioned, Ethiopia's electric supply has increased over the years, between 2005 and 2016, for example, its power generation capacity quadrupled from about 850 MW to 4,256 MW. The Universal Electrification Access Program (UEAP) was established to support the distribution of electricity throughout the country, and between 2005-2015 it increased the grid from 667 towns and villages to about 5, 000 (Fiseha (ed.), 2018). The regional distribution of electrified towns and villages has been shown in Table 8.9.

According to Tekeste (2018), as one can see from the Table 8.9, Oromia accounts for about 35.5% of the total number of towns and villages electrified by the EUAP, followed by Amhara with about

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28.5%. The SNNPR accounts for 19.2%, Tigray, for 8%. Tekeste (2018) stated that the statistics did not indicate a significant imbalance among the four regions. In contrast, Tekeste (2018) also stated that Gambela, Afar, BenshangulGumuz, and Somali appear to have lower levels of electrification of towns and villages. Tekeste (2018) added that there have been misgivings about some of the large-scale federal projects carried out by federal public enterprises. Tekeste (2018) also emphasized that it is not that there have been serious problems in their geographical distribution; rather, challenges have centered around planning, procurement, execution, and contract management. Tekeste (2018) also indicated that some public projects experience time and cost overruns as well as deviations from standards and designs, and cases of corruption have been reported (Fiseha (ed.), 2018).

In contrast to the above, as one can also see in Table 8.9 (the shaded one is calculated by the researcher), when one considers a number of towns and villages, for example, per 100,000 population, Gambela, BenshanulGumuz, Tigray, Amhara, and Afar have electrified towns and villages more than the national average (5.2). Whereas, Somali, Harari, Driedawa, SNNP, and Oromia have less than the national average. In the consideration of a number of towns and villages in percentage, Oromia is in the first category which has better coverage. But, in the consideration of a number of population per town and villages, Oromia is in the second category which has less than the national average. Thus, only calculating the total percentage of electrified towns and villages misleads the consideration of fairness in the country. Anyways, there is no fair allocation in the electricity sector across regions in Ethiopia. Generally, there are no formally written policies and guidelines used by EEP nor EEU in their allocation decisions, though both institutions were able to verbally explain processes. The absence of documented policy and guidelines significantly contributes to perceptions of unfairness (Harris *et al*, 2019). It is actually not the only perception but also a reality.

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Table 8. 9 Towns and villages electrified by the UEAP (EFY 1998-2017)

Region	Number of towns and villages	Percentage of total	Population	No_ of Towns and Villages per 100,000 pop.
Tigray	378	8.00	5,247,005	7.2
Afar	103	2.18	1,812,002	5.7
Amhara	1,345	28.47	21,134,988	6.4
Oromia	1,677	35.50	35,467,001	4.7
Somali	121	2.56	5,748,998	2.1
BenshangulGumuz	110	2.33	1,066,001	10.3
SNNPR	907	19.20	19,170,007	4.7
Gambella	54	1.14	435,999	12.4
Harari*	8	0.17	246,000	3.3
Diredawa*	21	0.44	466,003	4.5
Total	4,724	100	90,794,004	5.2

Includes towns and kebeles*

Source: Based on Assefa Fiseha (ed.), 2018, Emerging Issues in Federalism and Governance in Ethiopia; the Researcher's Calculation. **Note:** EEP/EEU.

8.5 National and Regional telecommunication Distribution Capacity in Ethiopia

The International Telecommunication Union (ITU) (which is the specialized United Nations agency for information and communication technologies (ICTs)) has recorded the universality of ICTs and the extent of digital gaps between countries and regions and through its annual ICT Development Index(IDI), which aggregates quantitative indicators for ICT use, ICT access, and ICT skills in the great majority of world economies (ITU, 2016). ITU also stated that there is a robust association between ICT and economic development, with the least developed nations at a specific disadvantage. The average IDI value for developed nations (7.40) is 3.33 points higher than that for developing nations (4.07), although developing nations enhanced their IDI value more than developed nations. There is also a great association between least connected nations, nations that are in the bottom quartile of the IDI 2016 delivery, and least developed nations. Certainly, the bottom 27 nations are all least developed nations, and the gap in IDI values between these nations and higher-performing developing nations to broaden (ITU,2016). The usage of the Internet and mobile phones, for example, is enabling more people in less develop countries to access financial facilities.

Moreover, Roller and Waverman (2001) investigated how telecommunications infrastructure affects economic growth. Telecommunication investments may enhance benefits in other sectors. In

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signifying that a country's telecommunications infrastructure has strong impacts on economic growth, it has been debated that telecommunications investments have significant spillovers and make externalities (Roller and Waverman, 2001). Thus, "If the telephone does have an effect on a countries' economy, it will be through the enhancement of the capabilities of managers to communicate with each other rapidly over increased distances" (Roller & Waverman, 2001, p.910). Therefore, there are ICT measurements world wide. According to ITU (2016), Ethiopia has got 0.9 in fixed-telephone subscriptions per100 inhabitants, 42.8 in mobile-cellular subscriptions per 100 inhabitants, 3.5 in the percentage of households with a computer, and 9.8 in the percentage of households with internet in 2015 (ITU,2016). Meanwhile, the history of telecommunication facilities in Ethiopia dates back to 1894 with the construction of a telephone line between Addis Ababa and Harar during the reign of Emperor Menelik (Harris *et al*, 2019). Hence, Ethio Telecom is one of the earliest public telephone suppliers in Africa (Harris *et al*, 2019). Ethio-Telecom is a state-owned enterprise and remains the sole supplier of telephone and internet services in the country.

As discussed in section 8.4 above, in mobile-cellular telephone subscriptions /100 pop, Ethiopia has got 59.7 value, 49.7 scores (scores are on a 0-100 scale, where 100 signifies the optimal situation or 'frontier'), and 130 ranks out of 140 countries in the world. In fixed-broadband internet subscriptions/100 pop, Ethiopia has got 0.6 value, 1.1 scores, and 115 ranks out of 140 countries in the world. In Internet users % pop, Ethiopia has got 15.4 value, 15.4 scores, and 127 ranks out of 140 counties in the world (Schwab,2018). Therefore, Ethiopia is relatively better in mobile-cellular subscriptions per 100 inhabitants than other aforementioned measurements. However, when one considers ICT in regional states in Ethiopia, there is a lack of such type of data availability in the country, especially across regional states. Therefore, it has been used total capacity and telecom density per 100 population in Ethiopia as a measurement across regional states in Ethiopia.

Likewise, expansion in telecoms infrastructure has been directed by demographic measures (population size and settlement pattern), economic and technical considerations. This is based on demand and meeting the expansion criteria. Regarding infrastructure equity issues, access to essential telecom services is one of the important factors in telecom geographic expansion while economic considerations drive largely network capacity (Harris *et al*, 2019). As one can see in Table 8.10 when one considers telecom density per 100 population, Addis Ababa, Harari, Driedawa, Tigray, Gambela, and BenshanulGumuz have telecom density more than the national average (67%). While, Somali,

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Afar, Amhara, Oromia, and SNNP have less than the national average. Although equity is considered in telecoms infrastructure spending as the point is to guarantee basic coverage to all citizens, there is still space for enhancements in quality of service delivery. Population size, settlement patterns, and economic feasibility establish network capacity and the type of service (2G, 3G, or 4G) (Harris *et al*, 2019).

Similarly, regional telecommunication distributions (mobile network capacity by region and fixed-line voice and data service network capacity by region in 2018) have also be considered in Tables 8.11 and 8.12 respectively.

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Table 8. 10 Total Capacity and Telecom Density per 100 Population in Ethiopia

Region	GSM Capacity1	UMTS Capacity2	LTE Capacity3	Total Capacity	Population	Telecom Density4	2 nd Generation Network Coverage	3 rd Generation Network Coverage
Addis Ababa	4,962,203	1,615,168	400,000	6,977,371	3,384,569	206%	100%	96%
Afar	988,837	06,871		1,195,708	1,812,002	66%	50%	38%
Amhara	10,949,987	2,631,890		13,581,877	21,134,988	64%	85%	71%
BenshangulGumuz	605,756	130,587		736,343	1,066,001	69%	55%	62%
Diredawa	691,769	143,138		834,907	446003	187%	100%	81%
Gambela	266,968	110,240		377,208	435,999	87%	58%	29%
Harari	378,665	83,870		462,535	246,000	188%		
Oromia	16,803,834	3,211,677		20,015,511	35,467,001	56%	82%	66%
SNNP	8,750,670	1,496,454		10,247,124	19,170,007	53%	83%	64%
Somali	2,586,177	640,520		3,226,697	5,748,998	56%	49%	31%
Tigray	4,118,628	935,593		5,054,222	5,247,005	96%	87%	73%
Country Lebel/ Total	51,103,494	11,206,008	400,000	62,709,503	94,178,512	67%	85%	68%

Source: Based on Ethiotelecom data, 20 17/18, the Researcher's Clculation

Note 1: GSM-Global System of Mobile1; UMTS -Univesal Telecommunication System 2; LTE-Long-Term Evoltion3; Note 2: Telecom Density4- per 100 population in the country.

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Table 8. 11 Mobile Network capacity by Region

Region	Current Capacity			
	2G Capacity	3G Capacity	4G capacity	Total
Addis Ababa	4,978,475	1,554,784	400,000	6,533,259
Afar	994,307	215,689		1,209,996
Amhara	11,851,899	2,757,276		14,609,175
Benshangul Gumuz	505,949	117,895		623,844
Dire Dawa	621,792	139,440		761,232
Gambela	275,790	111,942		387,732
Harari	275,299	64,740		340,039
Oromia	16,510,065	3,145,874		19,655,939
South	8,773,272	1,532,378		10,305,650
Somali	2,546,575	624,124		3,170,699
Tigray	4,045,248	917,181		4,962,429

Source: Ethio-Telecom, 2017/18

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Table 8. 12 Fixed line voice and data service network capacity by Region

Region	Voice	Data	Total
Addis Ababa	461,102	368,878	829,980
Afar	15,128	3,184	18,312
Amhara	177,220	106,021	283,241
Benshangul Gumuz	6,508	3,000	9,508
Die Dawa	20,056	20,264	40,320
Gambela	4,772	3,024	7,796
Harari	14,232	15,672	29,904
Oromia	269,731	135,130	404,861
South	106,528	64,040	170,568
Somali	26,062	12,576	38,638
Tigray	74,776	50,494	125,270
Especial Enumeration Area Region	2,368	832	3,200

Source: Ethio-telecom, 2017/18

8.6 Briefing Infrastructure, Economic Growth and Poverty Reduction in Africa

As reviewed in Chap. 2, policymakers and academics have long reflected a sufficient supply of infrastructure amenities to be significant for economic development (Calderon & Serven, 2014). Infrastructure is central for increasing economic progress and reducing poverty (Fay *et al*, 2010; Sawada, 2015; Ashenafi, 2017). Thus, it is here also very important to consider economic growth, infrastructure, and poverty reduction in Africa. The sufficient supply of infrastructure facilities has long been regarded as a prerequisite for poverty reduction and economic development, both in the policy and academic realms (Sawada, 2015). Paradoxically, in spite of this universally recognized attributes and importance, sub-Saharan Africa (SSA) tracks behind other regions in infrastructure service delivery and quality, with the gap widening over time. This is worryingly demonstrated in the energy sector. In spite of its great potential in clean energy resources, such as hydropower, solar, wind, and geothermal, investment in new facilities in SSA has been sadly inadequate, creating a chronic supply imbalance. Investment in maintaining existing infrastructure has also lagged behind, leaving many African nations with inefficient and degraded infrastructure facilities;

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poor quality roads, electricity, and inadequate information and communication technology (ICT) backbone (Jerome, 2011). The needs for infrastructure in SSA are enormous, hence the renaissance of interest in the region's infrastructure. Thus, infrastructure in Africa is very central to the various efforts to support growth, reduce poverty and improve the overall quality of life of Africans (Jerome, 2011; Ashenafi, 2017; UN-ECA, 2017).

It is also very important to consider infrastructure development and economic growth in Ethiopia, although the impact of infrastructure on economic growth is the focus of debate. According to Ashenafi (2017), using time series data from 1974/75-2014/15, a period across 40 years, and with the long run and short-run analysis, he found from such kind of relationship that economic infrastructure development is crucial for economic growth in Ethiopia over the periods under investigation. Besides, Ethiopian roads catalyzed production by facilitating the flows of inputs and outputs (Rammelt, 2018; Shiferaw, 2017). In both cases, the infrastructures are conducive to productivity growth in Ethiopia.

8.7 Poverty Analysis Reports of the Previous 20 years in Ethiopia

8.7.1 National and Regional GDP (Oromia, Amhara, Tigray, and Benshangul Gumuz) and Inequality by Region

The regional divergence in per capita income in India was explained in terms of inter-state variations in physical and social infrastructures (Simon and Natarajan, 2017). Inter-state disparities in infrastructure development in India were also analyzed by Chotia and Rao, 2015, and Patra and Acharya (2011). Intra-state studies within India have also been conducted to examine infrastructural disparity. It is clear from the literature that infrastructure has been linked with growth and inequality. Studies have also examined inequalities in infrastructure in a regional context (Simon & Natarajan, 2017). Makmuri (2017) found that telecommunication and road quantities tend to increase income disparity, while electricity quantity, airport quantity, and airport quality have a favorable effect on the allocation of income and help to improve income disparity.

According to Caleron and Serven (2014), infrastructure quality has also a vital impact on GDP growth. According to their empirical findings, Yilmaz and Cetin (2018) concluded that infrastructure has “a positive and significant determinant of per capita GDP growth”. They added that a one-point increase in infrastructure stocks would lead to an approximately 0.06 point in per capita GDP growth rate. However, several studies report a positive interrelationship between

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infrastructure measures and indicators of socio-economic development such as gross national product (GNP), GDP growth, GDP per capita, employment, and poverty headcount (AfDB, 2018). Generally, infrastructure capacity nurtures step for step with economic output- a 1 percent increase in the stock of infrastructure is associated with a 1 percent increase in GDP across all countries (WDR, 1994).

As mentioned in Chap. 2, for example, data for 1990 indicated that, while total infrastructure stocks expansion by 1% with each 1% increment in per capita GDP, paved road expansion by 0.8%, power by 1.5%, and telecommunications by 1.7% (WDR, 1994). In other evidence, the rate of return in these sectors is 63 percent and the elasticity of change in output with respect to a 1 percent change in the level of infrastructure was 0.16 (Okoh & Ebi, 2013). Moreover, infrastructure affects productivity and output directly as part of GDP formation and as an input to the production of other sectors (Shiferaw, 2017; AfDB, 2018). Therefore, the low infrastructure stock in Africa affects the development of many nations on the continent (AfDB, 2018). However, Ethiopia's GDP per capita has increased from US\$129 in 1999/00 to US\$ 863 in 2016/2017. The share of the population living below the national poverty line halved between 1995/96 and 2015/16, from 45.5 percent to 23.5 percent. Disparities in poverty among regions have narrowed, indicating a better balance in regional development (UNDP Ethiopia, 2018). Furthermore, it has been attempted to summarise the economic indicators of GDP at the regional and national level (specifically, the sample regions quantitative and qualitative surveys-Oromia, Amhara, Tigray, and BenshangulGumuz) in 2010/11 to 2016/17 at the current market price in '000' Birr or dollars, except Tigray region which was at current factor cost. However, the data showed each region per capita in 2016/17 are Oromia 694.59; Amhara 571; Tigray 458.41; and, BenshangulGumuz 784.9 (Each national regional state, Bureau of finance and economic development, 2018). The national per capita is 876. All regions are below the national per capita. However, it is not harmonized by the National Planning Commission (NPC) of Ethiopia that is why this study didn't use it for further analysis.

In other ways, one typical measure of uneven development is the Gini coefficient. It is a standard measure of economic inequality used widely by economists and entities such as the World Bank and the OECD. Gini is a statistical measure of the dispersion of income. In addition to income dispersion, per capita GDP, or poverty rates would be measures of uneven economic development

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(Schultz, 2017). According to UN-ECA (2017), high average inequality, three features characterized the inequality landscape in Africa: The unweighted average Gini coefficient in Africa is 0.44, which is the 2nd highest after the Gini in Latin America (around 0.50), and nearly 12% higher than the coefficient for the rest of the developing world, at 0.39. Seven of the 10 most unequal nations in the world are in Africa (UN-ECA, 2017). The average within-country disparity masks extensive variation from 0.31 in Egypt and Niger to 0.65 in South Africa and 0.66 in Seychelles. Ethiopia's Gini was 0.34. Recently, it is 0.33 (UN-ECA, 2017). This showed that there is also extreme disparity. South Africa, Namibia, and Botswana were among the most unequal nations in the world, with the Gini exceeding 0.60 in 2013. Around 10% of the African population live in highly unequal countries with the Gini in excess of 0.50. A further 50% lived in nations with the Gini in the range of 0.40 to 0.50. In short, close to 60% of the African population lived in nations with very high to high levels of disparity in 2013 (UN-ECA, 2017).

Whereas, Ethiopia is a fast-growing economy, with double-digit growth in the previous decade, and prior growth that also drastically decreased poverty. In spite of its large population of about above 100 million, the nation also has the world's lowest rates of inequality, with a Gini coefficient of 0.33. However, rapid growth has not reduced inequality for the very poorest (Geiger and Kanth, 2017). As discussed in section 8.3 above, infrastructure has direct and indirect effects on growth and income inequality. A few studies have directly examined the inequality impact of infrastructure at the aggregate level, by regressing Gini coefficients and similar inequality measures on indicators of infrastructure development in a cross-country panel data setting (Calderon & Serven, 2014). Overall, the literature found positive impacts of infrastructure development on income growth and, more cautiously, on distributive equity (Calderon & Serven, 2014).

While poverty has decreased remarkably in general, the rate of decrease in recent years is slower in rural areas while stronger decreases have occurred in urban areas in Ethiopia. However, due attention should be given to rising inequality observed recently, particularly in urban areas (UNDP Ethiopia, 2018). Moreover, recent data and a change of inequality measure (i.e. the Gini coefficient) showed that there is more inequality in urban than rural areas. The Gini coefficient for urban areas is 0.38 while it is 0.28 for rural areas in Ethiopia. Income inequality is generally greater in urban than in rural areas (World Social Report, 2020). But urban inequality declined over the

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last 10 years and the gap between urban and rural inequality narrowed (Kedir, 2015). In other ways, overall inequality remains low in Ethiopia, as measured by the Gini coefficient of 0.33. Moreover, the *spatial disparities* in many indicators of well-being demonstrate that development has not been fully inclusive in Ethiopia (WBG, 2017). Based on these evidence, trends of inequality measured by the Gini-coefficient (indicating that fiscal policy reduces inequality) by region and rural/urban and rank of the regions in Ethiopia have been identified for the last 20 years in Table 8.13 below.

Inequality by Region: Table 8.13 summarizes Gini-coefficient estimates by region and rural and urban areas. Based on inequality estimates, for example in year 2010/11, one can categorize the regions into two: (1) regions with Gini-coefficient below 0.3 are Oromia, Amhara, Somali, Gambela, Harari, and Dire Dawa with the Harari region having the lowest; and (2) Regions with Gini-coefficient above 0.3 are Tigray, Benshangulgumuz, SNNP, and Addis Ababa with inequality the highest in Tigray region. When one compares by rural-urban residence, one can find inequality is higher in urban areas for all regions. Among the regional urban, the highest inequality is observed in Amhara (0.41) followed by Benshangulgumuz and Tigray. Whereas, in 2015/16, (1) regions with Gini-coefficient below 0.3 are only the Somali region having the lowest; and (2) Regions with Gini-coefficient above 0.3 are Tigray, Oromia, Amhara, Gambela, Afar, Harari, Benshangulgumuz, SNNP, Dire Dawa, and Addis Ababa. Tigray region has the highest inequality in the country. Somali has the lowest inequality in the country. Therefore, trends in inequality (as measured by the Gini Coefficient of consumption) is increasing in all regions except the Somali region. Hence, the consequences of disparity both at the national and regional state levels, it becomes significant to understand the driving forces behind lower income inequality (Makmuri, 2017). Moreover, development policy and strategy grounded on “leave no-one behind”, “pro-poor growth” or “shared prosperity” principles need to be considered (Watkins, 2015, p. 2), as the ‘leave no one behind’ agenda can do for equity what the millennium development goals did for poverty reduction for 2030 (Watkins, 2015). This needs further investigation.

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Table 8. 13 Trends in inequality as measured by the Gini Coefficient of consumption by region and rural/urban and rank of the regions in Ethiopia

Region /	1995/96			1999/00			2004/05			2010/11			2015/16			Rank of regions
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	
Tigray	0.26	0.29	0.27	0.25	0.35	0.27	0.29	0.49	0.37	0.295	0.375	0.344	0.335	0.396	0.375	1
Afar	0.31	0.19	0.34	0.38	0.34	0.4	0.28	0.28	0.33	0.262	0.333	0.305	0.294	0.344	0.333	8
Amhara	0.25	0.34	0.27	0.27	0.36	0.28	0.25	0.39	0.27	0.270	0.416	0.296	0.283	0.400	0.343	6
Oromiya	0.27	0.33	0.28	0.24	0.34	0.26	0.25	0.43	0.28	0.262	0.368	0.283	0.270	0.366	0.304	10
Somali	0.25	0.21	0.27	0.27	0.34	0.31	0.27	0.37	0.31	0.276	0.301	0.286	0.242	0.330	0.265	11
BG	0.26	0.3	0.27	0.28	0.33	0.3	0.28	0.43	0.32	0.299	0.380	0.319	0.311	0.383	0.341	7
SNNP	0.28	0.32	0.29	0.26	0.35	0.27	0.27	0.40	0.29	0.293	0.360	0.303	0.292	0.374	0.322	9
Gambela	0.3	0.22	0.27	0.23	0.32	0.26	-	-	-	0.211	0.381	0.289	0.291	0.381	0.345	5
Harari	0.29	0.32	0.31	0.22	0.3	0.27	0.29	0.40	0.36	0.189	0.309	0.266	0.296	0.375	0.353	4
Addis Ababa	0.26	0.35	0.35	0.23	0.43	0.42	0.33	0.46	0.46	na	0.336	0.336	na	0.357	0.357	3
Dire Dawa	0.22	0.28	0.27	0.21	0.32	0.3	0.23	0.43	0.39	0.187	0.332	0.292	0.215	0.386	0.373	2
National	0.27	0.34	0.29	0.26	0.38	0.28	0.26	0.44	0.30	0.274	0.371	0.298	0.284	0.380	0.328	

Source: Based on MoFEC data, 2018, Author's Work

8.7.2 Status and Trends of Regional Poverty in Ethiopia

The poverty analysis at the national level, looking at the status of regional poverty may provide further insights in an effort to design and implement better equitable development policy across regional states. To this effect, Table 8.14 presented the regional distribution of total poverty in Ethiopia. All said, despite the occurrence of severe economic shocks such as drought and inflation over recent years, a marked regional poverty reduction is recorded across all regional states in the country during the GTPI. This might suggest that the ability of the Ethiopian Government to protect vulnerable sections of the society from economic shocks through various means such as the Productive Safety Net Program (PSNP), emergency relief aid, and increasing resilience that comes from the broad-based economic growth of the country (NPC, 2017). Although poverty rates have converged over time across regions, thereby reducing inter-regional disparities, there are also significant intra-regional and inter-woreda disparities (WBG, 2017).

From Table 8.14 below, one can see that a number of regions are more than the national average in the poverty line. These are Tigray, Amhara, BenshngulGumuz, Oromia, and Afar. The remaining regions are under the national average (23.5%). There are also differences by percentage decrease in poverty in 2015/16 from 1999/00. Tigray, Afar, SNNP, Benshangulgumuz, and Gambela have decreased poverty above the national average (20.5%). Amhara, Somali, Oromia, Addis Ababa, Harari, and Driedawa have decreased poverty under the national average which needs further investigations.

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Table 8. 14 Trends in regional national poverty headcount indices, rank of regions in poerty line, and Percentage decrease in poverty in 2015/16 from 1999/00

Region /	1999/00			2004/05			2010/11			2015/16			Rank of regions	%age decrease
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	urban	Total		
Tigray	61.6	60.7	61.4%	51	36.7	48.5%	36.5	13.7	31.8%	31.1	14.2	27.0%	1	34.4%
Afar	68	26.8	56%	42.9	27.9	36.6%	41.1	23.7	36.1%	26.5	10.6	23.6%	5	32.4%
Amhara	42.9	31.1	41.8%	40.4	37.8	40.1%	30.7	29.2	30.5%	28.8	11.6	26.1%	3	15.5%
Oromia	40.4	35.9	39.9%	37.2	34.6	37%	29.3	24.8	28.7%	25.3	15.3	23.9%	4	16%
Somali	44.1	26.1	37.9%	45.2	35.3	41.9%	35.1	23.1	32.8%	22.3	22.9	22.4	7	15.5%
BG	55.8	28.9	54%	45.8	34.5	44.5%	30.1	21.3	28.9%	28.7	17.7	26.5%	2	27.5%
SNNP	51.7	40.2	50.9%	38.2	38.3	38.2%	30	25.8	29.6%	21.9	14.4	20.7%	8	30.2%
Gambela	54.6	38.4	50.5%	---	---	----	32.5	30.7	32%	26.4	16.6	23.0%	6	27.5%
Harari	14.9	35	25.8%	20.6	32.6	27%.	10.5	11.7	11.1%	8.5	6.0	7.1%	11	18.7%
Addis Ababa	27.1	36.2	36.1%	29.9	32.6	32.5%	---	28.1	28.1%	----	16.8	16.8%	9	17.7%
Dire Dawa	33.2	33.1	33.1%	39.8	32.9	35.2%	14.2	34.9	28.3%	23.3	11.1	15.4%	10	19.3%
National	45%	37%	44%	39.3%	35.1%	39%	30.4%	25.7%	29.6%	25.6%	14.8%	23.5%		20.5%

Source: The Federal Democratic Republic of Ethiopia, Central Stastistical Agency (2018), the 2015/16 Ethiopian Household Consumption-Expenditure (HCE) Survey Results, Stastical Bultin 585-3, Addis Ababa, Ethiopia (HICE survey of 1995/96, 1999/00, 2004/05, 2010/11 and 2010/11) (Unpublished)

8.7.3 Urban Unemployment Rate at National and Regional States and its Trends in Ethiopia

Infrastructure links firms and expands economic activity by reducing production costs, and as the infrastructure becomes efficient and effective it attracts both national and foreign investors and enhances economies of scale (Chotia & Rao, 2015). Empirical evidence also recommends that public infrastructure investment results in greater economic output, higher employment, and better quality of life (Seid *et al*, 2016; Chotia & Rao, 2015). Nationally, 66.2% of the population is employed in agriculture, 21.8% in services, and 12% in the industrial sector in Ethiopia ((Deloitte, 2019). However, unemployment in Ethiopia has been an urban phenomenon (Seid *et al*, 2016). As mentioned in Chaps. 2 and 6, the high rate of public infrastructure investment has caused growth in construction and interrelated industries and initiated growth in other sectors through linkage effects (Seid *et al*, 2016). Therefore, according to Seid *et al* (2016), there are two major channels through which the process is believed to have influenced income distribution in Ethiopia. First, investment in infrastructure and buildings led to higher employment of rural migrants and urban youth in construction and linked sub-sectors. Second, partly instigated by this growth of employment, the demand for goods and services augmented.

The 2012 urban employment-unemployment survey was intended to deliver data on employment and unemployment at national and regional state urban levels. The study followed a household approach and covered all urban areas of the country except the pastoralist areas of 3 zones of Afar and 6 zones of Somali regions (CSA, 2012). Regarding the unemployment rate by region, the highest rate was observed in Addis Ababa City Administration (23.0 percent) followed by the Dire Dawa Administration (22.7 percent), while the lowest unemployment rate was recorded in Gambella Region (7.8 percent) and Benishangul-Gumuz Region (7.1 percent) in March 2012. The unemployment rate among females was higher than males in all regions (see Figure 8.1).

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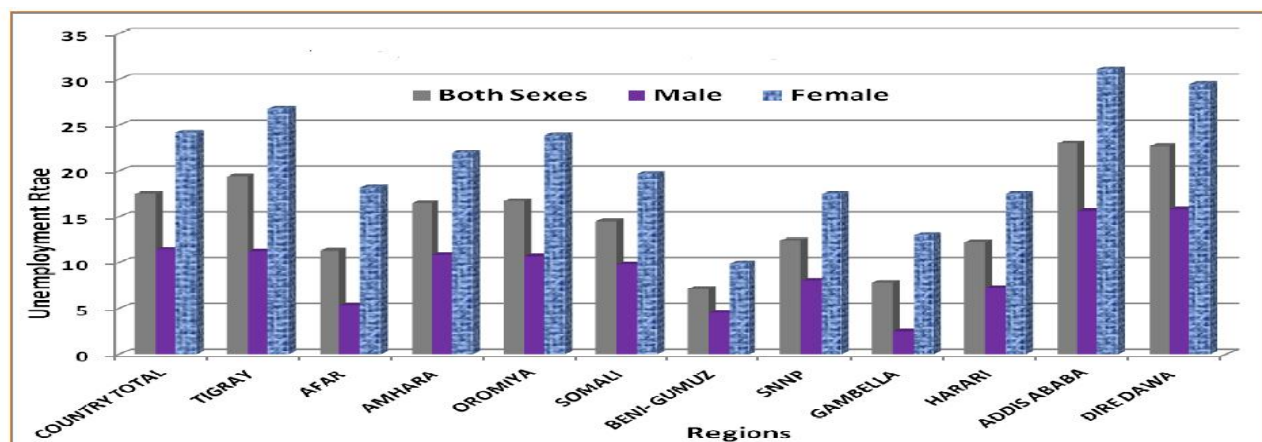


Figure 8. 1 Urban unemployment rate by region and sex

Source: CSA, 2012

Whereas, in 2017/18, in terms of unemployment rate by region that relied on the growth of employment opportunities, in Dire Dawa 25.3 percent, Tigray 21.5 percent, Addis Ababa 20.2 percent, and Amhara 19.7 percent in that order reported above the national average. Benishangul-Gumuz 7.2 percent is the lowest unemployment rate. The rest of the urban areas of other regions fallen between 10 – 19 percent of the unemployment rate in June 2018. This implied that the share of unemployment to the country total goes along with the population size of urban areas of each region. The unemployment rate among females is also higher than males in all regions (see Figure 8.2) (CSA, 2017/18).

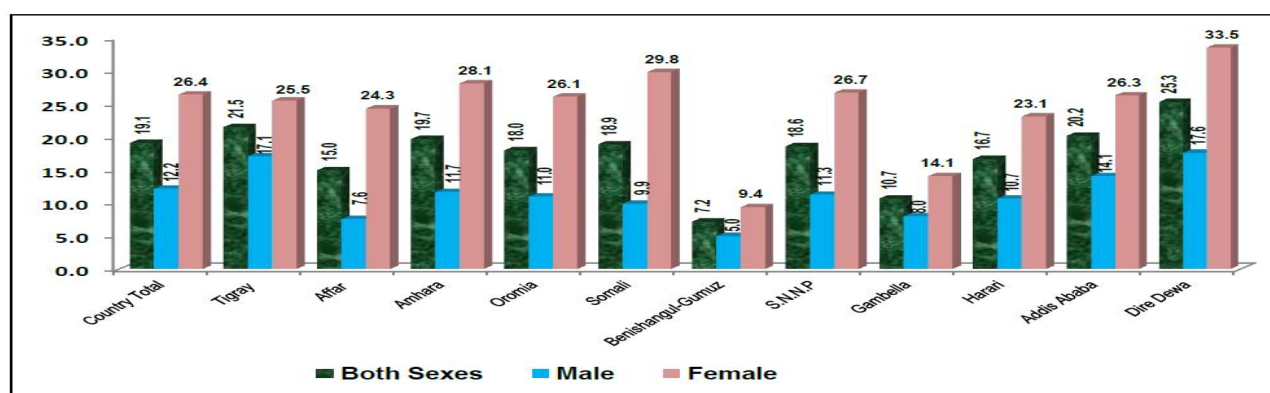


Figure 8. 2 Urban unemployment rate by region and sex, 2017/18

Source: CSA, 2017/18

Therefore, as mentioned above, Ethiopia faces a serious problem of uneven economic development. Whether at a macro or micro level, regions, and even areas such as different

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communities experience variations in unemployment, poverty, and other measures used to calculate or indicate uneven development. It is in contrast to the constitution of Ethiopia (1995).⁶³

8.7.4 Household Expenditure per Household (PHh) and Per Person (PP) Distribution per Region

Theoretically, measures of household prosperity can be indicated by consumption, income or expenditure information. However, the collection of accurate income and consumption data needs wide-ranging resources for household surveys. For example, income information does not capture the fact that people (and particularly the poor) may have income in kind, such as crops which are traded, and measuring income can be problematic for the transitory employed or self (e.g. agricultural work), due to seasonality and accounting issues. By comparison, consumption or expenditure measures are much more reliable and are at ease to gather than income, particularly in most rural settings (Vyas & Kumaranayake, 2006). Thus, the household expenditure is available by CSA as follows. As one can see from Table 8.15, Tigray, Afar, Amhara, BenshangulGumuz, and SNNP have less than the national average in total Household Expenditure Per Household(PHh) distribution. Whereas, the remaining regions have more than the national average in total Household Expenditure per Household (PHh) distribution. On another parameter, Afar, Amhara, BenshangulGumuz, and SNNP have less than the national average in total Household Expenditure per Person (PP) Distribution. While the remaining regions have more than the national average in total Household Expenditure per Person (PP) Distribution. Thus, this shows that there is a gap among regions in Household Expenditure per Household (PHh) and Per Person (PP) distribution.

Table 8. 15 per Household (PHh) and Per Person (PP) Distribution of Total Household Expenditure by HH Size and Household Expenditure per Capita Quintile - 2015/16.

Region /	2015/16					
	Rural		Urban		Total	
	PHh	PP	PHh	PP	PHh	PP
Tigray	38,881.26	8,227.87	57,109.48	16,198.63	44,368.84	10,166.25
Afar	37,593.23	7,473.06	52,652.16	15,604.81	41,435.75	8,992.40
Amhara	28,197.80	6,515.67	52,052.71	16,555.04	33,071.11	8,093.93
Oromia	45,358.90	8,797.38	54,177.23	15,026.35	47,042.07	9,679.43
Somali	53,382.14	9,418.84	68,600.45	12,923.03	55,802.75	9,946.17

⁶³ See Ethiopian constitution (1995), Article 89, Economic Objectives, sub-articles 2. Government has the duty to ensure that all Ethiopians get equal opportunity to improve their economic condition and to promote equitable distribution of wealth among them; 7. Government shall ensure the participation of women in equality with men in all economic and social development endeavors; and, 8. Government shall endeavor to protect and promote the health, welfare and living standards of the working population of the country.

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BG	35,186.17	7,424.43	47,016.33	13,862.80	38,199.36	8,689.86
SNNP	40,390.30	7,942.05	57,919.31	14,563.03	43,662.21	8,949.50
Gambela	42,153.89	8,471.89	61,303.19	15,072.04	49,553.14	10,714.94
Harari	62,746.20	11,421.99	65,722.60	19,632.67	64,718.98	15,890.54
Addis Ababa	-	-	79,477.55	20,355.00	79,477.55	20,355.00
Dire Dawa	45,485.01	8,682.60	78,024.20	19,393.09	68,422.36	15,614.24
National	39,507.72	8,042.45	59,827.32	16,350.69	44,390.86	9,626.78

Source: The Federal Democratic Republic of Ethiopia, Central Statistical Agency (2018), the 2015/16 Ethiopian Household Consumption-Expenditure (HCE) Survey Results, Statistical Bulletin 585-3, Addis Ababa, Ethiopia (Unpublished).

8.8 Infrastructure Composite Index (CII)

PCA is used to aggregate infrastructure components such as electricity, roads, telecommunication, and other infrastructures ((Patra and Acharya, 2011; Chakamera & Alagidede, 2016; Chotia & Rao, 2015). Hence, based on the above descriptions, to comprehend and gauge the trend and pattern of regional disparities between Ethiopian regional states in terms of infrastructure, it has been selected the indicators (for the latest time period available) listed below, which will constitute the infrastructure of the Ethiopian state. Indicators from the sectors of transport, electric, telecommunication, airport, and university have been selected so as to give a comprehensive view of the infrastructure. This study analyzed 9 regional states and one city Administration across Ethiopia in order to evaluate their levels. The study has excluded Addis Ababa city administration (the biggest city/ capital city) as it has extreme values in infrastructure. It is the infrastructure assets that are more inequitably distributed between regional states that are assumed more weight in PCA. Variables with low standard deviations (SDs) would convey a low weight from the PCA; for example, an asset which all regional states own or which no regions own (i.e. zero SD) would exhibit no disparity between regions and would be zero weighted, and so of slight use in distinguishing infrastructure status in a region to region.

Therefore, the study used all the aforementioned indicators pertaining to the road, electric, telecommunication sectors, and other infrastructures in order to construct a CII. Before constructing the index, all the indicators had to be normalized before the PCA was applied to decide the factor loadings and their respective weights (Based on Patra and Acharya, 2011; Chotia and Rao, 2015; Oswald *et al*, 2011; Calderon and Servén (2004, 2010, and 2014). All the results

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were found with PCA. The calculation was done by adopting STATA software (V=14). See Annex 4 for detailed analysis.

For normalization, the following formula was employed:

$$NV_{ij} = 1 - \frac{(BestX_i - ObservedX_{ij})}{(BestX_i - WorstX_i)}$$

Where:

NV_{ij} = Normalized value corresponding to the X^{th} indicator, where i = corresponding state and j = corresponding indicator;

$Best X_i$ = Best/Maximum value of X^{th} indicator, where i = number corresponding to the state (in this case values of 9 regions and 1 administrative city under the X^{th} indicator will become the i series);

$Observed X_{ij}$ = Observed/current value of X^{th} indicator where i = corresponding state and j = corresponding indicator; and $Worst X_i$ = Worst/Lowest value of X^{th} indicator.

The Infrastructure Sectors:

- Road (per 1000 sq.km of an area): An indicator which tells about the level of development of road transport through road length per 1000 sq. km area across the 9 regions and 1 administrative city of Ethiopia;
- Roads Density with population ratio (per 1000 sq.km of an area with 1000 pop): An indicator which indicated that the level of development of road transport through road length per 1000 sq. km area and per 1000 pop across the Ethiopian states;
- Number of MW per 1 million populations: This indicator tells us about the amount of electricity in MW to 1 million populations per a given state;
- Number of sub-station per 1 million: This tells about the number of sub-stations established in each region electrification provision per 1million population;
- Telecom density per 100 populations: This indicates the percentage telecom density within the regions;

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- Mobil networking capacity: This tells about the total numbers of 2G and 3G mobile networking distribution capacity of the Telecom Authority per the indicated regions;
- Fixed and data line service network capacity: This is the total fixed-line voice call and data service networking distribution capacity of the Authority per regions;
- Number of airport per 1million populations: This tells about the number of airport distribution per 1million population ratio;
- Number of universities per 1million populations: This indicates the total universities present in the region per 1million population correspondence.

It is also computed the Factor Loading and Weights of these indicators using the following formula:

$$I = \frac{\sum_{i=1}^n x_i \left(\sum_{j=1}^m |L_{ij}| * E_j \right)}{\sum_{i=1}^n \left(\sum_{j=1}^m |L_{ij}| * E_j \right)}$$

Where:

I is the index for a particular category (region)

x_i is the i^{th} indicator under a particular category.

L_{ij} is the factor loading value of the i^{th} variable on the j^{th} factor

E_j is the eigenvalue of the j^{th} factor

Table 8. 16 Composite Infrastructure Index (CII) with the ranks

No	Region	CII	Rank
1	Afar	0.6373	4
2	Amhara	0.4968	7
3	Benishangul-Gumuz	0.4176	8
4	Dire Dawa	1.0015	2
5	Gambela	1.2418	1
6	Harari	0.5830	5
7	Oromia	0.7010	3
8	SNNP	0.4109	9
9	Somali	0.1914	10
10	Tigray	0.5057	6
Country Level-Mean value		0.6187	

Source: Based on Chotia and Rao (2015), Author's Calculation, 2019

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The states are divided into infrastructural sound regions and infrastructural lagging regions according to their value in the CII. The infrastructural sound regions⁶⁴ have a value higher than the average value (0.6187) of the CII, and the infrastructural lagging states have a lower-than-average value (below 0.6187)⁶⁵.

The classification as per the average-value criteria was:

Sound states: Gambela, Dire Dawa, Afar, and Oromia

Lagging states: Tigray, Harari, Amhara, Benishangul, SNNP, and Somali

Analyzing the states by the CII; in the result, anyone can observe huge variations between them. Gambela has the distinction of being at the top of the list with an overall index score of 1.2418. It is 6.4880 times the value of the region with the lowest value of the overall development index, Somali, which has an index score of 0.1914. The difference between these two extreme overall index scores is 1.0504. The mean CII value for all regions is 0.6187 and the standard deviation is 0.3050. This is clear evidence of dispersion or disparities between regions with respect to the CII, calculated from the major sectors of road, electric, telecommunication networking, and other infrastructures. This is due to the lack of integrated frameworks as there are coordination failures because of the lack of proper government interventions including lack of proper understanding and implementation of the constitution and the federal system in Ethiopia. Therefore, the literature says that there is a high correlation between disparity in infrastructure assets and the infrastructure index, suggesting that improving infrastructure leads to inclusive growth as well. Therefore, the low infrastructure stock in Ethiopia reflects the low development of the regions (AfDB, 2018), which needs place-based and people-centered interventions (Wismadi *et al*, 2015). Thus, individuals, communities, groups, and regional states that are negatively affected by infrastructure allocation policies need to be compensated (Thomopoulos *et al*, 2009).

⁶⁴ Albalade *et al* (2012), beyond the efficiency-equity dilemma: Centralization as a determinant of government investment in infrastructure.... Some regions can receive investment in network modes simply because they lie between two major nodes. For this reason, areas surrounding the political capital may receive more investment that responds to the building of connections from and to the political capital.

⁶⁵ Note: The road which is used by all or some regions are counted by a region. For instance, a road in Oromia and Afar are giving service to all others. As well as the road in the Amhara region is also giving service to others.

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In other ways, the position of each state has been determined as per the value of CII and unemployment rate on the one hand and CII and Poverty ratio on the other. Empirical evidence suggested that there is a positive interrelationship between CII, urban unemployment, and poverty rate. Hence, efforts should be focused to create more infrastructure services at the state level, to increase the state domestic product and decrease the level of poverty and ultimately the standard of living of the people concerned (Patra & Acharya, 2011; Chotia and Rao, 2015; Calderon and Serven (2004, 2008, and 2014).

Thus, it has been analyzed the states with respect to CII, urban unemployment rate, and proportion of population below the poverty line. The following results were inferred from the analysis:

- The states with a high CII value – Gambela, Dire Dawa, Afar, and Oromia – But only Gambela should ideally have a low unemployment rate and the low percentage of the population below the poverty line. Gambela can be regarded as ideal states, which are relatively sound on infrastructure and low unemployment and have low poverty levels;
- The states with a low value of CII, high urban unemployment rate, and the high percentage of population below the poverty line – Tigray, Amhara, Harari, Benishangul Gumuz, SNNP, and Somali - can be regarded as poor-performing states, which are relatively lagging behind on infrastructure;
- All regions except Gambela have many inconsistencies.

In addition, based on CII results, expenditure per household (PHh), expenditure per person (PP) distribution, urban unemployment, poverty, and Gini Coefficient (see Table 8.13 – 8.15 above), the status of nine regional states and one city administration are compared in Table 8.17. Thus, one ideal situation, two worst situations, and others represent the inconsistent relationship between CII, urban unemployment rate, and Poverty. At that point, it could be possible to well-understand the difficulty and to reexamine the connection between infrastructure developments and increases in social well-being (Thomopoulos & Grant-Muller, 2013).

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Table 8. 17 CII, Expenditure per Household (PHh), Expenditure per Person (PP), Urban Unemployment, Poverty and Gini Coefficient

Regional state	CII		Exp. PHh		Exp. PP		Urban unemployment rate		Poverty Rate		Gini Coefficient		Overall Sign
	Above Average	Below Average	Above Average	Below Average	Above Average	Below Average	Above Average	Below Average	Above Average	Below Average	Above Average	Below Average	
Tigray		*		*	*		*		*		*		Φ
Afar	*			*		*		*	*		*		€
Amhara		*		*		*	*		*		*		Φ
Oromia	*		*		*			*	*			*	€
Somali		*	*		*			*		*		*	€
BG		*		*		*		*	*		*		€
SNNP		*		*		*		*		*		*	€
Gambela	*		*		*			*		*	*		√
Harari		*	*		*			*		*	*		€
Diredawa	*		*		*		*			*	*		€

Source: Based on Chotia and Rao (2015), Author's Calculation, 2019

Note:

√ represents High CII, Low urban unemployment rate, and Low Poverty (Ideal situation).

Φ represents Low CII, High urban unemployment rate, and High Poverty (Worst situation).

€ represents the inconsistent relationship between CII, urban unemployment rate, and Poverty.

8.9 Conclusion

This chapter examined the relationship between growth and infrastructure equity in Ethiopia since the 1990s. The CII result above showed that infrastructure equity is falling or disrupting in Ethiopia. This is due to coordination failures by the lack of proper government interventions. The well-known case of Ethiopia's miracle growth over the previous two and half decades obscures the overlooked truth that the gains from the economic infrastructure expansion have not been distributed in an equitable fashion across regional states. This flow in economic growth has brought about significant change for some states while leaving other states nearly unchanged. Given the consistent results obtained from the studies analysis, it can be concluded that the growth experience has certainly been imbalanced. Meanwhile, there is a high correlation between

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inequality in assets and the infrastructure index, suggesting that improving infrastructure equity leads to inclusive growth as well (AfDB, 2018). As a result of the above, infrastructure inequity has hindered inclusive growth and the nation-building processes of Ethiopia. As revealed in the literature, government policy, human capital, and geographical differences are likely to be the major drivers of these differences in infrastructure (Fan & Zhang, 2002).

Fan and Zhang (2002) also indicated that, by citing Rao, Shand, and Kalirajan (1999) who have argued that skewed distribution of public expenditures to the more at ease regions is the significant contributory factor to widening regional disparity. Thus, the widening disparity has noteworthy implications for growth and macroeconomic stability leading to suboptimal allocation of human resources and concentration of decision-making in the hands of a few. Moreover, surveys showed that infrastructure limitations are responsible for an estimated 50% of the productivity challenges faced by Ethiopian firms (Foster & Morella, 2011). Therefore, a new way of thinking is called to promote balanced regional development in the country (Fan & Zhang, 2002).

Moreover, in Ethiopia, inter-state disparities in economic and infrastructure development are posing questions about the authenticity of the growth process. For example, given the regional disparities in Ethiopia, a study of Ethiopian states is important if the country is to continue to develop economically in a balanced way. Therefore, policymakers need to sustain efforts to eradicate infrastructure inequity by following a growth-oriented strategy (Chotia & Rao, 2015; Simon & Natarajan, 2017). It can be concluded that policymakers need to endure and hasten the efforts so that momentum to reduce disparity in infrastructure will be sustained with the growth of the nation. Policymakers should also formalize comprehensive programs for the development of relatively lagged regions in infrastructure, especially those with a comparative shortage in the growth process. Thus, eradication of disparities lies at the heart of an efficient development process (Chotia & Rao, 2015; Simon and Natarajan, 2017).

A prolongation of the recorded unbalanced regional growth could compromise national development. But the most energetic task of the policymakers must be to launch policies by which to decrease regional disparities in various economic infrastructure services rather than just to target the equalization of public infrastructure investment across regions (Ghosh & De, 2005). Otherwise, the on-going reform process may be badly frustrated by the potential social disharmonies, which

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have been gathering momentum in many parts of Ethiopia. This is because infrastructure, through its indirect and direct impacts, has a bearing on equity, growth, and overall development of a nation (Chotia & Rao, 2015; Ashenafi, 2017).

Finally, this study provides a good beginning for generalizing the application of CII for ‘equity-based resource distribution for infrastructure. As mentioned in Chp. 2, CII contributes to the argument of ‘people-centered’ (E.g. Workers, Leadership, etc.) versus ‘place-based’ (E.g. Infrastructure, Housing, etc.) development (Wismadi *et al*, 2015). Hence, place-based policies (PBP), although it is traditional, comprise infrastructure investments, special zones, dealing of lagging regions, and local growth policies, (Duranton & Venables, 2019), and the approach should place the people at the center. Policies and strategies are known as progressive if they favor deprived/disadvantaged groups and regressive if they hurt such groups (Litman, 2020). Therefore, the low infrastructure stock in Ethiopia reflects the low development of the regions (AfDB, 2018), which needs both place-based and people-centered interventions (Wismadi *et al*, 2015), including deep interventions in the sector (Hoff, 200). However, the analysis is limited to studying equity across regions and does not consider equity within regions-although this issue is almost indeed significant. Taking everything into consideration, this analysis leaves much space for improvement. Based on the survey results of physical infrastructure equity (Chaps.7 and 8), the survey (both quantitative and qualitative) of the interrelationship among institutional capacity, infrastructure governance and equity, and nation-building process in Ethiopia are undertaken in Chap. 9.

CHAPTER 9

THE INTERRELATIONSHIP AMONG INSTITUTIONAL CAPACITY, INFRASTRUCTURE GOVERNANCE AND EQUITY, AND NATION-BUILDING PROCESS IN ETHIOPIA

Introduction

The chapter explores and empirically tests the causal structural model that depicts the interrelationship among institutional capacity, infrastructure governance and equity, and nation-building process with the support of interviews and focus group discussions (FGDs). As analyzed in Chap. 8, there is clear evidence of inequities/disparities between regional states with respect to the CII, calculated from the major sectors of road, electric, telecommunication networking, and other physical infrastructures. Therefore, the CII results in Chap. 8 Table 8.16 indicated that there is a lack of infrastructure equity distribution across regional states in Ethiopia. But the analysis of the physical infrastructure in Chaps. 7 and 8 is not enough to conclude as the equity issue is very sensitive to grievances. Thus, the chapter analyses the survey data (through questionnaire and interview and FGDs) collected and discusses the results; then, the survey data analyzed and hypotheses are tested using several statistical techniques. More importantly, a model of the critical factors affecting the current allocation of public investments in infrastructure in Ethiopia is examined and validated using Structural Equation Modelling- Partial Least Square (SEM-PLS).⁶⁶

From the data analysis, four groups of factors emerge as key challenges in moving towards public infrastructure investment including institutional capacity, infrastructure governance and equity, and nation-building process. Results obtained from the survey are discussed and explained together with the interviews and FGDs. Finally, the study investigated the interrelationships among institutional capacity, infrastructure governance, infrastructure equity, and nation-building process, and its impacts on state-and nation-building processes as well as the equitable allocation of infrastructure across regional states in Ethiopia, and the study framework is expected to emerge from the discussion and it has conclusions.

⁶⁶ Hair et al, J.F (2017), A Primer on Partial Least Squares Structural Equation Modeling. There are two types of SEM: covariance-based SEM (CB-SEM) and partial least squares PLS-SEM; also called PLS path modeling)... SEM is a class of multivariate techniques (second generation techniques) that combines aspects of factor analysis and regression, enabling the researcher to simultaneously examine relationships among measured variables and latent variables (assessment of measurement model) as well as between latent variables (assessment of structural model).....These developments have been accompanied by the release of Smart PLS 3, which implements many of these latest extensions in highly user-friendly software. Explanatory Factor analysis and Confirmatory factor analysis... Formative and reflective...Mediation.

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9.1 Data Description

This survey was conducted in January-July 2019 within the selected regions of Ethiopia. Questionnaires were directly sent to the higher officials, middle-level management, and professionals in federal and regional institutions of Oromia, Amhara, Tigray, and BenshangulGumuz. In order to triangulate the findings, the data was also collected with international organizations such as the World Bank and UNDP Ethiopia professionals in Addis Ababa by sending questioners via email. The sample was selected as the method denoted in Chapter 3. All in all, 1,037 questionnaires were distributed for the concerned respondents and finally, 947 questionnaires were returned. Out of this the valid returned response, 6 unengaged responses, and 37 questionnaires were incorrectly completed.

Therefore, a totally of 904 respondents were returned their responses properly. Thus, the response rate is about 87%. As a representation of 80% has been chosen as a standard for evaluation for a response rate (Fincham, 2008). According to Saldivar (2012), a survey is in person, an 80-85% response rate is good. The sample is adequate for meaningful statistical analysis (Hair *et al*, 2010). Therefore, based on these scholars' surveys, 87% is an acceptable response rate for this study. Table 9.1 provides the characteristics of the respondents. Out of 904 respondents, 261 respondents, accounted for 29%, were from federal government authorities, 469 (52.0%) respondents were from regional government authorities, whereas, the remaining 10 (1%) respondents were from research institutions. According to their level of position, most of them were higher officials, senior advisors, advisors, middle management, experts, and researchers. However, the remaining respondents consist of, contractors, consultants, and financial institutions like World Bank and UNDP Ethiopia, accounted for 18% of total respondents (Table 9.1). Their professional and management levels are provided in Table 9.2.

Table 9. 1 Questionnaire return rate

Group	Questionnaires Distributed	Responses received	Response rate (%)	Proportion (%)
Federal Government Offices	293	261	89	29
Regional Government Offices	541	469	87	52
Research Institutions	10	10	100	1
Civil society and multilateral Organizations	193	164	85	18

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Contractors	129	109		
Consultants	59	50		
World Bank Ethiopia	3	3		
UNDP Ethiopia	2	2		
Total	1037	904	87	100

Regarding the position of the study participants, out of the entire 904 (100.0%) respondents, most of them, 548 (61%) were experts, 246 (27%) middle level management, and 110 (12%) higher official (Table 9.2). See Annex 6 for other data.⁶⁷

Table 9. 2 Job Position of the Respondents

Types of Organizations	Job Position of the Respondents			Total
	Higher officials*	Middle level management	Experts	
Federal Offices	12	35	214	261
Regional Government offices	90	48	331	469
Research institutions	3	4	3	10
UNDP	2	0	0	2
Contractors' Associations**	0	109	0	109
Consultants' Associations**	0	50	0	50
World Bank	3	0	0	3
Total	110	246	548	904

Note 1: Higher officials* includes political assignees, chief officers and officers in Ethio-telecom and Ethiopian Electric power/utility, project office heads, regional government and Bureau heads', senior advisors, and board members.

Note 2: Contractor and consultant associations ** were considered as middle level Management, whereas the board members of the associations were considered as higher officials.

Regarding the last open-ended questions, which need more elaboration but not included in the qualitative question, in turn, out of the total 904 respondents, 175 respondents gave their responses.

According to their points of view:

Ethiopia is a great country full of resources but due to a lack of efficient, effective, and quality manpower, most of the infrastructure projects were enforced to fail down. The main cause is the insulation of politics with the technical qualification of managers/ workers. So, any activities were done instinctively, that is, anyone did not know why where, and when projects constructed. Every

⁶⁷ Note: Name of Federal Institutions and Job Position of Respondents; Name of Regional (from sample regions-Oromia, Amhara, Tigray and Benshangulugumuz) Institutions and Job Position of Respondents; Lists of Civil Society and Multilateral Organizations; Job Position of the Respondents and Sex; Age of the respondents; Level Education of the participant; and, Work Experience (years) of the respondents.

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decision was made by the interest of the politician; in that regard, mostly the high-level officials clearly forward biased and unfair decisions. Starting from the proposal level to the end of the projects, the entire activities were governed by those powerful politicians. The entire infrastructure institutions have not succession plan rather politically affiliated, not competency-based. Due to that regard, the sector was highly exposed to corruption and different mischiefs.

They also added:

...infrastructure is unfairly distributed among the regions; that is why the majority of the population are unhappy by the Federal Government act. Moreover, there was no justice in the country at all, for instance, the court's judgment as well the infrastructure distribution was done based on higher politicians' interference. Furthermore, the existing infrastructure funds were not fairly distributed. There was no transparency and accountability for the fair distribution of infrastructure. In addition, factors to infrastructure inequity/inefficiency and ineffectiveness were: political instability in Ethiopia; the political ideology of the incumbent government such as Ethnic federalism and revolutionary-democratic developmental state, principle; lack of clear accountability, and responsibility, demarcation among stakeholders and institution and lack of monitoring system; and, deteriorating national consensus among citizens...

Regarding the Nation-building procedures, the respondents argued that:

...Ethiopia just simply lived the last three decades without any additional common interest or agenda. The government was strongly working to destabilize the country and deteriorate the unity of the people for the interests and hidden agenda of some minority groups. From the federal to Kebele level workers were allocated to carry out the party assignments or homework more than any public interest. Due to this consequence generation and ideology gaps are created that would lead the country into a failed state...

The respondents also convinced that:

...the intentions of the higher leaders of the country were not concerned about infrastructure and growth rather they were played gamble by the citizens for their political interest and thirsty of power. They were eager to show up, but not for progress...

9.2 Factor Analysis

9.2.1 Choosing Factor Models and Number of Factors

Factor analysis is carried out to psychometrically evaluate instruments of measurement with multiple items like questionnaires. It is “a data reduction technique that is used to statistically aggregate a large number of observed measures (items) into a smaller set of unobserved (latent) variables” (Bhattacharjee, 2012, p. 135). Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) are widely used as applications of measurement for construct validation and scale refinement.⁶⁸ One of the more critical aspects of any CFA or EFA is communicating results (Kyriazos, 2018), two common techniques used in scale adaptation studies, and scale

⁶⁸ Hair et al, J.F (2017), A Primer on Partial Least Squares Structural Equation Modeling. Specifically, they are confirmatory when testing the hypotheses of existing theories and concepts and exploratory when they search for patterns in the data in case there is no or only little prior knowledge on how the variables are related.

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development (Orcan, 2018). However, it is recommended to use EFA if the relationship among the items is not known, whereas CFA is recommended to be used if the relationship is tested and the factors and related items are known (Bandalos and Finney, 2010; Buyukoztork, 2002; Kline, 2011). Hence, in this study, CFA is used as the relationship is tested and the factors and related items are known (see Chap. 4 Sec. 4.4). It is also good to consider path analysis which is “a multivariate general linear model technique for analyzing directional relationships among a set of variables” (Bhattacharjee, 2012) for comparison.

Indeed, there are applications to analyze this method but Smart PLS software 3 is the new and better efficient with good graphical presentation (Afthanorhan, 2013). In a CFA, the pattern of loadings of the measurement items on the latent constructs is specified obviously in the model. Figure 9.1 and Table 9.3 below provided the measurement model output of smart PLS. This value could be obtained from the outer-loading which indicated the factor-loading for each indicator variable included. Early, the researcher has suggested using the newly developed scales which is 0.50 or higher were retained in the measurement model. Thus, the outer-loadings below 0.50 were removed from the measurement models since it indicated these items or indicator variables have less contribution towards these factors. In this case, some items from latent variables (LVs) have been removed from these latent variables. This procedure can be known as unidimensionality procedure (the prerequisite that a set of arrangements should denote and quantify only one-construct, in only one-dimension (Sarantakos, 1993) or the quality of measuring a single construct, trait, or other attributes) (Nazim & Ahmad, 2013; Afthanorhan, 2013). This is because the purpose of CFA is to test whether the data-fit a hypothesized measurement model (Nazim & Ahmad, 2013). However, all items in a construct are multidimensional (Sarantakos, 1993).

Moreover, the other aspect is that must be examined during the CFA which is unidimensionality that is used to describe a specific type of measurement scale. Unidimensionality is attained when all measuring items have acceptable factor-loadings for each latent constructs. In order to confirm the unidimensionality of a measurement model, any-item with a low factor-loading is deleted. Furthermore, any factor-loadings below 0.50 must be deleted if items are newly developed, and factor loadings below 0.60 if items are well-established (Awang 2015, p. 54). Hair *et al* (2010) also suggested, although the deletion process is necessary, one should be mindful of; each

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construct must at least have three items, four the best. Thus, this study has more than five items in each construct. After the study has done this process, the model assessment has been applied in order to improve its reliability and validity. Thus, discriminant and convergent validity employed in this process. Similarly, the composite reliability and construct reliability have also been tested.

In Figure 9.1 below, the hypotheses are visually illustrated. Accordingly, the model displays 17 measured indicator variables and 120 items, and four latent constructs Institutional Capacity (IC), Infrastructure Governance (IG), Infrastructure Equity (IE), and Nation-Building Process (NBP). While measured variables are shown with a box, latent constructs are shown with an oval/circle. IC is an exogenous (independent) constructs in this model as there is no single-headed arrow entering the construct. IC and IG are each indicated by four measured variables. IG, IE, and NBP are all endogenous (dependent) constructs. IG and IE are hypothesized as outcomes in some relationships and as predictors in others. IE is indicated by five measured items. NBP is the final outcome and is indicated by four measured variables. Hypotheses to be tested are represented by arrows connecting two constructs.

There are two types of numeric denotation systems in the PLS-SEM diagram: Numbers in the circle: shows how much the variance of the Latent Variable (LV) is being explained by the other LVs; and, Numbers in the arrow: these are called the path coefficients. They explain how strong the effect of one variable is on another variable. The weight of different path coefficients enables one to rank their relative statistical importance. Based on this, the interrelationships among institutional capacity, infrastructure governance, infrastructure equity, and nation-building process, and its impacts on state-and nation-building processes as well as the equitable allocation of infrastructure across regional states in Ethiopia are discussed. Thus, the following is the model in Structural Equation Modelling-Confirmatory Factor Analysis (SEM-CFA).

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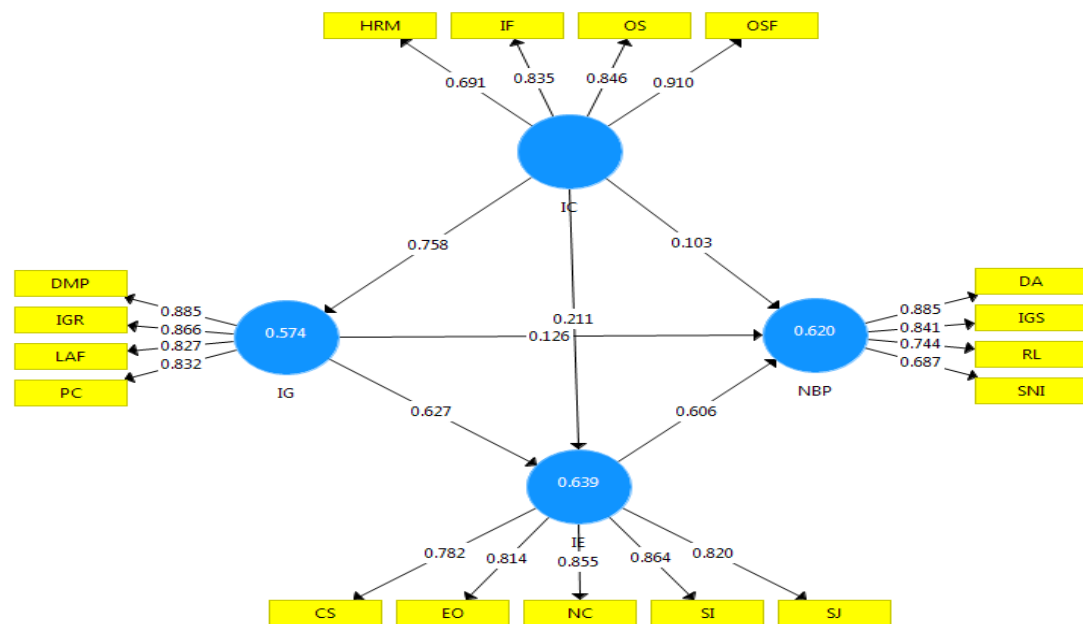


Figure 9. 1 Graphic Representation of Model in SEM-CFA

Source: Own data, 2019

Legend:

- **IC=Institutional Capacity** which includes (HRM) Human Resource Management; (OR) Organizational Structure; (OSF) Organizational Systems and Frameworks; and, (IF) Infrastructure Funding)
- **IG= Infrastructure Governance** comprises indicators like (IGR) Intergovernmental Relations; (DMP) Decision Making procedures; (LAF) Land Acquisition Framework; and, Political Commitment (PC)
- **IE=Infrastructure Equity** embraces factors like (EO) Equal Opportunity; (SJ) Social Justice; (NC) National Competitiveness; (SI) Spatial Intervention; and, (CS)Citizen Satisfaction)
- **NBP= Nation-Building process** includes (RL) Rule of Law; (DA) Democratic Accountability; (SNI) Shared National Identity; and (IGS) Inclusive Growth and Sustainability

Factor-loadings are the weights and correlations between each variable and the factor. The higher the load is the more important in identifying the factor's dimensionality. Factor-loading in the range of plus or minus 0.30 to plus or minus 0.40 is considered to meet the minimum level for interpretation of the structure. Loadings plus or minus 0.50 or greater are considered practically significant. Loadings exceeding plus or minus 0.70 are considered indicative of a well-defined structure and are the goal of any factor analysis (Patel, 2015; Hair *et al*, 2017). From the outer-loadings which denoted in Table 9.3, factor shared national identity (SNI) for the nation-building

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process, and HRM for institutional capacity (HRM) have 0.687 and 0.691, respectively. However, reflective indicator loadings >0.5 items indicated a good measurement of the latent construct. Hence, these exceptions are greater than 0.50 which can be considered practically significant (Hulland, 1999; Nunnally, 1978; Afthanorhan, 2013).

Table 9. 3 Outer -Loading

Construct (latent variables)	Factor loading
Insufficient Institutional capacity of the infrastructure sector in Ethiopia (IC)	
Lack of Human resource management (HRM)	0.691
Lack of Organizational structure (OS)	0.846
Lack of Organizational systems & frameworks (OSF)	0.910
Lack of Infrastructure funding (IF)	0.835
Lack of Infrastructure governance (IG)	
Lack of Intergovernmental/Stakeholders collaboration and coordination (IGR)	0.866
Lack of Decision-Making Process (DMP)	0.885
Lack of Land Acquisition Framework/Right of way (LAF)	0.827
Lack of Political Commitment (PC)	0.832
Lack of Infrastructure equity in Ethiopia (IE)	
Lack of Equal Opportunity in Infrastructure (EO)	0.814
Lack of Social/Distributive Justice (SJ)	0.820
Lack of National and Regional Infrastructure competitiveness (NC)	0.855
Lack of Spatial Intervention/Planning (SI)	0.864
Lack of Citizen/stakeholder/Public satisfaction (CS)	0.782
Inadequate Nation building process in Ethiopia (NBP)	
Lack of Rule of law (RL)	0.744
Lack of Democratic/public accountability (DA)	0.885
Lack of Shared national identity (SNI)	0.687
Lack of Inclusive Growth and Sustainability (IGS)	0.841

Source: Own data, 2019

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In other way direction, Cronbach's alpha computes the reliability of the items in terms of the unidimensionality of a set of scale items. It is a measure of the extent to which all the indicator variables in this scale are positively related to each other which is >0.7 (Nunnally, 1978). Generally, on the basis of calculations and modeling, it can be perceived that PLS-SEM path modeling using SmartPLS is appropriate to carry on the CFA which is more reliable and valid (Afthanorhan, 2013). Accordingly, the Cronbach Alpha value of all the considered factors of this study results are >0.80 , so, they are reliable enough (Table 9.4).

If a researcher would like to report the Cronbach Alpha value for each latent construct and the overall measurement model, it's only for the purpose of confirming the Composite Reliability (CR) value for each latent construct. The CR is used to assess whether the sample is truly free from bias or if the responses-on the whole-are reliable. CR coefficients between 0.60 and 0.70 are indicated appropriate in exploratory studies, while coefficients of 0.70 and 0.90 are indicated satisfactory for the other types of research (Hair *et al.*, 2014). CR is commonly used in reporting the reliability of a latent construct, as well as an instrument as a whole. The reason why, CR is commonly chosen over CronbachAlpha in CFA is due to its less biased estimates compared to the Cronbach Alpha's (Fornell-Larcker, 1981). Thus, as the study finding of this study, the CR of each factor is >0.80 with the Average Variance Extracted (AVE) level of larger than 0.6 (Table 9.4).

Table 9. 4 Cronbach's Alpha, composite reliability and AVA

		Cronbach's				
	Item	Loading	Alpha	rho_a	CR	AVE
IC	HRM	0.691	0.841	0.867	0.894	0.680
	OS	0.846				
	OSF	0.910				
	IF	0.835				
IG	IGR	0.866	0.875	0.876	0.914	0.728
	DMP	0.885				
	LAF	0.827				
	PC	0.832				
IE	EO	0.812	0.885	0.888	0.916	0.685
	SJ	0.820				
	NC	0.854				

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	SI	0.865				
	CS	0.784				
NBP	RL	0.750	0.801	0.823	0.871	0.629
	DA	0.883				
	SNI	0.686				
	IGS	0.839				

Source: Own data, 2019

9.2.2 Factor Interpretation

As can be seen from Table 9.3 above, lack of organizational system and frameworks was the biggest factor that causes a system change in infrastructure development with a loading factor of 0.910. The second major factors are lack of decision-making process, national and regional infrastructure competitiveness, and democratic/public accountability (0.855 each). The other factors are Lack of Intergovernmental/Stakeholders collaboration, coordination (0.866), Spatial Intervention/Planning (0.864), Organizational structure (0.846), Inclusive Growth and Sustainability (0.841), Infrastructure funding (0.835), Political Commitment (0.832), Land Acquisition Framework/Right of way (0.832), Social/Distributive Justice (0.820), Equal Opportunity in Infrastructure (0.814), Citizen/stakeholder/Public satisfaction (0.782), Rule of law (0.744), HRM (0.691), and Shared national identity (0.687). In general, the above results illustrated that both the internal and factors have high influences on infrastructure equity and the nation-building process in Ethiopia. This is because all factor loadings are above the threshold (0.7) except two.

Therefore, based on Table 9.3 above, lack of proper HRM, enabling organizational structure, organizational systems and framework, and infrastructure funding is the result of insufficient institutional capacity of the infrastructure sector in Ethiopia. Similarly, the lack of intergovernmental relations, decision-making processes, land acquisition framework, and political commitment is the result of infrastructure governance problems of the infrastructure sector in the country. Moreover, the scarcities of finding equal opportunity, social justice, national/regional infrastructure competitiveness, spatial intervention/planning, and citizen/public satisfaction of the infrastructure sector are also the result of inequitable infrastructure allocation in the country.

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Similarly, lack of rule of law, democratic accountability, shared national identity and inclusive growths are also the result of the insufficient nation-building process of the country.

9.3 Structural Equation Modelling (SEM)

9.3.1 Hypotheses and the Model

The objective of this section of data analysis is to capture the relationship between factors and the outcomes of the inequitable allocation of public infrastructure investments on nation-building processes. Based on the CFA above, four key constructs/factors could be assessed from variables that are related to the outcomes of the inequitable allocation of public infrastructure investments and insufficient nation-building process. As discussed in Chap. 3, between CB-SEM and PLS-SEM, the latter is more appropriate to examine the interrelated dependence relationships in this study given its prediction orientation. Similar to CB-SEM, PLS-SEM assessment of the theoretical model as specified in Fig. 9.1 above consists of two sections. Thus, a two-step approach is used to estimate the model, involving a construction method using latent variables (LV) scores: 1) The measurement model is estimated by providing factor-loadings and reliability measures from items to LVs; 2) The structural model is estimated to provide path coefficients, illustrating the relationships of each construct.

More importantly, there are two types of measurement in SEM: formative or reflective.⁶⁹ If the indicators cause the LV and are not interchangeable among themselves they are formative (Haenlein and Kaplan, 2004). However, if the indicators are highly correlated and interchangeable, they are reflective and their validity and reliability should be carefully studied (Haenlein and Kaplan, 2004; Hair *et al*, 2013). In reflective models, indicators are a representative set of items, which all reflect the LV they are measuring. Reflective models assume measured variables are a sample of all possible indicators of that reality, and the factor is the reality. Therefore, dropping one indicator may not change the meaning of the LV as the other indicators are representative (Hair *et al*, 2017). Thus, the reflective measurement model is applied in this study as the indicators are highly interchangeable and correlated. Besides, their conceptual definitions and reflective indicators are as follows:

⁶⁹ Hair *et al*, J.F (2017), A Primer on Partial Least Squares Structural Equation Modeling. Consideration of reflective and formative measurement models is a key issue in the application of SEM. PLS-SEM can easily handle both formative and reflective measurement models.

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- Institutional Capacity of the government institution of the infrastructure sector (IC): Institutional capacity and commitment in this context imply the strength of political leaders and government authority for spearheading infrastructure development. The reflective indicator factors are HRM, organizational structure, organizational systems and framework, and infrastructure funding;
- Infrastructure Governance (IG): By the governance of infrastructure meant the processes, decision-making, and monitoring used by governmental organizations, tools and norms of interaction, and their counterparts with respect to making infrastructure services available to the public and the public sector; the interaction among government institutions internally, as well as their interaction with the users, citizens, and the private sector. The governance of infrastructure includes institutional roles, assessment tools, procedures, and related issues. The reflective indicator factors are IGRs, decision-making procedures, land acquisition framework, and political commitment;
- Infrastructure Equity (IE): is smart, targeted, and equitable public infrastructure investments that can generate enormous community benefits-jobs, business opportunities, access to public infrastructure. The reflective indicator factors are equal opportunity, social justice, national/regional infrastructure competitiveness, spatial intervention/planning, and citizen/public satisfaction;
- Nation-building process (NBP): The pursuit of nation-building stems from a political and philosophical choice. Basically, the goal is to build the collective capacity to pursue a shared vision of the future and to accomplish public results. Moreover, it is more concerned with the character of relations between citizens and their state. The reflective indicator factors are rule of law, democratic accountability, shared national identity, and inclusive growth.

Institutional capacity of the infrastructure sector institutions is the core factor as they would have critical effects on other factors, which in turn affects infrastructure governance and infrastructure equity in the infrastructure development, and ultimately affects the nation-building process. So, based on the formulated conceptual framework drawn by Smart PLS under the contemplation of all concerned factors as denoted in Figure 9.1 above, the study hypothesized the following hypotheses:

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H1: Lack of institutional capacity negatively affects infrastructure equity in Ethiopia (IC - $\rightarrow$ IE);

H2: Lack of institutional capacity negatively affects infrastructure governance in Ethiopia (IC- $\rightarrow$ IG);

H3: Lack of institutional capacity negatively affects the nation-building process in Ethiopia (IC - $\rightarrow$ NBP);

H4: Lack of infrastructure equity is negatively related to the nation-building process in Ethiopia (IE - $\rightarrow$ NBP);

H5: Lack of infrastructure governance is negatively related to infrastructure equity in Ethiopia (IG - $\rightarrow$ IE);

H6: Lack of infrastructure governance is negatively related to the nation-building process in Ethiopia (IG - $\rightarrow$ NBP);

H7: Infrastructure governance positively mediates the relationship between institutional capacity and infrastructure Equity (IC $\rightarrow$ IG $\rightarrow$ IE);

H8: Infrastructure equity positively mediates the relationship between institutional capacity and the nation-building process in Ethiopia (IC $\rightarrow$ IE $\rightarrow$ NBP);

H9: Infrastructure equity positively mediates the relationship between infrastructure governance and nation-building process (IG $\rightarrow$ IE $\rightarrow$ NBP);

H10: Infrastructure governance and infrastructure equity positively mediate the relationship between institutional capacity and nation-building process (IC $\rightarrow$ IG and IE $\rightarrow$ NBP);

H11: Infrastructure governance positively mediates the relationship between institutional capacity and the nation-building process (IC $\rightarrow$ IG $\rightarrow$ NBP).

Following this, the evaluation of the measurement model and the structural model are discussed as follows.⁷⁰

9.3.2 Evaluation of the Measurement Model

Prior to running the PLS model estimation in Smart PLS, the researcher had to manually type the questionnaire and distributed it for the concerned sample respondent and collect the data. Primarily, the data were entered in an Excel spreadsheet and export for both SPSS and Smart PLS for analysis. In general, there were 904 sample participants involved in the study. This sample size

⁷⁰ Hair et al, J.F (2017), A Primer on Partial Least Squares Structural Equation Modeling. A PLS path model consists of two elements. First, there is a structural model (also called the inner model in the context of PLS-SEM) that represents the constructs (circles or ovals). The structural model also displays the relationships (paths) between the constructs. Second, there are the measurement models (also referred to as the outer models in PLS-SEM) of the constructs that display the relationships between the constructs and the indicator variables (rectangles)..... There are two types of measurement models: one for the exogenous latent variables (i.e., those constructs that explain other constructs in the model) and one for the endogenous latent variables (i.e., those constructs that are being explained in the model).

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fulfills both the guidelines (Hair, Hult, Ringle, & Sarstedt, 2013). Since the sample size is also greater than 50, the indicator variables are designed to make use of multiple-item instead of a single item to measure the LV (Diamantopoulos *et al.*, Sarstedt, Fuchs, Kaiser, & Wilczynski, 2012). Every factor was represented by 5 to 10 attritions. Before properly assessing the path coefficients in the structural model, the researcher must first examine the indicator reliability, internal consistency reliability, convergent validity, and discriminant validity of the reflective measurement model to ensure they are satisfactory (Wong, 2013). Thus, it should at least follow four steps: 1) the reflective measurement model assessment involves examining the indicator loadings. Loadings above 0.708 are recommended, as they indicate that the construct explains more than 50% of the indicator's variance, thus providing acceptable item reliability; 2) Assessing internal consistency reliability, most often using composite reliability; 3) the reflective measurement model assessment addresses the convergent validity of each construct measure; and, 4) Assessing discriminant validity, which is the extent to which a construct is empirically distinct from other constructs in the structural model.

The resulting path model estimation is presented in Figure 9.1 above and the outer-loadings (bootstrapping) of various constructs and 17 indicator factors are shown in Table 9.8 below. Thus, the outer loadings results are above 0.708 except two indicator variables; i.e., HRM = 0.691 and Shared National Identity (SNI) = 0.686. In PLS-SEM, composite reliability rather than Cronbach's alpha used to evaluate the measurement model, internal consistency reliability is advisable. The internal consistency reliability is traditionally checked using Cronbach's alpha, which is greater than 0.80 for all constructs in this study. However, it is not suitable for PLS-SEM because it is sensitive to the number of items in the scale, and this measure is also found to generate severe underestimation when applied to PLS path models (Werts, Linn, and Joreskog, 1974; Kwong and Wong, 2016). The Composite Reliability (CR) value for each construct must be ≥ 0.60 (Awang, 2015), or >0.70 (Hair *et al.*, 2010).

Thus, the composite reliability of all constructs is >0.80 in this study; that means the factors are reliable (Table 9.4 above). As discussed above, in this study, the composite reliability of the factors such as IC, IG, IE, and NBP are 0.894, 0.914, 0.916, and 0.871 respectively which indicates high levels of internal consistency and reliability. The prior study suggests that a threshold level of 0.60

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or higher is required to demonstrate satisfactory composite reliability in exploratory research (Bagozzi and Yi, 1988) but not exceeding 0.95 level (Hair *et al.*, 2013).

Construct Validity refers to the extent to which the construct measures what is supposed to measure. In SEM, CFA is commonly used to assess construct validity (Joreskog, 1967). It can be evaluated based on the model fit indices. As the model fit index is fit (See Table 9.5), therefore, construct validity in overall has been achieved. The standardized root means square residual (SRMR) is an index of the average of standardized residuals between the observed and the hypothesized covariance matrices (Chen, 2007). The SRMR is a measure of estimated model fit; when $SRMR = <0.08$ then the study model has a good fit (Hu and Bentler, 1998), with a lower SRMR being a better fit. Table 9.5 shows that this study model's SRMR was 0.06, which revealed that the model had a good fit; likewise, Normed Fit Index (NFI) equal to 0.861. The NFI results lay between 0 and 1; so, the closer the NFI to 1, the better the fit.

Table 9. 5 Model fit

	Saturated Model	Estimated Model
SRMR	0.064	0.064
d_ULS	0.634	0.634
d_G	0.268	0.268
Chi-Square	1,431.18	1,431.18
NFI	0.861	0.861

Source: Own data, 2019

However, depending on the overall fitness of a model is not enough in making sure the ability of an instrument to measure a certain phenomenon; in the case of instrument validation at least. Under the aspect of construct validity, there are two prominent terms used in CFA; convergent validity and discriminant validity (Campbell and Fiske, 1959). Thus, the other considered test is convergent validity. It takes two measures that are supposed to be measuring the same construct and shows that they are related. Conversely, discriminant validity shows that two measures that are not supposed to be related. Both types of validity are a requirement for excellent construct validity (Campbell and Fiske, 1959). Convergent validity is the degree of confidence that a construct is well-measured by its indicators (Campbell and Fiske, 1959). In other ways, if it is violated, it shows that the items are not well correlated with each other within their parent factor; i.e. the latent

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factor is not well explained by its observed variables. Convergent validity is assessed based on the AVE. Thus, the AVE Value for each construct must be >0.5 (Hair *et al.*, 2010). In this study, the value for each construct is >0.5 . In contrast to this, discriminant validity is the degree to which measures of different traits or constructs.

In other way direction, convergent validity is the model's ability to explain the indicator's variance. The AVE can provide evidence for convergent validity; if the AVE value larger than 0.5, it indicated that the model has convergent validity. Therefore, the entire four constructs exceeded this level 0.5; i.e., the constructs are valid convergent. Furthermore, an established rule of thumb suggested that the LV should explain a significant part of each indicator's variance, usually at least 50%. This means that an indicator's outer-loading should be above 0.708; since, that number squared (0.7082) equals 0.50 (Fornell and Larcker, 1981) Bagozzi and Yi (1988). Thus, the AVE for the latent construct IC, IG, IE, and NBP are 0.680, 0.728, 0.685, and 0.629, respectively (See Table 9.4 above). So, the measures of these reflective constructs can be said to have high levels of convergent validity.

For convergent validity and construct reliability, the AVE value for latent IC, IG, IE, and NBP is above 0.50. These constructs achieved the requirement as Fornell and Larcker (1981) proposed. This can prove that validity for this measurement model is highly accepted as also the Cronbach alpha and composite reliability fulfill the requirement as the literature supported. Finally, the study proceeds for discriminant validity.

The discriminant validity (DV) assessment has the goal to confirm that a reflective construct has the strongest interrelationships with its own indicators e.g., in comparison with any other construct in the PLS path-model (Hair *et al.*, 2017). Table 9.6 presented below is the discriminant validity according to PLS-SEM. DV test shows how much variance in the indicators that are able to explain variance in the construct. DV value obtained from the square root of AVE value. The diagonal values are the square root of AVE while other values are the correlation between the respective constructs. In this case, the DV is achieved when a diagonal value is higher than the value in its row and column (Afthanorhan, 2013). The Fornell-Larcker (1981) criterion is a common and conservative approach to assess DV and it can be applied in PLS-SEM. To establish the DV, the square root of the average variance extracted (AVE) of each latent variable should be larger than

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the latent variable correlations (LVC). Table 9.6 clearly shows that discriminant validity is fulfilled with all the considered criteria because the square root of AVE for IC, IG, IE, and NBP are greater than the corresponding LVC. Then, DV is met as the Square root of AVE>LVC.

Discriminant Validity; the criterion of Fornell-Larckern (1981)

Discriminant validity is also assessed based on the square root of AVE and correlations among latent constructs. Firstly, a correlation among constructs must be <.85 (Hair et al., 2010; Awang, 2015) and the square root of AVE greater than inter-construct correlations (Fornell& Lacker, 1981). Thus, the correlations among the constructs IC, IG, IE, and NBP are <.85. Moreover, the square root of AVE is greater than the inter-construct correlations of all constructs. Thus, the constructs are well measured by their indicators.

Table 9. 6 Fornell-Larcker Criterion

	IC	IE	IG	NBP
IC	0.824			
IE	0.686	0.828		
IG	0.758	0.787	0.853	
NBP	0.613	0.776	0.680	0.793

Source: Own data, 2019

Discriminant Validity; Heterotrait-Monotraitratio (HTMT)-PLS-SEM

Recently, a new approach in assessing the discriminant validity is through the Hetero Trait-Mono trait ratio by Henseler *et al* (2015). HTMT is the average of the hetero trait-hetero method correlations relative to the average of the mono trait-hetero method correlations. The HTMT derives from the classical multi trait-multi method (MTMM) matrix (Campbell & Fiske, 1959). The cut-off value for HTMT is <.85 (Kline, 2011), and <.90 (Gold *et al.*, 2001). According to Gold *et al* (2001), the HTMT result is <.90. However, HTMT <1 (Henseler *et al*, 2015) is acceptable. See Table 9.7.

Table 9. 7 Discriminant Validity; Heterotrait-Monotraitratio (HTMT)-PLS-SEM

	IC	IE	IG	NBP
IC				
IE	0.782			

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IG	0.867	0.895	
NBP	0.734	0.912	0.802

Source: Own data, 2019

More importantly, it is stated that “The t-test examines whether the means of two groups are statistically different from each other (non-directional or two-tailed test), or whether one group has a statistically larger (or smaller) mean than the other (directional or one-tailed test)” (Bhattacharjee, 2012, p. 132). To view the correlations between the LVs and the indicators in its outer model, the outer loading (using bootstrapping) is shown in Table 9.8. The critical t value for a two-tailed test is 1.96 (significance level of 0.05). Alternatively, to examine the p -value, which should be lower than 0.05. Thus, the entire construct P-values lower than the significant threshold (Hair *et al*, 2017). Hence, all outer loading results show that there are significant correlations between the LVs and indicators.

Table 9. 8 Outer loading (bootstrapping)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistics (O/STDEV)	P-Values
HRM <- IC	0.691	0.690	0.030	22.93	0.000
IF <- IC	0.835	0.836	0.012	69.86	0.000
OS <- IC	0.846	0.847	0.013	65.338	0.000
OSF <- IC	0.910	0.909	0.007	126.081	0.000
DMP <- IG	0.885	0.886	0.010	90.184	0.000
IGR <- IG	0.866	0.867	0.012	72.395	0.000
LAF <- IG	0.827	0.827	0.016	50.21	0.000
PC <- IG	0.832	0.834	0.014	58.658	0.000
CS <- IE	0.784	0.783	0.019	40.617	0.000
EO <- IE	0.812	0.813	0.017	47.305	0.000
NC <- IE	0.854	0.853	0.012	71.62	0.000
SI <- IE	0.865	0.865	0.012	74.049	0.000
SJ <- IE	0.820	0.819	0.015	56.389	0.000
DA <- NBP	0.883	0.884	0.008	109.091	0.000
IGS <- NBP	0.839	0.839	0.014	59.001	0.000
RL <- NBP	0.750	0.749	0.027	28.271	0.000
SNI <- NBP	0.686	0.684	0.030	22.704	0.000

Source: Own data, 2019

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Furthermore, Cross Loading Criterion subjective independence can help reduce the presence of multicollinearity amongst the LVs denoting that the AVE of an LV should be higher than the squared correlations between the LV and all other variables (Chin, 1998; Fornell and Larcker, 1981). An indicator's outer-loadings on a construct should be greater than all its cross-loadings with other constructs (Hair *et al.*, 2011). Based on the value of cross-loading, the correlation value of constructs with their manifest variable was higher than the correlation of their manifest variables with the other constructs. It can be concluded that the indicators used in this study met the criteria of DV. The following table shows the cross-loading results (Table 9.9).

Table 9. 9 Loadings and Cross-loading

	IC	IG	IE	NBP
HRM	0.691	0.427	0.422	0.396
OS	0.846	0.613	0.523	0.479
OSF	0.910	0.711	0.646	0.582
IF	0.835	0.698	0.635	0.540
IGR	0.677	0.866	0.652	0.568
DMP	0.702	0.885	0.679	0.583
LAF	0.630	0.827	0.678	0.587
PC	0.571	0.832	0.677	0.583
EO	0.562	0.677	0.812	0.581
SJ	0.505	0.639	0.820	0.570
NC	0.586	0.642	0.854	0.619
SI	0.613	0.689	0.865	0.744
CS	0.566	0.607	0.784	0.682
RL	0.378	0.454	0.559	0.750
DA	0.582	0.646	0.707	0.883
SNI	0.438	0.411	0.508	0.686
IGS	0.525	0.611	0.665	0.839

Source: Own data, 2019

As a summary, the subsequent PLS path model analyses reveal that all measures meet the commonly suggested criteria for measurement model assessment as described by Chin (1998), Henseler *et al.* (2009), and Hair *et al.* (2012). Specifically, the analyses per case show that all indicators exhibit loadings above 0.70, except HRM (0.691), and shared national identity (0.686)

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and that the constructs' AVE values are above 0.50. Likewise, all constructs achieve high composite reliability values of 0.80 and higher (Table 9.4 above). The study used two approaches to assess the constructs' DV. First, it has been examined the indicators' cross-loading, which indicated that no indicator loads greater than on an opposing construct (Hair et al., 2012). Second, it has been applied the Fornell and Larcker (1981) criterion and tested whether each construct's AVE is higher than its squared correlation with the remaining constructs. Both analyses clearly indicated that the constructs exhibit discriminant validity. Overall, these results delivered clear support for the measures' reliability and convergent validity (Sarstedt *et al*, 2011). Therefore, indicator reliability/outer loadings, convergent validity, internal consistency reliability/composite reliability, and discriminant validity are valid and reliable. Therefore, the researcher confirmed that the measurement model is valid and reliable. Then, the study can proceed to structural model assessment in smart PLS as follows.

9.3.3 Evaluation of the Structural Model

In addition to checking the measurement model, the structural model has to be properly evaluated before drawing any conclusion. This includes observing the model's predictive relevancy and the interrelationship between the constructs. The coefficient of determination (R^2), Path coefficient (β value) and T-statistic value, Effect size (f^2), the Predictive Relevance of the model (Q^2), and Goodness-of-Fit (GOF) index (see Sec. 9.7 below) are the key standards for evaluating the inner structural model. Moreover, collinearity is a potential issue in the structural model, and that Variance Inflation Factor (VIF) value of 5 or above typically indicates such a problem (Hair *et al*, 2012; Kwong and Wong, 2016). Thus, the study should examine each set of predictors in the structural model for collinearity. Each predictor construct's tolerance value should be higher than 0.20 (Kwong & Wong, 2013), and the VIF lower than 5. As the collinearity assessment results illustrated in Table 9.10 below all factors VIF values are lower than five, suggesting that there is no indication of collinearity between each set of predictor variables.

As the PLS model suggested IC, IG, and IE act as independent variables because they have arrows (paths) pointing towards NBP but the collective effect showed in NBP. So, the study runs a regression model as consider NBP is the dependent variable and IC, IG, and IE serve as "Independent" variables. As a result, the PLS check the VIF and has got more or less similar results; thus, there are no collinearity problems.

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Table 9. 10 Collinearity assessment

	IC	IE	IG	NBP
IC		2.348	1.000	2.471
IE				2.768
IG		2.348		3.437
NBP				

Source: Own data, 2019

I. Coefficient of Determination (R^2)

A major part of structural model evaluation is the assessment of the coefficient of determination (R^2). R^2 measures the proportion of variance in a latent endogenous variable that is explained by other exogenous expressed as a percentage (Chin, 1998). Moreover, bootstrap confidence intervals provide additional information on the stability of path coefficient estimates. The researcher should use the percentile method for constructing confidence intervals. PLS-SEM aims at maximizing the R^2 values of the endogenous latent variable(s) in the path model. The R^2 value ranges from 0 to 1. The exact interpretation of the R^2 value depends on the particular model and research discipline, in general, R^2 values of 0.75, 0.50 or 0.25 or for the endogenous construct can be described as respectively substantial, moderate, and weak (Henseler *et al.*, 2009; Hair *et al.*, 2011; Hair *et al.*, 2017). In this case, it suggested that the coefficient of determination, R^2 is 0.619 for the NBP endogenous latent variable. This means that the three latent variables (IC, IG, IE) 61.9% explain the variance of the endogenous factor NBP. The same model estimation also reveals the R^2 for other latent constructs; IC explains 57.4% of IG, whereas IG and IC are found to explain 63.9% of IE's variances in this PLS-SEM model. Thus, the overall R^2 is found to be above moderate.

Table 9. 11 R Square results

	R Square	R Square Adjusted
IE	0.639	0.638
IG	0.574	0.574
NBP	0.619	0.618

Source: Own data, 2019

II. Path Coefficient

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In Smart PLS, the relationships between constructs can be determined by their path coefficients and related t statistics via the bootstrapping procedure. The researcher selects “904” cases because there are 904 respondents in this study. From Table 9.12 below, it can be seen that all of the structural model relationships, except hypothesis 3 and 6, are significant. The P-Value of the t-test evaluated that IC has the strongest effect on IG (0.758), followed by IG which has a significant effect on IE (0.627), likewise, IE has a significant effect on NBP (0.609) and IC has a significant effect on IE (0.211). However, IC and IG do not have a significant effect on NBP (0.101 and 0.125 respectively), which are below the threshold (0.20) (Figure 9.1 above).

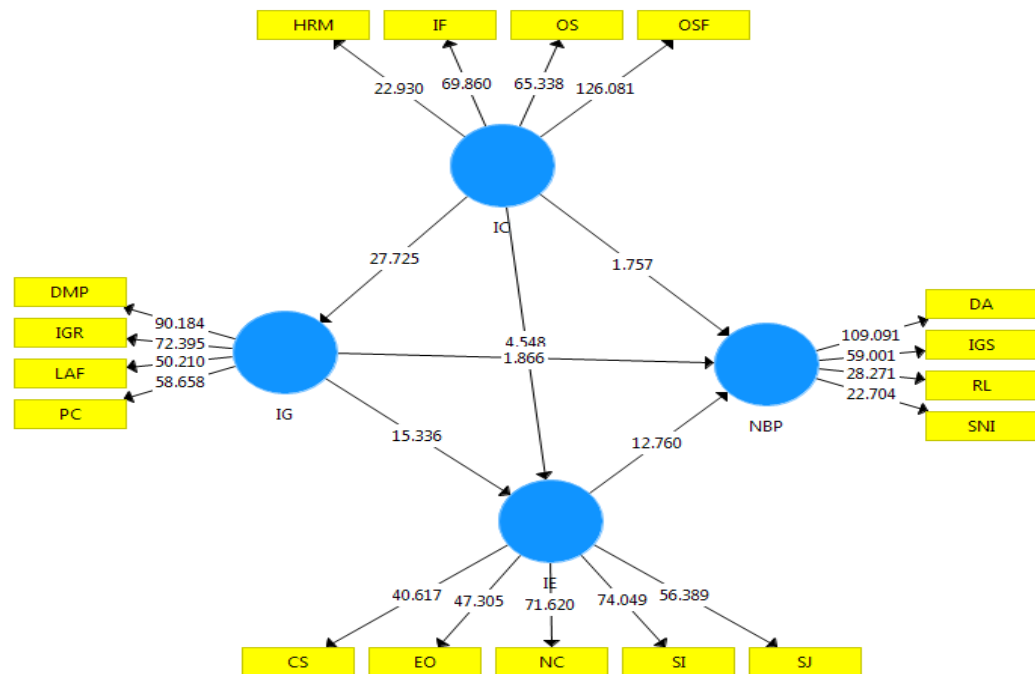


Figure 9. 2 Path coefficient with bootstrapping

The study used bootstrapping to assess the significance of path coefficients. The minimum number of bootstrap samples must be at least as large as the number of valid observations but should be 5000. Bootstrapping analysis is used to evaluate the direct effects of all hypothesized relationships that are represented by statistical testing of the hypotheses. If $t > 1.96$ (for a 2 tailed test), the hypothesis is supported (Peng and Lai, 2012). Hair *et al* (2017) suggest assessing Beta and the corresponding t-values through a bootstrapping procedure with a resample of 5000. With P values, frequently the criterion $P < 0.05$ is used instead of $P \leq 0.05$ for accepting a hypothesis. As can be

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seen from Table 9.12, the P-values of the t-test statistics of some variables are higher than the estimated threshold (0.05). In that regard, H1, H2, H4, and H5 are supported. However, H3 and H6 are not supported.

Table 9. 12 Significance Testing Results of the Structural Model Path Coefficients

Hypothesis	Relationship	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
H1	IC -> IE	0.211	0.213	0.047	4.492	0.000*
H2	IC -> IG	0.758	0.758	0.027	27.902	0.000*
H3	IC -> NBP	0.101	0.102	0.058	1.745	0.082
H4	IE -> NBP	0.609	0.605	0.048	12.584	0.000*
H5	IG -> IE	0.627	0.626	0.043	14.488	0.000*
H6	IG -> NBP	0.125	0.127	0.066	1.896	0.059

***is significant with 95% confidence interval**

Source: Own data, 2019

III. Predictive relevance (Q^2)

An assessment of Stone-Geisser's Predictive Relevance (Q^2) is vital because it checks if the data points of indicators of an endogenous construct in the reflective measurement model can be predicted accurately (Chin, 1988; Henseler *et al*, 2009). This can be achieved by making use of the blindfolding procedure in Smart PLS. IG, IE, and NBP are the three endogenous constructs in the model so they are selected for running the Blindfolding Algorithm.

The study used blindfolding to obtain “cross-validated redundancy” measures for each of the endogenous constructs. The resulting Q^2 values greater than zero suggests the exogenous constructs have Predictive Relevance for the endogenous construct. The effect size q^2 allows assessing an exogenous construct's contribution to an endogenous LV's Q^2 value. The relative measure of Predictive Relevance, q^2 values of 0.02, 0.15, and 0.35 respectively. Thus, it indicates that an exogenous construct has a small, medium, or large Predictive Relevance for a certain endogenous construct (Hair *et al*, 2014; Hair *et al*, 2017). As a result of the study revealed Q^2 results of the factors are greater than zero (Hair *et al*, 2017). It is observed that the proposed model has good predictive relevance for all of the endogenous variables as it is greater than zero.

Table 9. 13 Results of Coefficient of Determination (R^2) and Predictive Relevance (Q^2)

Endogenous Variables	R Square	Q^2 (=1-SSE/SSO)
IE	0.639	0.410
IG	0.574	0.393
NBP	0.619	0.367

Source: Own data, 2019

IV. The f^2 and q^2 Effect Sizes

The final step in structural model evaluation is to assess the effect of a specific exogenous construct on the endogenous construct if it is deleted from the model. This can be achieved by examining the f^2 and q^2 effect sizes, which can be derived from R^2 and Q^2 respectively. The f^2 effect size can be calculated manually by taking $(R^2_{\text{included}} - R^2_{\text{excluded}}) / (1 - R^2_{\text{included}})$. Similarly, the q^2 effect size can be calculated by taking $(Q^2_{\text{included}} - Q^2_{\text{excluded}}) / (1 - Q^2_{\text{included}})$. Following Cohan's (1988) guideline which states that f^2 values of 0.02, 0.15, and 0.35 are interpreted as small, medium, and large effect sizes respectively, it can be said that in general, the exogenous variables have small to large f^2 and q^2 effect sizes on the endogenous variables (Hair *et al*, 2014). Hence, the f^2 calculated equals 0.010, 0.005, and 0.344, for NBP, IG, and IE respectively. It can be concluded that the effect of the IE construct is medium, of the IG, and of the NBP are small. Whereas, based on the reported q^2 coefficients of each construct of IE, IG and NBP (0.126, 0.002, and 0.005) present medium, and small effects respectively (Table 9.13).

Table 9. 14 Results of f^2 and q^2 Effect Sizes

Institutional Capacity (IC)		
	f^2 effect size	q^2 effect size
NBP	0.010	0.005
IG	0.005	0.002
IE	0.344	0.126

Source: Own data, 2019

V. Infrastructure Governance (IG) and Infrastructure Equity (IE) as a Mediator

A mediator describes how or why an independent variable is related to a dependent variable (Hair *et al*, 2017).⁷¹ The focus areas of understanding the mechanisms are their chain of events or the underlying process. The inter-relationships among constructs in PLS-SEM can be not always straightforward and it is complex. To gain a better understanding of the role of IG and IE in this model, its potential mediating effect on the linkage between IC, IG, and NBP is considered (Table 9.15). This is accomplished by following the Preacher and Hayes (2008) technique, which is used instead of the traditional Sobel (1982) test because it does not have strict “distributional assumptions” (Hair *et al*, 2013). Running mediation requires a series of analyses, which address the significance of the direct and indirect effects. There is a need to distinguish between different types of mediation and non-mediation, depending on whether the model relationships are significant and their relationship to each other.

To test mediating effects, the study used bootstrapping instead of the Sobel test, which is not applicable in a PLS-SEM context. Then, the study has already considered all standard model evaluation criteria in the assessment of mediation models, such as convergent validity, discriminant validity, reliability, multicollinearity, R^2 , and so forth. To test multiple mediation models, the study included all mediators simultaneously and distinguished between specific indirect effects and total effects. If the significance of the indirect effect cannot be established, there is no mediating effect. Having a significant indirect effect is the basis to determine the mediator’s magnitude (Kwong & Wong, 2016). Thus, as can be seen from Table 9.15, based on the results of the P-value of t-statistics, H7, H8, H9, and H10 are supported, but not, H11.

Thus, the mediation analysis results are presented in Table 9.15. It can be said that 47.5% of IC’s effects on IE (H7); 12.8% of IC’s effects on NBP can be explained via the IE mediator (H8); 38.2% of IG’s effects on NBP (H9); and, 28.9% of IC’s effects on NBP can be explained via the IG and IE mediators jointly (H10). However, since the T statistics and P-value have not accepted the threshold level, IG is argued to have no mediating effect on the IC→NBP linkage. Thus, these

⁷¹Hair et al, J.F (2017), A Primer on Partial Least Squares Structural Equation Modeling. Moderation.... Moderation describes a situation in which the relationship between two constructs is not constant but depends on the values of a third variable, referred to as a moderator variable.... The moderator variable (or construct) changes the strength or even the direction of a relationship between two constructs in the model.

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findings lead the study to accept hypothesis H7-H10 but reject hypothesis H11 about IG's mediator role.

Table 9. 15 Indirect Specific Effect

Hypothesis	Relationship	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	t Statistics (O/STDEV)	P Values
H7	IC -> IG -> IE	0.475	0.474	0.034	13.899	0.000*
H8	IC -> IE -> NBP	0.128	0.128	0.028	4.571	0.000*
H9	IG -> IE -> NBP	0.382	0.379	0.045	8.516	0.000*
H10	IC -> IG -> IE -> NBP	0.289	0.287	0.034	8.616	0.000*
H11	IC -> IG -> NBP	0.094	0.097	0.051	1.863	0.063

***is significant with 95 % confidence interval**

Source: Own data, 2019

In the interpretation and testing of hypotheses, the researcher has differentiated between the direct effect (main effect), on one hand, and simple effect, on the other. The direct effect expresses the relationship between the two constructs when no mediator is included. On the contrary, the simple effect expresses the relationship between two constructs when mediated by a third variable, and this mediator has an average value (provided the data are standardized). Once the significance of the indirect effect is established, the strength of the mediator can be examined through the use of the total effect. It is also said that Total effect = direct effect + indirect effect. According to the study findings, the Total Effect of IC on the endogenous latent variables (IG, IE, and NBP) is significant with a T-Statistics and P-value in the Bootstrapping procedure. Therefore, the total effects of all hypotheses have been supported (Table 9.16).

Table 9. 16 Total effect

Hypothesis	Relationship	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
H1	IC -> IE	0.686	0.687	0.029	23.607	0.000*
H2	IC -> IG	0.758	0.758	0.027	27.902	0.000*
H3	IC -> NBP	0.613	0.614	0.039	15.82	0.000*
H4	IE -> NBP	0.609	0.605	0.048	12.584	0.000*
H5	IG -> IE	0.627	0.626	0.043	14.488	0.000*
H6	IG -> NBP	0.506	0.506	0.069	7.3	0.000*

***is significant with 95 % confidence interval: Source:** Own data, 2019

VI. Multi-group Analysis (PLS-MGA) – Among Institutions

Research has proposed several approaches to multi-group analysis (Sarstedt *et al*, 2011; Hair *et al*, 2017).⁷² When comparing two groups of data, researchers need to distinguish between the parametric approach and several nonparametric approaches. The parametric approach is the first in the field and has been widely employed because of its simplicity of implementation. The multi-group analysis allows us to test if pre-defined data groups have significant variations in their group-specific parameter estimates e.g., outer-weights, outer-loadings, and path-coefficients. The multi-group analysis allows testing whether differences between group-specific path coefficients are statistically significant (Keil *et al*, 2000). Thus, there are different approaches to multi-group analysis with the *t-test*-based parametric approach being most frequently applied (Hair *et al*, 2018). Then, smart PLS delivers outcomes of three different approaches that are based on bootstrapping results from every group (Sarstedt *et al*, 2011) (see Table 9.17 below).

The study primarily aims to evaluate the difference between federal government institutions, civil society, and multilateral organizations in their perceptions about infrastructure equity. Hence, a multi-group analysis (PLS-MGA) is conducted using the parametric approach as suggested by Keil *et al* (2000), which involves a modified two-independent-sample t-test to compare path coefficient across two groups of data. With the help of bootstrapping, the standard deviation of the path coefficient can be calculated. So the study explores if there is any categorical moderating effect of federal government institutions (group 1) and civil society and multilateral organizations (group 2). This kind of concern is understandable because heterogeneity may exist to show significant differences in model relationships. Becker *et al* (2013) advise that researchers who failed to consider this potential issue may draw incorrect conclusions.

More importantly, the main idea is to check if the variances of the PLS parameter estimates; i.e., path coefficients differ significantly across the two groups. The standard errors of the PLS parameter estimates can be found using the bootstrapping procedure. The bootstrapping standard deviation is the same as the bootstrapping standard error in SmartPLS. To find the standard error

⁷² Hair *et al*, J.F (2017), A Primer on Partial Least Squares Structural Equation Modeling. Multi-group Analysis (MGA)..... Henseler *et al*. (2009) proposed another nonparametric multi-group analysis approach that builds on bootstrapping results. Their PLS-MGA approach compares each bootstrap estimate of one group with all other bootstrap estimates of the same parameter in the other group..... By counting the number of occurrences where the bootstrap estimate of the first group is larger than those of the second group, the approach derives a probability value for a one-tailed test.

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(se(p(1))) of the parameter estimates in Group 1, the study runs bootstrap with 271 cases; to find the standard error (se(p(2))) of the parameter estimates in Group 2, the study run bootstrap with 164 cases. As revealed in Table 9.17, only 1 relationship (IG→IE) differs significantly across the two groups; while the rest path coefficients do not differ significantly.

Table 9. 17 Results of Multi-group Analysis (PLS-MGA) between Federal Institutions and Civil Society

Path (Federal - civil society)	Coefficients-diff	t-Value (Federal vs civil society)	p-Value (Federal vs civil society)	Level of Significant
IC -> IE	0.14	1.267	0.206	Not Significant
IC -> IG	0.106	2.137	0.033	Not Significant
IC -> NBP	0.001	0.007	0.994	Not significant
IE -> NBP	0.22	1.55	0.122	Not significant
IG -> IE	0.342	2.949	0.003	Significant
IG -> NBP	0.039	0.234	0.815	Not significant

Source: Own data, 2019

9.4 Summary of Hypothesis Testing

All of the hypotheses except three are acceptable in the study, and their results are summarized in Table 9.18. IC is found to have a significant impact on both IE and IG (H1 and H2), likewise, IG has significant influences on the two endogenous variables (IE and NBP) (H5). It has also been found that IE maintains a significant linkage with NBP (H4). In other way direction, IE serves as a significant mediator to the relationship between IC and IG, IC and NBP, IG, and NBP (H7, H8, and H9). Moreover, IG and IE positively mediate the relationship between institutional capacity and the nation-building process (H10). However, IC does not directly affect the nation-building process in Ethiopia (H3); and also IG is not directly related to the nation-building process in Ethiopia (H6). Furthermore, IG does not mediate the relationship between institutional capacity and the nation-building process (H11).

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Table 9. 18 Summary of Hypothesis Testing

Hypotheses	Supported? (Yes/No)
H1 Lack of institutional capacity negatively affects infrastructure equity in Ethiopia (IC - $\rightarrow$ IE);	Yes
H2 Lack of institutional capacity negatively affects infrastructure governance in Ethiopia (IC- $\rightarrow$ IG);	Yes
H3 Lack of institutional capacity negatively affects the nation-building process in Ethiopia (IC - $\rightarrow$ NBP);	No
H4 Lack of infrastructure equity is negatively related to nation-building process in Ethiopia (IE - $\rightarrow$ NBP);	Yes
H5 Lack of infrastructure governance is negatively related to infrastructure equity in Ethiopia (IG - $\rightarrow$ IE);	Yes
H6 Lack of infrastructure governance is negatively related to the nation-building process in Ethiopia (IG - $\rightarrow$ NBP);	No
H7 Infrastructure governance positively mediates the relationship between institutional capacity and infrastructure Equity (IC $\rightarrow$ IG $\rightarrow$ IE);	Yes
H8 Infrastructure equity positively mediates the relationship between institutional capacity and nation-building process in Ethiopia (IC $\rightarrow$ IE $\rightarrow$ NBP);	Yes
H9 Infrastructure equity positively mediates the relationship between infrastructure governance and nation-building process (IG $\rightarrow$ IE $\rightarrow$ NBP);	Yes
H10 Infrastructure governance and infrastructure equity positively mediate the relationship between institutional capacity and nation-building process (IC $\rightarrow$ IG and IE $\rightarrow$ NBP);	Yes
H11 Infrastructure governance positively mediates the relationship between institutional capacity and nation-building process (IC $\rightarrow$ IG $\rightarrow$ NBP);	No

Source: Own data, 2019

9.5 Interpreting Relationships

In general, for a data set that has up to 1000 observations or samples, the “standardized” path coefficient should be larger than 0.20 in order to demonstrate its significance (Kwong & Wong, 2013). As shown in

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the above pictorial presentation (Fig. 9.1), the estimated path coefficients of the relationships among target constructs are illustrated. Accordingly, as the magnitude of the coefficients indicated, lack of institutional capacity has the biggest impact (0.758) on infrastructure governance, and lack of infrastructure governance has also the next biggest impact (0.627) on infrastructure equity. Moreover, the lack of equity in infrastructure development has the third-highest impact (0.609) on the nation-building process. Lack of institutional capacity has a significant impact (0.211) on infrastructure equity; whereas, lack of infrastructure governance (0.125) and institutional capacity (0.101) of the infrastructure sector does not directly have a significant impact on the nation-building process in Ethiopia. The results presented in this study have shown that the four constructs scales is an appropriately validated instrument for measuring the nation-building process.

9.6 Determining Factor

The previous section tells about the descriptive effect and the estimation of SEM of public investments in infrastructure and the nation-building process. For the identification and determinants of the nation-building process of the country, herein, the study used the SEM model. Primarily 120 Likert scale questions were formulated based on the literature review. Then, the building of the structural model brought them into four, Institutional capacity, Infrastructure Governance, Infrastructure Equity, and Nation-Building Process. As the model illustrated, the above all the arrows came into the Nation-Building Process; i.e., this is the dependent variable, whereas, the remaining three variables are independent. So, the SEM model is carried out by taking into consideration the conceptual framework, shown in Figure 9.1, for assessing the relative effect of the explanatory variables over the dependent. Thus, to avoid an excessive number of variability and unstable estimates in the subsequent model, only variables that have reached a p-value of less than 0.05 are taken into consideration in the next analyses.

So, according to the first step of the analysis result of this study, the risk factors found to be significantly related to Nation-Building Process in Ethiopia. As the outcome elaborates Institution Capacity, Infrastructure Governance, and Infrastructure Equity are identified factors that show a significant association with Nation-Building Process in Ethiopia ($P < 0.05$).

The next step is running a multiple linear regression model based on the selected factors. For the regressing of these factors, the study has used the Enter method, which is the default procedure available in SPSS. Primarily, all the above analyses have been dealt with including outliers,

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normality, multicollinearity among independent variables, heteroscedasticity, and the goodness of fit of the model was checked through Cook's distance, Kolmogorov-Smirnov test, Variance Inflation Factor (VIF), and graphical presentation of standardized error term versus predicted value respectively. As the result indicates, the minimum Cook's result for the minimum is zero while the maximum is 0.435; i.e., the result is less than one. So, there is not detected any outliers which affect the model. The Kolmogorov-Smirnov test is also confirmed that the entire variables are linearly associated with each other. Likewise, the multicollinearity problem is not presented in the model because of the VIF of the highest and the lowest value lies between 2.397 and 3.361, which is less than 10. So, there is no strong relationship between explanatory variables. In addition, the distribution is not suffered by heteroscedasticity problems; because the graphical test confirmed this and the error term distributed normally with mean zero and variance one.

Now the estimated model full fill all the OLS criteria, so, the estimated regression model presented in the table below provides a more comprehensive and accurate examination of the issued variables. From the bases, the sign of all independent variables beta coefficient (β) indicates a +ve sign; i.e., any increments of the independent variables lead to an increase in the dependent counterpart.

For instance, the study wants to check whether Institutional Capacity is statistically significant to the determinant of the Nation-Building Process of Ethiopia or not. Hence, Institutional Capacity is significantly important to determine the Nation-Building Process (Beta= 0.109, P-value = 0.001 < sig. value = 0.05), i.e. after taking the remaining effect as a constant, for a unit percentage increment of Institutional Capacity of the country, would lead to 10.9% increment in the Nation-Building Process.

Similarly, the study wants to test in here that whether the Infrastructure Governance of Ethiopia has a significant impact on Nation-Building Process or not. As the result indicated, of course those two variables significantly associated to each other (Beta= 0.125, P-value = 0.001 < sig. value = 0.05). This compels that taking the remaining effect as a constant, for a unit percentage change of Infrastructure Governance effect would lead to a 12.5% increment in the Nation-Building Process of the country.

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Finally, the study wants to test whether Infrastructure Equity has a significant impact on the Nation-Building Process of the country or not. The result of the study also revealed in the Table below that this domain has a statistically significant contribution to the Nation Building Process (Beta= 0.592, P-value = 0.000 < sig. value = 0.05). Thus, for a unit percentage change of Infrastructure Equity would lead to a 59.2% increment on Nation-Building Process in Ethiopia, taking the remaining effect as a constant.

Table 9. 19 Tolerance Value and VIF for Composite Independent Variables

Model	Unstandardized		Standardized	t-	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta	s	
(Constant)	.881	.077		11.417	.000
institutional capacity in Ethiopian	.103	.031	.109	3.340	.001
Infrastructure Governance in Ethiopia	.107	.033	.125	3.249	.001
Infrastructure Equity in Ethiopia	.543	.032	.592	16.965	.000

Source: Own data, 2019

9.7 The Implications of the results

This study has provided several insights into infrastructure equity, especially the factors that drive the nation-building process from federal, regional, and civil society and multilateral organizations. The following overall implications can be drawn:

1. The nation-building process is influenced by several factors, including institutional capacity, infrastructure governance, and infrastructure equity. Resources have to be allocated to look after these areas in general. However, in relation to the model, institutional capacity and infrastructure governance do not have a direct significant effect on the nation-building process. This might be due to other factors that need to be researched in the future. More importantly, both have indirect significant effects on the nation-building process;
2. Out of these three factors, infrastructure equity is the most important, followed by infrastructure governance and then institutional capacity. That means if the government of Ethiopia give more emphasis on infrastructure equity management, the nation-building process of the country would improve significantly;

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3. This study also shows that infrastructure equity significantly mediates the strengths between institutional capacity, infrastructure governance, and the nation-building process. This means that as there is inequity in infrastructure development, it has directly affected the nation-building process in Ethiopia. As a result, the federal government should not only simply focus on getting institutional capacity for infrastructure development in the country; it would be more important for it to understand infrastructure governance and equity including regional governments' needs, react to their concerns, and keep them satisfied on the equitable distribution of infrastructure across regions in the country;
4. The result of this study viewed in two dimensions. The first one is common sense or universal truth of institutional capacity for any activity or process. The second one is the empirical results of this study, i.e., institutional capacity and infrastructure governance do not directly affect the nation-building process. This is because there might be other factors such as visions, policy issues like place-based policies, long-term plans, deep interventions, other governance issues, etc. that need to be considered in this case. However, when one considers the indirect paths (through IG and IE to NBP), institutional capacity has the biggest impact on the nation-building process. This seems mainly because the respondents are 'equity sensitive' (citizens or regional states which must have an equity balance in infrastructure allocation as they have experienced dissatisfaction and stress until they rebalance) than 'benevolent' and 'entitled' (see Chap. 2 Sec. 2.1.5).

9.8 Interviews and Discussions

9.8.1 Profile of Interviewees

After the questionnaire survey was conducted with some results, in-depth interviews, and focus group discussions (FGD) were conducted. The interviews and FGDs were conducted from August 2019 to November 2019. 23 higher officials, who are holding key positions in the organizations and involved in planning and executing national infrastructure development plans, were contacted (see Chap. 4 Sec. 4.5.1 for sampling method). However, only 18 (8 federal and 10 regional) of them agreed to be interviewed. In relation to sample size, Creswell (1998) suggested a sample size from 5 to 25. Thus, the sample size satisfies the required minimum size of in-depth interviews for this study. In addition to this, four out of eight FGD were also conducted. The profiles of these interviewees and FGDs could be found in Table 9.20 and Table 9.21 respectively.

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Based on the survey results, interviewees were mainly asked to explain why institutional capacity, infrastructure governance, and equity factors on the nation-building process occurred, and how to address them to improve the investment equity of funded infrastructure development in Ethiopia. Following this, using the thematic content analysis, transcripts of interviews were first to read and used to identify and check topics and aspects of contents. In the next stage, all contents of each topic were generally grouped together for direct reference for the discussion. Contents, including cases and examples, would be extracted from transcripts to link with the survey findings. Related documents were collected to illustrate various issues as well. Thus, the interviews combined with the survey findings and their relations with kinds of literature are discussed in the following sections.

Table 9. 20 Profiles of the in-depth interviewees

Interviewees Code	Designation/Position	Organization's main business
TR1	Tigray National Regional government, Chief Administration Office, Higher Official	Planning, organizing, leading and evaluating the regional government institutions and the public at large
TR2	Tigray Region, Road and construction Bureau, Higher Official	Leading and coordinating road and construction sectors in the region
AR1	Amhara Rural Road Agency, Higher Official	Designing, constructing, contracting and administrating rural roads in the region
AR2	Amhara Region Electric Utility office, Higher Official	Distributing Electric utilities for industry, commercial, and at household level, and giving services in the region
AR3	Amhara region Telecom, Higher Official	Designing, constructing and giving telecom services for its customers in the region
OR1	Oromia Region, Road and Transport Bureau, Higher Officials	Designing, constructing, contracting and administrating Road and Transport in the region
OR2	Oromia Region, Urban development and construction Bureau, Higher Officials	Leading and coordinating urban development and construction sector in Oromia region
BR1	BenshangulGumuz National Regional government, Chief Adminstration Office, Higher Official	Leading and coordinating the regional political, economic and social activities

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BR2	BenshangulGumuz Region, Urban Development and Construction Bureau, Higher Official	Coordinating and leading the urban development and construction sector.
BR3	BenshangulGumuz Region, Road and Transport bureau, Higher Official	Coordinating and leading the road sector
FG1	Federal Democratic Republic of Ethiopia, PM Office, Higher Official	Giving advisory services in the infrastructure sector for the government.
FG2	Ethiopian Road Authority, Higher Official	Designing, constructing, contracting and administrating highways in Ethiopia
FG3	Federal Democratic Republic of Ethiopia, House of Federation, Higher Official	Preparing Budget allocation formula and allocating budget based on the approved formula in Ethiopia
FG4	Federal Democratic Republic of Ethiopia, Ethio-telecom, Higher Official	Designing, constructing and giving telecom services for its customers in Ethiopia
FG5	Ethiopian Electric Utility, Higher Official	Distributing Electric utilities for industry, commercial, and at household level, and giving Electric services in Ethiopia
FG6	House of Federation, Member of Budget Committee, Higher Official	Preparing Budget allocation formula and allocating budget based on the approved formula in Ethiopia
C1	Ethiopian contractors association, Higher Executive	Leading and coordinating the contractors association Activities
C2	Ethiopian Consultants Association, Higher Executive	Leading and coordinating the consultants association activities

Source: Survey Data, 2019.

9.8.2 Institutional Capacity of the Government in the Infrastructure Sector in Ethiopia

Insufficient institutional capacity of the government was hypothesized as the root construct affecting other constructs including infrastructure governance, infrastructure equity, and nation-building process in Ethiopia. The PLS-SEM analysis and the tests of significance indicated that insufficient institutional capacity of the government (lack of HRM, organizational structure, organizational systems & frameworks, and infrastructure funding) had direct effects on other constructs including infrastructure governance (0.76) and infrastructure equity (0.21) (see Sect. 9.2.2 above). This also created an indirect relationship between the insufficient institutional capacity of the government and a lack of infrastructure equity (0.63). However, the direct effects

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of insufficient institutional capacity (IC) on an inadequate nation-building process (NBP) (0.10) were not significant. The combined indirect effect of IC on NBP is 0.60, which placed insufficiently institutional capacity of the government in the critical position among factors affecting the nation-building process in Ethiopia. Hence, it was pertinent to study the interaction of infrastructure investment and institution quality in the context of Ethiopia's economic growth path. This is consistent with the literature on development policymaking and the role of government institutions (Todaro & Smith, 2009). Thus, insufficient attention was typically paid to the development of the necessary institutions to operate and maintain infrastructures in Ethiopia (Rammelt, 2018). This also means that infrastructure investment-economic growth links could be influenced by institutional quality (Okoh & Ebi, 2013).

However, the government of Ethiopia has been structured practically vertical. Consequently, one of the weaknesses of the institutional structure is the lack of horizontal coordination (Treuhft, 2016). Thus, the hindrance to attaining a better state of affairs is not a matter of technological opportunities (even knowledge of opportunities), or of resources or preferences, but only of coordination (Hoff, 2001). This requires capabilities that emphasize inter-relationships, interdependencies, and a holistic rather than a hierarchical approach (Hoff, 2001). Besides, lack of policy cooperation and coordination can pose high risks of infrastructure inequity. This is consistent with literature that this needs an intentional focus on eliminating inequities and barriers and making accountable and catalytic investments to promise that lagging regions (Treuhft, 2016).

More importantly, at the national planning level, the lack of horizontal coordination in infrastructure development is reflected in the lack of inter-ministerial and inter-sectoral coordination. Given the interdependencies and linkages between infrastructure and other sectors as well as the economy as a whole (Hoff, 2001), infrastructure planning for economic development and nation-building process involves various sectors such as construction and infrastructure service technology. National development planning in Ethiopia as described in Chap. 6 is mostly a top-down process led by the executive body (the Prime Minister) and coordinated by the National Plan Commission (NPC). Moreover, there is no central system of horizontal coordination between ministries and between regional governments, which makes it difficult for any individual government department to collaborate across institutions. In the absence of such a system, the NPC

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coordinating function is largely limited to monitoring separate, sometimes contradictory, policy agendas adopted by individual sectors and regions (NPC, 2016). This means that a lack of political consensus goes together with the lack of a high-powered government institution that provides an effective mechanism for implementing national infrastructure plans equitably (Oyedele, 2012; Dang & Sui Pheng, 2015).

Building on this, all interviewees (18) agreed that institutional capacity, infrastructure governance, and infrastructure equity have great impacts on the nation-building process in Ethiopia. They believed that institutional capacity is the base for the nation-building process in any country. In other words, infrastructure cannot be fulfilled without a strong institutional capacity (AfDB, 2011). All interviewees also indicated that this needs to have unbiased and rational institutions. This is because other factors such as infrastructure governance and equity should be governed through these institutions. Otherwise, when there are weak institutions, this deteriorates infrastructure governance and infrastructure equity. Moreover, infrastructure institutions have limited execution capacity in Ethiopia. As indicated in WBG, investments in human capital have become more and more important as the nature of work of infrastructure development has evolved in response to rapid technological change (WBG, 2018). Hence, it is a must to invest in human resources in order to have knowledgeable and skilled manpower.

Moreover, TR1 maintained that the major criteria to measure institutional capacity is its institutional policies and systems. This is practically true. This is because institutions have emerged as sets of rules, structures, systems and policies, and common frameworks for managing the infrastructure provision by key actor's process, and for enforcing binding agreements (Cunningham and Kwakkel, 2009). However, TR1 and C2 (11%) believed that, in the previous years, the institutions in the infrastructure sector has contributed a great role in the nation-building process as they performed based on government policies and systems. Whereas, 89% of the interviewees described that institutional capacity has been wrongly implemented for the last 27 years as the interference of politicians in every institution to support their plan even the financial institutions. As a result of this, the law was "violated and hijacked" by the political leadership as they give priority for their source of origin/regions or political party directions. From this one can suggest that the role of institutional capacity in the infrastructure sector became insufficient in Ethiopia. This is because the infrastructure was not governed by institutional systems rather it was

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allocated by an irresponsible political leadership who allocated infrastructure budget without clear criteria or formula. For example, there were budget allocation disparities by the Ethiopian Road Authority in the 2017/18 budget year. From the total budget of 19.2 billion, South 2.5 billion (13%); Tigray 9.3 billion (48%); Oromia and South 3.5 billion (18%); Oromia 1.7 billion (8%); Amhara 1.6 billion (8%); and Drie Dawa 992 million (5%) has been allocated in this budget year (Ethiopian Road Authority Roads Magazine, 2018). Thus, there is a gap between the principle and practice of policy formulation in the infrastructure sector in Ethiopia in which few government officials on the top are the key actors. Hence, people and other stakeholders have limited participation in the process. Thus, the process is a less consultative, exclusive, and top-down process (Kaso *et al*, 2018).

Moreover, FG6 added that when there is a lack of capacity in the infrastructure sector, it is very difficult to build the nation. Therefore, it is hypothetically believed that infrastructure plays a positive role in the nation-building process. This is consistent with the goal of nation-building which is to form the collective capacity to attain public results and to follow a shared vision of the future (Dinnen, 2006; Bourgon, 2010). According to BR2, as “nation-building is psychological thinking”, previously, the periphery regions like BenshangulGumuz felt as “neglected in the county’s infrastructure development effort”. Gradually, as the connection is increased they are thinking that the government has a concern for them. Thus, one can argue that infrastructure is a tangible instrument for the nation-building process. Furthermore, infrastructure creates socio-economic connections among regions. It also strengthens the public to public relations. Moreover, infrastructure is crucial for sustainable growth and inclusive development, and good infrastructure has an impact on growth directly and indirectly (AfDB, 2018; Rauniyar & Kanbur, 2010; Okoh & Ebi, 2013).

89% of the informants believed that the institutions are not led by professionals rather they are led by political assignees based on political loyalty. This was the practice in Ethiopia for the last three decades. Hence, the results of the collaboration are varied, they are not always easy to grip, they often lack clear measures for evaluating them and they give rise to disagreements (Koppenjan, 2008). BR1 and TR2 (11%) also explained that institutions have internal capacity limitations such as lack of upgrading and maintenance capacity, lack of technical support for regional bureaus, and collaboration with regional bureaus in order to facilitate federal projects. There is also a lack of

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organizational systems and frameworks which help to give support for federal projects by regional bureaus. Hence, politicized infrastructural planning and decision-making processes have been affecting the institutional capacity of the sector in Ethiopia. Thus, the institutionalization of participation in the planning of public infrastructure delivery and strengthening democratic institutions is crucial in Ethiopia (Terefe, 2014). This should also propose that the success of investment in infrastructure could, to a great extent, depend on the “institutional quality” (Okoh & Ebi, 2013). Moreover, lack of commitment of political leaders and government bureaucrats to national goals as opposed to personal interests could make infrastructure planning and decision-making politicized rather than rationalized (Oyedele, 2012; Dang & Sui Pheng, 2015). In addition, powerful groups with a vested interest can create pressure to affect the planning that serves their own interests (Dang & Sui Pheng, 2015).

AR3 argued that Ethio-telecom is relatively better than other infrastructure institutions in its coverage and service delivery despite its own inequity and network quality problems. This is evident in Chap. 8’s Table 8.10 which shows that Somali, Afar, Amhara, Oromia, and SNNP has less than the national average in Telecom density per 100 population in Ethiopia. AR2 also believed that whenever there is a change in leadership there is also a change in structure. For example, in the previous eight years (from 2012 to 2019) the Ethiopian electric power/utility has changed its structure four times. As a result of this, there is no stable human resource in the sector. Tiruneh (2011) also emphasized that public sector organizations lack sustainable human resource training and development policy, the training programs in the public sector have been planned without properly considering the skill requirements and/or lack of employees in the organizations in Ethiopia (Tiruneh, 2011).

According to AR2, it is surprising that it is not possible to move electric distribution materials from one region to the other regions; even it is not possible to take these materials from one place to another place within a region. This is because the community does not allow to take this material from place to place. It is not also possible to take the electric materials even if it is leftover from one area. This is caused by the dissatisfaction and mistrust of government institutions. Asfaw (2009) also stated that a lack of citizen institutional trust can lead to low public confidence and low legitimacy of governments in Ethiopia (Asfaw, 2019). AR2 also mentioned infrastructure projects are poorly executed (i.e. over budgeting, delays, corruption, etc.) in Ethiopia. In

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infrastructure development, a great deal of concern has to be given to the design and execution of major projects (Bowditch & Noble, 2017). This is related to saying ‘if you cannot measure it, you cannot manage it’.

Subsequently, the inconvenient truth is that (governance gaps form the greatest impediment to developing, financing and implementing) explained that gains from the implementation of its capacity building programs, especially the “civil service reform” and internal and external complaints handling mechanisms to complement social accountability initiatives need to be consolidated in Ethiopia (Terefe, 2014). Besides, institutional capacities are also about efficient delivery of public services, good governance, and other services such as infrastructure; employment programs; personal safety, and access to justice to the society by institutions of the government of Ethiopia (Hundara, 2017). Thus, the fundamental problem that is generally met is the incapacity of local “actors” to preserve, reinforce and make appropriate use of existing institutional capacity in developing countries (Bhagavan & Virgin, 2004). From the above discussion, one can understand that there should be a high level of emphasis in institution building. The researcher has also experienced the fact that institutional independence and professional ethics have to be the areas of focus as individual (personal) power has more strength than institutions in the Ethiopian decision-making process in the infrastructure sector.

So, the quantitative analysis ensured that the organizational system and frameworks were the biggest factor that causes a system change in the infrastructure development in Ethiopia (see in Table 9.3 above). Therefore, the government should deliver a framework to ensure the good performance of various actors in carrying out fundamental policies (Kaso *et al*, 2018). Furthermore, planning and policy-making for infrastructure is a multi-actor process, fostering of an innovative institutional capacity that coordinates efforts and resources is considered one of the determinants of infrastructure development (Okoh & Ebi, 2013; Dang & Sui Pheng, 2015). This is also consistent with the literature on political and economic developmental pointing to development planning and the role of the state (Todaro & Smith, 2006; Fukuyama, 2011; Dang and Sui Pheng, 2015). And then, the infrastructure governance is discussed as follows.

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9.8.3 Infrastructure Governance in Ethiopia

This study hypothesized that lack of infrastructure governance would be positively related to the inequitable allocation of public investments in infrastructure. It also negatively affects the nation-building process in Ethiopia. Results of the PLS-SEM analysis and evaluation had confirmed that lack of infrastructure governance was a statistically significant cause. The estimated parameter between IG and IE of 0.63 implied that lack of infrastructure governance in infrastructure development was largely responsible for the inequitable allocation of public investments in infrastructure in Ethiopia. But, the direct effects of the lack of infrastructure governance on the nation-building process (0.13) were not significant. However, the combined indirect effect of infrastructure governance on the nation-building process was significant (0.60) (see Sect. 9.2.2 above). Moreover, the lack of infrastructure governance can have a significantly negative impact on returns to infrastructure investment, and ignoring governance weaknesses can significantly dampen economic returns to infrastructure projects in developing countries (AfDB, 2011). Besides, the nearly exclusive focus of infrastructure delivery in the hands of the public sector, especially in less developed countries, has led to failures in the supply of these facilities (Okoh & Ebi, 2013). Thus, to extract the full long-term benefits of infrastructure investment, it must have a stronger framework so that all individual agencies (public and private) have a shared commitment to the betterment of the system (network) of infrastructure (Bowditch & Noble, 2017).

Moreover, from confirmatory factor analysis, lack of infrastructure governance in Ethiopia is first reflected in the lack of intergovernmental/stakeholders collaboration and coordination, lack of clear decision-making procedures, lack of land acquisition framework/right of way, and lack of political commitment. Thus, the lack of these has created infrastructure governance problems in the infrastructure sector in the country. Besides, corruption has been a roadblock to institutional accountability and governance in Ethiopia (WBG, 2017). This showed that corruption has a great effect on infrastructure governance in the country which is the result of a lack of transparent and accountable governance. Furthermore, the state could fail because politicians, bureaucrats, and donor agencies often pursue their own objectives (Sawada, 2015), rather than national goals.

Generally, all interviewees believed that there is a lack of infrastructure governance in Ethiopia which is very essential for national consensus and nation-building processes in the country. They

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emphasized that the role of governance in contributing to bring about trust in state-society relations is very weak. They also stated that civil society is not strong in the sector. From this one can understand that there is no good governance. Therefore, further reform and cultural change is needed, and how there could be a strong case for building a national consensus for enhanced stakeholder stewardship through infrastructure (Bowditch & Noble, 2017). Besides, a clear mark of distinction for successful infrastructure is that it offers far more effective benefits than just good customer service (Bowditch & Noble, 2017). Meanwhile, according to TR1, for the last 27 years, the following three basic criteria were used for the allocation of basic infrastructures, especially road, in Ethiopia: connecting Addis Ababa to neighboring countries and ports; regions to regions; and, potential, and areas of unconnected and densely populated ones. Thus, TR1 believed that, as the infrastructures were allocated based on these criteria, and there are great improvements in infrastructure governance. This is unlike the other informants.

Moreover, all interviewees believed that there are no integrated infrastructure development systems between federal and regional infrastructure institutions. They also believed that there are no adequate trust-building measures carried-out among the federal government and regional states with respect to infrastructure development in Ethiopia. It is also mentioned that there is weak political commitment and willingness on the part of top leadership and high-level decision-makers in infrastructure governance. Actually, every citizen commented that there is no integration between road, electricity, and Ethio-telecom in Ethiopia. Thus, poor infrastructure integration raises the cost of doing business, eroding competitiveness, and limit access to markets, both domestic and foreign (AfDB, 2011). Moreover, the Ethiopian Constitution deals little guidance on managing federal-state relations relative to roles and tasks including the infrastructure sector (Fiseha, 2009). There is no much study of how the relationship between the federal government and the states will be managed on a sector-by-sector basis (Fiseha, 2009). Therefore, according to Fiseha (2009), one could carefully state that IGR in Ethiopia is in its early phase. Hence, the federation needs formal institutions and principles of IGR to handle such problems amicably including transparent budget allocations (Mengie, 2016).

In addition to the above, TR2 stated that there are delays in infrastructure projects starting from the design and bid process. This is because all the concerned bodies (clients, contractors, consultants, and beneficiaries) are not adequately integrated and aligned to design, implement,

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monitor, and evaluate infrastructure projects. Besides, corruption weakens the power of voice and client-power, and it is also generally thought to be rampant in Ethiopia (Terefe, 2014). Furthermore, FG4 mentioned that the decision-making process has become an extremely complicated task in the infrastructure sector. Therefore, infrastructure development demands much more transparency (including open data) to inform better investment decision-making across stakeholder groups (Bowditch & Noble, 2017). This is also consistent with the literature on how it is a difficult task to make decisions in a way that is inclusive, transparent, effective, and democratic, and taking into account different interests, different claims, and different legitimacies (Palermo & Alber, 2015).

As well, according to TR1, the other point that needs to be considered is “expectation management”. When development is improved, there will be higher expectations. However, to have realistic expectations, politicians have to manage these public expectations. If it is not possible to manage these expectations, the politicians may choose “the populist ways of doing things”. This will lead to sayings like “you are hurt by others” or “us-them”. It is identified that political considerations and weak management capabilities can also lead to soft but pervasive “forms of populism” where households and firms do not pay bills, starving public utilities of revenue (AfDB, 2018). It has been also suggested that institutional performance matters for explaining the source of citizens’ trust. The level of skepticism in institutions in Ethiopia is driven more by “the gap between the perception of citizens’ expectations and the actual performance of public institutions” (Asfaw, 2019, p. 37). Thus, infrastructure institutions benefit from establishing strategies to actively manage customer rights and addressing fairness through reduced costs from disputation, being able to manage customer expectations and an enhanced reputation (Bowditch & Noble, 2017). Hence, without understanding the root cause of the governance problem it is not possible to discuss how to manage expectations. Because expectations are the reflection of results. The political interferences and unconventional fund allocation in infrastructure development out of the criteria need political solutions. Actually, it has been generally stated that the regional distribution of infrastructure investment is deeply affected by political inquiries, while the impacts of reallocation and efficiency differ from one investigation to the next (Albalade *et al*, 2012).

All interviewees established that land acquisition and right-of-way were the main obstacles for infrastructure development in Ethiopia. This is also intensified by populist politicians. This is

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because investment in infrastructures such as road, airport, and hydropower development for public purposes is very significant for the development of the country and needs a vast quantity of land (WDR, 2006; Ghimire *et al*, 2017). This is the result of a lack of effective bureaucracy in settling land-acquisition claims and disputes in infrastructure development. There is also a lack of effective land-acquisition compensation and monitoring system in Ethiopia (Fiseha, 2009; Afesha, 2015). Moreover, low infrastructure availability in Africa impacts the development of many countries on the continent (AfDB, 2018). Thus, Ethiopia also includes factors explaining the low infrastructure delivery in Africa: Weak legal and institutional frameworks, weaknesses in infrastructure planning and project preparation, governance and corruption, and infrastructure deficits that are not exceptional to Ethiopia (AfDB, 2018). This is also consistent with the literature that institutions are used by political authority in the exercise of management of its resources for inequitable infrastructure development (Okoh & Ebi, 2013), due to political, government, and administrative failures in Ethiopia.

Therefore, political failures (when the individual or sectional interests are allowable to overtake the public interest due to effective lobbying on the part of those interests); government failures (the reasons why a public sector intervention could fail to lead to an overall-improvement); and, administrative failings (the interests of public servants could not coincide with the public interest, for example, a public servant could be concerned with perceptions of their own significance) are the main cause of the coordination failures in the infrastructure sector (Cooper & John, 1988; Hoff, 2001; Glavan, 2007; Jones, 2009; Dang & Sui Pheng, 2015). It is the emphasis of this study that the government should not overlook its role as coordinator and facilitator of the whole economic development, particularly in the less developed countries like Ethiopia where market failure is great as well. Thus, as confirmed in the quantitative and qualitative survey (in this chapter) as well as the physical survey of the infrastructure distribution (Chap. 7 &8), all these failures have negatively impacted the infrastructure governance, equitable infrastructure development, and nation-building processes across regional states in Ethiopia need strong cooperation and coordination with deep intervention by the government.

Finally, one can understand from the above that this can be the result of poor selection of contractors, poor feasibility study and appraisal, etc. due to incompetent leadership and management in the sector. However, legal, regulatory institutional frameworks are not the major

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factors in Ethiopia as most of the laws, regulations are professionally supported. The major problem lies in the unlimited power of individuals especially those political elites who break these laws without fear of accountability. From this perspective, it is plausible to argue that civil society is an advantage for infrastructure governance by creating and energizing popular participation, consultation, inclusion, and accountability. Rather, when stakeholder-led infrastructure is a reality, the country is more likely to be better included by infrastructure solutions that are scaled, feasible, and timely (Bowditch & Noble, 2017). Next to this, infrastructure equity is addressed.

9.8.4 Infrastructure Equity in Ethiopia

Lack of infrastructure equity was hypothesized as the root construct affecting the nation-building process in Ethiopia. The PLS-SEM analysis and the tests of significance indicated that inequitable infrastructure development (lack of equal opportunity in infrastructure, lack of social/distributive justice, lack of national and regional infrastructure competitiveness, lack of spatial intervention/planning, and lack of citizen/stakeholder/public satisfaction) had direct effects on nation-building process (see Sect. 9.2.2 above). This creates a direct relationship between lack of infrastructure equity (except university distribution (see Chap. 7 Sec. 7.3.4 Table 7.11)) and insufficient nation-building process. The effect of IE on NBP is 0.60, which has negative effects on the nation-building process in Ethiopia. Thus, inequitable infrastructure development has a negative effect on NBP that discourages everyone's participation and benefit from the nation's economic transformation (Treuhart, 2016). This is also directly related to sayings like the rural population of Ethiopia stated as "The road is our bloodline!" (Rammelt, 2018, p. 18). Thus, equity concerns the delivery of infrastructure resources and is unavoidably related to ideas of fairness and social justice (Bejakovic & Meinardus (Eds.), 2011). In other ways, a fair allocation of resources must be one that all "prospective members of society" would agree on, before they recognized which position they would occupy (World Bank, 2006).

TR1 and TR2 (11%) argued that there was no deliberate policy problem infrastructure equity in Ethiopia. TR1 also mentioned that it has been raised that all Woredas are connected in Tigray and Gambela. But, TR1 described that there were many Woredas in the Tigray region, but the Tigray region had merged them into only 34 rural Woredas. The centers of these Woredas were relatively bigger cities. That is why all Woredas have got road infrastructures in Tigray. Even, most of them had gravel roads before. According to TR1, there are also issues in the western Tigray about inequitable distribution of infrastructure. There were three reasons for the establishment of these

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infrastructures in western Tigray. First, it is very periphery. Second, the establishment of the Wolkait Sugar factory. Third, this area has military purposes. All these are the prioritization of the regional government of Tigray. Thus, there is no equity problem in this area. Besides, TR1 added that there are Woredas in the Amhara region which are not connected in infrastructure, especially in North Gonder. TR1 added that this is the problem of the Amhara region's political leadership as they did not prioritize infrastructure projects in the area of North Gonder. Then, TR1 mentioned that there is no such infrastructure equity problem in Ethiopia.

In contrast to the above, OR1, OR2, and AR3 (17%) argued that there is no equity in the infrastructure sector across regions Ethiopia. But, this is not only from region to region but also there is no equitable distribution in infrastructure from zone to zone and Woreda to Woreda. For example, 73 Woredas in the Oromia region do not have asphalt roads. For example, in the western region of Oromia, there is a wider gap than the center of Oromia. There are also many Woredas in the Amhara region, for example, North Gonder, which do not have asphalt roads. But, all Woredas are connected by asphalt road in Tigray and Gambela region. AR1 also added that, for example, there is an asphalt road in the Tigray region around Tselemt which was constructed by the federal government but stopped it at the Kebele level. But, it was possible to connect the Amhara's Telement which is nearer to Tigray's Tselemt as the main priority of the federal road authority would have been to connect region to region. Similarly, there are 24 hours of electric light in Tigray's Tselemt, but there is no electric light in Amhara's Telement at Dejaach Media. From the above to the opposite arguments, the researcher can argue by supporting the latter arguments. The reality shows the absence of infrastructure equity in the aforementioned areas. This is a reality in some asphalt roads in western Tigray where there are roads nowhere. This is because ERA received instruction to be involved in the construction of intra-regional roads through the MoT/board. The main motive to involve ERA in intra-regional road construction was to ensure equity as regions have different capacities in road construction (Harris *et al*, 2019). However, the above fact does not show equity. Thus, this direction negatively impacted the fair allocation of infrastructure across the regions in Ethiopia. To make it worse, there was no official comment for this case by the federal government whether the distribution was fair or unfair. Thus, many infrastructure investments are immovable and serve local markets, excess capacity cannot serve other markets and it remains underused (WDR, 1994).

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Moreover, AR1 mentioned that the facts of infrastructure development are not appreciated by the public. According to AR1, the main reason for this is that the public believes that there is no equitable distribution of infrastructure in the country. This leads to a lack of citizen/stakeholder/public satisfaction. For example, there is no equal access/opportunity in road infrastructure between Amhara and Tigray. In the Amhara region, there are zones that are not connected with each other, for example, North Gonder and Wag Hemea zone let alone Woreda to Woreda and Kebele to Kebele. Whereas, in the Tigray region, there is no Woreda that is not connected to each other. This is similar to the empirical work in Chap. 8 Table 8.3 which indicates that, for example, Diredawa, Harari, South, Oromia, and Amhara are below the national average in road density per 1000 population.

Similarly, according to AR1 and FG1, there is also an unfair distribution in Industry Park development. For example, there are around 50 Shades in Hawasa Industry Park. Whereas, there are around 13 Shades in Bahirdar Industry Park. There is also an unfair budget allocation (see Chap. 7 Table 7.2). BR2 also added that there is an imbalance in infrastructure development. For example, the issue is repeatedly raised by the Amhara region as there are gaps in the region. Moreover, there are gaps in the Oromia region, especially in the Wollega zone. There are also gaps in BenshangulGumuz in Metekel and Kamashe zone. This is the result of the lack of strong institutional capacity in the infrastructure sector. Due to this inequitable distribution of infrastructure, there is dissatisfaction and complaints by the community and the society at large. This is related to document review which is assessed under the supervision of the FDRE House of Federation that says there are high complaints by the regional governments and the public at large about road infrastructure distribution. It is also stated that the issue of road infrastructure equity needs further investigation (Ethiopian road authority (ERA), 2019).

Besides, AR2 and AR3 (11%) indicated that there is no fair distribution in electric distribution. This is because the distribution of electricity is decided by the unnecessary intervention of political figures. That means that it is not decided based on clear criteria by the relevant institution. This is similar to the empirical assessment in Chap. 8 Table 8.8 which showed that BenshangulGumuz, Amhara, Oromia, SNNP, Harari, and Somali are less than the national average in capacity usage per MW per region. As a result of this, there is a lack of regional infrastructure competitiveness. As revealed in the literature, government policy, human capital, and geographical differences are

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likely to be the major drivers of these differences in infrastructure (Fan & Zhang, 2002). In addition, AR2 argued that, based on documented evidence, for example, there are 44 old substations (named 66/45). Out of 44 old substations, 20 and 11 are found in Oromia and Amhara region respectively. This seriously affects the two regions of electric consumption. Moreover, the substations which have better capacity are called 132 and above. Thus, there are about 127 substations with a capacity of 132 and above. The distribution of these substations is as follows. Addis Ababa 24, Afar 3, Amhara 16, BenshangulGumuz 1, SNNP 16, Driedawa 3, Gambela 1, Harari 1, Oromia 45, Somali 5 and Tigray 12. Although, according to AR3, it is possible to accept the relatively better distribution of electricity in Addis Ababa and Dridawa. But, the question is why there is a big difference among regions. For example, it is impossible to justify the difference between Amhara and SNNP, and Tigray. This showed that there is a lack of fair distribution of electric substations in the country (see also Chap. 8 Table 8.7).

In other ways, FG5 described that electric distribution can be categorized into two. The first one is how to create access and the second one is how to distribute in a demand-driven way. From the access point of view, the access coverage of Ethiopian electric utility is not more than 60%. It is not also more than 35% at the household level. About 60% of the country's inhabitants have no access to electricity and where there is grid-coverage, only 60% of households are linked. In other ways, about 85% of the urban population has access to electricity while only 29% of the rural population has access to Ethiopia (Deloitte, 2019). FG5 added that universal access in electrification is a government program that is done by the government budget. As it had been evaluated last year, there is a lack of equitable distribution in electricity. This is also related to document review which is assessed by Ethiopian Electric Power (EPU) under the supervision of the FDRE House of Federation that ensured the unfair distribution of electric per capita generation (EPU, 2019). Therefore, FG5 indicated that it is necessary to take corrective measures for those regions which have limitations in electric access.

To put in another way, TR1 stated that equity matters. TR1 also described that the center for infrastructure development should be the people/ the community at large. According to TR1, Colonialists built roads but it was not to connect peoples or communities. Rather, it was to exploit resources by connecting the potential and productive areas to ports. TR1 added that it did not have any significance for the nation-building process in that country. This is true in infrastructure

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development during colonial times concentrated on building transportation from resource sites to a port (WDR, 2006). In contrast to the colonialists, TR1 argued that the center for infrastructure development in Ethiopia was the people. For example, in road construction, the government gave priority for periphery areas or unconnected regions. Due to this reason, Somali, Benshangulgumuz, and Gambela were connected first. Thus, more investment in physical infrastructure such as roads bring remote regions closer to the world markets and reduce regional disparity (Makmuri, 2017). In principle, the above argument is correct. But, in reality, the Ethiopian incumbent government did not ensure infrastructure equity across regions in Ethiopia due to coordination failures.

Moreover, in contrast to the above, FG6 argued that the road map was prepared for infrastructure development for the last 20 and above years in Ethiopia. Even there were standards and criteria for infrastructure distribution. But, the problem was that there was no implementation according to the road map, standard and criteria so that there is an unbalanced distribution of infrastructure development in effect. This is the result of the lack of spatial intervention/planning and proper implementation. The main cause of this was that there was an illegal intervention of autocratic individual political officials. Thus, this is against the Ethiopian constitution article 89 (1) which says that “government shall have the duty to formulate policies which ensure that all Ethiopians can benefit from the country’s legacy of intellectual and material resources”. Sub-article 2 also says “the government has the duty to ensure that all Ethiopians get equal opportunity to improve their economic condition and to promote equitable distribution of wealth among them”. FG6 added that during the previous time if somebody raised questions about why it has happened like that there were no reasonable and clear answers by those irresponsible political officials. The researcher also strongly believed that the misallocation of infrastructure was one of the reasons for the current crisis in Ethiopia. As a result of this, there is no common understanding, trust, empathy, and love for each other among political elites across the country. Moreover, the authorities’ understanding of infrastructure stakeholders is limited, because they do not regularly examine the stakeholder valuation of the infrastructure sector (Hietbrink, 2012).

However, according to FG2, as Ethiopia is following a federal system, and as there are scarce resources, infrastructure equity is very fundamental. FG1 added that the Ethiopian government has believed that there is no equity in the infrastructure sector as it was evaluated by FDRE House of Federation. FG3 also indicated that inequity is the main source of conflict in most federal

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countries. Currently, one can believe that the federal system of Ethiopia is in a situation of “fragile” state. As mentioned above, infrastructure distribution is one of the causes of this crisis. Thus, large differences in economic situations between regional states are likely to threaten the social cohesion of the federation and to distort federal policymaking and the operation of the internal market. It is incompatible with the very notion of a federal system of government (Saunders, 1995). Besides, infrastructure equity helps for national consensus and the nation-building process (Rubin, 2006). This also needs to have the knowledge of addressing equity issues in decision-making which requires a theory of social choice and an applicable method of preference modeling that simultaneously addresses equitable social and spatial distributions in infrastructure (Wismadi *et al*, 2015). Therefore, as mentioned in Chap. 2 sec. 2.1.5, the equity theory asserts that the satisfaction of citizens and regional governments rather is influenced by the extent to which they feel that they are being treated equitably by the federal government. However, the citizens and regional states believe that they are not fairly treated by the federal government. This is the result of a lack of social/distributive justice.

Furthermore, according to OR1, OR2, BR3, AR2, AR3, FG5, and AR1 (39%), the allocation of infrastructure is not based on clear criteria. Rather, it was decided by those individual political leadership groups who have key positions in the government institutions. Here, one can also agree that there is no clear policy guidelines and standards to ensure infrastructure equity across regions in Ethiopia. But there were/are GTP I and GTP II which are serving as general frameworks. However, the performance evaluation of GTP I and the GTP II plan says there should be equity in the Ethiopian development process. But it did not mention whether there is equity or not in the infrastructure sector. Thus, the interaction of political, economic, and sociocultural inequalities forms the rules and institutions in all societies (WDR, 2006). The way these institutions play touches people’s opportunities and their capacity to capitalize and prosper. Inadequate economic opportunities lead to unsatisfactory outcomes and strengthen unequal political power. Unequal power forms institutions and policies that incline to foster the persistence of the initial conditions (WDR, 2006).

Finally, 89% of interviewees (except 2 out of 18) do believe that there is no infrastructure equity in Ethiopia. Thus, the researcher supports this group. This is due to equity theory (Adams, 1963) that proposed that individuals who perceive themselves as either “under-rewarded or over

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rewarded” will experience discomfort and that this discomfort leads to efforts to restore equity (Huseman *et al*, 1987; Wismadi *et al*, 2015; Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013). Hence, there is a struggle among elites to restore infrastructure equity in Ethiopia. This is because infrastructure plays a decisive role in encouraging economic growth and thereby contributes to the reduction of economic disparity, poverty, and deprivations in the country (Ferro & Lentini, 2008; Srinivasu & Rao, 2013). Therefore, this needs that collaborations across sectors, across neighborhoods, and across jurisdictions are essential for moving “the regional equity agenda” to ensure both horizontal, vertical, spatial, social, and environmental equity including solidarity (Blackwell & Fox, 2004; Gerber & Loh, 2014; Wismadi *et al*, 2015; Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013).

More importantly, infrastructure inequity was also studied that, between 2006 and 2016, for example, the increase in road density was concentrated in some regions, especially Ethiopia’s capital of Addis Ababa, as well as in Oromia in the center and in Tigray in the north of the country. Whereas, remote and economically lagging regions like Benshangul/Gumuz and Somali, and Amhara region, see lesser increases in road density (Kanth and Geiger, 2017). Moreover, the empirical test results confirmed that there is a lack of infrastructure equity which has negative effects on the nation-building process in Ethiopia (see Sect. 9.3.1.2 above). This infrastructure inequity problem was also ensured by using CII in this study (see Chap. 8 Table 8.16). All these are against the Ethiopian constitution article 89 sub-article 4 which says that “government shall provide special assistance to Nations, Nationalities, and Peoples least advantaged in economic and social development”. Besides, “by perceiving infrastructures as potentially having unequally distributed catalytic effects, we should be able to better grasp their role in upholding-and perhaps in addressing-poverty and inequality in Ethiopia” (Rammelt, 2018, p.12). Therefore, implementing smart practices and securing more funds alone cannot guarantee infrastructure equity. Instead, it needs to be recognized that infrastructure equity has been missing from the discussion and acknowledgment that its absence leads to the kinds of infrastructure disparities (Rubin, 2006). From the above argument, one can conclude that there is no infrastructure equity across regional states in Ethiopia which is a systemic problem, and not only perception but also it is actual inequity in contrast to Harris *et al* (2019) conclusions.

9.8.5 The distribution of University, Industry Park and Airport in Ethiopia

All interviewees believed that the government of Ethiopia has done a lot to make higher education accessible. However, all also believed that there was a lack of detailed study whether it is suitable for the people or not. It did not also consider the potential of each site. Moreover, some universities are established by personal interest than the public interest. Similarly, BR1 indicated that the university is built by the request of some influential community leaders rather than a feasibility study. FG1 also mentioned that political leaders sometimes allocate universities by their own political interests. The researcher also assessed that Universities were allocated without clear policy and roadmap in Ethiopia. Thus, the expansion seems to be led by the condition of ethnic politics where the fair distribution of public Higher Education Institutions (HEIs) and expanding access in all regions has worried the pattern of the establishment of institutions (Woldegiyorgis, 2015).

FG3 also mentioned that the leadership of the ministry of education said that a university is built where there are 2 million and above population. However, the researcher argued that this was not practically used as a criterion in Ethiopia. For example, this is done in Ethiopia in order to give priority to emerging regions, for example, Gambela, Afar, and Benshangulgumuz without considering the population. Whereas, this did not work for bigger regions (in population) like Oromia and Amhara (see Cap. 7 Table 7.9). Rather, it is better to say that, at the heart of the political discourse, social inclusion takes a central place with respect to assuring the constitutional rights of nations and nationalities (Semela, 2011). Hence, guaranteeing fair distribution of higher education opportunities and social inclusion across ethnic groups, regional states, and other disadvantaged segments of the Ethiopian society should be the “key political priorities” (Semela, 2011).

AR1 and C1 also stated that;

There might be political purposes such as identity recognition or other economic and social purposes, it is good as the country needs many universities. However, the question is that are these universities doing differently, for example, in course allocation or duplicating the same issue? That is not the case. They described that there are no clear specialized courses given by these universities. The universities are not doing it differently rather they do have duplication of efforts. To make it worse, universities are not seen equally. Some universities are not properly equipped. As a result of this, there are quality problems at each university.

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As a result of the above quotes, graduate unemployment has now become a serious political concern in Ethiopia (Bishaw & Melesse, 2017). Besides, along with the national interest, institutional capacity building should be given priority to put in place efficient and effective institutional quality enhancement systems in each university (Semela, 2011). However, 78% of the interviewees believed that there is fair distribution, but the problem is the quality of education. Whereas, FG6, BR1, FG3, and C2 (22%) believe that there is an unfair distribution of universities in Ethiopia. Moreover, the researcher supports those who said that there is a lack of equity in university allocations as there are no clear criteria and standards in Ethiopia (see Chap.7 Sec. 7.3.3). This is because the number has been highly worried and some HEIs have been established in remote areas where there are low facilities and it is very difficult to invite and retain qualified academic staff (Woldegiyorgis, 2015).

Regarding Industry Parks in Ethiopia, 94% (except 1 out of 18) of interviewees believed that there is an unfair allocation in Industry Parks. BR1, FG3, and C2 (16%) added that Industry Parks should not be allocated by quota systems. Now, they are practically allocated in quota systems rather than economic feasibility studies as the government is trying to address all areas/regions. Rather, it is better to be focused on economic generation capacities and raw materials. Besides, C2, C1, and FG1 (16%) mentioned that the corporation is not fully empowered to lead its sub-sector. From this one can indicate that there is no fair allocation of Industry Parks, and it should not also be allocated based on quota systems. The Corporation should also be free from any political intervention. Thus, effective implementation needs efficient and empowered institutions, built-in mechanisms for feedback and lessons learned, flexible and adaptive policy monitoring, and correction systems (UNCTAD, 2018). However, the researcher supports those who said that there is a lack of equity in Industry Parks' allocations in Ethiopia as there is no transparency and accountability (see Chap.7 Sec. 7.1.4). This is because the industrial policy is an invitation to corruption and rent-seeking, and it opens the door to preferential policies whose main purpose is to transfer income to politically connected groups (Rodrik, 2008; Gebreeyesus, 2013).

Regarding airports, 89% (except 2 out of 18) of interviewees believed that there is an unfair allocation in airports. Similarly, FG1 and FG3 (11%) argued that, for example, Hawassa airport was constructed without a feasibility study. They also mentioned that there is an airport below 100 Km radius within a region, for example, between Axum and Share which is 63 Km. In contrast to

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this, some airports which have an old destination like Debermarkos, etc. are not constructed. Thus, one can conclude that there is a lack of equity in airport allocations in Ethiopia as there are no clear criteria in the sub-sector (see Chap.7 Sec. 7.2.2). This is mainly due to the absence of clear policy, standards, and guidelines on how to establish a new airport in a region to ensure the fairness of its distribution across the regions in Ethiopia (Ethiopian Airport Enterprise, 2018). Therefore, governments and the aviation sector in general that, should be interested in examining how to improve the allocation of an airport, should critically think before building new airport infrastructures (Ageland & Smale, 2017).

9.8.6 Equity vs. Efficiency in the Infrastructure Development in Ethiopia

According to AR2, AR3, OR2, FG1, FG2, OR1, BR2, FG4, TR2, AR1, FG5, FG3, C2, and FG6 (78%) believed that it is better to give priority to equity than efficiency in Ethiopia as the public currently became equity-oriented, especially the elite. They also agreed that there should be equal opportunity to all infrastructure development as a basic need. Here, one can suggest that to maintain the federal system of Ethiopia, the equity should be given priority. This is because increased access to essential services could reduce inequality, foster inclusion, and support poverty reduction, efforts, and then builds the nation (Calderon and Chong 2004; Calderon and Serven 2010). Moreover, social justice is fairness between individual's activities and rewards that one receives from his/her community or society/country (Coninck *et al*, 2013). Due to these reasons, infrastructure development has become a policy priority in many countries (Calderon & Serven, 2014). Thus, the government should have an entity created for managing equity and efficiency which is the warrant for reaching the objectives of deploying the economic life at optimal parameters such as creating and maintaining optimal equity standards (Bodislav, 2012).

Moreover, policymakers should continue to wrestle with the best way to proceed. On the one hand, it is indicated more market efficiency is demanded in infrastructure. While on the other hand, there are also needs for more government-intervention, with national project lists based on bureaucratic processes that are included with claims of market-failure demanding even more public-intervention (Bowditch & Noble, 2017). Finally, as discussed in Chap. 1, there is a trade-off between equity vs. efficiency. However, the efficiency principles play only a partial role in the geographical distribution of the government's investment in infrastructure (Castells & Sole-Olle,

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2005). Moreover, regional specific infrastructure needs and political factors appear also as factors explaining the regional allocation of investment in infrastructure (Castells & Sole-Olle, 2005).

In contrast to the above, BR3, C1, TR1, and BR1 (22%) believed that it is better to give priority for efficiency than equity for national growth. They added that, although the public currently becomes equity-oriented, rather it is a must to change the attitude of the people in order to give priority to efficiency. This is, of course, highly desirable, but it is frequently presumed that efficiency and equity objectives are commonly exclusive. However, there are cases where equity and efficiency may not trade off against each other (Castells & Sole-Olle, 2005; Bejakovic & Meinardus (Eds.), 2011). Furthermore, the idea is to discover policy situations that promote greater equity but have little effect on efficiency or even better policy situations where equity and efficiency complement each other and where government policies, mostly allocate from advantageous to the disadvantage regions, may even perhaps produce a more efficient society than would occur in the absence of those activities (Castells & Sole-Olle, 2006; Bejakovic & Meinardus (Eds.), 2011; Bodislav, 2012).

More specifically, AR1, AR2, AR3, OR2, OR1, and BR2 (33%) believed that there is neither equity nor efficiency in infrastructure development in Ethiopia. AR1 said that, for example, those roads in the Amhara region which were constructed by the federal government have faced efficiency problems (for example, North Gonder road projects and North Wollo road project-from Gashena to Lalibela). AR1 added that, as a matter of fact, the contractors and sub-contractors were natives of the Tigray region. In other ways, there is no complaint about those projects which were constructed in Tigray regions through media. This is because for a long time the head of the federal road authority was mainly from the Tigray region. But, the main focus of this study is infrastructure equity rather than efficiency.

However, the literature indicates that there are other concerns about the infrastructure development in developing countries, including cost overruns and benefit shortfalls, waste, or corruption in large infrastructure projects (Flyvbjerg, 2007). Moreover, it is said that, for example, the big-trade-off is that more efficiency can be achieved only at the cost of less equity (Okun, 1975) and that Pareto improvement is possible by improving both the efficiency and the equity of the system. Thus, the empirical findings advise that government preferences in the regional allocation of infrastructure

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expenditure diverge, with evidence of only equity, only efficiency, and of both equity and efficiency (Mohanty *et al*, 2017). The idea is to discover policy situations that promote greater equity but have little effect on efficiency or even better policy situations where equity and efficiency complement each other and where government policies, mostly allocate from advantageous to the disadvantage regions, may even perhaps produce a more efficient society than would occur in lack of those activities (Castells & Sole-Olle, 2006; Bejakovic & Meinardus (Eds.), 2011; Bodislav, 2012).

With respect to enhancing equity, and the anti-cyclical rule would be to improve redistribution when resources abound and the economy is growing and to protect these gains during times of crisis. In other ways, efficiency in the use of resources and equity go hand in hand (Ferro & Lentini, 2008). Meanwhile, improved equity analysis in planning can reduce conflicts and delays, and better reflect a community's needs and values (Litman, 2018). The possible outcomes of efficiency and equity analysis, for example in the electric utility, are equitable (equitable and efficient-accept, and inequitable and efficient-inconclusive) and inequitable (equitable and inefficient-??), and inequitable and inefficient-reject) (Felder, 2010). Thus, there are no one-size-fits-all answers to balancing efficiency and equity arguments. From the above analysis, one can conclude that there is no both equity and efficiency (inequitable and inefficient-reject situation) in the infrastructure sector across regions in Ethiopia.

Consequently, strategically, it is better to attempt both equity and efficiency in a harmonized way in the country in the future. This is because if they are used in a harmonious way, they are very crucial for the nation-building process. The current situation of Ethiopia seems both inequitable and inefficient. At least, there should be equity to maintain the nation. And finally, although short-term equity is considered necessary, efficiency must also be studied because in the long-run more efficient transfers are likely to be growth improving, which has the potential to increase tax revenues and thus future transfers, allowing equity at a higher level of income in the longer term (Harris *et al*, 2019). According to Harris *et al* (2019), the ability of the regional state to convert infrastructural investments into future growth and tax revenue can govern whether federal transfers lead to a “virtuous” or “vicious” cycle. The cycle can be virtuous if the infrastructural investment has large positive growth effects, or vicious if growth is compromised in the quest to attain equity.

9.8.7 Who were the Decision Makers and What were the Criteria for Infrastructure Equity?

All interviewees believed that, generally, infrastructure allocation is mainly decided by the government and approved by the parliament. They also mentioned that, during this decision, as there is a lack of transparency and participation, there are misallocations of resources. Moreover, decision-making has become an extremely complicated task. Actually, lack of dialogue on infrastructure development with its end-users, civil society, and the private sector, has also a negative impact on the quality of planning and project implementation (ISU, 2017). Besides, governments are said to lack the tools and institutions that provide the foundation for good decision-making (Wegrich & Hammerschmid, 2016). Moreover, BR1 and BR2 (11%) mentioned that there is the Growth and Transformation Plan (GTP) in Ethiopia. But, the problem is that the infrastructure was allocated by political interferences/influences. OR2, FG4, and FG5 (17%) also said that the budget is prepared by the FDRE Ministry of finance based on the formula and approved by the federal parliament. However, the budget for infrastructure is mainly allocated by the executive body which made it unfair. According to government officials in an existing Ethiopian political system, policy and plans are organized at national and regional levels where national policies are organized by the federal government and within the federal government following “the formal procedure of policymaking” (Kaso *et al*, 2018).

It is revealed that “the practice of policy formulation process in Ethiopia is not always in line with the constitution of the country and the principle of constitutionalism” (Kaso *et al*, 2018, p. 159). They also revealed that most policies that guide the existing system are deriving from the executive particularly, the Prime Minister (PM). This is contrary to Article 89(6) of FDRE constitution that stated: “the government shall at all times promote the participation of the people in the formulation of national development policies and programs; it shall also have the duty to support the initiatives of the people in their development endeavors”. Article 43 of the FDRE constitution also stated that “the people, nations, and nationalities of Ethiopia have the right to development, and particularly, the right to participate in national development and to be consulted with respect to policies and reject projects affecting their community”. Specifically, infrastructure governance covers the entire life-cycle of the asset, but the most resource thorough activities will typically be the decision-making and planning phase for most assets (Mansuri & Rao, 2013; ISU, 2017; OECD,

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2015). Therefore, it indicates that there is a limitation for public and stakeholders' participation in the process of Ethiopia policy formulation, especially in the infrastructure sector.

Moreover, FG2 and FG5 considered that, for example, in the road sector, the socio-economic analysis had been done. Then, the Road Sector Development Program has been prepared. Based on this program, the roadmaster plan has been done. This was the way that the road sector was led. However, there was political dominance in each project approval process. Besides, according to FG3 and OR2, infrastructure is allocated by political leadership by using subjective criteria. As a result of this, there is the political tension between the federal and regional states, and among the regional states in the country which is the current social problems such as exclusion, marginalization, inequalities of individuals and ethnic groups, and absence of equal access to opportunities and resources (Kaso *et al*, 2018).

Thus, a society without political commitment is a society of perpetually disengaged or permanently dissatisfied citizens, where vital decisions end up being taken by a “handful of elites” (Ypi, 2016). In order to strengthen direct public participation further in the development and good governance processes in a sustainable manner, a system has been established whereby communities, mass-based organizations, and professional associations would be engaged in the decision-making processes at all levels (NPC, 2016). Ethiopia has the budget formula for budget allocation which is prepared by the FDRE House of Federation. But, the budget for federal infrastructure projects are allocated by the executive body and is approved by the parliament. They call it capital spending. This government spending is excluded from the main budget which is excluded from the formula. This is not correct as it is revealed for misallocation due to a lack of transparency and accountability of government officials. Thus, there should be unbiased and impartial institutions in this sector in Ethiopia.

9.8.8 Nation-Building Process

Lack of institutional capacity, infrastructure governance, and equity were hypothesized as the root construct affecting the nation-building process in Ethiopia. Specifically, the PLS-SEM analysis and the tests of significance indicated that insufficient nation-building process results in a lack of rule of law, lack of democratic/public accountability, lack of shared national identity and, lack of inclusive growth and sustainability (see 9.2.2 above). These issues are related to state-building which is a tangible concept such as building institutions, systems, etc. Whereas, nation-building in

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multi-national society is intangible concepts such as enhancing political participation, the abstract process of developing a shared sense of identity, (“unity in diversity”), etc. (Dinnen,2006). As mentioned above, the goal of nation-building is to form the collective ability to accomplish public results and to follow a shared vision of the future (Bourgon, 2010; Hundara, 2017), which needs to build strong institutional capacity, infrastructure governance, and infrastructure equity in Ethiopia. This is reflected in the literature that says productive capacity is the accumulation of human capital and the institutions that facilitate inclusive and sustainable economic growth to build Ethiopia (Shiferaw, 2017). Moreover, it is stated that “federalism has rightly the potential to address all identity, diversity and governance-related problems the highly centralized and undemocratic systems unfold” (Hundara, 2017, p.4).

However, all interviews believed that infrastructure has a tangible effect on the nation-building process. They also described that nation-building is an attitude and thinking. Infrastructure improves the citizen’s lifestyle. For example, the expansion of road, electric, and telecom will help to continue as one unified country, to introduce each other, to be connected in different economic, social, and political activities, to create a common vision opportunity, and to widen the opportunity to live together. TR1 also explained that the experiences of other developed countries showed that the importance of infrastructure is to create a connected society. For example, the European countries are not only connected within the country they are also connected across the country to country through infrastructure. Likewise, many infrastructures have been constructed in Ethiopia for the last 27 years. As a result of this, many communities have been connected and introduced to each other. From this one can say that infrastructure is very crucial for state-and nation-building by ensuring the rule of law and democratic/public accountability. Thus, it is explained that “state building is a process that integrates the disparate groups, peoples, and nations together. It also determines the relation as well as makes the state represents all these different groups structurally and institutionally” (Hundara, 2017, p. 4-5). This is because political stability, peace, and security is an overwhelming aspiration of all Ethiopians today (Salih *et al*, 2018). It is also indicated that human capital is a source for building the architecture of a nation as a paradigm to society (Lonska, 2015).

FG3 also described that it is impossible to build a country with one nation’s superiority rather it must be built by giving equal opportunity and equitable benefits for all nations and nationalities in

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the country. To achieve this mission, first of all, the government should build institutional capacity in the infrastructure sector. Secondly, infrastructure governance follows. Then, if the institutional capacity and infrastructure governance are properly executed, it may be possible to achieve an equitable allocation of infrastructure and the right nation-building process. This is because a country or Ethiopia stays together when its citizens share enough preferences and values and can communicate with each other (Alesina & Reich, 2015). Moreover, equal access to infrastructure services and a policy environment that does not discriminate against certain location(s), ethnic groups is a central ingredient of “structural transformation” (Kedir, 2015). This is also because a lack of accommodation of diversity could lead to clashes and pose risk for unification, particularly, in multiethnic federal systems like Ethiopia (Mengie, 2016).

In addition, it is indicated that the core of federal arrangements lies in the establishment and care of power-sharing which pursue to accommodate certain values suitable to their common circumstances in the process of nation-building (Kincaid, 2011). It is also crucial to strengthen the focus on citizens which is an important and necessary building block to help accelerate the power of the citizen in guiding and disciplining “the nation’s infrastructure capital and operational expenditure” (Bowditch & Noble, 2017). Therefore, it is possible to conclude that nation-building is the primary interest in Ethiopia. Hence, there should be a great effort for institutional capacity, infrastructure equity, and governance. But, currently, as regionalism/provincialism becomes a primary interest, it seems unlikely to give priority for the nation-building process in Ethiopia. However, according to Elazar (1994, p. 5), to reach that fulfillment of the promise, the government must address: “people’s minds; their cultures; and, their institutions-one of the most promising vehicles to addressing all three is the federal idea”. Thus, it is also necessary to ensure the rule of law in the country. Hence, the three central elements of a successful nation-building processes are, closely interlinked in most cases, a unifying and persuasive/integrative ideology, integration of society, and a functional state apparatus (Hippler (Ed.), 2004, 2005).

9.8.9 The Way Forward in Infrastructure Development in Ethiopia

89% of interviewees believed that, first of all, the federal government should accept the presence of an unbalanced distribution of infrastructure in the country. Moreover, it is necessary to scientifically audit the current performance of each institution, and then to prepare the

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remedy/corrective measures for this issue wherever necessary. And then, the government should explain to the public why such an unbalanced distribution of infrastructure has occurred. Next to this, the government should develop a clear plan on how to correct this unfair distribution in the country. Based on these two critical issues the government should build consensus with the public. Then, the government should implement the plan as per consensus. After the implementation of these principles and directions, the government can solve the unbalanced distribution of infrastructure in the country. This process will help to enhance institutional capacity and good governance. Thus, it is indicated that it is a set of person's abilities and skills, having a direct impact on one's economic and social activity potential, need to be used to find the corrective measures (Lonska, 2015).

However, TR1 and OR2 indicated that the ways of development, especially infrastructure development, have so many unknowns and many ups and downs. Therefore, there might be so many limitations in infrastructure development. As far as possible, the best strategy is to correct limitations immediately. Through the process, there should be similar measures. Otherwise, it is impossible to fully avoid governance problems. More importantly, the FG6 explained that the Ethiopian government should strengthen IGR systems in the country. Therefore, there should be strong regional government representatives at the federal level. To ensure this issue, it is good to benchmark the Australian government as it has a very strong IGR system. Thus, IGR is a forum for bargaining with the federal government on "matters of common interest" (Fiseha, 2009).

Finally, all interviewees indicated that all infrastructural development institutions have to prepare a transparent master plan at the national level by participating in regional government appointees and experts. However, it has been indicated that the process of policy-making in Ethiopia lacks the central elements of the process which is not following consultative and systematic procedure rather it is less consultative and less systematic as well as a "top-down approach" while a genuine bottom-up policy process is preferable and possible. For instance, the Addis Ababa Integrated Regional Development Plan formation was opposed and criticized by the citizens, and even by outside observers (Kaso *et al*, 2018; Assefa, 2019). More importantly, Ethiopia should have an inclusive and systematic that follow the acceptable policy-making stages and process including identifying problems, investigating the problems and evidence, setting the priorities based on evidence, formulating draft policies, consulting the key-stakeholders to test the draft policy,

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reviewing, formulating, and implementing the policy (Kaso *et al*, 2018; Assefa, 2019). There should also be National Development Council (NDC) that serves as a forum for bargaining over five-year plan allocations which is the Indian experience (Kumar, 2014). Following this, the regional governments have to prepare plans at the regional level and develop the infrastructure according to their objective realities in order to ensure equity and efficiency as far as possible. Regarding shared national identity: there has to be a political will in the first place and agreement among Ethiopian political elites on the benefits of their unity and as to how they would be able to strengthen their unity sustainably.

9.9 Focus Group Discussion (FGD)

9.9.1 Focus Group Discussants Profile

The study has also conducted FGDs in four regions in Ethiopia as follows. Table 9.21 shows the profile of the focus group participants.

Table 9. 21 Profiles of the Focus Group Discussants

Group Code	Participants Code	Region	City
T1	TM1, TM2 and TM3	Tigray	Mekelle
A1	AB1, AB2 and AB3	Amhara	Bahir Dar
O1	OA1, OA2, OA3, OA4, and OA5	Oromia	Adama
B1	BA1, BA2, BA3, BA4, BA5 and BA6	BenshangulGumuz	Assosa

Source: Survey Data, 2019.

9.9.2 Institutional Capacity in the Infrastructure Sector

All focus groups believed that, generally, institutional capacity in the infrastructure sector has a great impact on the nation-building process. It is also very fundamental for economic growth. Then, infrastructure governance and equity follow. Moreover, the focus group discussants have similar results about institutional capacity with the interviewees (see sec. 9.8.2).

9.9.3 Infrastructure Governance

All focus groups believed that there is an infrastructure governance problem in Ethiopia. They also mentioned that legal frameworks are not properly implemented in this country. Moreover, the focus group discussants have similar results about infrastructure governance with the interviews (see sec. 9.8.3).

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9.9.4 Infrastructure Equity

All focus groups believed that there is no equitable allocation of infrastructures in Ethiopia. They also stressed that, in the previous years, infrastructure was allocated based on political interference without any clear criteria in Ethiopia. Moreover, the focus group discussants have similar results about infrastructure equity with the majority (89%) of the interviews (see sec. 9.8.4).

9.9.5 Distribution of University, Airport, and Industry Park

All groups believed that the distribution of these infrastructures was decided by irresponsible political leaders. Moreover, all political leaderships were trying to benefit their source of origins or nations/nationalities. Finally, the focus group discussants have more or less similar results about the distribution of university (22%), airport (89%), and Industry Parks (94%) with the interviews (see sec. 9.8.5).

9.9.6 Equity vs. Efficiency

T1 believed that, generally, it is not good to leave equity and to consider the only efficiency. But, it is necessary to consider both equity and efficiency in a harmonious way. However, it indicated that as the public is currently becoming equity sensitive in Ethiopia, it is good to give priority for equity than efficiency. Whereas, A1, B1, and O1 believed that where there is no access to infrastructure, one could not talk about efficiency rather equity. There should be something to measure efficiency. However, these focus group discussants have similar results about equity vs. efficiency with the interviewees (78%) (See sec. 9.8.6).

9.9.7 Who were the decision-makers and what were the Criteria?

Both focus groups believed that the federal government prepares a proposal, and it is approved by the federal parliament. But, it is not transparent to the public. This is because there is no clear standard and criteria for the allocation of infrastructure in Ethiopia. However, these focus group discussants have similar results about the decision-makers and the criteria with the interviewees (see sec. 9.8.7).

9.9.8 The Way Forward in Infrastructure Development in Ethiopia

Generally, the focus group discussants suggested the following issues: The problem is multifaceted in the infrastructure sector. We Ethiopians need to work hard on every aspect of that

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will lead to the improvement of professionals, government officials, labor, ethics, performance work and life security, and good knowledge-based leadership. The current Ethiopian reform is not efficient. It needs a revolution. Especially, the old mentality or mindset and the new hidden agenda hindered the change process due to like “conspiracy theory” which is a belief that some underground but powerful organization/party is responsible for the covert experience. It needs to reveal the previous “pandora’s box” (a process that on one occasion begun causes many complex problems) in the reform process, specifically in the distribution of infrastructure. The other issue is the lack of project feasibility study, project management knowledge, implementation, and evaluation. In order to provide or distribute fair infrastructure for every region, federal and regional governments, stakeholders, policymakers, financiers, and other related bodies should participate in planning, controlling, execution, and process in order to achieve the planned objective. Moreover, citizens and the private sector must actively participate in the infrastructure sector.

Finally, both in-depth interviews and FGDs have resulted in more or less the same results in this study. The interviews and FGDs have been validated by peer groups and experts. The suggestions and recommendations will be included in the findings, conclusions, and recommendations in the next chapter.

9.10 Conclusion

Analyzing the data (both quantitative and qualitative) collected, this chapter showed that the equity of public investments in infrastructure is falling or disrupting, and is damaging the nation-building process in Ethiopia which is a systemic problem. This is due to the lack of an integrated framework as there are coordination failures by the lack of proper government interventions. Specifically, CFA indicated that constructs critical to the current allocation of public investments in infrastructure in Ethiopia are the institutional capacity of the government institution, infrastructure governance, infrastructure equity, and nation-building process, including 17 indicator factors. Among these constructs, the institutional capacity of the government and infrastructure governance is at the root of the inequitable allocation of public investments in infrastructure which also affects the nation-building process. However, in the quantitative analysis, the hypothesis of institutional capacity and infrastructure governance is not directly supported to influence the nation-building process in Ethiopia due to other factors such as institutional visions, policy, and strategy, programs, rules, and regulations, etc. Moreover, the in-depth interviews and FGDs results

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showed that there is a lack of institutional capacity, infrastructure governance, and infrastructure equity which negatively affects the nation-building process in Ethiopia. However, lack of institutional capacity is the main cause of lack of infrastructure governance and infrastructure equity which also indirectly negatively affects the nation-building process. Therefore, the federal government should give corrective measures for the inequitable distribution of infrastructure. These require other factors such as establishing a ministry of infrastructure by upgrading the infrastructure coordinating agency to coordinate infrastructure sectors, policy issues like place-based policies, long-term plans, deep interventions, other governance issues, etc. that need to be considered in this study.

It has to be understood that infrastructure delivery is becoming increasingly more complex and multifaceted. Especially, as citizens contact increase and grow more unstructured through, for example, social media, and take place outside the supported channels or traditional boundaries in, for example, social media and digitally-based information delivery which leads to political instability in the country (Bowditch & Noble, 2017). According to interviewees' concern, so long as the unmet demand for infrastructure exists, it remains a key restraint on doing business in most African countries which reduces their firms' productivity by roughly 40% (World Bank, 2013). This is due to the lack of integrated frameworks as there are coordination failures including the lack of proper government interventions including lack of proper understanding and implementation of the constitution and the federal system. Whether these large trends are simplified to inspire a more equitable and sustainable Ethiopia, or allowable to exacerbate inequities/disparities and divisions, will basically govern the shape of Ethiopians common future. Thus, the results presented in the chapters (7, 8, and 9) are used to develop the study conclusion and recommendations in the next chapter. Further, considerations of the related problems and challenges in this chapter are also stretched to provide policy implications and recommendations in the following chapter.

CHAPTER 10

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The study examined the question of equity in allocating public infrastructure investments to support economic growth and the nation-building processes in the context of Ethiopia. In this study, infrastructures are agreed as the basic physical services and installations required for the functioning of society, such as grids for energy provision, roads for transportation, and telecommunication services including university, airport, and industrial parks.

Regarding research questions, chapter 3 (as literature II) has addressed the major issues that could affect infrastructure equity, institutional capacity, infrastructure governance, and state- and nation-building processes in developing countries. Hence, there are concerns about the equity of public infrastructure investments for effective nation-building processes in developing countries, specifically Ethiopia. This chapter also exhibited factors affecting the equitable allocation of infrastructure investments and the nation-building process which served as a base for questionnaire development. Chapter 4 has dealt with the methodology. Chapter 5 also addressed the issues of institutional capacity, infrastructure governance, and equity from the perspective of federalism and the nation-building process in Ethiopia with relation to international and national practices. Further, it also indicated that Ethiopian federalism has suffered in uneven resource allocation in the infrastructure sector, and much is needed for the Ethiopian government to attain the valued levels of federalism and national development.

Chapter 6 examined the major concerns in infrastructure governance, equity, and the nation-building process from the perspective of political and economic development in Ethiopia as well as the role of each infrastructure sector institutions and how infrastructure is planned and allocated in Ethiopia. In addition, the global status of Ethiopia in infrastructure development, and related issues have been addressed in this chapter. This is because infrastructure and its impacts on economic growth, social wellbeing, sustainability, and solidarity have been given a great deal of attention today in the nation.

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Basically, the study's leading question is how physical infrastructure distribution decisions and capital spending by the federal government of Ethiopia are equitable across regional states and are guaranteed the same protections and accesses as everyone else in the country? Thus, the analyses chapters (7, 8, and 9) by using-multi stakeholder/actor, multi-criteria analysis-Principal Component Analysis (PCA) Chap. 7 Table 7.3, Composite Infrastructure Index (CII) Chap. 8 Table 16, Factor Analysis (Confirmatory Factor Analysis), and Partial Least Square-Structural Equation Modelling (PLS-SEM) Chap. 9 sections 9.2 and 9.3- revealed that there is inequity in infrastructure distribution (except university distribution (see Chap. 7 Sec. 7.3.4 Table 7.11)) across regional states in Ethiopia. This has also brought a negative impact on the state- and nation-building processes in the country. Above and beyond, as there is a lack of written policy documents/guidelines to ensure infrastructure equity in each infrastructure sector institutions, there is no corrective mechanisms to protect disadvantaged regional states. Though all institutions' officials talk a lot orally about equity.

Meanwhile, from legal analysis and policy documents point of view, the Ethiopian constitution (1995) (Articles-25, 40 (3, 8) and 89 (1, 2)) and some provisions (e.g. Proc. No. 455/2005, for example, land acquisition frameworks) indicated that there should be equitable allocation (equal opportunity) of government spendings like infrastructure across regional states, communities, and the society at large. Moreover, the policy documents such as GTP I and II (although it states about equity repetitively) did not guarantee infrastructure equity in the country as there is no clear instruments/tools like international and national practices (e.g. Infrastructure Composite Index (CII), Spatial Preference Modelling to Distribute Resources, Place-based vs. people-based policies as well as Deep vs. Shallow intervention, Structural Equation Modelling (SEM-PLS), Establishing National Development Council, etc.) which are addressed in this paper.

Finally, the chapter is divided into five sections. The first section discusses the conclusions. The second section describes the recommendations. The third section indicates theoretical and methodological contributions. Section four outlines the policy implications. Lastly, the study recommends suggestions for future research. Thus, the following conclusions and recommendations are presented from the data analyses.

10.1 Conclusions

A. Lack of Institutional Capacity

This paper emphasizes why vibrant, articulate, and sector-specific insights into the politics of infrastructure equity and management are required to expand optimal economic policy selections and reform processes. Human capital investments have become more and more significant as the nature of work of infrastructure development has grown in response to rapid technological change (WBG, 2018). It is also stated that human capital development and inequalities are the other important factors in developing countries. Several of the most vital externalities grow gradually through time as human (and social) capital changes at diverse speeds in diverse places (Duranton & Venables, 2018). Regarding institutional capacity in the infrastructure sector, the empirical results revealed that the lack of institutional capacity of the government has produced detrimental impacts on infrastructure equity and nation-building processes far beyond other factors. Insufficient institutional capacity of the government including human resource management, organizational structure, organizational systems & frameworks, and infrastructure funding has directly negatively impacted the equity of public infrastructure investments across regional states in Ethiopia, and indirectly negatively impacted the nation-building processes. Hence, a lack of institutional capacity of the government restricts the government's ability to generate good planning and plausible policies, as well as the ability to create a framework that ensures the good performance of various actors in carrying out federal policies in the sector. This is because insufficient attention is typically paid to the development of the necessary institutions to ensure and maintain infrastructure equity.

In relation to this, the literature indicates that low-income countries like Ethiopia have relatively weak public investment management institutions and that improving those institutions could increase infrastructure equity and considerably the efficiency (i.e., the "value for money") of public investment (Gurara *et al*, 2017; Rammelt, 2018). The empirical analysis also advocates that it might be beneficial to scale up infrastructure investment gradually, while building-capacity and strengthening institutions to improve the capability/the functioning of the human resource as well as the civil servant and leadership, and then the quality of life of the citizen. Thus, anchor institutions that can serve as intermediaries for broadly engaging a range of stakeholders on regional infrastructure equity action are fundamental for raising relationships and supporting change.

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Moreover, the empirical study indicated that there is inadequate fund allocation for the infrastructure sector. Existing funding/financing modalities are not diversified (external source, both local and federal tax, PPP, etc.) and infrastructure projects are poorly executed (i.e. over budgeting, delays, corruption, etc.) in Ethiopia. In addition, there is a wastage of national resources in government-funded mega infrastructure projects (e.g. roads, electric power generating, etc.). More importantly, there is evidence of a lack of strategic management of sources (and providers) of finance to the infrastructure sector. Without proper policies and institutions in place, inequities focus on political supremacy among those who are previously better off, which inclines to preserve or even broaden opportunity gaps. Lacking proper policies and institutions, inequities in outcomes make or preserve unsatisfactory opportunities and continue social disunions. Growing political impact among the more lucky erodes trust in the capacity of governments to address the desires of the majority. Hence, this lack of trust can weaken political systems and delay the functioning of democracy. Nationwide policies, strategies, and institutions do matter in the infrastructure sector. Nowadays, popular discontent/dissatisfaction is high in Ethiopia. This is predominantly due to a lack of institutional capacity, specifically, a lack of enabling organizational systems & frameworks. So rising inequity is inevitable.

B. Lack of Infrastructure Governance

Concerning infrastructure governance, according to the study findings, there are four broad areas of problems associated with infrastructure governance in government-funded infrastructure development in Ethiopia. Thus, the empirical analysis disclosed that lack of intergovernmental/stakeholders' collaboration and coordination, decision-making process, land acquisition framework/right of way, and political commitment and partnerships in infrastructure governance is largely accountable for the inequitable allocation of public infrastructure investments, and which ultimately negatively impacted infrastructure equity and the nation-building processes in Ethiopia. The low level of these factors poses significant risks of corruption and fraud and law-breaking practices of government officials and local firms in public projects. Above and beyond, this can also have serious detrimental impacts on the quality and efficiency of infrastructure development and ultimately the equity of public infrastructure investments in the country.

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Moreover, governance of infrastructure is the processes, tools, and norms of collaboration, democratic decision-making processes, and monitoring expanded by governmental organizations and their counterparts with regard to making infrastructure amenities available to the public and the public sector. Thus, it relates to the collaboration between government institutions internally, including their interaction with citizens, users, and the private sector as well as bi and multilateral organizations and NGOs (OECD, 2015, 2017). In reality, Ethiopia is struggling with poor infrastructure governance, for example, lack of land acquisition frameworks, which results in a lack of public accountability and transparency, and including functioning administrative and regulatory authorities that are also suffering from a lack of governance. Likewise, infrastructure policy-making and planning relates to the lack of transparency and accountability. Still, opening up the ‘black box’ (mysterious to the user broadly) of the infrastructure decision-making process is challenging to attain in practice and could be painful for some politicians and professionals. This is because, for example, the government (the then ruling party-EPRDF) has invested more in a regional state where electoral output is higher.

The empirical analysis confirmed that ethnic-interest agitation and lobbying are common things in infrastructure governance in Ethiopia. In fact, this is mainly personal well-being and sector governance biases such as populism-a tough keenness to be reelected including short-term power-hunt (power via democracy); patronage-effort to preserve power by an elite/club control over sector (power via undemocratic mechanisms); industry-friendliness- for keeping future positions in the infrastructure sector, for example, allies in the industry, usually within legal boundaries (legal money-hunt); and, corruption-personal benefits that the politician needs to save secret (illegal money-hunt) (Benitez *et al*, 2012) (see Chap. 3 sec. 3.3.2 and Chap. 9 Sec.9.8.3). Additionally, unsuccessful governance can also lead to the construction of inappropriate infrastructure, poor construction, and quality of delivery, inadequate maintenance, and high levels of losses and thefts. There is also unusual difference across regions when it comes to political control processes as well as how powers are separated between institutions, the simplicity of the rules, and the execution of them. Constitutional implementation weaknesses are themselves the consequence of political difficulties. Thus, ignoring infrastructure governance weaknesses can significantly dampen economic returns to infrastructure projects and then infrastructure equity. Growing earnings to scale for a region, coordination failure, and the fact that multiple

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circumstances should be fulfilled for policy to be equitable and efficient are all sources of trouble (Hoff, 2001; Glavan, 2007; Felder, 2010; Duranton & Venables, 2018). All these are due to the collaboration and coordination failure (as well as political, government, and administrative failures) of the incumbent government including the ruling party and politicians in Ethiopia (see Chap. 9 Sec. 9.8.3).

C. Lack of Infrastructure Equity

Equitable infrastructure allocation is becoming increasingly more complex and multifaceted. Lack of access to road, electricity, mobile phones, and the Internet limits the potential earnings of modern accessibilities and facilities in developing countries (World Social Report, 2020). The empirical results showed that lack of equal opportunity in infrastructure, social/distributive justice, national and regional infrastructure competitiveness, spatial intervention/planning, and citizen/stakeholder/public satisfaction have brought negative impacts on infrastructure equity and the nation-building process in Ethiopia. Even though equitable infrastructure allocation has a great impact on nation-building processes, the necessary due attention is not given by the federal government of Ethiopia. As a result, social unrest, conflicts at a larger scale, and mistrust and corruption in federal and regional states become common phenomena in the country. Currently, one of the causes is the lack of infrastructure equity, and consequently negatively impacted the nation-building processes in the country. This is mainly due to a lack of social equity (attaining equity over socio-economic groups of society) or spatial equity (attaining equity over geographical locations or regions), horizontal, vertical, environmental, gender equity and including lack of solidarity and equitable infrastructure development initiative (Thomopoulos *et al*, 2009; Thomopoulos & Grant-Muller, 2013; Wismadi *et al*, 2015; Rammelt, 2018; Duranton & Venables, 2018 Litman, 2020). Meanwhile, there is a high correlation between inequality in assets and the infrastructure index, suggesting that improving infrastructure equity leads to inclusive growth as well (AfDB, 2018).

Moreover, it is also crucial to consider the issue of the trade-off between equity and efficiency. The possible outcomes of efficiency and equity analysis are equitable (equitable and efficient-accept, and inequitable and efficient-inconclusive) and inequitable (equitable and inefficient-??), and inequitable and inefficient-reject) (Felder, 2010). Based on the interview and FDGs analysis,

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the current situation of Ethiopia is both inequitable and inefficient scenario in the infrastructure sector. Increasing inequity has made discontent, deepened political splits and could lead to violent conflict. In consequence, the lack of consensus is recognized and a range of indicators is applied to evaluate diverse equity principles and forms and in order to reduce the potential of a constrained or biased outcome. Though this could not provide a firm answer to the debates, it is practical in the interim. There is also a lack of establishing a ministry of infrastructure, by upgrading the the federal infrastructure coordinating agency (which is currently a “Toothless Lion”), to coordinate infrastructure sectors as the institutions are not integrated well across Ethiopia.

To these end, the literature and the empirical analysis exhibited that equitable development is a positive development strategy that guarantees everyone participates in and benefits from the nation’s economic transformation-especially low-income residents, communities, regional states, and others at risk of being left behind (Treuhaft, 2016; Rammelt, 2018; Duranton & Venables, 2018). However, except in times of crisis, the government seldom thinks about infrastructure equity and how roads, electricity, telecommunication, parks, universities, and airports are part of a wide-ranging system that supports the communities and regional states (Rubin, 2006; Rammelt, 2018). The impacts of inequity or inequality are sluggish economic growth and poverty reduction, perceived or actual barriers to upward mobility make social strains and place the social contract under risk such as lower relative intergenerational mobility, and captured political processes, suspicion of institutions and increasing unrest, and as well as the rise of populism (World Social Report, 2020). In seriously unequal societies, elite groups are more real at manipulating policymakers, generating a situation that favors their interests (World Social Report, 2020). Hence, this is more than a theoretical concern as failure to access correctly is an area or region where there is a substantial possibility for a legal encounter. Otherwise, unfairness or iniquitousness can lead to political chaos (World Social Report, 2020).

D. Lack of Nation-Building Processes

Regarding state- and nation-building processes, the empirical results disclosed that lack of rule of law, democratic/public accountability, shared national identity and inclusive growth and sustainability are the results of insufficient nation-building processes in Ethiopia as well as the inefficient implementation of the federal system due to corruption and anti-democratic nationalism. Ethiopians are further divided and especially in recent times between federal and regional states, and among regional states over the nature of federalism. While some believe that the current situation might lead to the break-up of the country, others feel that failure to grip the same will jeopardize the unity and political future of Ethiopia. This shows that

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“ethnic” federalism has not been properly practiced in Ethiopia due to complications of drawing the boundaries, tendency for secession, etc. In circumstances of severe conflict and hostility, it does not render an adequate solution for rival groups (Anderson, 2013). In another perspective, this study argued that while the implementation of reforms launched by incumbent government leadership of Ethiopia has the potential to deliver progress on democracy and growth, the outcome of the transition depends on three possible paths including intensifying instability and relapse into conflict, gradual stabilization, and democratization, or a mix of democratization and turmoil (Salih *et al*, 2018; ICG, 2019; Faleg, 2019). Currently, the study indicated that the third path is reflected in the country in which one of the causes is the lack of infrastructure equity, and consequently affecting the nation-building processes in Ethiopia.

Therefore, Ethiopia stays together when the regional states, communities, citizens, specifically the elites and the society at large share enough favorites and principles and can talk with each other including equitable resource allocation like infrastructure (Alesina & Reich, 2015). Generally, development practitioners incline to specialize in aspects of building state capacity rather than claiming expertise in how to develop all aspects of a ‘state-nation’ policies (Nested-set of policy) (Linz, 1993; Hippler (Ed.), 2004, 2005; Dinnen, 2006; Stefan *et al*, 2010; Hundara, 2017), not ‘nation-state’ in Ethiopia. Moreover, endeavors to undertake a successful nation-building process by pragmatically feeling one’s way forward without a comprehensive and practicable concept are also problematic in most cases. Hence, much is needed from both the leaders and the led, the elite, and the people at large to attain the valued levels of democratic federalism and national development for Ethiopia.

Lastly, concerning the in-depth interviews and FGDs, 89% of the in-depth interviewees, and 100% FGDs believed that there is a lack of infrastructure equity (except university allocation) in Ethiopia (see Chap.9 Sec. 9.8.4 and 9.9.4 respectively). Generally, they also stated that setting national infrastructure equity policy agenda, making national policy decisions, guiding the law-making process, as well as monitoring and guiding policy implementation, and adequate institutional capacity of the government that generates good planning and sensible policies need to be implemented in this country. Without sufficient institutional capacity (the right skill, attitude, and knowledge) and infrastructure governance, the government would not move to equitable policy agenda or set planning policies that do not reflect the interests of a majority of the population. And then, the government should wish to address infrastructure inequity, and develop an equitable strategy and public investment policy. Finally, the study identified the factors that negatively impact the equitable allocation of infrastructure investments and state- and nation-building processes in Ethiopia. The findings of the study are summarized in the framework illustrated in Fig. 10.1.

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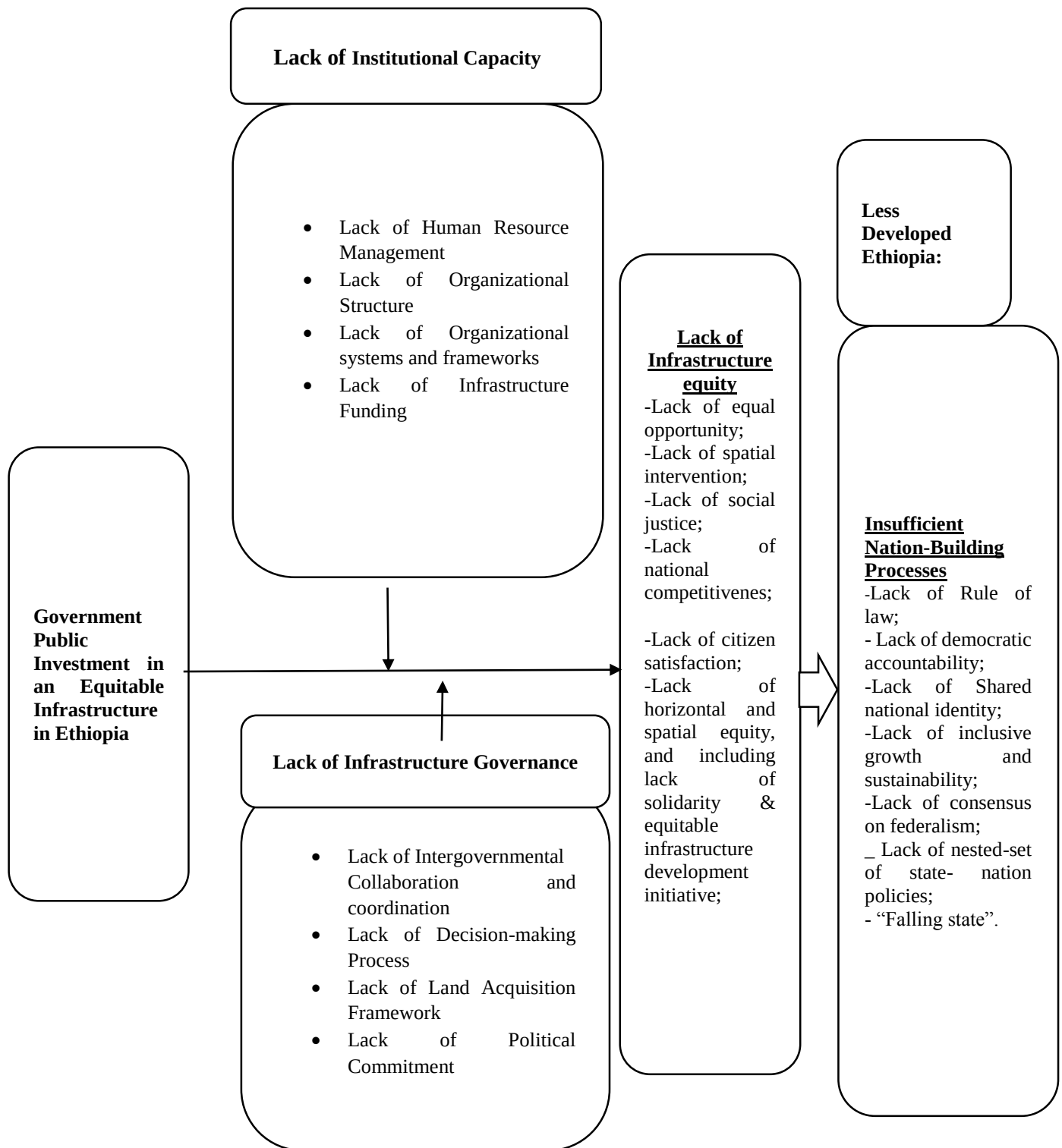


Figure 10. 1 Factors affecting the equitable allocation of infrastructure investments and nation-building processes in Ethiopia

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10.2 Recommendations

A. Building Institutional Capacity

The institutional capacity of the government of Ethiopia suggests that there is a demanding need for better planning and running of equitable infrastructure development across sectors and regional states. Enhancing institutional capacity reveals the leading role of the government in organizing and coordinating infrastructure development. Keys recommended in this area focus on enhancing ways to strengthen institutional links and to bring interests from different sectors and government levels together, and to improve top leader's commitment for vision, institutional systems and frameworks, respecting the law, empowerment of employees, formulating working policies, and designing systems and frameworks that truly operates for organizational goals and assigning knowledgeable, professional and ethical leaders and experts in the infrastructure sector, and ensuring infrastructure equity and adequate nation-building processes in Ethiopia. This means that institutional functions comprise the institution and structural arrangements, policy formulation, and implementation, decision-making, information flows, effectiveness of leadership, and the relationships between government officials and the public. It also attaches to the public authorities an essential and potentially active role in establishing the economic environment and determining the distribution of infrastructure assets and benefits equitably.

This also means that infrastructure investment-economic growth links could be influenced by institutional capacity in Ethiopia. This may also imply that the success of equitable infrastructure investment should, to a great extent, depend on the fundamental of institutional quality which improves the capability/the functioning of the human resource including reforming the civil service, using new technologies such as, for example, communication networks and Internet through mobile phones (highly skilled workforces are earning the maximum from innovative technologies which are creating winners and losers), and improving the quality of life of the people which requires strong federal leadership. It is also good to reflect the five-part formula of USA experiences: educate the people, develop open foreign policy, create and implement best rule and regulation, and establish strong R&D which should include the sector.

Accordingly, successful governance of infrastructure demands a clear regulatory and institutional framework, robust coordination across levels of governments and sustainable performance throughout the life-cycle of the asset (need standardization). Bridging equitable infrastructure gaps

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need a broad set of actions to advance the equity and efficiency of public spending, mobilize national resources, and crowding in private investment and funding from development partners as well as embracing clear horizontal equity objectives in long-range plans, and integrating criteria in funding decisions. Thus, more diversified internal and external finances to support infrastructure development is also needed in Ethiopia. In addition, civil society is a vital instrument for transformation in institutions and policies. Community participation is also a vehicle in the achievement of equitable infrastructure development plans.

B. Ensuring Infrastructure Governance

Governance is an essential prerequisite for building effective infrastructure. And hence, infrastructure governance is a primary concern for the equitable allocation of public infrastructure investments and is crucial to enhance the nation-building processes in Ethiopia. Regional states and the federal government should display a number of interactions significant for infrastructure governance such as developing legal-based intergovernmental relations, democratic decision-making processes, improving land acquisition framework, and political commitment and partnerships. Literature indicates that IGR procedures are the lifeblood of real-life federalism. Thus, government interventions to repair coordination failures in infrastructure have often resulted in some form of governance and political failure and this contributes significantly to clarify inequities and inadequacies in the supply of infrastructure facilities in developing countries. So this paper suggests a structured framework for detecting the given governance challenge and recommends the need for more ideal approaches to sector-reform. Hence, the government must address those challenges encountered in the areas of planning, mechanisms for coordination and dialogue, human resources, measurement and evaluation, and many others. From this perspective, it is plausible to argue that civil society (contractors and consultant associations), research institutions, and universities are an advantage for infrastructure governance by creating and energizing popular participation, consultation, inclusion, transparency, and accountability as well as conducting international benchmarking and scaling-up best practices.

Moreover, the government should recognize the following six infrastructure governance challenges. First, there is the issue of evaluating the infrastructure needs of the regional states. This requires the ability to gather evidence to identify the relevant needs across sectors and regional states. Second, a prioritization of these needs should take place based on planning, processes, and tools that allow aggregation of the many project dimensions and preferences of stakeholders.

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Third, in the project preparation phase, suitable procedures and skills in terms of technical design, affordability, and value for money issues need to be applied. Fourth, in the construction phase, appropriate skills and systems should be available to ensure that project assumptions are delivered upon or that changes are subject to appropriate scrutiny. Fifth, in the operational stage of the project, the right incentives and tools for appropriate monitoring of infrastructure asset performance and maintenance should be in place as well as mechanisms for reflection on the access provided. Sixth, preventing and preparing for climate changes and environmental traps. Still, there are portions of the lifecycle, such as the construction phase, when there is substantial potential for disturbance even though in the long-run the infrastructure increases equity largely. All these need to avoid the coordination failures of the Ethiopian government in the infrastructure sector to ensure infrastructure equity. Federal and regional states could maximize the probability of equitable actions among members once they promote a system where infrastructure resources are allocated equitably among member regional states or communities, there is a mechanism for agents to coordinate their activities, and they could achieve a better (cooperative) balance. That is, a coordinated increase in the strategies of all authorities would be improving infrastructure governance and equity. In addition, new technologies can improve governance and enable participation, facilitating individuals, groups, and regional states to voice their feelings/opinions and establish on behalf of shared causes.

It is also necessary to consider best practice policies with relation to infrastructure equity such as oversight and regulation which is the creation of independent regulatory authorities that has commonly been seen as the most understandable suggestions to minimize political interference with regulatory procedures. Regulators ought to be engaged based on their skills, not their political connections, and a number of situations would maintain their integrity. In addition, introducing competition (Government and PPPs) which is thought to reinforce accountability via pressure from the demand side of the market, and implementing decentralization of sectoral strategic decision-making process to local or regional states. The additional positive trend in some countries is a better understanding of the status of checks and balances. This is concluded that a planning process in which population groups or regional states should be acknowledged by their spatial location, their accessibility is well-defined, along with an adequate minimum threshold for accessibility. This minimum threshold needs to be recognized as political and somewhat that ought to be well-

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known by democratic discussions (such as joint decision-making and/or decetralization). For this purpose, effective reform must start with an obvious recognition of how distortions may initiate policy selections.

C. Planning and Implementing Equitable Infrastructure Development

Given its complexities, it could be anticipated the limited advancement that has been prepared in the provision of infrastructures that openly address subjects of equity. Equity requires the government/state that implements policy to attain a more equitable allocation of the required of the infrastructure resources. Infrastructure equity in itself means fairness that is to say the government requires to bring out policies that will support the economy grow up and enhance the nation-building process such as priorities for an equity agenda including targeted action for disadvantaged groups/regional states, social safeguard, reallocation, and challenging entrenched power inequities. This recommendation suggests the idea of planning for infrastructure scaling up on a continuous basis to come across the needs of the regional states and the goal of inclusive growth. This is reinforced by the plans of coordinate across regional states', appraise, reiterate, and adapt, confirm equity in decision-making processes, and innovate an open knowledge to ensure infrastructure equity in the country.

Certainly, there needs to be an acknowledgment that equity has been almost missing from the recognition and conversation (it does not mean that it is not constitutional, no in policy documents like GTP I and II, and no lip-service) that its deficiency leads to the types of disparities across regions in Ethiopia. This consensus can result in increased opportunity for everyone in the regional states and a more productive workforce, better circulation of goods and information, and more sustainable development practices. In doing so, there is a need for the government to execute a policy that will support to allocate the resources for the disadvantaged regional states to improve development in the country by expending social equity (attaining equity over socio-economic groups of society) or spatial equity (attaining equity over geographical locations or regions) including equitable infrastructure development initiative. Therefore, this needs that collaborations across sectors, across neighborhoods, and across jurisdictions are essential for moving "the regional equity agenda" to ensure both horizontal, vertical, spatial, social, environmental, and gender equity including solidarity and subsidiarity– the two pillars of federalism-across regions in Ethiopia. Special attention is given in this study to the macroeconomic and institutional conditions that are necessary for the socially equitable provision of infrastructure. Infrastructure equity

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concerns need to be addressed not only to attain greater fairness and opportunity but to make the conditions essential to sustain economic growth and enhance the nation-building processes of Ethiopia.

Moreover, organized efforts to bring equity into infrastructure planning, decision-making, and spending can build political consensus for new funding. Implementing smart exercises and obtaining more funds alone cannot ensure equity. The decisions about rebuilding infrastructure in Ethiopia and the allocations of new funds in the regional states should be critical opportunities to address equity directly. In a time of constrained resources, only a commitment to equity will ensure that the needs of everyone in the regions are addressed. More importantly, the seven basic principles can result in greater infrastructure equity which needs to develop a strong political commitment to infrastructure equity principles as a just process for the distribution of benefits and burdens (see Chap. 1 Sec. 1.1.5).

It is also suggested to decision-makers as a method of six equity principles together with the opportunity to explicitly express opinions on each principle, they are then in a position to make well-informed decisions as to the final purpose of assessment. These are: (i) egalitarian (all individuals are treated equally, making the same contribution, disregarding their financial or other ability); (ii) equal shares delivery (benefits equally allocated to all groups); (iii) Rawls' principle (reducing pre-existing inequalities between regions by distributing all project benefits to the least advantaged regions); (iv) maximizing the "average net benefit" with a "minimum range" of "x" units; (v) maximizing the "average net benefit" with a "minimum floor" of "x" units; and, (vi) maximizing the benefit for the community, group or regional states as a whole (utilitarian approach). Besides, stakeholders also have the alternative to use varied equity principles for the divers' equity types (horizontal, vertical, environmental, territorial/regional/spatial, and accessibility objectives) when needed with the consensus of federal and regional states. See Chap. 1 Sec. 1.1.5.

Anyways, this study has mostly focused on the equal shares policy principle which allocates an equal share of all infrastructure project benefits to all-region impacted, and on horizontal equity (equal treatment) among regional states in Ethiopia. So, stakeholders should initially decide on which of equity (mutually exclusive) principles are to be implemented in the infrastructure sector

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and then on (which can be complementary) the equity types grounded on the policy, program, and/or project objectives. To guarantee consistency only one equity principle can be implemented throughout the decision-making process and the integrated method should be decided in advance. From other countries' experiences, the priorities should be explicit (for example, in sections of national policy documents, like 10 years' strategic plan) or maybe implicit (for example, integrated into political decision-making processes) or may be implanted in the individuals' capability and political determination. It is also crucial to design a strategy and policy to improve equity and efficiency trade-off in the long-term.

Moreover, as is discussed, infrastructures should be reflective of the principles or values of the regional states, or citizens that harvest them then it is the planning-process, through which those inputs are prepared. Some of those principles or values are hidden in the traditions of the experts handling the process whilst others escape in from the political setting in which choices are prepared. Equity needs a critical principle, or value at this juncture in the process if the voices of all those who should be expected to bear the burdens have to be given equal weight. This does not mean that all burdens should be treated equally. Tolerable limits to the burdens enforced and benefits distributed by the construction and operation of infrastructure is something that should be established by an open democratic process to guarantee that the voices of the most powerful do not ignore others. It ought also to be recalled that the process itself is a benefit to some and a burden to others. The politicians and the professionals that undertake the process, public bureaucrats, and particularly the private sector consultants occasionally have a vested interest in the planning process. The same is true of groups looking for to delay outputs that they could wish to avoid. Again, equity as a principle should go some way to safeguarding that such strategic conduct should be visible for what it is.

Furthermore, to have equitable infrastructure through more equitable planning across regional states in Ethiopia, federal and regional as well as local governments should be well-positioned to confirm that regional state/the community's voice is comprised of democratic decision-making in infrastructure investments that reflect regional state/community need and that as a public good, infrastructure should be democratically controlled. Therefore, federal and regional as well as local governments should take: Using a comprehensive approach toward defining infrastructure including addressing the threat of climate change and making resilient infrastructure; Guaranteeing

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investments should be made in communities that require them the most and that projects deliver tangible community and environmental benefits; Making the best use of the opportunity to generate good jobs through community workforce agreements that provide all-inclusive policy instruments; Encouraging significant community engagement and transparency throughout every phase of an infrastructure project to make sure that investments yield vibrant environmental, economic, and community benefits; and, Practicing financing measures that safeguard accessible and affordable infrastructure by applying arrangements such as the practice of private equity financing through PPPs often rely on high user fees to exhaust the possibilities of shared returns. This also needs special policies for lagging regional states. Interventions are frequently part of ambitious multi-policy tools that include, for example, transport infrastructure investments to increase connections within lagging regional states and between lagging and relatively better regions, fiscal incentives and many direct service delivery, and a package of actions that target to enhance attitudes, skills and knowledge, innovation, and enterprise development in specific parts of a region in the country.

It is also crucial to prepare a National Equity Strategy and Policies for the delivery of equitable infrastructure that benchmarks for measuring progress in the direction of further equal opportunity. This is because infrastructure equity is a big deal in Ethiopia. Alternatively, a place-based policy (PBP) should lead to infrastructure development in a place, for example, an infrastructure allocation, potentially acting as a coordination instrument. Then, a real execution of policy matters. This needs action that is coordinated across functions (land, infrastructure, etc.). These concerns mean that commitment is required from the highest level of government, though at the same time the authority desires to be responsive to the worries of stakeholders. These policies should be executed without any disappointments, although the outcomes of PBP are inherently uncertain, selections have to be accomplished. Meanwhile, to be effective, the policy necessitates coordination across space, function, and time. Thus, the policy, and the capability to implement it effectively, require to be integrated spatially-for example in order to grow a region/city, authority is required within the region/city. It also necessitates being integrated functionally-covering planning, land regulations, infrastructure and utility, and public service delivery. And the policy requires a long-view, able to make reliable commitments to future region/city development.

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Consequently, some consistency and coordination are required between the different levels of government, local, regional, and federal. Having capability, financial resources, and trustworthiness to encounter these challenges needs an authorizing situation more unified than that which is usually present between varied parts of the government. However, this study noted that a particular PBP may not likely to be the ‘first-best’ way to address market failures. The concept of policy targeting articulates that the central determinants of market failure ought to be identified and then addressed by the targeted policies. It is also vital to consider policymaking through an equity lens by promoting equal access to opportunities, by introducing a macroeconomic policy situation favorable to reducing inequity (fiscal and monetary policies which could inspire greater equity), and by tackling bias and discrimination (on the basis of ethnicity, rural-urban, gender, or other features) and promoting the participation of disadvantaged groups or regional states in economic, social and political condition.

Therefore, based on this study, the federal government needs to take the important step to conduct a needs assessment to determine where the biggest infrastructure needs were. This assessment needs to involve the regional states and the criteria the federal government will use must make it public. Below are some areas where the needs assessment needs to be improved: Engage regional states in determining which areas had the greatest needs and publish the scoring criteria used to determine needs. Given the provision of resources are often the first priority based on anticipated returns in the future there is a prerequisite to preserving the trust of those who deliver them, the public. This is the trust that the predictions are truthful, that justification will be provided and of an adequate standard, and that the demanded benefits will really emerge. Consequently, applying regional equity principles and policies can map a realistic and fair course for future development and investment decisions, helping to build the nation of inclusion and broad opportunity including planning for equitable infrastructure development. To guarantee infrastructure equity principles, the government should ensure equal opportunity, enhance social justice, strengthen national and regional competitiveness, improve citizens and stakeholders’ satisfaction and implement spatial interventions/planning in the infrastructure sector.

All these require international and national practices as means of inequity/disparities reduction (e.g. Infrastructure Composite Index (CII), Decentralizing the Infrastructure Sector, Spatial

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Preference Modelling to Distribute Resources, Place-based policies as well as Deep vs. Shallow intervention, establishing ministry of infrastructure by upgrading the infrastructure coordinating agency to coordinate infrastructure sectors in Ethiopia, and Establishing National Development Council). Moreover, development policy and strategy grounded on “leave no-one behind”, “pro-poor growth” or ‘shared prosperity’ principles need to be considered. But converting these equity principles into practice is very challenging due to a lack of a roadmap for converting the principles into a measurable target as the “leave no one behind” agenda can do for equity what the millennium development goals did for poverty reduction. Thus, to prepare a roadmap and promote equitable infrastructure development in Ethiopia, the government should assign qualified and well-skilled professionals in each infrastructure sector rather than assigning political assignees. Besides, there are two core processes to reduce infrastructure inequity a citizen or regional state could use to re-establish infrastructure equity: altering a citizen’s or regional states’ input or outcomes; and, developing explanations for the inequity to make it equitable, fixing perceptions of inputs and outcomes, altering the comparative other, or any other way that endeavors to frame the perception of the circumstances by ensuring both distributive justice (allocation of resources which is distributed across groups or regional states) and procedural justice (the fairness of the procedures which is considered as a separate social justice care).

D. Enhancing State-and Nation-Building Processes

Regarding state-and nation-building processes, democratic federalism including power-sharing or consociational democracy (citizen-oriented federalism) as well as proportional representation (as well as multicultural nationalism by promoting diversity and ethnic minority rights through ethnic acknowledgments) is a form of government structure that can address such concerns in a multinational country like Ethiopia. In other ways, the three central elements of successful nation-building process are, closely interlinked in most cases, a unifying and persuasive/integrative ideology (a system of thought and fundamental philosophies that explain the past, present and future according to certain value models), integration of society and a functional state apparatus. Hence, an indigenous state capacity, as well as state-nation policies (The seven nested-set of policies as well as constitution amendments), should be almost always a prerequisite for the successful state- and nation-building processes in Ethiopia. See Chap. 5, Sec. 5.3.2 about state-nation policies.

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Moreover, state-building is an activity that incorporates the disparate peoples, groups/regional states, and nations together which are the current situation of Ethiopia. It also governs the relation as well as makes the state embodies all these different groups institutionally and structurally. Above and beyond, building unity without weakening diversity through the carefully negotiated terms that are acceptable to all on national issues as well as territorial (or regional) demarcation which is traditionally linked to state-building processes, and governs the division of the country's internal territory into two or more territorial constituent units or regional states. This kind of issue requires inclusive growth policies that are expected to aim at the creation of a 'society for all'. Accordingly, inclusive growth is meant to focus on the poor, the marginalized, the disadvantaged communities, and those relatively living in backward regional states. Hence, place-based policies (PBP) that comprise infrastructure investments, special zones, dealing with lagging regions, and local growth policies as well as considering developmental state are also significant. One way of doing so would be to increase fiscal transfers from the center to these lagging states so that they can achieve the growth needed to attract investment. Such transfers should be connected to any sector-specific investment and policy initiatives already running in these states. Thus, it should be concerned with overall equity, not excluding any section of society or "leave no-one behind". It is, at the same time, achieving SDGs such as, for example, "Goal 8: Promote Sustained, Inclusive, and Sustainable Growth", including the link between infrastructure and sustainable environment. It is also decisive to consider, if the idea of a mutual future is to be carried forward, Ethiopian leaders and the led have to grasp every opportunity to take bold and crucial action to diminish inequality and inequity.

In relation to nation-building, as mentioned in Chap. 5, Elazar (1994, p.5) stated that "the air is full of promise", which the government must transform into "fulfillment". According to Elazar (1994), to reach that fulfillment the incumbent government of Ethiopia should address the following three issues- "people's minds, their cultures, and, their institutions" (Elazar, 1994, p. 5). It also stated that one of the most promising vehicles to addressing all three are the 'federal idea' which is also a 'treaty or an agreement' and the vehicles of nation-building process in multi-national/cultural/, religions, etc. countries like Ethiopia, and could build a cohesive state. In addition, three promises of federalism are enhancing democracy, good governance, and management of diversity. It is also important to use 'open method of coordination' and 'laboratory

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federalism’ to recommend new policy, innovation, and policy learning for Ethiopia (see Chap. 5, sec. 5.3.2).

Currently, there are a lot of reforms in Ethiopia. Thus, the focus should be on the necessity of the rule of law in infrastructure governance and equity for the real nation-building processes in the country. This should include accountable government, both individual rights and collective recognition as well as rights-based citizenship, and law enforcement and security. These three pillars are critical to securing legitimacy for governance and effective state-building. Meanwhile, the rule of law is a principle of governance anchored in participatory and consultative processes. It also anchors the link between society and state around an acknowledged set of political, social, and economic rules. In reality, Ethiopia is in a “fragile state” or “failing state or be at risk of “failure” as well as “a vulnerability of collapsing of the state” that the need for rule of law is most urgent, and its absence felt most strongly. This is because political stability, peace, security, and protecting human dignity is an overwhelming aspiration of all Ethiopians today. The answer to such a fragile state is strong leadership and enhancing political participation as well as engaging civil society. It is expected that an increased focus on subsidiarity and solidarity issues could be simplified by setting the Ethiopian integrated infrastructure policy in the context of the wider constitutional arrangements and cohesion policy.

Therefore, if a reform processes in the field of infrastructure access are to be accelerated with the decrease of regional inequity/disparity then the nation shall undoubtedly be able to achieve the stated publicly objective of “growth with justice”. In the future, efforts ought to be guided to build more infrastructure accesses at the state level, to increase the state domestic product and decrease the level of poverty, and ultimately to improve the standard of living of the people concerned. For this purpose, infrastructure development is nation-building by itself, but, when it is equitably distributed across regional states. Henceforward, nation-building processes in Ethiopia should have an effectively functioning state, rule of law, democratic accountability, shared national identity, and inclusive and sustainable growth including political change.

Finally, all issues are reflected, the data certifies a need for infrastructure equity centered on the programs in place, and the trend in infrastructure investment over time. In many cases, they appeared to be inequities which could be clarified in 3 ways: 1) balancing infrastructure investment

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with bi and multilateral projects; 2) intrinsic differences in infrastructure across regional states; and, 3) efficiency influences. Firstly, the federal government should balance by giving priorities with inter-regional equity. Secondly, certain types of regional infrastructure investments are related to intrinsic differences (exploring the intrinsic differences are of crucial significance for detailed analysis and helpful decision-making process) in infrastructure across regional states. Thirdly, although infrastructure equity matters, there are some types of infrastructure investments that need to be directed by efficiency values. This can be determined by the difference between a project which is planned to have an economic effect, or one considered to preserve the rights of Ethiopian citizens. For example, Industrial Parks are planned to have an economic impact by inspiring economic growth and generating tax revenue. Moreover, these kinds of infrastructure investments ought to be economically efficient and intended to provide maximum economic benefits.

Thus, a harmonized plan of action between policymakers and state governments is required to achieve this in the long term. It is also significant to consider the implementation of reforms that needs to make the difference between a “deep intervention” and a “shallow intervention”, as with privatization and anti-corruption struggles. It is good to implement deep intervention with privatization and anti-corruption intentions in the sector (see Chap. 2 sec. 2.1.3). The recommendations above deliver normative and conceptual frameworks that rationalize a reallocation of resources in the direction of more equitable arrangements of infrastructure delivery through proper understanding of the constitution (including amendements for asymmetric federalism- “ political and/or constitutional asymmetry” need to be built in some cases) and implementation of the federal system as a device by reconsidering federal arrangements such as “ethno-territorial, territorial autonomy/council, “federacy”, hybrid, or the “middle-way” that avoids the complications related to both, etc. for the nation-building process in Ethiopia. For example, States such as Canada, Spain, and India are hybrids that have some vital features of both “territorial” and “ethnic” federalism. Obviously, constitutional asymmetry leads complexity. Though, some federations have found that the only way to accommodate the unpredictable pressures for regional autonomy has been to include asymmetry.

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In the long run, it is vital to recall that the “federal system” is merely one amongst a complex collection of devices that deliver the institutional glue holding Ethiopia together as the “unitary system” alternative had already failed. It is also good to consider that the “endless minorities’ problem” is unavoidable or inevitable which needs “multinational federalism and democracies” and “genuine authonomy” (just like Beligum and India) as there are really more than 80 “internal nations” within the state in Ethiopia by introducing “asymmetrical federalism” accordingly. It is crucial to craft “democratic political institutions”, develop “shared national identity”, and strengthen “democratic nationalisms” of nations that could improve rather than aggravate ethnic separations. In the short run, the country has to build consensus at least on “non-secessionist regionalism” (rather than “secessionist tendencies”) including amending the constitution (1995) article 39 (like India except some regions-a fruitful federal nation today to benchmark) to save the country from fragmentation. Ethiopians have to establish their own “federal model” as the biggest advantages of federalism is its experimental nature including the rebuilding of civil society, encouraging civic cohesion and reinforcing democratic practices. In addition, an integrated new equitable public infrastructure and government action are needed to build the nation. These should be complemented by policies and strategies that allow access to equitable infrastructure distributions, equal employment opportunities, and financial inclusion which requires far-sighted and integrated government actions. Grounded upon these frameworks the following figure sketches out and indicates a model of the system in which the planning process could support the notion of infrastructure equity to shape the delivery of future infrastructures and to ensure state-and nation-building processes in Ethiopia. Out of these discussions above, the study’s recommendations are finally summarized in Fig. 10.2.

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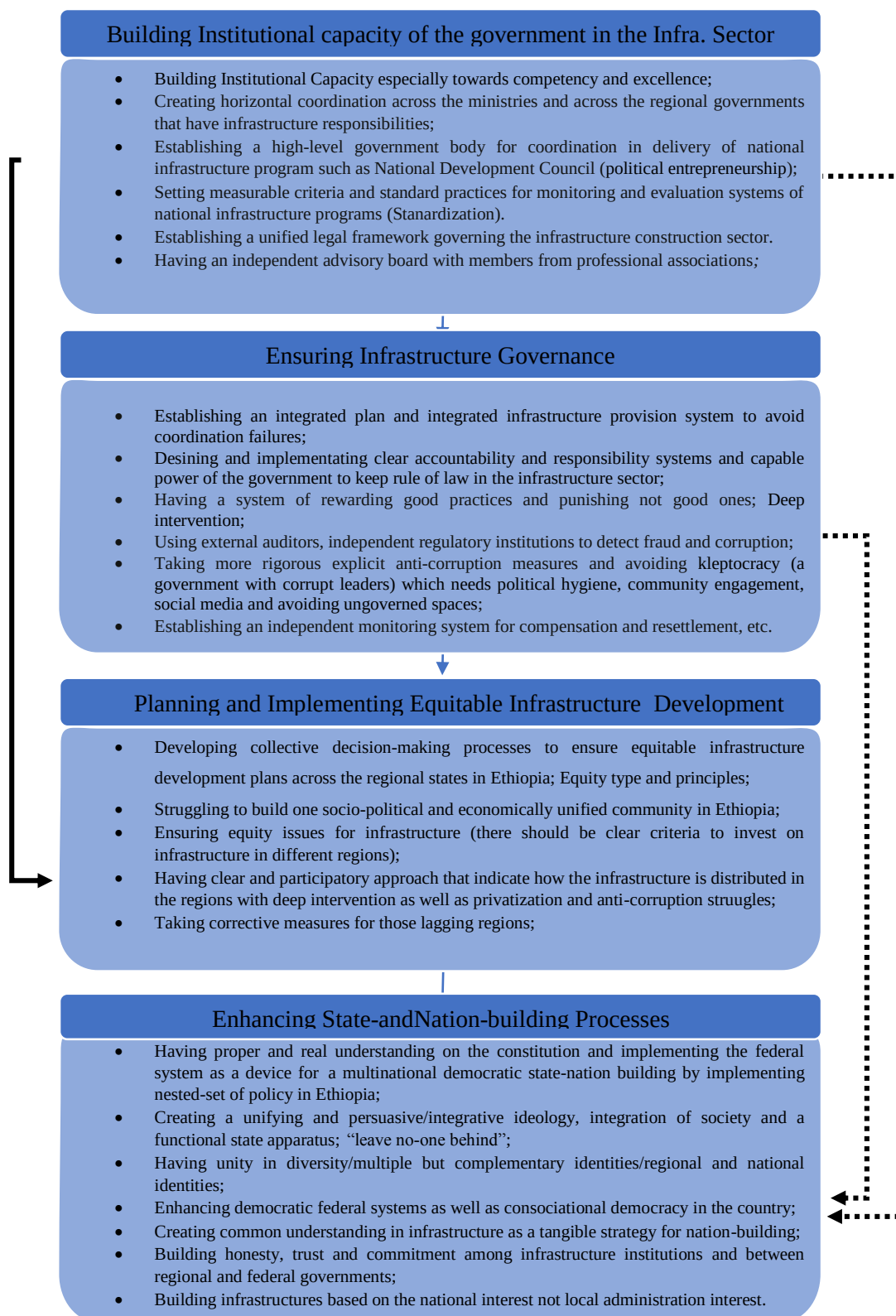


Figure 10. 2 Framework for developing capacities for the equitable allocation of public infrastructure investments and nation-building process in Ethiopia

10.3 Theoretical and Methodological Contributions

A. Theoretical Contributions

The literature on infrastructure equity in Ethiopia is very scarce. The findings of this study have suggested theories of coordination failure, equity, and infrastructure equity that will support equitable infrastructure access as a just, and a significant for nation-building processes using democratic federalism as a means. It also suggested that state capacities are crucial to support the equitable allocation of public infrastructure investments and the nation-building processes in Ethiopia. Meanwhile, the equitable allocation of public investments in infrastructure does not end at planning and decision-making of infrastructure investments (Huseman *et al*, 1987; Rubin, 2006). There are a number of policies and activities that can cause infrastructure equity interferences, including budgeting decisions, land acquisition, spatial development, and construction laws and policies. More importantly, the findings of this study suggest that the government should look more into policy initiatives (infrastructure policies that promote opportunity and inclusion) that would significantly improve the management of equitable infrastructure access as infrastructure is the skeletal support of communities and regional states. Moreover, this study has provided a good basis for generalizing the application of CII for ‘equity-based resource allocation for infrastructure and contributes to the debate of “people-centered” (E.g. Workers, Leadership, etc.) versus “place-based” (E.g. Infrastructure, Housing, etc.) development’ (Wismadi *et al*, 2015; Duranton & Venables, 2019). Thus, understanding of the linkages is critical for devising an effective framework for infrastructure deep interventions in Ethiopia, be it at national/federal/, regional states/zonal/, and local governments as well as at a community level. The important theoretical contributions of this study are illustrated in Figure 10.3 below.

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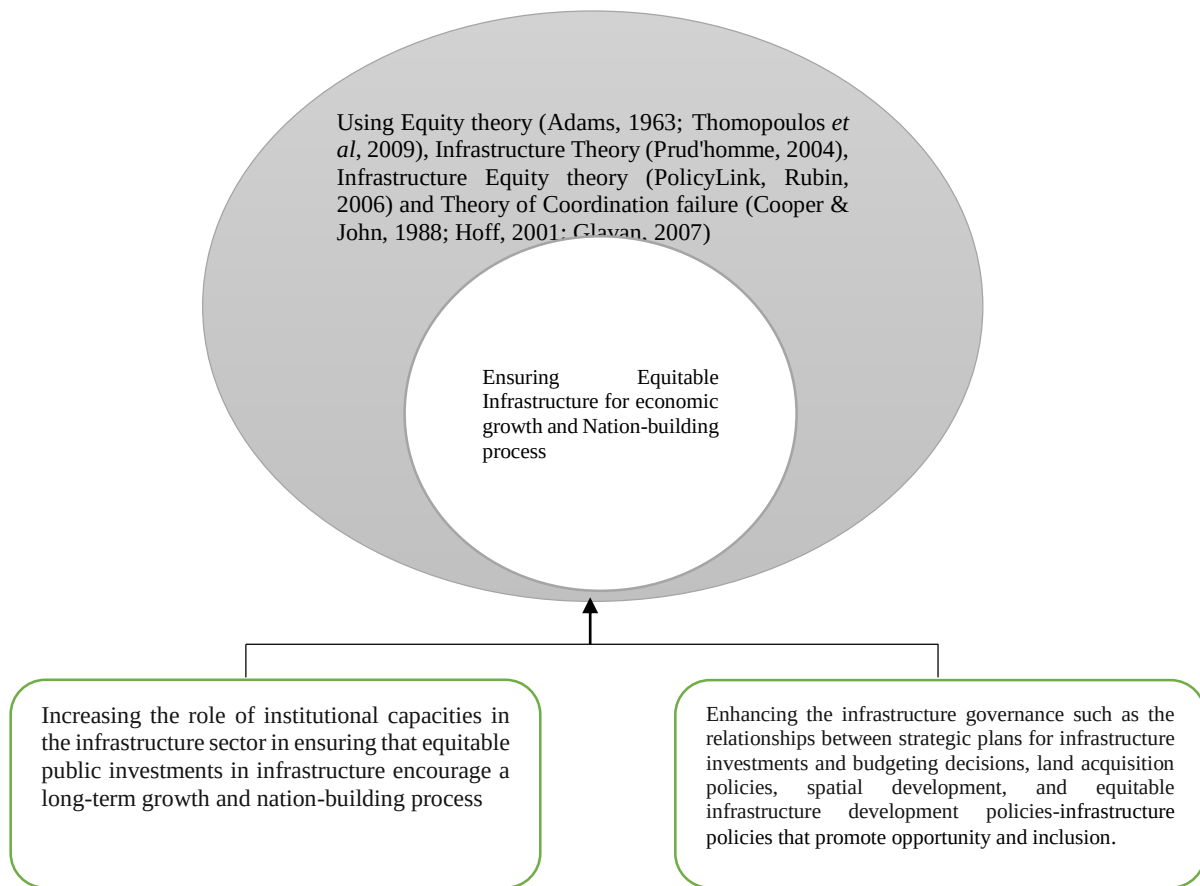


Figure 10. 3 Theoretical contributions of the study

Note: Adapted from Giang Dang • Low Sui Pheng (2015), Infrastructure Investments in Developing Economies: The Case of Vietnam

B. Methodological Contributions

The value in the study is in delivering some vital methodological improvement to the historically problematic question of how to assess infrastructure equity and other wider effects (Thomopoulos & Grant-Muller, 2013). Thus, this study mainly employed a quantitative approach to validate and confirm the proposed model with the empirical data obtained. This is because of the complexity of infrastructure equity in Ethiopia. A qualitative approach is also used to support and justify the unexpected findings obtained from the survey study. It is evident that most of the four construct variables and the 17 measurement indicator factors including 120 items employed in the study are valid and reliable. Therefore, the study has provided a model developed and tested which measures the qualitative issues in quantitative ways, and indicators/items as a measure of perception, attitude, and behavior in relation to the impacts of infrastructure equity on the nation-building

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processes in the context of developing countries (see Chap. 9 sec. 9.3). The study has also developed CII which can serve as an assessment tool for infrastructure (in) equity in Ethiopia (see Chap. 8 sec. 8.8). Therefore, the method has the know-how to deliver a quantified output to notify the decision-making process and strategic planning (Thomopoulos & Grant-Muller, 2013).

10.4 Policy Implications

The lack of horizontal coordination channels is found to be a major challenge for government authorities to coordinate policies in the infrastructure sector in Ethiopia. The findings of this study suggested that the government needs a more refined planning system that would bring interests together and solve coordination failures and infrastructure inequity. Thus, the government is suggested to take measures to strengthen institutional capacity links and sustaining a commitment to national and regional interests, including cooperative planning mechanisms at the federal and regional level, independent consultations, monitoring and evaluation systems of the federal and regional infrastructure programs, and a unified legal and equitable infrastructure development framework governing the infrastructure sector. Thus, infrastructure planning and delivery demand a higher level of coordination across sectors and government levels. This is because the traditional vertical models of planning can result in fragmented policy-making of sectoral ministries and local governments etc. ((Patra & Acharya, 2011; Chotia & Rao, 2015; Dang & Sui Pheng, 2015).

Moreover, one of the obvious implications of the research is that infrastructure governance such as transparency and accountability which are becoming increasingly significant for the equitable allocation of public investments in infrastructure. Thus, the government should consider changes at two main levels: the policies and laws that encourage greater equity, measures that improve information disclosure concerning decisions made by public authorities, and enforcement of rules; and organizational development (including allocation of responsibilities across government tiers to limit excessive bureaucracy, and systematic monitoring and evaluation) ((Patra & Acharya, 2011; Chotia & Rao, 2015; Dang & Sui Pheng, 2015). Henceforward, the government should give great attention to the success of Ethiopia in the infrastructure sector by combining high progress with equity.

Findings of the study suggested that there should be policy to address these needs at two main levels: institutional capacity (the respective roles of the ministry of urban development and

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construction, contractors, supervision consultants, designers and engineers; and their management, financial and technological capabilities); and HRD (training) (Chotia & Rao, 2015; Dang & Sui Pheng, 2015). In addition, one of the key factors affecting the equitable allocation of public investments in infrastructure in Ethiopia relates to land acquisition. The findings of the study also suggested that the current framework could not correspond to the considerable requirements for land acquisition and resettlement. Current compensation rates are highly distorted due to regulatory and procedural constraints, necessitating changes in land laws and policies. To sum up, the study has mapped out the general principles of significant institutional capacity building work which are useful for policy implications, including:

- Institutional capacity for leading and coordinating infrastructure development is the core of the equitable allocation of public investments in infrastructure;
- Infrastructure governance such as transparency and accountability are becoming increasingly significant for the equitable allocation of public investments in infrastructure;
- Ensuring adequate compensation is the key to solve the land acquisition issues in infrastructure development; and,
- Strengthening the building capacity of local contractors and consulting firms is also essential for achieving the equitable allocation of public investments in infrastructure.

Finally, the study's analysis indicated that relatively lagging states need infrastructure investment extensively in these areas, bearing in mind the scarcity of their resources, using place-based including deep intervention policies with privatization and anti-corruption measures. Thus, focused investment to expand Industry Parks, airports, universities, and improve road, telecommunication, and energy infrastructure will accelerate the overall growth prospects of the Ethiopian states, especially the lagging ones. The main objective of improving these major sectors is to help the lagging states emerge from poverty and participate more effectively in the socio-economic process. Only then can the country walk the ideal path of economic growth with the real nation-building processes.

10.5 Suggestions for Future Research

The study has considered the indicators of the road, telecommunication, and energy sectors including Industrial Parks, universities, and airports. Depending on feasibility and their importance in terms of the objective of the study, other sectors could also be included. This study has only focused on ex post evaluation. It is also vital to study the ex ante evaluation method, and

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recommend for future infrastructure allocation in Ethiopia. In other ways, the hypotheses of “lack of institutional capacity negatively affect the nation-building process” and “lack of infrastructure governance is negatively related to nation-building process” in Ethiopia are not directly supported the nation-building process in this study. In addition to this, the hypothesis of “infrastructure governance positively mediates the relationship between institutional capacity and nation-building process” is not supported as well. These all are good if they would be reconsidered in the future. Moreover, as far as infrastructure is concerned, there is a debate whether it has to be guided by ‘equity’ or ‘efficiency’, i.e. for instance, one may ask a relevant question as: “should we build a university on one of the emerging regional states in the low land of Ethiopia or research and training centers on livestock to increase the production of abundant resources in the region? What is the orientation of the society at large and, particularly the political elite in Ethiopia?” If one opts for the first, the respondents are guided by equity. Whereas, efficiency consideration leaves them to opt the second. However, it is better off if the study had collected the perception of the respondents selected for this study in detail. Moreover, there are also debates about the distribution of infrastructure that says they should not be measured by fairness rather by their economic utility. Currently, if someone asks the question that what is the orientation of the society at large and, particularly the political elite in Ethiopia? Is it equity sensitive and/or efficiency-oriented? Thus, there are no one-size-fits-all answers to balancing efficiency and equity arguments. In this study, it is equity sensitive. But, it also needs further research.

Moreover, the issue of system, “automation and digitization” for the institution, governance, and management of the infrastructure equity also need further research. There are also concerns from the interviewees that ethnic-based federal structure in general and the ethnic-based structure of the incumbent government, make it difficult to ensure equity of infrastructure and economic growth as officials try to benefit the ethnic group they came from. Generally, it is crucial to study the current situation of Ethiopia by considering “three state-nation indicators of country pride, institutional trust, and democratic support” (Stefan *et al*, 2011, p. 82). This also needs further investigation.

Meanwhile, future research can also examine the effects of regional coordination (especially in East Africa as well as the new geopolitics of the Red Sea region which is currently scrambled by

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different international groups (like USA, French, China, UAE, Etc.), and the Abay/Blue Nile and the Port issues) of cross border infrastructure policies on the equitable allocation of public investments in infrastructure and nation-building process in Ethiopia. Whether regional coordination of infrastructure policies help improve the equity of infrastructure access, and what are the difficulties the country may face in regional coordination of infrastructure policies need to be studied.

To conclude, the study has some contributions to knowledge which is about equitable infrastructure for economic growth and the nation-building processes including empirically tested conceptual model and CII in Ethiopia. However, there remains a potential scope for future research. This is because this study focused on common issues that can be found across infrastructure sectors. A better understanding of the most persistent obstacles encountered by each sector would be helpful to identify sector-specific areas that need urgent actions. Measures and tools would then be better targeted to sectoral priorities. Therefore, this study can be extended to include sector-specific analyses for different infrastructure sectors. Future research can examine the equity of public investments in the infrastructure of each sector, and uncover the specific factors that determine the sectoral equity. A review across infrastructure sectors is required to further explain the performance of each sector and to formulate sectoral strategies (Dang & Sui Pheng, 2015). In addition to this, the analysis is limited to studying equity across regions and does not consider infrastructure equity within regions-although this issue is almost indeed significant. Therefore, Ethiopia needs a greater statistical capacity to monitor progress in all sectors, manage risks, and evaluate the impact of policy reforms in the sector (WBG, 2017). All this needs further investigation.

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ANNEXES

Annex 1: Sample Size Determination

I. For the case of federal government offices:

$$s = \frac{Z_{\alpha/2}^2 NP(1-P)}{d^2(N-1) + Z_{\alpha/2}^2 P(1-P)}$$

Where:

s= required sample size

$Z_{0.05/2}^2$ = the table value of normal distribution with a 95% C.I (1.96)

N= the population size which is 1424.

P= the population proportion (assumed to be .50)

d= the degree of accuracy expressed as a proportion (.05)

Which is

$$s = \frac{(1.96)^2 * 1,424 * 0.5 * (1-0.5)}{(0.05)^2 (1,424-1) + (1.96)^2 * 0.5 * (1-0.5)} = \frac{1,367.6096}{4.5179} = 303$$

Therefore, from the federal government offices 303 representatives were selected. Then by proportion, the sample size allocation technique which was formulated by William stratified formula (1977:75) was used to identify the representative samples from each federal institutions.

II. Regional government offices:

a) Oromia Region

Only the value N will change

N= the population size which is 324

So,

$$s = \frac{(1.96)^2 * 324 * 0.5 * (1-0.5)}{(0.05)^2 (324-1) + (1.96)^2 * 0.5 * (1-0.5)} = \frac{311.1696}{1.7679} = 176$$

With the same samples allocate technique:

$$P_n = \frac{n}{N} * N_0$$

Where

P_n = Proportional allocation to size within each institutions (n=1, 2, 3...6)

N_0 =number of employees in each institutions

N = Total number of employees in the 6 selected institutions (324)

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n = The sampled employees will be selected from 6 institutions (176)

Therefore, from the Oromia regional government offices 176 representatives were selected. Then by proportion a sample size allocation technique which was formulated by William stratified formula (1977:75) was used to identify the representative samples from each regional government institutions.

b) Amhara Region

Only the value N will change

N= the population size which is 270

So,

$$s = \frac{(1.96)^2 * 270 * 0.5 * (1 - 0.5)}{(0.05)^2 (270 - 1) + (1.96)^2 * 0.5 * (1 - 0.5)} = \frac{259.308}{1.6329} = 159$$

With the same samples allocate technique:

$$P_n = \frac{n}{N} * N_0$$

Where

P_n = Proportional allocation to size within each institutions (n=1, 2, 3...6)

N_0 =number of employees in each institutions

N = Total number of employees in the 6 selected institutions (270)

n = The sampled employees will be selected from 6 institutions (159)

Therefore, from the Amhara regional government offices 159 representatives were selected. Then by proportion a sample size allocation technique which was formulated by William stratified formula (1977:75) was used to identify the representative samples from each regional government institutions.

c) Tigray Region

Only the value N will change

N= the population size which is 167

So,

$$s = \frac{(1.96)^2 * 167 * 0.5 * (1 - 0.5)}{(0.05)^2 (167 - 1) + (1.96)^2 * 0.5 * (1 - 0.5)} = \frac{160.3868}{1.3754} = 117$$

With the same samples allocate technique:

$$P_n = \frac{n}{N} * N_0$$

Where

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P_n = Proportional allocation to size within each institutions (n=1, 2, 3...6)

N_0 =number of employees in each institutions

N = Total number of employees in the 6 selected institutions (167)

n = The sampled employees will be selected from 6 institutions (117)

Therefore, from the Amhara regional government offices 117 representatives were selected. Then by proportion a sample size allocation technique which was formulated by William stratified formula (1977:75) were used to identify the representative samples from each regional government institutions.

d) Benshangul/Gumuz

Only the value N will change

N= the population size which is 116

So,

$$s = \frac{(1.96)^2 * 116 * 0.5 * (1 - 0.5)}{(0.05)^2 (116 - 1) + (1.96)^2 * 0.5 * (1 - 0.5)} = \frac{111.4064}{1.2479} = 89$$

With the same samples allocate technique:

$$P_n = \frac{n}{N} * N_0$$

Where

P_n = Proportional allocation to size within each institutions (n=1, 2, 3...6)

N_0 =number of employees in each institutions

N = Total number of employees in the 6 selected institutions (116)

n = The sampled employees will be selected from 6 institutions (89)

Therefore, from the regional government offices 89 representatives were selected. Then by proportion a sample size allocation technique which was formulated by William stratified formula (1977:75) was used to identify the representative samples from each regional government institutions.

III. Civil society, bilateral and multilateral offices

In here also only the value N will change

N= the population size which is 387

So,

$$s = \frac{(1.96)^2 * 387 * 0.5 * (1 - 0.5)}{(0.05)^2 (387 - 1) + (1.96)^2 * 0.5 * (1 - 0.5)} = \frac{371.6748}{1.9254} = 193$$

Therefore, from the civil society, bilateral and multilateral offices 193 representatives were selected. Then by proportion a sample size allocation technique which was formulated by William stratified formula (1977:75) was used to identify the representative samples from each civil society, bilateral and multilateral insti

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SURVEY INSTRUMENT

Part I: Institutional Capacity in the infrastructure sector in Ethiopia

Please indicate your answers by circling the number that represents your opinion or perception regarding each of the statements which are shown below and relate to **institutional capacity in Ethiopian** infrastructure sector. In your response, please circle “1” if you Strongly Disagree, “2” if you Disagree, “3” if you are Undecided, “4” if you Agree and “5” if you Strongly Agree.

Human Resource Management	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
The manpower working in the infrastructure sector has relevant education to accomplish their jobs.	1	2	3	4	5
The manpower employed in the infrastructure sector is well trained and skilled, able to accomplish its job successfully.	1	2	3	4	5
Employees working in the infrastructure sector have sufficient years of work experience allowing them to accomplish their job successfully.	1	2	3	4	5
Employees working in the infrastructure sector have low level of performance, expressed in terms of productivity and effectiveness.	1	2	3	4	5
There are sufficient numbers of human resources working in the infrastructure sector.	1	2	3	4	5
In the infrastructure sector, the rate of employee's turnover is high.	1	2	3	4	5
In the infrastructure sector, human resource management policy (selection, training and development, performance appraisal, compensation, promotion, incentives, work design, participation, involvement, communication) is not effectively implemented.	1	2	3	4	5
In the infrastructure sector, human resource management outcomes (competence, cooperation, motivation, commitment, satisfaction, retention, and presence) are below the desired level.	1	2	3	4	5
Organizational Structure					
Organizational structures in infrastructure sectors are not well designed in order to achieve their goals	1	2	3	4	5
In infrastructure sectors, the existing organizational structures are frequently changed but not able to accommodate the current overall changes.	1	2	3	4	5
The current organizational structures are not suitable to attract dynamic human powers in infrastructure sub-sectors.	1	2	3	4	5
The current organizational structures in infrastructure sector are not suitable to collect feedback from citizens.	1	2	3	4	5
Existing organizational structures in infrastructure sectors are not addressing stakeholders' need.	1	2	3	4	5

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Existing organizational structures are poor in managing overall resources needed in the infrastructure sectors.	1	2	3	4	5
Organizational Systems & Frameworks					
There is lack of a comprehensive infrastructure performance measurement system for institutions operating in the infrastructure sector.	1	2	3	4	5
Existing rules and regulations in infrastructure sector are not suitable to collect feedbacks from citizens and stakeholders.	1	2	3	4	5
In the infrastructure sector, existing methods, procedures and general systems/frameworks are not fully implemented and respected by responsible bodies.	1	2	3	4	5
The current infrastructure systems/ frameworks are not efficient to handle the overall resources allocated for the infrastructure sector.	1	2	3	4	5
The current administrative systems in the infrastructure sectors are inadequate to gather and utilize up-to-date data.	1	2	3	4	5
There are inherent problems in predicting the future in infrastructure development.	1	2	3	4	5
In Ethiopia, there is complicated and bureaucratic infrastructure administrative system.	1	2	3	4	5
There is lack of coordination between infrastructure construction and environment conservation.	1	2	3	4	5
There is inadequate monitoring and evaluation system in the infrastructure sectors to undertake effective controlling on the infrastructure projects.	1	2	3	4	5
There is a lack of integrated infrastructure data management system for efficient utilization of infrastructure and its maintenance.	1	2	3	4	5
Infrastructure Fund					
In Ethiopia, infrastructure projects are poorly selected.	1	2	3	4	5
In Ethiopia, infrastructure projects are poorly executed (i.e. over budgeting, delays, corruption, etc.).	1	2	3	4	5
In Ethiopia, there is inadequate fund allocated to the infrastructure sector.	1	2	3	4	5

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In the infrastructure sector, existing funding/financing modalities are not diversified (External source, both local and federal tax, PPP, etc.).	1	2	3	4	5
There is wastage of national resources in government funded mega infrastructure projects (e.g. Toll roads, Electric power generating, etc.).	1	2	3	4	5
In the infrastructure sector, existing infrastructure funds are not properly utilized.	1	2	3	4	5
The failure to complete a project as per its schedule is a result of fund shortage in the infrastructure sector.	1	2	3	4	5
The main challenge in the infrastructure sector is not the lack of fund, but fund management (i.e. managing the allocated fund properly).	1	2	3	4	5

Part II: Infrastructure governance in Ethiopia

Please indicate your answers by circling the number that represents your opinion or perception regarding each of the statements which are shown below and relate to **Infrastructure Governance in Ethiopia**. In your response, please circle “1” if you Strongly Disagree, “2” if you Disagree, “3” if you are Undecided, “4” if you Agree and “5” if you Strongly Agree.

Intergovernmental/Stakeholders Collaboration and Coordination	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
There are no adequate trust building measures carried-out among federal government and regional states with respect to infrastructure development in the county.	1	2	3	4	5
There are no adequate trust building measures undertaken among institutions operating in the infrastructure sector.	1	2	3	4	5
There is low level of knowledge transfer and experience sharing performed among regional states and federal government with respect to infrastructure development in the country.	1	2	3	4	5
There is lack of knowledge transfer and experience sharing among federal infrastructure development institutions in the infrastructure sector.	1	2	3	4	5
There is lack of inter-ministerial and intersectoral coordination for infrastructure development.	1	2	3	4	5
There is a weak communication and interaction between political leaders and non-governmental and bilateral/multilateral actors (such as World Bank, UNDP, etc.) engaged in infrastructure projects design and implementation.	1	2	3	4	5

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All the concerned bodies (client, contractors, consultant and beneficiaries) are not adequately integrated and aligned to design, implement, monitor and evaluate infrastructure projects.	1	2	3	4	5
Decision-making Process					
Decision-making processes at institutional level on infrastructure development (human, financial and material resources) are unfair.	1	2	3	4	5
Decision making processes in the infrastructure sector are not supplemented by up-to-date and sufficient information.	1	2	3	4	5
Decision making processes on both new and delayed infrastructure projects are slow.	1	2	3	4	5
Infrastructure decision-making processes are not transparent and participatory, in that they do not allow concerned individuals to contribute to the planning and policymaking	1	2	3	4	5
Core decisions made by government agencies aimed at achieving social policies are not strictly following the rules and regulations.	1	2	3	4	5
Land Acquisition Framework/Right-of way					
Land acquisition for infrastructure development, and compensation payment for land holders are not comparable/the same across regions in the country.	1	2	3	4	5
Existing land acquisition and right of way cleaning frameworks are not effective in securing well developed land for infrastructure development.	1	2	3	4	5
In the infrastructure sector, there is ineffective bureaucracy in settling land acquisition disputes and claims.	1	2	3	4	5
In the infrastructure sector, there is lack of effective land acquisition compensation monitoring system.	1	2	3	4	5
In the infrastructure sector, there is lack of clarity about the valuation methods used for compensation.	1	2	3	4	5
There is lack of law enforcement to properly regulate the price of property on land acquired for infrastructure projects.	1	2	3	4	5
Political Commitment					
There is weak political willingness on the part of top leadership and high-level decision makers in infrastructure governance.	1	2	3	4	5

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There is no highly-empowered government institution that provides direction for implementing national infrastructure plans.	1	2	3	4	5
Political leaders and government bureaucrats have shown low level of political will for the effective implementation of national goals related to the infrastructure sector.	1	2	3	4	5
There are different interest group pressures that affect infrastructure governance.	1	2	3	4	5
There is low level of dialogue among top political leaders to bring consensus in infrastructure development across the country.	1	2	3	4	5
There is weak level of political and professional commitments to avail funds and implement these funds in a proper manner.	1	2	3	4	5
Decentralization is not properly implemented in the infrastructure sector.	1	2	3	4	5

Part III: Infrastructure Equity in Ethiopia

Please indicate your answer by circling the number that represents your opinion or perception regarding each of the statements which are shown below and relate to **Infrastructure Equity in Ethiopia**. In your response, please circle “1” if you Strongly Disagree, “2” if you Disagree, “3” if you are Undecided, “4” if you Agree and “5” if you Strongly Agree.

Equal Opportunity in Infrastructure	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
In Ethiopia, citizens across all regions do not generally get equal opportunities in infrastructure access.	1	2	3	4	5
In Ethiopia, the existence of unequal opportunity in access to infrastructure utilities is not yet addressed.	1	2	3	4	5
The numbers of people who have resentment on unfair infrastructure development have increased over time.	1	2	3	4	5
There is lack of equal opportunity for emerging regions (Afar, BenshangulGumuz Gambela & Somali) in infrastructure sector.	1	2	3	4	5
There is no adequate special compensation mechanism for inequality in infrastructure development.	1	2	3	4	5
There is low level of accountability effort shown in infrastructure development across the Ethiopian regions.	1	2	3	4	5
Social /Distributive Justice					
There is no fair access to labour (working in infrastructure sector) in the country.	1	2	3	4	5
There is no equitable distribution of educational infrastructure (e.g. University) in Ethiopia.	1	2	3	4	5

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There is no fair distribution of health infrastructure (e.g. Hospital, Health station) in the country.	1	2	3	4	5
There exists social exclusion (e.g. of people with disabilities) in the infrastructure sector in the country.	1	2	3	4	5
There exists low level of social cohesion (i.e. the willingness of members of the society to cooperate with each other in order to prosper) in Ethiopia.	1	2	3	4	5
There is no fair distribution of infrastructure development (e.g. Mega projects, Airport, Industry park, etc.) in Ethiopia.	1	2	3	4	5
Considering their potential, members of the society in all age groups are not equally engaged in the country's social activities.	1	2	3	4	5
In Ethiopia, there is lack of intergenerational justice, in that members of the current generations are living at the expense of future generations.	1	2	3	4	5
National and Regional Infrastructure competitiveness					
In Ethiopia, there is low level of access to infrastructure (road, electric and telecom) across the regions.	1	2	3	4	5
There exists low road density or connectivity in your region or the country.	1	2	3	4	5
There is low level of quality roads which in turn affect regional/ national competitiveness.	1	2	3	4	5
There is low electrification rate, in terms of percentage of the population having access to electricity, in your region or in the country.	1	2	3	4	5
There is low electric quality or a high electric power transmission and distribution losses, in terms of percentage of the output, in the country.	1	2	3	4	5
There are medium mobile-cellular telephone subscriptions per 100 population in the country.	1	2	3	4	5
In Ethiopia, there are low fixed-broadband internet subscriptions per 100 population.	1	2	3	4	5
There are low internet users, in terms of percentage of the population, in the country.	1	2	3	4	5
Spatial Intervention/Planning					
There is a problem in ensuring infrastructural links and mobility to enhance competitiveness across Ethiopian regions.	1	2	3	4	5

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There is lack of consultation with the interested or affected individuals or groups on forecasting methods, criteria of project selection, and the determination of planning objectives in the infrastructure sector.	1	2	3	4	5
There is difficulty in ensuring the provision of public services and infrastructures for basic needs to guarantee equivalent living conditions across the region in the country.	1	2	3	4	5
There is lack of preparing integrated spatial planning policy to a national coordination framework of infrastructure to ensure the provision of public services and to strengthen economic capacity of the regions	1	2	3	4	5
There is lack of restructuring and implementing alternative solutions from spatial planning pilot projects and others in an exemplary manner in the country.	1	2	3	4	5
There is low level of efforts to mediate and settle conflicts arising in the course of federal, state and regional planning procedures with the participation of local governments.	1	2	3	4	5
Local government and citizens have center-periphery competition issues in spatial planning	1	2	3	4	5
There is no adequate consideration made to competing interests arising between public and private actors in using open spaces, e.g. cultural landscapes.	1	2	3	4	5
Citizen /Stakeholder /Public satisfaction					
In the infrastructure sector, there is low level of willingness to help customers and provide prompt service (responsiveness).	1	2	3	4	5
In the infrastructure sector, there is low level of capacity to provide the promised service dependably and accurately.	1	2	3	4	5
There is lack of knowledge and courtesy of leadership and employees, and their ability to inspire trust and confidence (assurance) in the infrastructure sector.	1	2	3	4	5
There is lack of attention to their individual customers for the service the firm provides (empathy) in the infrastructure sector.	1	2	3	4	5
In the infrastructure sector, there is a challenge in achieving organizational goals.	1	2	3	4	5
There is inadequate social responsibility service in the infrastructure sector.	1	2	3	4	5

Part IV: Nation-Building Process in Ethiopia

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Please indicate your answer by circling the number that represents your opinion or perception regarding each of the statements which are shown below and relate to **Nation-Building Process in Ethiopia**. In your response, please circle “1” if you Strongly Disagree, “2” if you Disagree, “3” if you are Undecided, “4” if you Agree and “5” if you Strongly Agree.

Rule of law	Strongly Disagree	Disagree	Undecided	Agree	Strongly agree
In the infrastructure sector, government powers are effectively limited by independent auditing and review.	1	2	3	4	5
In the infrastructure sector, officials from the executive branch do not use public resources for private gain.	1	2	3	4	5
In the infrastructure sector, government officials are sanctioned for misconduct.	1	2	3	4	5
In the infrastructure sector, there is lack of equal treatment in compliant handling.	1	2	3	4	5
There is limited availability of publicized laws and public data related to infrastructure sector.	1	2	3	4	5
In the infrastructure sector, government regulations are not effectively enforced.	1	2	3	4	5
In the infrastructure sector, there is weak contract administration.	1	2	3	4	5
There is lack of good governance due to incompetent leadership for better infrastructure equity.	1	2	3	4	5
Democratic/Public accountability					
There is no adequate consultation made with interested or affected individuals/groups about forecasting methods, criteria of project selection and the determination of planning objectives.	1	2	3	4	5
There is low level of independent peer review & quality checks done on infrastructure forecasts and planning outcomes by independent review bodies, scientific and professional community.	1	2	3	4	5
There is lack of punishment systems to enforce penalties on those that deliberately and consistently produce misleading forecasts in the infrastructure sector.	1	2	3	4	5
In the infrastructure sector, the government and its officials and agents as well as individuals and private entities are not accountable under the law in the infrastructure sector.	1	2	3	4	5
There is low level of effective social accountability mechanisms such as participatory budgeting and public expenditure tracking systems in public infrastructure policy decisions.	1	2	3	4	5
Shared-rule (horizontal cooperation) and self-rule (regional autonomy) is not properly implemented in the country.	1	2	3	4	5

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There is no adequate information provided to the public in regard to the budget allocation formula applied in the infrastructure sector.	1	2	3	4	5
Shared national identity					
Our common history helps us to form shared – national identity.	1	2	3	4	5
Increased consciousness about national history is an important determinant of national identity.	1	2	3	4	5
National values (peace, security, justice, democracy, flag, music, etc.) are the determinants of national identity.	1	2	3	4	5
National identity is formed by the relationship existing among citizens.	1	2	3	4	5
Customs and traditions are major determinants of national identity.	1	2	3	4	5
Language is the most important element that unites society.	1	2	3	4	5
Inclusive Growth					
There is no adequate participation and contribution made by all members of society, with particular emphasis to the poor and disadvantaged, in growth.	1	2	3	4	5
There is inequality in non-income dimensions well-being (including access to infrastructure, social integration, etc.) which are particularly important for promoting economic opportunities.	1	2	3	4	5
There is a challenge in ensuring high quality infrastructure development through good and inclusive design, and the efficient use of resources.	1	2	3	4	5
There is low level of ability or willingness to create inclusive and livable communities (benefiting people of all ages) in the mega infrastructure projects.	1	2	3	4	5
There is low level of initiation or performance in promoting the human capacities of, especially, the poor people so that they are able to contribute/ benefit from economic growth.	1	2	3	4	5
There is lack of competent leadership for realizing higher productivity of society and sustained growth.	1	2	3	4	5

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6. Please indicate any other related issues (other than those mentioned above) that could inhibit the institutional capacity, infrastructure governance, infrastructure equity and nation-building process in Ethiopia. Please, kindly write your valuable comment and suggestions or feelings (either in English or Amharic) in the box found below.

Thank you very much for completing this questionnaire thoroughly and patiently. I am very confident that your valuable inputs will have greater importance in addressing issues related to infrastructure equity in Ethiopia and, hence, contributing towards the country's economic growth.

Once again, thank you very much!!

The Researcher

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Annex 3: The Composite Infrastructure Index in Ethiopia

The researcher used all indicators pertaining to the road, electric, telecommunication sectors and other infrastructures in order to construct a CII. Before constructing the index, all the indicators had to be normalized before the PCA was applied to decide the factor loadings and their respective weights (Based on (Patra and Acharya, 2011; Chotia and Rao, 2015; Oswald *et al*, 2011).

For normalization, the following formula was employed:

$$NV_{ij} = 1 - \frac{(BestX_i - ObservedX_{ij})}{(BestX_i - WorstX_i)}$$

Where:

NV_{ij} = Normalized value corresponding to the X^{th} indicator, where i = corresponding state and j = corresponding indicator;

Best X_i = Best/Maximum value of X^{th} indicator, where I = number corresponding to the state (in this case values of 9 regions and 1 administrative citiy under the X^{th} indicator will become the i series);

Observed X_{ij} = Observed/current value of X^{th} indicator where i = corresponding state and j = corresponding indicator; and Worst X_i = Worst/Lowest value of X^{th} indicator.

1. Road Sector

- Road (per 1000 sq.km of area): An indicator which tells about the level of development of road transport through road length per 1000 sq. km area across the 9 regions and 1 administrative city of Ethiopia.
- Roads Density with population ratio (per 1000 sq.km of area with 1000 pop): An indicator which indicated that level of development of road transport through road length per 1000 sq. km area and per 1000 pop across the Ethiopian states;

Regarding road sector, road density per 1,000 population distribution of the regions with normalized or standardized values and the road desity per 1,000 sq. km distribution of the indicated regions with normal values were recorded in Table below.

As an example the first standardized distribution value was calculated as:

$$NV_{11} = 1 - \frac{(1.41 - 1.06)}{(1.41 - 0.11)} = 1 - \frac{0.35}{1.3} = 0.7308$$

Table 1: Road Network by Region in km

Region	Density per 1000 popn.	Normalized value	Density per 1000 sq. km	Normalized value
Afar	1.06	0.7308	26.5	0.1262
Amhara	0.30	0.1462	36.6	0.1936
Benishangul	0.70	0.4538	14.9	0.0487
Diredawa	0.11	0.0000	34.0	0.1762
Gambella	1.41	1.0000	24.3	0.1115
Harari	0.22	0.0846	157.4	1.0000
Oromia	0.25	0.1077	25.3	0.1182
Somali	0.46	0.2692	7.6	0.0000
South	0.24	0.1000	41.5	0.2263

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Tigray	0.49	0.2923	32.4	0.1656
Grand Total	0.31		23.4	

Source: Based on Ethiopian Road Authority data, researcher's calculation, 2019

From the normalized value calculated in the above table, the variance covariance matrix, eigenvalue and factor loadings was calculated with STATA software and put in the below manner.

Variance covariance matrix of road network:

```
. factor RoadDensity1000000pop RoadDensity1000000SqKm,pcf
(obs=10)

Factor analysis/correlation
Method: principal-component factors
Rotation: (unrotated)

Number of obs   =      10
Retained factors =       1
Number of params =       1
```

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.32550	0.65100	0.6627	0.6627
Factor2	0.67450	.	0.3373	1.0000

```
LR test: independent vs. saturated:  chi2(1)  =      0.95 Prob>chi2 = 0.3292

Factor loadings (pattern matrix) and unique variances
```

Variable	Factor1	Uniqueness
RoadDensit~p	-0.8141	0.3373
RoadDensit~m	0.8141	0.3373

2, Electric

- **Number of MW per 1,000,000 populations:** This indicator tells us about the amount of electricity in MW to 1,000,000 populations per a given state.
- **Number of sub-station per 1,000,000:** This tells about the number of sub-stations established in each region electrification provision per 1,000,000 population.

As illustrated below, the number of MW per 1,000,000 population electric distribution of the regions with normalized or standardized distributions and the number of sub stations per 1,000,000 population electric distributions with a normal values was calculated and recorded.

For the sample the first standardized value was calculated as:

$$NV_{ij} = 1 - \frac{(BestX_i - ObservedX_{ij})}{(BestX_i - WorstX_i)}$$

$$NV_{11} = 1 - \frac{(266.09 - 34.22)}{(266.09 - 10.78)} = 1 - \frac{231.87}{255.31} = 0.0918$$

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Table 2: Electric Network by Region in MW and Substation

No	Region	Number of MW per 1,000,000 pop.	Normality	Number of sub-station per 1,000,000 population	Normality
1	Afar	34.22	0.0918	2.20	0.1175
2	Amhara	20.53	0.0382	1.28	0.0362
3	Benishangul	29.08	0.0717	1.88	0.0892
4	Dire Dawa	266.09	1.0000	6.44	0.4920
5	Gambela	71.10	0.2363	6.88	0.5309
6	Harari	12.60	0.0071	12.19	1.0000
7	Oromia	17.48	0.0262	1.83	0.0848
8	SNNP	16.17	0.0211	0.89	0.0018
9	Somali	10.78	0.0000	0.87	0.0000
10	Tigray	35.45	0.0966	2.48	0.1422
Country Level		32.95			

Source: Based on EEP Data, researcher's calculation, 2019

According to the normalized values of the actual data shown on the above table, the variance covariance matrix, eigenvalue and factor loadings were calculated and recorded below.

Variance covariance matrix of electric distribution:

```
. factor NoofMW1000000pop Noofsubstation1000000pop ,pcf
(obs=10)
```

```
Factor analysis/correlation                                Number of obs    =      10
Method: principal-component factors                        Retained factors =       1
Rotation: (unrotated)                                    Number of params =       1
```

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.29574	0.59147	0.6479	0.6479
Factor2	0.70426	.	0.3521	1.0000

```
LR test: independent vs. saturated:  chi2(1)  =      0.78 Prob>chi2 = 0.3778
```

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Uniqueness
NoofMW1000~p	0.8049	0.3521
Noofsubsta~p	0.8049	0.3521

3. Telecommunication Network

- **Telecom density per 100 populations:** This indicates the percentage telecom density within the regions.
- **Mobil networking capacity:** This tells about the total numbers of 2G and 3G mobile networking distribution capacity of the Telecom Authority per the indicated regions.
- **Fixed and data line service network capacity:** This is the total fixed line voice call and data service networking distribution capacity of the Authority per regions.

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Regarding the telecommunication distribution, the telecom density per 100 population of the regional distribution with normalized or standardized result, mobile networking capacity regional distribution with a normal equivalent and the fixed line voice and data service network distribution with a normal equivalent value.

The formula and the sample how standardized the distribution is indicated as follow:

$$NV_{ij} = 1 - \frac{(BestX_i - ObservedX_{ij})}{(BestX_i - WorstX_i)} \quad NV_{11} = 1 - \frac{(206 - 206)}{(206 - 53)} = 1 - \frac{0}{153} = 1.0000$$

Table 3: Telecommunication Network distribution by Region

No	Region	Telecom density per 100 population	Normality	Mobile networking capacity	Normality	Fixed line voice and data service network	Normality
1	Afar	206	1.0000	1,209,259	0.0426	18,312	0.0265
2	Amhara	66	0.0849	14,609,996	0.7381	283,241	0.6937
3	Benishangul	64	0.0719	623,844	0.0123	9,508	0.0043
4	Dire Dawa	69	0.1046	761,232	0.0194	40,320	0.0819
5	Gambela	187	0.8758	387,732	0.0000	7,796	0.0000
6	Harari	87	0.2222	340,039	-0.0002	29,904	0.0557
7	Oromia	188	0.8824	19,655,939	1.0000	404,861	1.0000
8	SNNP	56	0.0196	10,305,650	0.8147	170,568	0.4099
9	Somali	53	0.0000	3,170,699	0.1444	38,638	0.0777
10	Tigray	96	0.2810	4,962,429	0.2374	125,270	0.2959
Country Level		67		65,559,993		1,961,598	

Source: Based on Telecommunication data, researcher's Calculation, 2019

After normalize the actual value of the data set and make them normalized, based on that data the variance covariance matrix,

eigenvalue and factor loadings were calculated. The below table illustrated the matrix.

Variance covariance matrix of Telecommunication Network:

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```
. factor Telecomdensity100pop Mobilenetworkingcapacity Fixedvoicedataservice ,
> pcf
(obs=10)
```

```
Factor analysis/correlation
Method: principal-component factors
Rotation: (unrotated)
Number of obs = 10
Retained factors = 1
Number of params = 3
```

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.94751	0.94879	0.6492	0.6492
Factor2	0.99872	0.94496	0.3329	0.9821
Factor3	0.05376	.	0.0179	1.0000

```
LR test: independent vs. saturated: chi2(3) = 18.44 Prob>chi2 = 0.0004
```

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Uniqueness
Telecomede~p	0.1262	0.9841
Mobilenetw~y	0.9790	0.0415
Fixedvoice~e	0.9864	0.0269

4. Other infrastructures

- **Number of airport per 1million populations:** This tells about the number of airport distribution per 1million population ratio.
- **Number of universities per 1million populations:** This indicates the total universities present in the region per 1million populations correspondence.

The table below indicated that the number of airport per 1million populations of the regions with standardized distributions and the number of university per 1million population with a normal values.

To make normalize the distribution, the researcher use the same formula as the above. The formula with sample calculation are denoted as follow:

$$NV_{ij} = 1 - \frac{(BestX_i - ObservedX_{ij})}{(BestX_i - WorstX_i)} \quad NV_{11} = 1 - \frac{(2.3 - 0.6)}{(2.3 - 0.0)} = 1 - \frac{1.7}{2.3} = 0.2609$$

Table 4: Other infrastructure distribution by Region

No	Region	Number of airport per 1,000,000 populations	Normality	Number of university per 1,000,000 populations	Normality
1	Afar	0.6	0.2609	0.6	0.2609
2	Amhara	0.2	0.0869	0.5	0.2174
3	Benishangul	0.9	0.3913	0.9	0.3913
4	Dire Dawa	2.1	0.9130	2.1	0.9130
5	Gambela	2.3	1.0000	2.3	1.0000
6	Harari	0.0	0.0000	0.0	0.0000
7	Oromia	0.1	0.0435	0.3	0.1304
8	SNNP	0.2	0.0840	0.5	0.2174
9	Somali	0.5	0.0870	0.3	0.1304
10	Tigray	0.8	0.2174	0.8	0.3478
Country Level		0.2	0.3478		

Source: Based on Airport enterprise and Ministry of Science and higher education data, researcher's calculation, 2019

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The variance covariance matrix, eigenvalue and factor loadings of the normalized other infrastructure variables were calculated and illustrated below.

Variance covariance matrix of other infrastructure:

```
. factor Noofairport1000000pop NoofUnivetsity1000000pop ,pcf
(obs=10)
```

```
Factor analysis/correlation          Number of obs    =          10
Method: principal-component factors   Retained factors =           1
Rotation: (unrotated)                 Number of params =           1
```

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.98762	1.97524	0.9938	0.9938
Factor2	0.01238	.	0.0062	1.0000

```
LR test: independent vs. saturated:  chi2(1) = 31.49 Prob>chi2 = 0.0000
```

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Uniqueness
Noofairpor~p	0.9969	0.0062
NoofUnivet~p	0.9969	0.0062

As shown in the above procedure, primarily make the distribution normalized. It helps to avoid the variation which can occur due to non-considered effect. Then, PCA is done. This is a systematic way of reducing large set of factors in the narrowed manor without losing the generality. In the calculation the eigenvalue and eigenvector composition result would get. The eigenvalue told about the total variance accounted by each factor. The sume of all eigenvalues would be equivalent with the total number of variables. When negative, the sum of eigenvalues is equal to the total number of factors (variables) with positive eigenvalues.

Based on the size share of the variation the factors would determine. Factors are the group of items those can share the character. If the items are strongly correlated, their association would be stronger. So, one can express with the other. According to Kaiser Criterion, it suggests to retain those factors with eigenvalues equal or higher than 1. After identified the eigenvalue and the corresponding factors, the next job is determine the loading. Factor loadings are the weight and correlations between each variable and the factor. The higher the load is the more relevant in defining the factor's dimensionality. A negative value indicates an inverse impact on the factor.

All the above results are found with the PCA. The calculation is done by using STATA software (V=14). It is also used to compute used the Factor Loading and Weights of these indicators using the following formula:

$$I = \frac{\sum_{i=1}^n X_i \left(\sum_{j=1}^m |L_{ij}| * E_j \right)}{\sum_{i=1}^n \left(\sum_{j=1}^m |L_{ij}| * E_j \right)}$$

Where:

I is the index for a particular category (region)

X_i is the i^{th} indicator under a particular category.

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L_{ij} is the factor loading value of the i^{th} variable on the j^{th} factor

E_j is the eigenvalue of the j^{th} factor

Table 5: Composite Infrastructure Index with the ranks

No	Region	CII	Rank
1	Afar	0.6373	4
2	Amhara	0.4968	7
3	Benishangul	0.4176	8
4	Dire Dawa	1.0015	2
5	Gambela	1.2418	1
6	Harari	0.5830	5
7	Oromia	0.7010	3
8	SNNP	0.4109	9
9	Somali	0.1914	10
10	Tigray	0.5057	6
Country Level			

Source: Researcher's Calculation, 2019

The states divided into infrastructural sound regions and infrastructural lagging regions according to their value in the composite infrastructure index. The infrastructural sound regions have a value higher than the average value (0.6187) of the CII, and the infrastructural lagging states have a lower-than-average value (below 0.6187)⁷³.

The classification as per the average-value criteria was:

Sound states: Gambela, Dire Dawa, Afar, and Oromia

Lagging states: Tigray, Harari, Amhara, Benishangul, SNNP, and Somali

Analyzing the states by the CII; in the result anyone can observe huge variations between them. Gambela has the distinction of being at the top of the list with an overall index score of 1.2418. It is 6.4880 times the value of the region with the lowest value of the overall development index, Somali, which has an index score of 0.1914. The difference between these two extreme overall index scores is 1.0504. The mean CII value for all regions is 0.6166 and the standard deviation is 0.3050. This is clear evidence of dispersion or disparities between regions with the respect to the CII, calculated from the major sectors of road, electric, telecommunication networking, and other infrastructures. There is a high correlation between inequality in assets and the infrastructure index, suggesting that improving infrastructure leads to inclusive growth as well.

⁷³ Note: The road which are used by all or some regions are counted by a region. For instances, road in Oromia and Afar are giving service for all others. As well road in Amhara region is also giving service for others.

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Annex 4: Other Data

From 271 (100.0%) federal institutions respondents, 217 (80%) were experts, 39 (14%) middle level management and 15 (6%) higher officials. Relatively, most of the participants were from Ethiopian Road Authority, followed with the Ethiopian Electric power and Ministry of Urban Development and Construction. Only one respondent participated from the Prime Minister Office. In summing up, the majority of the respondents were experts (Table 1).

Table 1: Name of Federal Institutions and Job Position of Respondents

Name of Institutions	Position of the Respondents			Total
	Higher officials	Middle level management	Experts	
Ministry of transport	1	2	11	14
Ethiopian road authority	3	4	42	49
Ethio-telecom	0	2	24	26
Ethiopian electric utility	0	6	19	25
Ethiopian electric power	1	6	23	30
Ministry of finance	0	3	17	20
National development and planning commission	0	2	19	21
Ministry of urban development and construction	1	5	24	30
Office of house of federation	1	1	3	5
Airport enterprise	1	1	4	6
Ministry of science and higher education	1	1	11	13
Industry park authority	1	1	6	8
Ethiopian research institute	3	4	3	10
Prime minister's office	1	0	0	1
Federal integrated infrastructure coordination agency	1	1	11	13
Total	15*	39	217	271

Note: 15* includes 3 higher official respondents of Ethiopian research institute from table 9.3 above.

According to the institutions with respect to the job position, out of 469 (100.0%) respondents participated in the regional institutions, 331 (71%) of them sat in the experts level, 90 (19%) study participants were higher officials; whereas, the remaining 48 (10%) found from the middle level management. This implies that expertise respondents constitute the majority level (Table 2).

Table 2: Institutions per Job Position

Name of Institutions	Position of the Respondents			Total
	Higher officials	Middle level management	Experts	
Road Bureau	12	7	48	67
Finance and Economic Cooperation Bureau	11	20	61	92
Planning Commission	3	8	61	72
Regional Administration Office	36	0	0	36
Region Telecommunication	14	8	81	103
Region Electric Office	14	5	80	99
Total	90	48	331	469

Furthermore, from the entire respondents of civil society and multilateral organizations, 159 (97%) were middle level managements; while, the rest 5(3%) respondents were higher officials. The Ethiopian Contractors Association constitutes the majority portion of the respondent, followed with Consultant Association. In fact the result illustrated that the majority of the respondents were middle level manager of Ethiopian Contractors Association (Table 3).

Table 3: Lists of Civil Society and Multilateral Organizations

Name of the Institution	Position of the Respondents		Total
	Higher officials	Middle level management*	
Ethiopian Contractors Association	0	109	109
Consultant Association	0	50	50
World Bank (Infrastructure Sector)	3	0	3
UNDP (Infrastructure sector)	2	0	2
Total	5	159	164

Middle Level Management* is considered as each member contractors'/consultants' of the associations

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In terms of sex distribution, the majority of the study participants, 742 (82.0%), were male; whereas, the rest 162 (18%) respondents were females. Most of the male participants were experts; likewise, female experts comprise the largest portion within the group.

Table 4: Job Position of the Respondents and Sex

Job Position of the Respondents	Sex of the Respondents		Total
	Male	Female	
Higher officials	94	16	110
Middle level management	200	46	246
Experts	448	100	548
Total	742 (82.0%)	162 (18.0%)	904 (100.0%)

Regarding age distribution, 404 (44.7%) of the respondents were found in the category of 25-34 years. Likewise, 322 (35.6 %) of the study participants age were found between 35 and 44; whilst, 33 (3.7%) participants were found above 55 years of age. In general, more than three fourth of the study participants were adult and young (Table 5).

Table 5: Age of the respondents

Age of the Respondents	Frequency	Percent
< 24	47	5.2
25-34	404	44.7
35-44	322	35.6
45-54	98	10.8
>55	33	3.7
Total	904	100.0

From the entire 904 (100.0%) federal and regional institutions respondents education level 563 (62.3%) of them had got first degree; likewise, 279 (30.9 %) respondents had MSc/ MA degree. However, few respondents, 20 (2.2%), had PhD and higher educational level (Table 6).

Table 6: Level Education of the participant

Level Education of the participant	Frequency	Percent
Diploma	42	4.6
First Degree	563	62.3
Second Degree	279	30.9
PhD and Above	20	2.2
Total	904	100.0

From 904 respondents of federal and regional institutions, work experiences 11-15 and 6-10 were the highest respondents, which is 250 (27.7%) and 212 (23.5%), respectively (Table 7).

Table 7: Work Experience (years) of the respondents

Years	Frequency	Percent	Valid Percent	Cumulative Percent
< 5	171	18.9	18.9	18.9
6-10	212	23.5	23.5	42.4
11-15	250	27.7	27.7	70.0
16-20	128	14.2	14.2	84.2
21-25	66	7.3	7.3	91.5
>26	77	8.5	8.5	100.0
Total	904	100.0	100.0	

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Annex 5: Operational Definitions and Conceptual Clarifications

Administrative failings: It arises primarily because public servants work for others rather than themselves, they face the information problems discussed above; and, importantly, they face different incentive structures to those of the private sector. Moreover, the interests of public servants may not coincide with the public interest, for example, a public servant may be concerned with job security, promotion, and perceptions of their own importance. Some also argue that, because the quantity and quality of public sector work is difficult to monitor and measure, the public sector is inherently less efficient than the private sector;

Behavioral processes: They understand human behavior, including mental and verbal behavior, as an active version of verbal and mental processes.

Benevolent: A giver, more willing to accept fewer rewards, contribute more inputs than the outcomes they are receiving.

Citizens/public/stakeholder Satisfaction: Citizen Satisfaction with public services is a popular performance measure, and public employees' perceptions about performance are also frequently employed. Understanding the process of stakeholder satisfaction is a prerequisite to investigate citizens' overall satisfaction with government infrastructure services. This is one of the factors considered for infrastructure equity.

Cognition process: It is the process of acquiring knowledge through our thoughts, experiences, and senses.

Coordination Failure: The central pillar of the literature on coordination failure is the idea that the economy can fail to achieve coordination among complementary activities. Coordination failure leads the market to an outcome (equilibrium) inferior to a potential situation where resources would be correctly allocated and all agents would be better off.

Customer stewardship: It is, for the purposes of this study, the collective management values and exercises that emphasis on long-term customer outcomes. Put simply, customer stewardship is the collective management values and exercises that focus on bringing quality long-term customer outcomes. Opening up new pathways for improved economic functioning and social influence is the long game for customer stewardship.

Decision-making Procedures: It is used as the process of making choices by identifying a decision, collecting information, and evaluating alternative resolutions for the infrastructure allocation. Using a step-by-step decision-making process can help the infrastructure institutions make more deliberate, thoughtful decisions by organizing pertinent information and describing alternatives. It is one of the factors of infrastructure governance in this study.

Democratic Accountability/Public Accountability: It is a central piece of good governance. It describes the relation between state institutions and regions, private sector affected by their decisions. It is about the obligation of state institutions, or any other authority with assigned public infrastructure investment to inform the public, to explain, justify their decisions and actions. And it is about the right and responsibility of the citizens to access information, get explanations, to check, and to pass judgment on the conduct of those with public responsibilities which is critical for nation-building process. The two concepts are interchangeably used in this study.

Distributive Justice: Outcomes are spread evenly and fairly throughout an organization.

Entitled: A person, individual, or region who/which feels they are worth the extra compensation, therefore are more willing to accept over benefit.

Equal Opportunity: It is a state of fairness in which infrastructure are allocated fairly across regions in Ethiopia. Businesses rely on modern infrastructure to continue competitive, while society depends on good infrastructure to ensure equal opportunity and equal access to services for citizens. Good governance of public infrastructure can thus yield considerable benefits for all. This is one of the factors for infrastructure equity.

Equity in infrastructure distribution, fair or even infrastructure development: Equity is concerned with fairness and social justice which are used interchangeably in this study; Equity I mean that individuals, communities and regions access to basic infrastructure and other public investments. Inequity, unfair, disparity, unbalanced, and uneven infrastructure development are interchangeably used in this study.

Equity Sensitive: A person, individual, or region who/which must have an equity balance or else they will experience a stressor until they rebalance.

Government failure: The term in this study is used to refer to the reasons why a public sector intervention may fail to lead to an overall improvement. It occurs when government intervention results in a more inefficient and wasteful allocation of resources. Government failure can also be driven by political and administrative failings.

Government intervention: It is any action carried out by the government or public entity that affects the market economy with the direct objective of having an impact in the economy, beyond the mere regulation of contracts and provision of public goods.

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Human Resource Management: This is one of the factors in institutional capacity in the infrastructure sector. This is a distinctive approach to employment management which pursues to attain competitive advantage through the deliberate deployment of a highly dedicated and skilled workforce, using a combined array of cultural, structural, personnel techniques, and activities intended to deliver for and coordinate the human resources of the infrastructure institutions in Ethiopia.

Inclusive and Sustainable Growth: Inclusive and sustainable infrastructure is central to decrease poverty in all its dimensions and to build the nation. Everyone has to be given a chance to contribute in and benefit from infrastructure development. Creating the circumstances for inclusive and sustainable growth must comprise all 3 aspects of sustainable development: economic, social and environmental.

Infrastructure Equity: “Infrastructure Equity” which is about targeted, smart, and equitable public infrastructure investments that can make huge community benefits-jobs, business opportunities, access to public transportation, electric, telecommunication and fair distribution of Industry Parks, Airport and University are used by Policy Link website since 2006 (Rubin, 2006).

Infrastructure Fund: It is to provide the opportunity to invest in essential public assets, such as roads, energy, telecommunication, and airports facilities. It is to what extent is properly used in the infrastructure sector in Ethiopia. It is also about getting new options of fund. It is one of the factors of institutional capacity building.

Infrastructure Governance: the governance of infrastructure covers a range of processes, tools and norms of communications, decision-making and monitoring used by governments and their complements delivering infrastructure services. Thus, it connects to the communications between government institutions internally, including their interactions with private sector users and citizens externally (OECD, 2017).

Infrastructure: Infrastructure is the term for the essential physical systems of the country—road, telecommunication, and electric systems including Industry Parks, Airport and University are all instances of infrastructure in this study. It does not include water and sewerage as it is not only federal but also regional jurisdiction. These systems incline to be high-cost investments and are vital to the country's economic development and prosperity.

Institutional Capacity: It covers, on the one hand, the functions (tasks) that institutions should have the capability (competence) to execute, and, on the other, the resources (human, organizational, technical and financial) and structures and systems in the infrastructure sector. However, the researcher uses the terms “organization” and “institution” interchangeably in this study.

Intergovernmental Collaboration and Coordination: The purpose of the Intergovernmental Coordination is to formalize coordination mechanisms and agreements between federal government, and regional and state agencies. The Intergovernmental Coordination also aids in identifying and resolving conflicting goals, objectives, and policies in federal and regional governments comprehensive plans in the infrastructure sector. It is also to promote better understanding among all levels of government (especially federal and regional) on the roles and responsibilities of each. It is one of the factors of infrastructure governance in this study.

Land Acquisition Framework: Such kind of framework outlines the objectives, policy principles and procedures for land acquisition, compensation and other supports measures for displaced persons, etc. for infrastructure construction. Compensation and other supports will have to be paid to affected peoples prior to any physical or economic displacement of those peoples. This is the third infrastructure governance in this study.

Market Failure: It is the utmost reason for defending an active economic role of the state. Among other market imperfection-based arguments, the theory of coordination failure is widely used at the present by development economists to define a new case for industrial policy.

Nation, state and Country: There is a **difference** between the terms **nation**, state, and **country**, even though the words are used interchangeably. **State** and **Country** are synonymous terms that both apply to self-governing political entities. However, on the one hand, a **nation**, is a group of people who share the same culture but do not have sovereignty. On the other hand, **nation** is a large body of people united by common descent, history, culture, or language, inhabiting a particular country or territory.

National and regional Competitiveness: It is the sustained ability of a region/nation by using infrastructure to compete with other regions/countries, to ensure sustained infrastructure equity, including the ability to attract investors. This is one of the factors for infrastructure equity.

Nation-building Process: It is the development of the nation, nationalities and peoples of Ethiopia (Ethiopian Constitution, 1995). It is also constructing or structuring a national identity using the power of the state. It mainly aims at the unification of the regions with the federal government by using infrastructure within the state so that it remains politically stable and viable in the long run. State-building and nation building are interchangeably used in this study.

None-excludable: It means that it is costly or impossible for one user to exclude others from using a good. Non-rivalries mean that when one person uses a good, it does not prevent others from using it.

Organizational System and Frameworks: This considers a framework for keeping in perspective the big picture of key variables that impact organizational performance in the infrastructure sector. The organizational system is the structure of how each institution is set up. This is one of the factors of institutional capacity building.

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Organizational/Administrative Structure: This is typically hierarchical arrangement of lines of authority in government institutions. It determines how the responsibilities, power and roles are assigned, and how the work process flows among different management levels in the infrastructure sector in Ethiopia. This is one of the factors of institutional capacity building.

Political Commitment: It should be seen as a driving force that inspires the activity and ultimately leads to several benefits for national and regional development by ensuring infrastructure governance as it requires committed and coordinated political will in this study.

Political failings: It arises when individual interests override the public interest, for example when special interest groups are successful in lobbying for intervention for their own rather than the public's benefit or influence the design and implementation of policy to serve their own interest. For example, an industrial or sector lobby may successfully seek preferential treatment or selective support on the grounds that it is a more important or a growth sector in the region. This also occurs when an individual or sectional interests are allowed to supersede the public interest because of effective lobbying on the part of those interests. This is often referred to as regulatory capture and represents a significant danger when a small number of interest groups are able to get very close to the public sector decision-making process;

Procedural Justice: It determines if the process of allocating outcomes/rewards is fair by making the procedures fully transparent.

Public good: It is good that it is impossible to produce for private profit and therefore is a good for which no market exists. The reason for this market failure is because public goods exhibit two important characteristics. (i) They are non-excludable once the good has been produced it is difficult to exclude consumers from consuming the good. (ii) The cause of market failure is compounded by the fact that public goods are often non-rivalries and hence consumption by one individual does not reduce the amount of the good or service available for consumption by another consumer.

Rule of law: It is the principle that all institutions and people are question to and accountable to law that is fairly enforced and applied in the infrastructure sector to ensure nation-building process; the principle of government by law in the infrastructure development in Ethiopia.

Shared National Identity (unity in diversity): To what extent infrastructure development is used to establish a shared sense of national identity and to encourage integration among the regions which is with the motto of unity in diversity in Ethiopia. It is also one of the factor of nation-building process in this study.

Social/Distributive Justice: This concerns the socially just allocation of goods such as infrastructure. It concentrates on outcomes of infrastructure. It also perceived as fairness of how costs and rewards are distributed by (distributed across) group members or region in this study. This is one of the factors for infrastructure equity.

Spatial Intervention /Planning: This is as planning tools for knowledge-based infrastructure development in Ethiopia. This is considered here is that it is to analyze spatial planning interventions in the infrastructure sectors and their implications on infrastructure equity. This is one of the factors for infrastructure equity.

Spillovers: This relates to a situation where producers of a good or service may find it difficult to appropriate all the returns to their activities, there is a spillover from the producer to other parties. As a result, producers' incentives to engage in certain activities that have spillovers are lower than the optimal level.

Stewardship: It is the set of values and exercises that have the possible to make intense changes in the governance of civic institutions.