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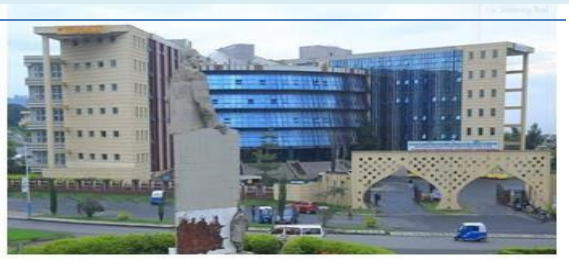
COLLEGE OF SOCIAL SCIENCES, ARTS AND HUMANITIES DEPARTMENT OF GEOGRAPHY AND ENVIROMENTAL STUDIES

THE ROLE OF EMERGING REGIONAL INNOVATION SYSTEM (RIS) FOR REGIONAL COMPETITIVENESS IN ETHIOPIA: A CASE OF HAWASSA


KASSAHUN AMAN SUBE

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN URBAN, REGIONAL AND LOCAL (REGIONAL AND LOCAL DEVELOPMENT AND GOVERNANCE)

ADDIS ABABA UNIVERSITY

ADDIS ABABA, ETHIOPIA

NOVEMBER, 2025

THE ROLE OF EMERGING REGIONAL INNOVATION SYSTEM (RIS) FOR REGIONAL COMPETITIVENESS IN ETHIOPIA: A CASE OF HAWASSA.

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PRINCIPAL SUPERVISOR: TEGEGNE GEBRE-EGZIABHER (PROFESSOR)

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NOVEMBER, 2025

Declaration

I, **Kassahun Aman Sube**, hereby declare that this dissertation entitled: "***The Role of Emerging Regional Innovation System (RIS) for Regional Competitiveness in Ethiopia: A Case of Hawassa"*** is my original work and that it has not been presented for a degree in any other university, and all sources of material used for the dissertation have been duly acknowledged.

This dissertation is submitted in partial fulfilment of the requirements for the degree of ***Doctor of Philosophy in Urban, Regional, and Local (Regional and Local Development and Governance).***

I fully understand that any false declaration is a breach of academic integrity and may result in disciplinary action by the University.

Name: Kassahun Aman Sube
Signature: November, 2025
Date: _____

Approval Sheet

This is to certify that the dissertation entitled: ***"The Role of Emerging Regional Innovation System (RIS) for Regional Competitiveness in Ethiopia: A Case of Hawassa"*** *submitted by* ***Kassahun Aman Sube*** in partial fulfilment of the requirements for the degree of ***Doctor of Philosophy in Urban, Regional, and Local (Regional and Local Development and Governance)*** has been carried out under our supervision.

We approve the dissertation and recommend it be accepted by the College of Social Sciences, Arts and Humanities, Addis Ababa University.

_____

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Principal Supervisor

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Name
Chairperson of the Department

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Name
External Examiner

_____

Name
Internal Examiner
Date of Approval: _____

List of Publications

The following scholarly articles have been produced as part of this PhD research. These publications reflect the core findings, theoretical contributions, and policy implications of the study. The first two articles have been **peer-reviewed and published** in reputable academic journals, while the remaining two have been **submitted for review** and are currently under consideration by academic journals:

1. Sube, K., Belay, T., Hando, F., & Bayinesagn, A. (2025). Regional Innovation System (RIS) as a means for development: Policies, opportunities and challenges in Ethiopia. *F1000Research*, *14*, 34. https://doi.org/10.12688/f1000research.159772.2
2. Sube, K., Belay,T., Bayinesagn, A. (2025). Challenges and Opportunities for Technology Transfer and Community Engagement at Research Universities: The Case of Hawassa University, Ethiopia.(Latter attached)
3. Sube, K., Belay,T., Bayinesagn, A. (2025). Capacitating Graduates‘ Employability: The Role of Social Enterprises in Ethiopia (Under Review process)
4. Sube, K., Belay,T., Bayinesagn, A. (2025). Factor affecting innovativeness in Ethiopia: Acase of Industrial Clusters in Sidama Region. (Under review process)

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Acronyms and Abbreviations

Acronym	Full Form
AAU	Addis Ababa University
AI	Appreciative Inquiry
AGOWA	African Growth and Opportunity Act
AU	African Union
CRA	Constructing Regional Advantage
CSO	Civil Society Organization
EPD	Entrepreneurial Discovery Process
EU	European Union
FGD	Focus Group Discussion
FDRE	Federal Democratic Republic of Ethiopia
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GTP	Growth and Transformation Plan
HIP	Hawassa Industrial Park
HGER	Home grown Economic Reform
IP	Industrial Park
KII	Key Informant Interview
NIS	National Innovation System
OECD	Organisation for Economic Co-operation and Development
RIS	Regional Innovation System
R&D	Research and Development

SDG	Sustainable Development Goal
SNNPR	Southern Nations, Nationalities, and Peoples' Region
S3	Smart Specialization Strategy
STI	Science, Technology, and Innovation
STIP	Science, Technology, and Innovation Policy
TIP	Transformative Innovation Policy
TH	Triple Helix
QH	Quadruple Helix
WEF	World Economic Forum

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Kassahun Aman Sube

November, 2025

THE ROLE OF EMERGING REGIONAL INNOVATION SYSTEM (RIS) FOR REGIONAL COMPETITIVENESS IN ETHIOPIA: A CASE OF HAWASSA.

ABSTRACT

In today's globalized and knowledge-based economy, innovativeness is not merely a competitive advantage but a necessity for emerging economies such as Ethiopia. This study investigates the role of the Regional Innovation System (RIS) in promoting regional competitiveness, using Hawassa as a case study. It emphasizes the contributions of key innovation actors, regional innovation capacity, and policy frameworks. Grounded in the Quadruple Helix model and endogenous development theory, the study analyses how science, technology, and innovation (STI) policies contribute to an evolving innovation ecosystem. A mixed-methods approach was employed, combining qualitative data from document reviews, key informant interviews, focus groups, and field observations with quantitative firm-level survey data. Thematic analysis was used to analyze qualitative data, while inferential analysis was employed for the quantitative data. Findings indicate that Ethiopia's RIS is supported by STI policies that aim to foster an entrepreneurial culture, enhance R&D funding, and strengthen university-industry linkages. However, implementation is hampered by infrastructural limitations, weak coordination, and minimal R&D investment. Social enterprises and civil society actors also play a critical role in bridging gaps between higher education and labour market demands, thereby enhancing graduate employability. Although regional clusters such as Hawassa Industrial Park, Hawassa Industry Zone, and Yirgalem Agro-Industrial Park have made strides, they face challenges in achieving their intended innovation outcomes. Factors influencing firm-level innovation include location, access to resources, collaboration with universities, and internal R&D activities. The study concludes that overcoming structural barriers, reforming policies, and fostering inclusive institutional collaboration are essential for strengthening the Ethiopian innovation system. Universities—especially Hawassa University—and social enterprises must lead efforts to enhance capacity-building and promote sustainable regional innovation.

Keywords: *Regional Innovation System (RIS), Regional Competitiveness, STI Policies, Quadruple Helix, Industrial Clusters, Innovation, Economic Development.*

CHAPTER ONE

INTRODUCTION

This chapter constitutes of introduction, providing background, rationale, and conceptual underpinnings for understanding the study. It opens by describing how crucial regional development and competitiveness are in the modern, knowledge-driven, global economy, where universities, business, government, and civil society need to collaborate together to create novel ideas and learn as a means to achieve sustainable growth. The study's theoretical underpinnings are covered in this chapter, with a focus on endogenous development theories that highlight the importance of regional networks, capacity, and knowledge in promoting innovation. It then explores the research problem, which is derived from Ethiopia's relatively poor competitiveness and fragile innovation ecosystem, although promising policies and institutional frameworks. The rationale section emphasizes the relevance of this research in the Ethiopian context, referencing national and regional policy objectives. Along with presenting the conceptual framework that guides the research, the chapter further sets out the objective, significance, scope, limitations, and delimitations of the study. It concludes by outlining the research methods used, including the design, data collection tools, philosophical position, and quality assurance procedures, offering a comprehensive structure for the subsequent chapters.

1.1. Background

In a globalised knowledge-based economy, competitiveness predominately shapes national, regional, and local development in terms of economic growth, prosperity and sustainability (Chaaben et al., 2025; Kouskoura et al., 2024). Economic decisions are considered sustainable when they enable economies to maintain social, economic, and environmental characteristics while simultaneously developing a competitive advantage (Alketbi, 2023; Judrupa, 2021). As markets evolve due to accelerated technological advancements, shifting trade dynamics, and emerging socio-political challenges, nations must employ adaptable strategies to strengthen their economic standing and competitiveness globally (Baxrom, 2025).

At the World Economic Forum (WEF), the notion of competitiveness is defined as a set of institutions, policies, and factors that determine the level of productivity (Nasir & Zhang, 2024). Competitiveness refers to a country's capacity to build and maintain an environment that fosters greater value creation for its businesses and the quality of life for its

citizens (Kistow & Hosein, 2024). Besides, national competitiveness is the capacity of a country to establish and sustain an environment that is conducive for its enterprises to thrive (Kouskoura et al., 2024; Bhawsar and Chattopadhyay 2015). Consequently, competitive countries are successful economically and have higher earnings or living standards (Omri et al., 2025). It is now generally acknowledged that a region's ability for innovation, knowledge, and entrepreneurship is a key factor in deciding the pace at which its economy will grow (Kistow & Hosein, 2024). Against this backdrop, the need to understand how RIS can serve as engines of place-based competitiveness and sustainable development—particularly in emerging economies like Ethiopia—forms the central focus of this study.

The World Economic Forum (WIF) developed the Global Competitiveness Index (GCI), which employs 114 variables that may be indicative of a nation's competitiveness (Qazi, 2024). These factors are grouped into three categories the fundamental, efficient, and innovative pillars. Based on this index, western and a few southwest Asian nations have ranked high in their level of competitiveness. These nations' highly innovative, entrepreneurial, and business-enabling environments have served as the primary determinants of their performance. These are the outcomes of a substantial share of GDP being dedicated to research and development, along with improvements in structural reforms, prudent investment, and public-private partnerships—the most significant elements impacting this country's competitiveness.

Economic policy is significantly determined by innovativeness as it generates a competitive advantage (Wang et al., 2024). Innovation has been underscored as an essential component of economic development, enabling nations to improve productivity, economic growth, and competitiveness in the global market while simultaneously raising the quality of life (Dutta et al., 2018; Kaynak, Altuntas & Dereli, 2017; de Miranda et al., 2021; Kostoska & Hristoski, 2017). Remarkably, as countries approach the edge of knowledge, innovation remains the most efficient means of creating new value while developing lasting competitive advantages (de Miranda et al., 2021; Farinha, Ferreira & Nunes, 2018). Innovation is regarded as an essential means for national development and prosperity in a global economy that continues to grow more interconnected and competitive (de Miranda et al., 2021; Kaynak et al., 2017). Thus, as Çetin and Erkisi (2023), indicated innovation has become the primary driver of global competitiveness.

In today's knowledge-based economy, although there is no universally applicable model for regional development, nevertheless, the ability to innovate, entrepreneurship-friendly policies, and innovation systems that promote innovative settings have been considered to be the main drivers of economic growth and competitiveness (Chaparro-Banegas et al., 2024). The sustainable development of both nations and regions depends on continuous innovation. It has been evident in recent years that innovations typically come about as a result of on-going, sustained collaboration, and interaction among many actors in their environment (Machado et al., 2024; Asheim et al. 2011). Regional and local governments, institutions of higher education, businesses, and civic organizations are some of these actors. Theoretically, an innovation system involves interactions between important actors in the innovation process and institutions (Pino & Ortega, 2018).

RIS is an effort to bring all regional innovation actors together to create a collective learning ecosystem; it suggests that regions have untapped capacity for innovation, and sustained economic growth (Pino and Ortega, 2018). In line with this, Entrepreneurial Discovery Process (EPD) is a participatory process for local decision- making that, in its ideal form, brings together business, government, research, and educational institutions, as well as civil society and consumer groups (users), to discover new domains for innovation and market opportunities (Dosso, 2022). Also, businesses, institutions of higher learning, or technology hubs (among others) are typically the pertinent agents that interact and give rise to learning processes and innovations at the regional or national level (González-López, 2019).

In Europe, there are regional policies within the framework of the regional policy agenda of the European Union (EU) that aim to promote economic diversification of the regions, including constructing regional advantage (CRA) and smart specialization strategies (S3) (Brownlow & Budd, 2023; Boschma, 2014). Regional innovation strategies originated in Europe, but too many non-Europeans are adopting the concept (Kruse & Wedemeyer, 2022). Economies in Latin America, Africa, Canada, Australia, and the United States are additionally employing the policy to commence accelerating regional development. As an example, Latin American countries such as Brazil, Chile, Colombia, Mexico, and Peru offer further demonstrations. Pilot projects are currently being conducted in many Latin American regions to assess the concept of Smart Specialization based on particular features (Belen et al., 2017; Gómez Prieto et al., 2019).

In Africa, although a few countries, such as South Africa, Tunisia, Cote d'Ivoire, and Cameron, have tried to employ smart specialization strategies, studies indicate that regional innovation policies are still in their infancy in the continent. For instance, Kruse and Wedemeyer (2021) argued that despite geographic proximity, North Africa currently lacks a stand-alone strategy and is instead engaged in developing one. However, they have assessed that the idea of smart specialization holds particular promise for less developed regions because it aims to reduce regional disparities by launching catch-up processes and utilizing endogenous growth potential. Dosso (2021) then mapped the economic, scientific, and innovative potentials for Côte d'Ivoire (West Africa) in keeping with the smart specialisation strategies for evidence collection for innovation policy. The conceptual and mapping process can assist practitioners and stakeholders in recognizing significant evidence gaps that need to be filled to guide place-based or regional development initiatives.

Ethiopia, a low-income country, ranks 125th with a population of 123.4 million, a GDP of 347.8 billion PPP$, and a GDP per capita of 3,434 PPP$ is categorized as a lower-income country (WB, 2025; Sube et al., 2025; GII, 2023). Ethiopia is ranked as one of the least developed countries based on the UN Human Development Index, which places Ethiopia in the 173rd position among 189 countries (Dagne, 2024). The level of competitiveness is extremely low, with Ethiopia ranking 126 out of 141 countries (World Economic Forum, 2019). The innovation ranking calculated by the Global Innovation Index (GII) shows a notably low level of innovation in less developed countries (as defined by the World Bank classification). In some countries (including Ethiopia), the level of innovation is notably below expectations for the development level (GII, 2020). The Global Innovation Index (2024) ranked Ethiopia 130th out of 133 economies evaluated in 2024. Out of the seven Global Innovation Index (GII) indicators, Ethiopia ranked among the lowest in the world in the following metrics: Institutions 25.6 (117th), Market sophistication 5.0 (133rd), Business sophistication 13.3 (128th), Infrastructure 21.5 (123rd), Creative outputs 5.5 (122nd), and Human capital and research 7.2 (133rd). Nevertheless, Ethiopia scored higher in Knowledge and Technology Outputs (14.7, ranked 88th).

Ethiopia has a long history of national planning, tracing back to the Imperial era in 1957. In the early post-World War II era, multiple government departments developed independent plans and programs that formed the basis of government policy and were not integrated into a national plan covering the economy as a whole (Mulu, 2017). As a result, Ethiopia created its First Five Year Development Plan (1957–61) and its Second Five Year

Plan (1962–67) (Asfaw, 1992). These plans were inadequate to address serious problems arising from the underlying shortcomings in the economic system itself (Egziabher, 2000). A Ten-Year Perspective Plan stretching the years 1984–85 to 1993–94 was introduced by the Office of the National Committee for Central Planning (ONCCP), which was founded in 1984. Scholars consider the ten-year plan of the Dergue regime to be the greatest long-term plan by far (Mulu, 2017). Finally, the two GTPs and PASDEP are the three five-year plans that EPRDF has been introducing since 2004.

The Home-Grown Economic Reform (HGER) was initiated in 2021 by the FDRE Plan and Development Commission with the purpose of boosting the nation's overall productivity and competitiveness as well as facilitating a gradual transition from growth driven by the public to private sectors. The plan's primary objectives are to build a digital economy and increase its benefits, develop national innovation research and technological capabilities, build technology-based industries to boost national productivity and competitiveness, and set up innovation and technology regulatory systems and operating procedures (Planning and Development Commission, 2021).

The legal framework for the operation of Ethiopia's innovation system has been established by the Higher Education Proclamation (650/2009) of 2009, the Intellectual Property (IP) Rights System of 2008, the National Science, Technology, and Innovation (STI) Policy of 2012, the Research and Technology Transfer Conceptual and Governance Framework of Ethiopian Higher Learning Institutions of 2016, and the Professional and Programme Mix Policy of 2008 (Mulu, 2017). He also pointed out that national legal and regulatory frameworks promote innovation and research that enhances the transfer of knowledge and technology and enables universities to carry out research, including collaborative projects with industry, to meet the demands of the development of the nation.

Nevertheless, the pathways for effectively supporting and advancing the emerging RIS, including the collaboration among universities, industry, government, and civil society, and its prospective contribution to regional competitiveness, remain insufficiently clarified. The legal and policy frameworks have to operate in seamless synergy to regulate the practices of academia, industry, government, and civil society toward genuine cooperation in research, innovation, and technology transfer at regional level. Assessing the possible role of RIS for Regional Competitiveness in Ethiopia is the predominant purpose of the research; so that the study intends to identify specific enablers and barriers affecting the emerging RIS, through research and technology transfer activities by examining the interactions between

the actors. Finally, the study proposes to offer insights that can inform policy and form basis for feasible strategies in order to foster innovation-driven regional competitiveness in Ethiopia by examining the dynamics of collaborative learning among regional development actors.

1.2. Rational of the study

The persistent challenges of poverty and underdevelopment in Ethiopia necessitate strategic approaches to enhance economic growth and improve quality of life. This study is motivated by the growing recognition that regional and local competitiveness are critical prerequisites for sustainable development in Ethiopia. Global, regional, and national policy initiatives underscore the feasibility of strengthening regional competitiveness through multi-stakeholder engagement and coordinated interventions. Fortunately, learning about regional local development theories ignited his interest in thinking more about competitiveness. Since then, he has developed a strong belief that regional and local competitiveness is a prerequisite to bringing development into Ethiopia. Correspondingly, the researcher was persuaded by the global, regional, and national policy initiatives that regional competitiveness in Ethiopia is a realistic goal that a number of partners could support. In line with this, the researcher was convinced that regional competitiveness in Ethiopia is a feasible objective that multiple stakeholders could contribute to by engaging in national, regional, and international policy interventions.

To begin with, the Sustainable Development Goals (SDGs), often referred to as the Global Goals, are a collection of 17 interrelated aspirations designed to serve as a shared blueprint for a prosperous and peaceful world both now and in the future. The Sustainable Development Goals (SDGs) highlight the value of the social, economic, and environmental components of sustainable development by placing emphasis on resilience. The study will therefore focus on the following SDGs: infrastructure, industry, and innovation (goal 9); reduced inequalities (goal 10); decent employment and economic growth (goal 8); improved health and well-being (goal 3); and high-quality education (goal 4).

At the regional level, the Africa Union (AU) also aspires to a unified, wealthy, and peaceful Africa that has government by its own citizens and serves as an influential actor in the global community. Agenda 2063 is the tangible representation of how the region intends to realize this vision over a 50-year period from 2013 to 2063 (Richardson, 2024; Tanyu,

2024). Africa's aspirations for the future are encapsulated in Agenda 2063, which also outlines important Flagship Programmes that can accelerate the continent's fast change and help it thrive economically. Furthermore, it makes use of the comparative advantages of the continent, such as its people, history, and cultures; its natural resources; and its location and repositioning in the world to bring about fair and people-centred social, economic, and technological transformation and the eradication of poverty. The agenda comprises objectives like (1) quality of life and well-being for all citizens; (2) well-educated citizens and skills revolution supported by science, technology, and innovation; (3) inclusive growth and sustainable development; and (4) transformed economies. The successful implementation of Agenda 2063 will necessitate the adoption of deliberate and purposeful policies, strategic methodologies, and a strong commitment from leadership.

Locally, the researcher believes that there are several important driving forces behind Ethiopia's local, regional, and national development. First and foremost, it is unquestionable that Ethiopia is endowed with a variety of natural resources. It is also strategically located in the Horn of Africa, close to the Middle East and its markets. The country's rapid economic growth during the previous two decades is evidence of its economic potential, showing that it can develop a robust economy and realize its goal of joining the lower-middle-income countries by 2025. Further, the government's ambition to nurture a strong knowledge-based economy and willingness to provide funds for Science, Technology, and Innovation (STI) will contribute to a business-enabling environment.

Above all, it is true that the country aspires to a sensational development that would release millions of its citizens from abject poverty. The government's ambitions to accelerate growth may be highlighted by the Homegrown Economic Reform (2019), the 10-year development plan (2021), the emerging considerable public investments in research & development, innovation, and technological infrastructures, and the development of Industry Parks (IPs). In line with this, the Ethiopian government has received and is prepared to receive profitable investments from regional and international development partners. Henceforth, this study would provide a remarkable contribution by demonstrating how the regional development actors would cooperate and foster learning.

Although endogenous development theories primarily highlight the contribution of internal elements including innovation, human capital, and social capital to regional and economic growth, they also progressively recognize the essential part that external forces

serve in determining potential paths (Han and Liu, 2025). To supplement endogenous growth structures, globalization, participation in global value chains, and international networks are important external drivers that help knowledge, technology, and best practices spread across regional boundaries (Palani et al., 2025; Acs & Sanders, 2021). These external relationships strengthen a region's capacity for innovation and competitiveness through allowing it a connection with larger resources and market opportunities. Thus, present structures for endogenous development promote an intricate perspective that takes into account both the external economic environment, which has been impacted by globalization and global value chains, and the fundamental capacities of regions. This integrated viewpoint emphasizes how effective engagement with global economic dynamics is essential for sustainable regional development, as it bridges the gap between macro-level external influences and micro-level endogenous processes (Vázquez Barquero, 2007; Acs & Sanders, 2021).

1.3. Concise Literature Review

1.3.1. Theoretical Foundations: Endogenous Development Theories

The middle of the 1980s and the beginning of the 1990s marked the introduction of endogenous development theories, which intended to offer conventional neo-classical thoughts a rationale (Plummer et al, 2014). These theories, which rely on premises related to investing in both human and technological resources, seek to modify neoclassical models by offering models in which sustainable development impacts are endogenous variables (Lepori, 2022; Plummer et al, 2014). The presence of innovative businesses in a specific region that consistently fosters emerging technologies and products while preserving collaborative relationships with other regional players is essential for economic growth (Cvetanovict et al., 2015). The capacity to innovate and produce "collective intelligence" in a localized setting is the primary focus of endogenous development, which emphasizes the distribution, accumulation, production, and internalization of knowledge (Omi, 2024; Garofoli, 2002).

According to Cvetanovict et al. (2015), among the primary distinctions between neoclassical and endogenous growth theories are their different views on the nature of technological change (exogenous vs. endogenous), the dynamics of economic growth (zero/constant growth), and the existence of market equilibrium (perfect market/market failures). Endogenous development is part of a social-economic and cultural system where knowledge generation is facilitated by aspects such as entrepreneurship, local production variables, and relationship management skills. It relies extensively on the concentrated organization of a region (Capello, 2011).

Bodnár et al. (2022) stated that the endogenous variety of development may be seen as its re-evaluated theory; in economics, the term "endogenous" itself refers to elements that are purposefully made by economic actions rather than inherited. Endogenous character is defined in regional studies as top-down, thoughtful community initiatives and actions that actively include the community at large within a region and are based on specific regional features (Lengyel, 2012). The endogenous growth theory states that since knowledge is a public benefit, investments in new knowledge promote economic growth and innovation (Dinc, 2015). Accelerated economic growth and competitiveness depend on the commercialization of innovative knowledge (Block et al., 2013).

In line with endogenous growth theories, on-going regional growth is the result of labour and capital accumulation along with the regional human resources, R&D, innovation, knowledge, and possible spill-over effects of knowledge and technology (OCDE 2009, Romer 1990, Romer 1994, Solow 1994). The primary contributions of these theories to regional development are their concentration on innovation, knowledge, and human capital as the main drivers of sustainable development and growth. Another important contribution is the recognition that information and technology have a cascading impact that contributes to regional development as an indispensable underlying factor. High-quality production systems, flexible production organization, urban and institutional growth, and the spread of innovation and knowledge all bring about significant achievements (Cvetanovict et al., 2015). Technology change is highlighted by endogenous growth theory as a result that is subject to serious market failures (Samuelson and Nordhaus, 2009).

Endogenous development is characterized by economic growth that relies on the development, expansion, and application of internal resources at all spatial scales (Bodnár et al., 2022). As endogenous development does not restrict itself to a certain spatial dimension, it cannot be associated with regional development (Domaski, Marciniak, 2003). Opportunities for innovation as well as knowledge sharing between enterprises are generated when individuals are "learning" in the same industrial field, especially in cities and areas with significant concentrations of production (Bodnár et al., 2022).

Regional endogenous growth is mostly dependent on three key elements: innovation, social capital, and human capital (Lepori, 2022). Regarding the application of scientific discoveries in manufacturing, the quick development of new technologies, and the improvement of production management methods, it is worthwhile to invest in human capital (Antonelli et al., 2022). As Cvetanovict et al. (2015), social capital is the capital of

cooperation, mutual operations, mutual trust, and mutual support that are developed throughout people's economic interactions. It reflects the characteristics of a public good and cannot be possessed by an individual. The concentration of innovative enterprises in a given region, which consistently invest in new technologies and product development alongside maintaining strong ties with other regional players, is the foundation of economic growth in all cases (Bond-Smith, et al., 2017).

There are problems with endogenous growth theory notwithstanding its benefits. It implies regions have the necessary resources to disseminate knowledge and technology and to transform R&D and human capital into innovative products and improved efficiency (Gruzina et al., 2021). The new growth paradigm emphasizes the significance of institutions while underscoring the essential role of human capital (Mishra, 2016). It may occasionally be challenging to determine the difference between physical and human capital (Crouzet et al., 2022). Misra (2016) states that non-convergence and economic gap between developed and emerging economies cannot be adequately explained by these theories.

1.3.2. Empirical reviews

1.3.2.1. Regional Innovation System (RIS)

The concept of a "National Innovation System" (NIS), which centers on one particular area, is the source of the notion of a "Regional Innovation System" (RIS) (Iammarino, 2005). Cooke (1992) first proposed the concept of a regional innovation system in 1992. Through applying the idea of "embeddedness" in the institutional context, he explained how the RIS could potentially be employed as an interactive learning tool for business enterprises and other organizations. Three aspects can be examined in order to clarify the meaning, according to Xu (2019): In the first place, "interactive learning" considered as a shared asset that is owned by different actors in a production system and is combined and interacted with; in the second place, "environment" refers to a broadened, multifaceted area that includes laws, norms, values, and both natural and human resources; and in the third place, "embeddedness" encompasses all economic and knowledge creation and replication processes inside and outside a business. Typically, a specific kind of social contact is what initiates and sustains these processes.

As Asheim and Coenen (2005), indicated RIS, is the institutional framework that fosters innovation within a region's industrial structure. RIS has been developed as a means that allows national and

regional policymakers to accelerate innovation considering market systems do not appear to be capable of offering appropriate, flexible, and quick change in a region's development (Pinno & Ortegan, 2018). A creative ecosystem that complex network of actors whose interactions produce innovative and creative processes and outcomes, which are shaped by economic, social, and cultural values; a creative ecosystem is a network of dynamic relationships between actors (intended as individuals as well as institutions and infrastructures) whose goal is to create economic, social and cultural values through creative and innovative activities is the most important precondition to bring about regional innovation system (Gasparin and Quinn, 2020). As Pinno and Ortega (2008) any policy framework aimed at supporting the sector must be designed to facilitate the economic, social, and cultural values and their impact on the region.

The innovation system concept was created with an eye toward organizational and institutional aspects before being further developed in terms of institutional concerns (Pinno &Ortega, 2018). Also, innovation systems could be considered as a collection of institutions and groups, along with all of the networks and interactions among them (Edquist, 2005). A system would become stagnant without the links, connections, and feedback that the players get; they are essential components of an innovation system that make the system dynamic. Jiao et al. (2016) state that regional governments should create policies and institutions to foster a more collaborative environment between academic institutions and industries in order to enhance their contribution to the innovation performance of the RIS, considering the significance of multiple stakeholders and their interactions within the Innovation System. On the other hand, the institutional approach emphasizes RISs and the means by which institutions influence players and their interactions.

The quality of interactions between regional innovation actors and the innovation outcomes of the RIS is determined by the institutional setting at the regional level, consequently, policymakers have to be mindful of how regional institutions are evolving. There are both formal and informal institutions that are essential components of the institutional landscape. The institutional world, which encompasses both formal and informal institutions, is composed of both official and informal institutions. Also, the capabilities approach analyses the perspective of regional strengths and capabilities (Lau & Lo, 2015).

Accordingly, regional governments should support the right institutional environment, uphold a culture that fosters the development of innovation skills, and concentrate on creating

a competitive group of core industries that are able to achieve greater innovation (Li, 2015). The basic concepts of the RIS are highlighted as follows: (1) RIS is a social system, and innovation is the outcome of social interaction among economic actors; (2) it considers the interaction between the various actors as well as the effectiveness of the actors' innovations; (3) institutional components are prominently displayed and taken into consideration; and (4) it is to further the goal of fostering regional innovation activities (Xu, 2019).

Innovation systems, as per RIS models, rely on spatially informed networks of communities and players involved in the innovation process (Phillips et al., 2015). Cooke (2001) presents the requirements for improved innovation potential in territorial and regional systems, including the development of trust and collaborative working practices among economic players. A RIS has to be networked and collaborative if it is inclusive and innovation is pushed from the bottom up instead of the top down. In a bottom-up approach, networking is essential for capacity building since learning processes are social and highly interactive; consequently, innovators, firms, and educators need to cooperate to co-develop the skills necessary for the local economy to thrive (Gasparin and Quinn, 2020). Policymakers may support this process and boost the potential for regional innovation by enacting a range of legislation designed to enhance local authority over local institutions, infrastructure, and taxation (Pino & Ortega, 2018).

Three main categories of underdeveloped innovation systems may be identified in case studies of regional innovation systems in the European context: (a) regions with thick institutions but thin organizations; (b) regions with thick organizations but thin institutions; and (c) regions with both thin and thick organizations. Regions with strong institutional collaboration and support are the first of these, but there aren't enough research-led organizations capable of taking full advantage. In regions where organizations are numerous but institutions are limited (both governmental and cultural), multiple strong organizations exist in the absence of institutions. The last category is organizational and institutional thinness, which refers to regions where the institutional and organizational setups lack the capacity for innovation. As Brown et al. (2016) showed, successful innovation in an ecosystem may occur without robust institutional support. In fact, imposing institutions on that ecosystem can eventually cause harm to it.

1.3.2.2. Helix models in Regional Innovation System (RIS)

The concept of "Regional Innovation Systems" (RIS) has its roots in the literature on Marshallian industrial districts, economic geography, learning regions, clusters, innovative milieux, and national systems of innovation (Roman et al., 2020). It underlines the significance of regions as the driving forces behind innovation (Asheim et al. 2011). It is believed that a wide range of actors from multiple industries and regions interact to bring about innovation (Doloreux 2002). RIS research has been dominated by two major concerns: how different organizations create and share knowledge and how such organizations interact with one another (Doloreux and Gomez, 2017).

The regional innovation system is described by Asheim et al. (2019) as an ecosystem where players engage in interactive learning through two sub-systems. First, there is the 'knowledge exploitation' subsystem that is predominantly made up of businesses. The second subsystem, referred to as the 'knowledge exploration' subsystem, is made up of government and private research labs, technology transfer institutions, universities and colleges, and vocational training institutes. Consequently, these two subsystems together constitute the fundamental structure of the RIS (Roman et al., 2020). Nevertheless, a broader definition also considers the framework that supports innovation, competence development, and institutions and organizations that support the labor market.

Building innovation systems in local contexts with significant partners has been emphasized as a means of fostering regional competitiveness through knowledge-sharing (Yun & Liu, 2019). The process of exchange of knowledge is further impacted by geographic proximity as it might be tough to transfer knowledge beyond regional or territorial boundaries across multiple innovation process regions (Hakeem et al., 2023).

As stated by Etzkowitz and Leydesdorff (1995), the triple helix (TH) model, which is a fundamental concept in the RIS literature, begins by characterizing regional development as the result of interactions between three distinct actors: government, industry, and university. As a compelling framework that promotes the generation, dissemination, and transfer of knowledge for innovation, the Triple Helix (TH) model has been extensively adopted by regional stakeholders, such as governments, businesses, and academic institutions (Hasche et al., 2020; Schoonmaker & Carayannis, 2013; Yun & Liu, 2019). Nonetheless, regional development fails to demonstrate adequate expertise transfer throughout the innovation process, proving the theoretical framework inadequate (Miller et al., 2018).

The triple helix model offers an analytical framework for analyzing how knowledge-based interactions between university, business, and government lead to regional innovation and economic growth (Roman et al., 2020). The three main goals of a Triple Helix system include knowledge, innovation, and consensus building. further, a recent study identified multiple approaches to achieve these objectives including fostering an ecosystem that promotes university- industry linkage, technology transfer and entrepreneurship (Ranga & Etzkowitz 2013).The Triple Helix (TH) model is a prime example of the cooperative relationships between government, industry, and academia that are intended to promote innovation (Roman et al., 2020). It has been used to support the development, dissemination, and transfer of knowledge for innovation in higher education, business, and government (Carayannis & Campbell, 2009; Hasche et al., 2020; Yun & Liu, 2019). Given that academics can use the process of knowledge creation and dissemination as a means to engage with industry and government, the model assumes that: (1) academia plays a leading role in the innovation process; (2) industry uses innovative platforms for knowledge creation, dissemination, and commercialization through collaborative research with academia; and (3) governments can perform a statist role as long as it employs the legislative authority bestowed to it by the constitution to claim the lead and exercise total control over its constituents (Etzkowitz & Leydesdorff, 2000). However, the model is not without its critics; Kimatu (2016) stated that the TH model is deficient since it fails to adequately consider the local community when explaining the process of innovation generation that integrates long-term sustainable growth.

The fourth helix was then added to the TH model, which was then expanded into the QH model by Hakeem et al. (2023), in order to better describe the innovation process as the cornerstone of a knowledge-based economy. The extension of the TH model to the QH innovation model resulted in a range of specifications for the fourth helix, such as consumers, consumers of innovation, the public as citizens, civil society, and media- and culture-based public (Roman et al., 2020). The acknowledgement of citizens as important stakeholders in the innovation process is a shared characteristics among these conceptions. Additionally, civil society encompasses both official and informal communities of practice and interest, as well as non-governmental organizations. It also includes the participation of people as co-developers, co-creators, and lead users of innovative and entrepreneurial initiatives (Carayannis et al., 2019).There have been additional proposals for the fourth helix, including

financing information, media, culture, and civic society (Colapinto & Porlezza, 2012; Zhou & Etzkowitz, 2021).

For the development and execution of the smart specialization strategy in research and innovation, the European Commission has selected the QH model (Marques et al., 2021). The model has served as a viable social setting for disseminating innovative and ethical methodologies for research (European Commission, 2016; Hasche et al., 2020). Civil society, a fourth helix, reflects the prerequisites of the public at large as end users while taking into consideration an ongoing cycle of iteration and feedback (Hoglund & Linton, 2018; Leydesdorff, 2012).

As per Roman et al. (2020), the quadruple helix model offers a number of advantages over the TH model in the development of sustainable innovation. First, the QH model can supplement and improve the TH model by providing "bottom-up" perspectives from civic society to counterbalance "top-down" perspectives from government, business, and academics in regional development. Second, the participation of civic society promotes the development of social innovations, as well as their justification and legitimization. The demand function of civil society, which is regarded as the final user of innovation, significantly impacts the creation of information and technologies. Third, civil society's commitment to and ownership of a development agenda depends on their participation in creating regional development strategies and establishing strategic objectives.

1.3.2.3. Innovation and Innovativeness

Innovation is defined broadly as the application of a new or significantly improved product, process, marketing strategy, or organizational structure in business practices, workplace organization, or external relations (OECD, 2010). As per the OECD (2005), there are four dimensions of innovation: product, marketing, organizational, and process innovation. The notion of innovation dates back to 1930 when Schumpeter assigned it into five categories, including new or improved products, processes, markets, sources of supply, and organisational structure. Bel (2010) defines innovation as ―marketable invention: the act of generating an idea and transforming it into a new product, service, solution, or business model that can be sold to customers‖ (p. 47).

Innovation emerges when an entity implements a new or improved product, process, marketing strategy, or organizational technique in its business operations, workplace structure, or external interactions (OECD, 2005). Generating innovative solutions requires

different relationships and teamwork (Dos-Santos, 2021; Dahlin, 2019). Innovative economies promote high productivity and sustainability at the national level (López-Fernández et al., 2021). Innovativeness at the company level refers to the use of new or enhanced organizational procedures, marketing strategies, or products (OECD, 2014). Businesses may implement new ideas, processes, or products owing for this skill, which further improves their overall performance (Ioanid et al., 2018).

As innovativeness is a capacity to generate and implement novel ideas, products, or procedures. According to Schumpeter and Swedberg (2021), it is an essential component of economic growth and entrepreneurship. Innovation entails both the development of new concepts and their effective commercialization, according to Leiponen and Helfat (2010). This dual capacity is critical for entrepreneurs seeking to make a difference in a competitive ecosystem (Kim et al., 2023). Innovativeness is a critical organizational ability that involves researching novel ideas, products, or processes that are not currently in use (Elbanna & Elsharnouby, 2025). This capability, which is critical for competitive dynamics, has a substantial influence on business' performance (Martin-Rios & Ciobanu, 2019). Businesses must continue to be able to innovate as a means to thrive and position themselves in highly competitive marketplaces by creating products and services that are valued, unique, and irreplaceable. This is consistent with Porter's notions regarding competitive advantage along with resource-based theories of substitution and imitation (Elbanna & Elsharnouby, 2025).

Innovation has been widely acknowledged as a key strategic asset for achieving competitive advantage in dynamic market environments (Khan et al., 2021). Firms that embed innovation into their operations—whether through new product development, process optimization, or organizational restructuring—are better positioned to respond to evolving market demands and sustain long-term competitiveness (Munir & Beh, 2019; Thaise et al., 2020). Among the most effective strategic orientations, differentiation plays a pivotal role in enabling firms to deliver diverse and unique value propositions tailored to specific customer segments (Bayraktar et al., 2017). By innovating products, services, and customer engagement methods, firms enhance their ability to create distinct market identities.

Complementing differentiation, cost leadership strategies also benefit from innovation through improved productivity, minimized defects, and enhanced operational efficiencies (Bashir & Farooq, 2018). However, innovation is not merely the result of internal capabilities but is significantly shaped by broader institutional environments. Normative institutions, which influence social values and risk orientations, and cognitive institutions, which shape shared mental models and opportunity recognition, form the structural foundations of national

and regional innovation systems (Park et al., 2025). Innovativeness, therefore, is both a product of organizational initiative and institutional conditioning (Kassa & Kegne, 2025).

The determinants of firm-level innovation are multifaceted. Internally, factors such as leadership style, employee engagement, interdepartmental collaboration, resource availability, and the firm‘s age and size are critical enablers (Daksa et al., 2018; Egbetokun et al., 2016; de Oliveira Sousa et al., 2020). Externally, innovation is shaped by policy environments, access to finance, industry dynamics, and the quality of linkages with external organizations, particularly in the context of industrial clusters or sustainable industrial parks (Bacq & Eddleston, 2018; Azerefegn et al., 2020; Guteta & Worku, 2022).

Organizational innovation, as a core dimension of strategic performance, hinges on sustained investments in R&D, access to highly skilled talent, and a supportive culture of innovation (Kim & Kim, 2018; Divisekera & Nguyen, 2018). When effectively managed, these factors enable firms to adapt, scale, and maintain relevance in competitive markets. However, in developing contexts such as Ethiopia, systemic barriers—including limited technological awareness, weak mentoring systems, inadequate infrastructure, and restrictive policy frameworks—pose serious obstacles, particularly for micro and small enterprises (Daksa et al., 2018). Addressing these structural constraints is critical to unleashing innovation potential and fostering more inclusive and competitive economic development.

1.3.2.4. Regional Competitiveness

Although it's often associated with direct rivalry, competitiveness actually refers to the features that enable businesses to successfully compete in regional, national, and global markets (Grassia et al., 2024; Huggins & Thompson, 2017). Competitiveness is defined by the World Economic Forum as a set of policies, institutions, and factors that contribute to a nation's overall level of productivity (Krasniqi & Skenderi, 2025; Krsti et al., 2020; Radivojevi et al., 2019; Schwab & Porter, 2018). It could also refer to the ability of a country (or region) to use its domestic resources to improve the quality of life for its citizens; the ability of a region to create wealth while maintaining equilibrium with its rivals; and the ability of a region to build wealth and increase its value through reliance on its domestic economy and international trade (Chaaben et al., 2025). Additionally, Mereuță et al. (2007) describe competitiveness as the ability to coexist with other entities in a conflict of interest. This ability is divided into three levels: superiority, development, and survival.

Competitiveness encompasses both individual financial security and the expansion and sustainability of businesses (Omri et al., 2025; Stoica et al., 2020 Huggins et al., 2019). Competitiveness includes both the growth and sustainability of enterprises and the financial security of individuals (Omri et al., 2025; Stoica et al., 2020 Huggins et al., 2019). Benítez-Márquez (2022) presents national competitiveness in the framework of macroeconomic policy, stressing that its ultimate objective is to raise citizens' real incomes and living standards by providing them with globally competitive products and services. Creating an environment that promotes efficient and sustainable value generation is the ultimate objective of competitiveness (Tolossa et al., 2025). Strengthening competitiveness is a top priority for all states in the present economy. Malecki (2004) makes a distinction between low-road competition, which is predicated on economic wages and taxes, and high-road competition, which involves entrepreneurship and knowledge policy. Regional economic and social activities can benefit from high-road competition's positive-sum effects (Sutton & Arku, 2024).

A hierarchy of competitiveness principles is presented by Zhidebekkyzy (2020) and includes Product, Enterprise, Industry, Regional, and National. A country's capacity for effective resource management, robust and stable economic growth, and competition globally are all components of its national competitiveness. Also, Sustainable economic growth, political stability, financial infrastructure, export strength, resource accessibility, reliable governance, and educational quality are some of the elements that contribute to it (Benítez-Márquez, 2022).

Besides, Porter (1990) put forth a four-pronged model, also known as a diamond, which suggests four factors that determine competitive advantage for an industry or industry segment in a country or region: (1) firm strategy, structure, and rivalry; (2) demand conditions; (3) factor conditions; and (4) related supporting industries. Since policies, political involvement, and unanticipated circumstances may significantly impact competitiveness within an industry; the role of the government and an element of opportunity have also been proposed as additions to complete the diamond (Webster & Cain, 2024). Regional competitiveness is the ability of a specific region to improve the quality of life for its citizens and promote economic growth and societal well-being by making effective use of resources (Kouskoura et al., 2024; Judrupa, 2021). It includes a wide range of elements from the political, social, economic, and business spheres (Brand, 2022).

Regional competitiveness, which lies between the micro and macro levels of competitiveness (Krsti & Radivojevi, 2022; Sánchez et al., 2019), is becoming increasingly

relevant since regions play a crucial role in creating wealth and economic growth. This relates to a region's capacity to produce goods and services that fulfill the needs of the domestic and global markets while maintaining a substantial and predictable level of income (Krstić and Radivojević, 2022). Regional competitiveness requires sustainable workforce development to improve living standards overall (Holis et al. 2018) and depends on circumstances that enable enterprises to compete while maintaining value within the region (Huggins & Thompson, 2017). Relevant factors include productivity, human capital, social-cultural dimensions, infrastructure, and intellectual capital (Sánchez et al., 2019).

Regions should concentrate on enhancing economic productivity, employment rates, quality of life, and development. Technical know-how, research infrastructure, human capital quality, innovative ability, and specialized skills generated by the educational system are all examples of competitive advantages (Raudeliūnienė & Matar, 2025; Sánchez et al., 2019). Endogenous development processes at the local and regional levels are critical to a country's growth and well-being (Medina-Sánchez et al., 2025; Sánchez et al., 2019). Regional competitiveness has been characterized as a region's capability to compete in global markets while producing high levels of both employment and revenue, (Dijkstra et al. 2023).

1.3.3. Conceptual framework

This section discusses the processes and pathways through which the four primary regional innovation actors—academic institutions, businesses, governmental bodies, and civil society organizations—engage in dynamic interaction and collaborative learning to strengthen regional competitiveness. The framework demonstrates the emergence of regional competitiveness. A quadruple helix model is used to articulate how all the players in the innovation ecosystem interact with one another. Knowledge and innovation are highlighted by the quadruple helix model, where each helix plays its typical role: governments offer financial support and regulation, businesses transform research and creativity into products, and universities provide innovative researchers, civil society is an active user and driver of innovation.

Following the QH principles the conceptual framework identifies the four innovation actors: University (Hawassa University), Industry (regional industrial clusters such as the Hawassa Industry (HIP), Hawassa Industry Zone, and Yirgalem Integrated Agro Industrial Park), Government (federal and regional government offices) and civil society (civil service organizations). These actors contribute to the regional innovation system and are engaged in the innovation system. The four innovative actors are interconnected and engage in multiple directions (shown by arrows in the diagram) with the corresponding actors in the

eco-system that enable the allocation of resources, knowledge transfer, and collaborative problem solving. This configuration of the quadruple helix offers the foundation for innovation that is capable of accommodating the demands of society and the market.

The framework depicts how these actors' collaboration result in interactive learning, an essential transformational step that turns collaborative efforts into tangible outcomes. This interactive learning highlights the development of a shared understanding that emerges when multiple stakeholders engage in joint innovative initiatives. Improvements in productivity, service delivery, and knowledge creation—the three primary outputs that emerge from effective regional innovation systems—are strongly connected to the results of this process. The present model stands out due to its recognition that infrastructure and the landscape for innovation operate as enabling components that maintain the system as a whole. These include innovation support systems providing incentives and resources, and also innovation policies that offer strategic direction. The framework demonstrates how each of these elements contribute to the interactions between actors, implying that corresponding policies and support systems may improve the interactions between academic institutions, business, government, and civil society, thereby increasing the region's total potential for innovation.

New product development, production gains, business innovation, and the establishment of new businesses are the four outputs that the model yields in strengthening regional competitiveness. The framework shows how these competitive advantages are directly influenced by the interactive learning process provided it is supported by sufficient conditions and infrastructure. This demonstrates the causal link between successful innovation systems and regional economic growth.

This conceptual framework highlights the essential elements and associations that drive innovation-led competitiveness, offering policymakers and practitioners of regional development with insightful data. It suggests that in effort to improve their competitiveness, regions should concentrate on building supporting innovation policies and infrastructure, encouraging interactive learning processes, and fortifying linkages between innovative players. Regions may establish mutually beneficial innovation ecosystems that generate sustainable competitive advantages by dealing with these variables upon one another.

The conceptual framework for the regional innovation system illustrates how the system is driven by innovation infrastructure and environment (innovation policy and innovation support) and moves from actors of innovation (university, government, industry,

and civil society) through interactive learning (which produces outcomes related to productivity, service, and knowledge) to regional competitiveness (which results in new business, production gains, business innovation, and new products).

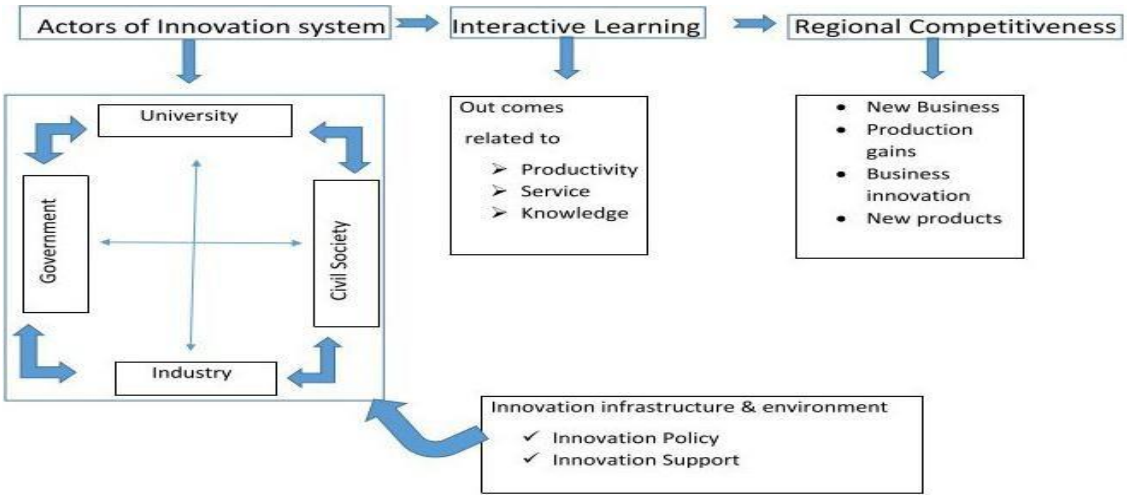

Figure 1.1: Conceptual framework of Regional Innovation System (RIS) and Regional Competitiveness (developed by the author)

1.4. Research Questions

- How does the Regional Innovation System (RIS) contribute to regional competitiveness in Ethiopia?

1.4.1. Specific Research Questions

1. How do existing Science, Technology and Innovation (STI) policy frameworks align with the principles of a Regional Innovation System (RIS)?
2. What practices and components currently constitute the RIS in the region?
2 What major challenges hinder the development of the RIS, and what mechanisms can be used to overcome them?
3 What strategies can be implemented to strengthen and enhance the RIS?
4 What is the current level of firms' competitiveness and regional competitiveness?
5 In what ways does the emerging RIS influence the competitiveness of firms and the region as a whole?

1.5. Objectives of the Study

The general objective of this study is to illustrate the contribution of the RIS to Regional Competitiveness in Ethiopia. To achieve the general objective, the specific objectives identified are to:

1. Examine the existing Science, Technology and Innovation (STI) policy frameworks in light of the Regional Innovation System (RIS).
2. Evaluate the existing practices and elements that form the Regional Innovation System (RIS).
3. Identify the challenges of Regional Innovation System (RIS) in the region and the mechanisms of overcoming the challenges in RIS;
4. Identify ways forward to enhance the Regional Innovation system (RIS);
5. Identify the status of firms' and regional competitiveness;
6. Examine how the emerging Regional Innovation System (RIS) is contributing to firms' and regions' competitiveness.

1.6. Significance of the Study

Despite being a novel idea for regional development, the regional innovation system has been successful in fostering regional and local development across Europe since 1970 and its effectiveness has been witnessed in other continents as well. Consequently, the use of the concept in the Ethiopian setting creates a new paradigm and supports the on-going domestic economic reform initiative. Likewise, the research findings will provoke discussions among actors and challenge policymakers on alternative regional development policies and strategies. Furthermore, the initiative would facilitate an enabling environment to achieve the Sustainable Development Goals (SDGs) and Agenda 2023, and the endogenous home-grown policy of 2019. In a similar vein, the quadruple helix concept would improve the integration of local governments, businesses, and academic institutions. The proposed research would be significant for regional development, policy, and academics. Most importantly, the study would offer a fresh perspective on directing regional development processes for the regional actors.

In both academic and research position, this study offers a substantial contribution to the theoretical and empirical comprehension of regional innovation systems, notably in the context of emerging nations like Ethiopia, where such frameworks are still not well recognized. A critical gap in the literature would be covered by the research, presenting new

viewpoints on how innovation dynamics function in emerging economies through integrating and extending the regional innovation system and quadruple helix concepts to the Ethiopian context. Additionally, the study promotes multidisciplinary research through the integration of viewpoints from innovation studies, public policy, regional planning, and economics. It further provides a robust analytical framework and empirical data that future researchers may use to study regional development procedures within comparable settings.

Finally, this study contributes to academic debates by questioning established models and indicating context-specific adaptations, resulting in a deeper awareness of regional innovation and development. Most importantly, this study has major implications for the local community since it promotes inclusive economic growth and encourages collaboration among local players. It offers scholars and practitioners a reproducible framework for analyzing innovation in emerging economies, thereby improving both empirical insight and methodological rigor. For policymakers, the study provides evidence-based assistance for developing and implementing innovation policies tailored to Ethiopia's particular regional concerns, allowing for more effective and context-sensitive policy interventions.

1.7. Scope of the Study

The study, geographically limited to Hawassa and Yirgalem towns, assesses how the RIS fosters regional competitiveness and development using the quadruple helix framework. It examines institutional actors: Hawassa University, Hawassa Industry Park (Africa's largest sustainable textile hub), Yirgalem Integrated Agro processing Industrial Park, Hawassa Industry Zone, regional and municipal governance bodies, Africa Jobs Network, and local residents. The study uses an exploratory sequential mixed-methods design that integrates document reviews, Interviewees, group discussions, observations, and survey design to address the primary inquiry: how is the emerging Regional Innovation system contributes to the regional competitiveness

The theoretical scope of the study looks at regional innovation systems considering a position of regional competitiveness. It highlights how businesses, academic institutions, research groups, the government, and civil society collaborate to create benefits based on innovation. It is important to note that it excludes evaluations of micro-level company strategies, internal management practices, and individual entrepreneurial activities, which are deemed outside the scope of the system-level focus. Furthermore, it ignores broad macroeconomic talks on competitiveness that are detached from regional institutional and network dynamics, as well as simply national or global perspectives on innovation systems and in-depth sectoral innovation studies. Cultural, historical, and sociological variables are recognized only in terms of their impact on the functionality of the regional innovation system, rather

than as separate theoretical concepts.

1.8. Limitations of the Study

The study encountered several limitations during data collection, primarily linked to contextual and institutional constraints within the regional industrial clusters. Following Ethiopia's removal from AGOA, a substantial number of export-oriented firms ceased operations or relocated to neighboring countries, significantly reducing the number of active firms in Hawassa Industrial Park—from 21 in 2023 to fewer than eight at the time of data collection. This contraction severely limited the pool of potential respondents. In addition, the prevalence of prior research activities within HIP led to respondent fatigue, with many participants expressing disinterest due to repeated engagement without observable benefits. Some firms also misinterpreted the nature of the research, conflating it with government investigations, which further diminished trust and willingness to participate. These factors collectively constrained the depth and breadth of qualitative insights, despite concerted efforts to build rapport and clarify the academic intent of the study.

1.9. Delimitations of the study

Since the research aims to focus on the RIS as a primary objective, particular significant issues might get overlooked. The inquiry would have conceptual, geographic, and temporal boundaries. First, theoretically, as noted in the sections above, the study will only focus on how RIS would boost regional competitiveness; geographically, it will only look at the Sidama regional state and its regional industrial clusters. From the time perspective, the data was gathered once between September and December 2024, which may have resulted in the omission of regional dynamics longitudinal trends; from the perspective of population, the research was restricted to key informants, higher level officials, and management members of the companies for the survey questioner, which may have resulted in the omission of other potentially pertinent personnel. The researcher may concentrate on certain players (government, businesses, universities, and civil society) that would best implement the proposed idea because the process of collecting research data for it is costly.

1.10. Structure of the Dissertation

This dissertation is organized into six chapters, each addressing a core component of the study and collectively building a coherent narrative on the role of the Regional Innovation System (RIS) in enhancing regional competitiveness in Ethiopia. The first chapter provides the overall introduction, outlining the background, rationale, research questions,

objectives, significance and scope of the research. Ethiopia's National Innovation System (NIS), policy frameworks, and comparative experiences from other African nations are all examined in Chapter Two, which provides a thorough analysis of national and regional innovation policies. Regional innovation systems function within a larger policy framework that is established in this chapter. In order to improve graduates' employability and foster regional innovation capacity, Chapter Three examines the role of social businesses within the RIS, focusing on how they connect academia and business.

The fourth chapter analyzes the prospects and constraints of technology transfer and community participation at Hawassa University, measuring the institution's ability to contribute to regional innovation. The fifth chapter investigates the determinants of firm-level innovativeness within regional industrial clusters, employing quantitative approaches to analyze how R&D, collaboration, location, and market orientation influence innovation outcomes. finally, Chapter Six summarizes the conclusions from all chapters, bringing together theoretical, empirical, and policy perspectives. It highlights the study's contributions, makes recommendations for improving the RIS, and outlines directions for further research. Together, these chapters provide a complete analysis of how evolving regional innovation frameworks affect Ethiopian competitiveness, with Hawassa serving as an exemplary regional instance.

CHAPTER TWO:

NATIONAL INNOVATION SYSTEM (NIS) AS A MEANS FOR DEVELOPMENT: POLICIES, OPPORTUNITIES, AND CHALLENGES IN ETHIOPIA

ABSTRACT

A robust National Innovation System (NIS) has become crucial for fostering socioeconomic progress and competitiveness in emerging economies like Ethiopia, and its success relies significantly on successful implementation of science, technology, and innovation (STI) policies. Using a document review approach, the study examined at various STI policies and legal frameworks regarding their relation to the National Innovation System (NIS).The results of the study indicate that the National Innovation System is supported by the current STI policies and legal frameworks. There is evidence that an enabling environment emerges to strengthen the NIS, which includes enhancing R&D funding, improving university-industry linkage, and promoting an entrepreneurial culture. Similar to this, research shows that Ethiopia has a lot of potential to increase STI's capacity because of its advantageous location, wealth of natural resources, and expanding support from the public and private sectors. The execution of STI laws and policies is nevertheless hampered by a number of issues, such as poor R&D investment, weak university-industry linkage, poor coordination among stakeholders, and inadequate infrastructure. Ethiopia's STI policies and legal frameworks are essential for driving economic growth, innovation, and competitiveness by fostering an environment that encourages collaboration and technology transfer. Nevertheless, the country faces challenges in effectively implementing these comprehensive policies due to existing barriers like policy gaps and insufficient institutional support. To strengthen its National Innovation System and promote sustainable economic development, Ethiopia must assess current opportunities, address these obstacles, and explore alternative policies that can enhance its STI capabilities.

Keywords: Competitiveness, Development, Ethiopia, Policies, Research & Development, Regional Innovation System (RIS), Science Technology & Innovation (STI).

2.1. Introduction

Science, Technology, and Innovation (STI) is vital in ensuring sustainable development and national competitiveness in the knowledge-based economy (Andrade et al., 2022; Asheim et al., 2020; Krammer, 2017). This is therefore thought to be possible through supporting the creation of STI policies and regulations, institutions, and funding programs that encourage economic expansion, employability, entrepreneurship, and increased productivity (Ali et al., 2024; Andabayeva et al., 2024). Likewise, the degree to which a country‘s institutions and policies encourage the pursuit of new knowledge, technological advancement, and the inventiveness of its enterprises determines its capacity to attain and sustain viable, dynamic economic development (Khan, 2022; Basheer, et al., 2022). Therefore, policies pertaining to science, technology, and innovation (STI) are critical to a nation‘s progress and are required for it to develop a dynamic, integrated, and self-sufficient economy (Singh et al., 2022; Chauhan et al., 2024).

At every level—global, regional, and local—policy and legal frameworks have been developed to achieve socioeconomic progress and prosperity (Ali et al., 2024; Muchie & Ezezew, 2022). For instance, the Sustainable Development Goals (SDG), Agenda 2030 stands for collective action on economic, social, and environmental dimensions in a stable and integrated manner. Similarly, the African Union (AU) adopted a long-term Agenda 2063, ―The Africa We Want‖ to foster inclusive growth and sustainable development at local and regional levels. Both the abovementioned policies recognise Science, Technology, and Innovation (STI) is vital role as universal enablers for achieving aspirations and goals. Within the broader framework of AU Agenda 2063, the African Union (AU) launched the Science, Technology, and Innovation Strategy for Africa 2024 (STISA-2024) in 2014 as the regional framework for accelerating the continent‘s transition to a knowledge-based, innovation-led economy. Accordingly, pertinent African organizations were created during this process through the implementation of decisions and legal documents into effect, including the Pan-African Intellectual Property Organization (PAIPO), the African Scientific Research and Innovation Council (ASRIC), and the African Observatory for Science, Technology, and Innovation (AOSTI).

To increase the entire economy‘s productivity and competitiveness and facilitate the gradual transition from state to private sector-led growth, the Federal Democratic Republic of Ethiopia (FDRE) Plan and Development Commission developed the Home-Grown Economic

Reform (HGER) in 2021. Promoting national innovation, research, and technological capabilities; generating a digital economy and broadening its benefits; enhancing national competitiveness and productivity through the development of technology-based industries; and establishing innovation and technology regulatory systems operating procedures are some of its objectives (Wazza, 2022).

The Strategic Policy also provides the legal framework for the Ethiopian national innovation system for National Science, Technology, and Mathematics Education, Investment Proclamation, Intellectual Property Law, National Research and Development Strategy, Industrial Parks Development Proclamation, and Technology Incubation and Transfer Policy, Higher Education Proclamation (650/2009) of 2009, the Intellectual Property (IP) Rights System, the National Science, Technology, and Innovation (STI) Policy, and the Professional and Program Mix Policy. Similarly, Higher education institutes are highly required to carry out research, including partnerships with industry, to serve the demands of the development of the nation, and the national legislative and policy frameworks encourage research and innovation that enhances knowledge and technology transfer.

The 1994 education and training policy has been considered to possess the foundation for the creation and execution of various legislative frameworks, programs, and strategies by the Ethiopian government to regulate the operations in Ethiopian higher education institutions with regard to research and development and university-industry linkages (Kahsay, 2017). The national framework emphasizes technology transfer, university-industry collaboration, and strategies to enhance research and technology transfer in Ethiopian universities, grounded in the Research and Technology Transfer Conceptual and Governance Framework of Ethiopian Higher Education Institutions. The Professional and Program Mix Policy requires a 70:30 undergraduate professional allocation that favors science and technology over the humanities and social sciences (MoE, 2008); this policy contributes to the expansion of training and research collaborations between universities and industry. In addition, the intellectual property rights system was created in 2003 along with the Ethiopian Intellectual Office (MoE, 2008). The absence of institutional IP policies in public research and development institutions, government-owned businesses, and higher education institutions, however, is the most significant problem; additionally, the enterprises overlook the need for IP protection (Kahsay, 2017). Lastly, the study was conducted out primarily to deal with the objectives that follow.

1. To review the STI policies and legal frameworks supporting National Innovation Systems (NIS) in Ethiopia.
2. To explore the opportunities for leveraging National Innovation Systems (NIS) for economic development.
3. To identify the main challenges hindering National Innovation Systems (NIS) from contributing to economic development.

2.1. National Innovation System (NIS)

These days, Science, Technology, and Innovation (STI) policies are now essential to sustainable socioeconomic development as well as national competitiveness in knowledge-based economies (Xu et al., 2022; Surana et al., 2020). Accordingly, promoting SPI policies is a prerequisite to achieving innovation-driven development (Zhu et al., 2022); since STI may improve worker efficiency and improve the calibre of production factors (Zhou et al., 2022). Also, maintaining healthy and sustainable economic development is largely dependent on STI (Walsh et al., 2020). The STI capability is a key indicator of overall competitiveness and a determining element in gaining a competitive edge globally. According to Zhou et al. (2022), Science, Technology, and Innovation (STI) policy is a crucial element of national innovation systems, a vital tool for influencing the innovation environment and promoting innovation vitality, and a basic assurance for innovation-driven development.

The main concern of policy makers in developed and developing countries today is national competitiveness and how competitiveness can be improved (Khyareh et al., 2022). The need to resolve policy failures has led to the development of innovative systems that may refer to the innovation characteristics of either a country or Regional level (Chaparro-Banegas et al., 2023). Innovation systems, which develop continuously over time, are created through collaboration and cooperation among entities within a region or country (Asheim et al., 2011; Doloreux & Parto, 2005). The concept of the National Innovation System (NIS) originated between the end of the 1980s and the middle of the 1990s; Bengt-Åke Lundvall was the first scholar coin the term National Innovation System (NIS) (Lopez-Rubio et al., 2021). It has been in use for over two decades and is now extensively used by researchers and policymakers worldwide (Kurpayanidi, 2021). The significance of systemic collaboration in innovation processes has been emphasized by the NIS concept (Samara et al., 2012). The National Innovation System (NIS), which focuses on a specific territory, is the inspiration for the ― RIS concept (Iammarino, 2005).

2.3. Science, Technology, and Innovation Policies (STIP) in Emerging Economies

Although widely considered as an emerging concept, Science, Technology, and Innovation (STI) Policies have garnered more attention in the context of sustainable and inclusive development (Khan, 2022). Research and development policies, innovation policies, industrial policies, scientific policies, and technology policies are other names for the scientific Technology and Innovation (STI) policies. It includes a range of strategic activities that are intended to support innovation efforts while simultaneously addressing more general objectives, such as enhancing social integration, promoting sustainability, and improving quality of life (Sagar, 2023). Increased investment in research and development is being made as a result of the national policies‘ emphasis on science and technology to promote the quick integration of cutting-edge technologies, strengthen international cooperation, and address grand social issues (Arimoto, 2024).

Emerging economies, including Brazil, India, China, South Korea, and South Africa (BICSS), illustrate that a country‘s competitiveness in the global marketplace is contingent upon its proficiency in executing science, technology, and innovation policies. This involves not only the acquisition and adaptation of technical knowledge but also the enhancement of domestic technological capabilities. These countries can close the technological gap with advanced nations and significantly boost productivity (Salami & Soltanzadeh, 2012).

An examination of the innovation capabilities across eight Asian nations reveals a positive correlation between income levels and both the inputs and outputs of innovation. Countries classified as high- and upper-middle-income predominantly depend on private sector investments in research and development, whereas those in the lower-middle-income bracket, including Indonesia and Bangladesh, are largely supported by public R&D funding. Japan and South Korea stand out with a greater volume of domestic patent filings, in contrast to Malaysia, Thailand, Indonesia, and Bangladesh, which depend significantly on research and development conducted by foreign enterprises. While China has successfully attained substantial innovation outputs through considerable investments in R&D, India has not progressed beyond a lower-middle-income status, primarily due to its limited R&D spending and dependence on government initiatives (Park and Kim, 2021).

The Lagos Plan of Action, established in 1980, laid the groundwork for the subsequent Lagos Consolidated Plan of Action, which emerged in the early 2000s. This latter

plan underscored the significance of Science, Technology, and Innovation (STI) as essential components for fostering socio-economic advancement across African nations (Khan, 2022; Yongabo & Göransson, 2020). Key objectives of these initiatives included enhancing research capabilities and reforming the higher education landscape. A notable commitment was made for African countries to allocate 1% of their Gross Domestic Product (GDP) towards research and development (Khan, 2022). The evolution of innovation and science and technology policies in developing nations is being influenced by the rise of a knowledge-based economy, the forces of globalization, and the involvement of various international organizations, as illustrated by the experiences of the BRIC countries (Gachie and Govender, 2017). However, STI institutionalization in Africa has not kept pace with other regions; many African countries lack sufficient STI management bodies or policies to advance STI successfully. Developing countries, especially those in sub-Saharan Africa, often regard their National Innovation Systems (NIS) as ―immature‖ or ―catching up‖ (Skorge, 2024; Yongabo & Göransson, 2020; Seifu et al., 2022).

In the African context, Science, Technology, and Innovation Policies (STIP) can be reconceptualized as a mechanism for transforming the continent‘s rich history, cultural heritage, and artisanal practices into globally recognized creative industries. This would change the way STI is conceptualized and create an ecosystem similar to Silicon Valley, which creates millions of jobs while balancing ―grassroots‖ and ―mission-oriented‖ innovation policies to boost national innovation capacities, encourage inclusive growth, and combat poverty and inequality (Khan, 2022; Mavhunga, 2017). Evidence showcases that while R&D significantly drives innovation, which in turn enhances firm productivity, the engagement in R&D and innovation is largely influenced by access to skilled labour and financial resources, highlighting the importance of developing mechanisms and policies to promote knowledge production and bolster innovation initiatives (Keraga & Araya, 2023).

With South Africa and Egypt contributing the vast majority of contributions, Africa has the weakest research infrastructure of any continent. It also contributes less than 2% of global research publications, struggles with brain drain, and has a very low innovative profile, with 88% of patent activity concentrated in South Africa. Furthermore, Africa falls short of meeting the GERD target of allocating 1% of GDP for research and development (Khan, 2022; Mavhunga, 2017). In this regard, the latest updates for Ethiopia, Kenya, and Rwanda showed Gross Expenditure on Research and Development (GERD) as follows Kenya (0.8%),

Rwanda (0.7%), and Ethiopia (0.3%) (Ogada et al., 2022). In Africa, significant development entities, including universities, research institutions, financial organizations, educational bodies, and intermediary organizations, are present; however, they often exhibit limited competencies. Furthermore, these entities frequently lack the necessary connections and institutional capacity to effectively participate in innovation strategies that are responsive to market demands (Seifu et al., 2022).

2.3. Methods

The study employed a qualitative approach, specifically document review as the primary methodology to conduct a thorough evaluation of the existing Science, Technology, and Innovation (STI) policies and legal frameworks in Ethiopia within the context of the RIS. The study's primary objective is to identify possibilities and gaps that could guide future policy while analysing how well STI laws and policies connect with the National Innovation System (NIS). The data collection process consisted of a review of relevant documents, which were categorized into four key areas: government publications, including significant policy documents such as the National Science and Technology Policy (2012) and the Investment Proclamation (2020); reports from international organizations like the United Nations and the World Bank; academic literature that examines STI policies in Ethiopia alongside comparative studies in emerging economies; and regional and global initiatives, including frameworks like the Sustainable Development Goals (SDGs).

In terms of the inclusion criteria, the primary one is how relevant policies and legal frameworks are to the national innovation system. Science, Technology, Innovation (STI) policies and legal frameworks, and their impact on Ethiopia‘s economy and society are the subjects of the selected documents. The process of reviewing the documents was stopped when it became clear that adding more documents to the study was no longer adding anything either novel or relevant. Each document is legally sourced from official government ministries. Although the exclusion criteria weren‘t mentioned explicitly, it appears from the selection process that documents that did not match the criteria for inclusion would be excluded.

The selected documents cover a wide range of important topics that are crucial to fostering creativity, technological advancement, and economic growth in Ethiopia. The National Science and Technology Policy (2012), the STEM Education Program (2016; Investment Proclamation (1180/2020), the Intellectual Property Law (320/2003; National Research and Development Strategy (2021), the Industrial Parks Development Proclamation (886/2015), the Digital Strategy (2021), the Addis Ababa University Innovation and Incubation Policy (2022), the Professional and Program Mix Policy (MoE, 2008), the Higher Education Proclamation (650/2009), and Directive No: Research (01/2019) are among the current STI policies and legal frameworks covered in the study.

Data analysis involved a deductive approach to thematic analysis was used in the study‘s methodology, with a focus on predetermined categories such as STI policies and legal frameworks, innovation opportunities, policy gaps and challenges, and comparative analysis of Ethiopia‘s National innovation ecosystem capabilities with Kenya and Rwanda. This thematic analysis was conducted enabling a comprehensive exploration of the relationships between STI policies, National and regional innovation dynamics, and economic outcomes. Triangulation was used to compare data from multiple sources, such as government publications and scholarly literature, in order to increase the results‘ credibility. Furthermore, input from subject-matter specialists was requested to confirm interpretations drawn from the examined materials. Notwithstanding the comprehensiveness of this document assessment, some limitations were noted, including possible gaps brought on by the use of publicly accessible materials and the constantly evolving nature of policies. The study‘s findings are intended to enhance knowledge of how STI policies impact Ethiopia‘s national innovation system and support sustainable development.

2.4. Ethiopia, Kenya, and Rwanda Experience

The Global Innovation Index (GII) serves as an annual evaluation that measures the innovation capabilities and achievements of economies across the globe. It includes more than 80 metrics categorized into seven distinct groups: institutions, human capital and research, infrastructure, market sophistication, business sophistication, knowledge and technology outputs, and creative outputs. According to the 2023 Global Innovation Index, each country exhibits distinct characteristics.

Ethiopia is a low-income country, ranks 125th with a population of 123.4 million, a GDP of 347.8 billion PPP$, and a GDP per capita of 3,434 PPP$. Kenya, on the other hand, is classified as a lower-middle-income nation, has 54 million people, a GDP of 311.8 billion PPP$, a GDP per capita of 6,122 PPP$, and a rank of 100. Similarly, Rwanda, which is placed 103rd and with a population of 13.9 million, a GDP of 37.6 billion PPP$, and a GDP per capita of 2,836 PPP$, is likewise categorized as a lower-income country. Based on the Global Innovation Index, this report presents a comparative picture of these three countries.

Ethiopia, Kenya, and Rwanda exhibit significant differences in their institutional frameworks, which have an effect on their national innovation systems. Ethiopia has a very low total institutional score of 32.7, particularly when it comes to the business environment (30.5) and institutional environment (18.6), which restricts Ethiopia‘s capacity to foster innovation. Kenya, on the other hand, had a score of 45.0, which suggests that it has made some progress in terms of innovation but still needs to improve. This can be attributed to a somewhat supportive corporate climate (30.5) and a more favorable regulatory environment (49.0). With a remarkable overall score of 65.4, Rwanda leads the country in innovation. This is driven by a robust business climate (79.1) and a sound regulatory framework (63.2). Considering these disparities, it is advisable that Ethiopia and Kenya take lessons from Rwanda‘s effective policies in order strengthen their institutional frameworks and enhance their business environments, so enhancing their ability to foster innovation. Promoting local innovation systems and promoting economic growth requires policymakers to have a solid understanding of the institutional context. Globally, Singapore, Switzerland, and Finland had the highest marks in the world for the institutional structure (98.4, 87.3, and 85.4, respectively).

Rwanda scored 22.6, higher than both countries, indicating a strong emphasis on R&D (3.5) and significant expenditures in education (37.7) and higher education (26.6). Ethiopia may need to improve its research and tertiary education programs in order to increase its capacity for innovation and national competitiveness. This analysis emphasizes how important research and education are to fostering creativity. Both Rwanda and Kenya are improving their R&D and human capital frameworks. The differences in these countries‘ R&D and educational strategies highlight the necessity for purposeful advancements in human capital development to promote national progress by demonstrating how varying levels of investment and emphasis may affect their whole innovation ecosystems. Sweden,

Singapore, and South Korea have the highest human capital scores in the world, at 66.9, 63.2, and 62.7, respectively.

There are significant disparities between the infrastructure landscapes of Ethiopia, Kenya, and Rwanda that have implications for their distinct national innovation systems. There is potential for improvement, as evidenced by Ethiopia‘s 12.1% overall infrastructure score, particularly in the Information and Communication Technologies (ICT) category, where the country scored 17.4. In contrast, Kenya has a stronger infrastructure base, scoring a respectable 25.3 and an impressive 56.4 in ICTs, demonstrating the nation‘s advanced digital ecosystem and the government‘s commitment to online services and e-participation. Rwanda leads the field in this comparative analysis with an infrastructure score of 27.9, which highlights its efficient use of ICTs at 53.7, and a general infrastructure score of 18.3, which demonstrates its strategic investments in technology and development. Ethiopia may find it challenging to promote innovation due to its relatively underdeveloped infrastructure, whereas Kenya and Rwanda, with their more robust infrastructure, are better positioned to lead in national innovation, enabling greater connectivity, sustainable ecological practices, and increased entrepreneurial activity. With scores of 69.2, 67.6, and 65.6, respectively, Finland, Sweden, and Denmark are the top three nations in the world for infrastructure.

A comparison of Rwanda, Kenya, and Ethiopia‘s market sophistication reveals several intriguing distinctions that have significant implications for each country‘s innovation processes. Ethiopia has a 19.8 market sophistication score, compared to Rwanda‘s 18.6 and Kenya‘s higher 22.1 scores. To be more precise, Kenya scores 21.5, which indicates that it has a strong investment performance and offers a conducive atmosphere for funding innovation. Ethiopia‘s investment score, however, lower at 0.4, emphasizes difficulties in bringing in both foreign and domestic funding, which may impede the development of creative businesses. Kenya is probably positioned to maximize its potential for regional competitiveness, although differences in investment and general market sophistication could result in diverse innovation paths. On a global scale, the leading countries in market sophistication are the USA, Hong Kong, and the United Kingdom, with scores of 82.9, 71.8, and 69.3, respectively.

Ethiopia‘s business sophistication score of 14.7 indicates difficulties in creating a strong innovation environment. Nonetheless, with a score of 24.2, Kenya tops the list, demonstrating a higher ability to integrate knowledge workers and create innovative

connections—two factors that are essential for promoting innovation and technological growth. Rwanda‘s business sophistication score of 20.0 indicates a well-rounded strategy, bolstered by its focus on knowledge absorption (26.7) and innovation connections (24.9). Kenya appears to have a more dynamic environment for promoting innovation, which can propel economic development more successfully than Ethiopia‘s existing situation, based on its better ratings for knowledge workers (22.7) and innovation links (23.2). On a global scale, Sweden, the USA, and Singapore lead in business sophistication, with impressive scores of 78.5, 69.9, and 65.6, respectively.

The comparative analysis of the knowledge and technology outputs among Ethiopia, Kenya, and Rwanda reveals distinct. Ethiopia‘s knowledge and technology outputs stand at 17.9, with a particularly strong emphasis on knowledge creation (19.2) and knowledge impact (24.1). In contrast, Kenya demonstrates slightly higher overall outputs at 18.4, with significantly higher levels of knowledge diffusion (20.4) compared to Ethiopia and Rwanda.

Rwanda‘s strategy appears to be centered on optimizing the impact of current information, whilst Kenya and Ethiopia are concentrating on using knowledge creation and impact to spur innovation. A more competitive and connected national economy might result from improving the innovation ecosystems of all three countries through regional cooperation and focused investments in knowledge creation and diffusion, as indicated by the disparate performance in these indicators. Switzerland, the United States, and Sweden are the top three countries in terms of knowledge and technology outputs, scoring 65.3, 63.9, and 63.4, respectively.

Ethiopia, Kenya, and Rwanda exhibit noteworthy disparities in their creative outputs and innovation skills, which have important ramifications for their respective national innovation systems. Ethiopia‘s creative output score, as the data shows, is 4.5, with intangible assets accounting for the majority of this score (2.1) and online creativity being a relatively new sector (13.6). Kenya, on the other hand, produces significantly more creative work (14.1), supported by significant intangible assets (18.9) and a robust online creativity score (17.2). Rwanda‘s dedication to promoting a digital economy is demonstrated by its strengths in intangible assets (7.0) and online creativity (12.2), while having a lower overall creative output (6.9). Ethiopia and Rwanda must improve their intangible assets and digital creativity programs to promote innovation, as these discrepancies underscore Kenya‘s highly developed creative economy. The implications for the national innovation system are significant;

improved cooperation between these countries may make it easier to exchange information and distribute resources, which would eventually lead to a more resilient and cohesive creative economy throughout East Africa. Switzerland, the United Kingdom, and Hong Kong lead the global GII in terms of creative outputs and innovative capabilities, with scores of 68.5, 60.0, and 59.2, respectively.

Ethiopia, Kenya, and Rwanda have established legal institutions to coordinate STI activities, with the Ministry of Science and Technology in Ethiopia, the National Council of Science and Technology in Kenya and Rwanda, and the Kenya National Innovation Agency in Kenya. The human resource capacity varies across countries, with Ethiopia and Kenya having a majority of personnel in agriculture and veterinary sciences, while Rwanda has a majority in natural sciences. The majority of personnel are from government institutions in Ethiopia (70.1%) and Rwanda (56.1%), while in Kenya, they are from higher education institutions (56.7%). Rwanda has made progress in STEM education, with 22.4% student enrollment, but female students make up less than a third of this total. The countries have made progress in establishing centres of excellence under the Africa Centre of Excellence program and industrial parks, with Ethiopia leading the region with five industrial parks. There is a pressing necessity to strengthen collaborations between countries, enhance infrastructure, encourage investments from the private sector, and cultivate human resources, particularly emphasizing STEM fields and the participation of women, in order to improve the execution of science, technology, and innovation (STI) initiatives.

2.5. Policy and legal frameworks in Ethiopia

The National Science and Technology Policy, established in 2012, serves as a foundational framework aimed at promoting research, development, and innovation within the nation. It promotes a conducive ecosystem that will support innovation, research, and technology as engines of economic growth and sustainable development. It emphasises public-private partnerships in technology development and commercialisation, strengthens the capacity and efficiency of the research and innovation ecosystem, and creates an environment that is conducive to technology transfer and intellectual property protection. According to the STI Policy, research is an essential part of a strategic plan to effectively adopt foreign technologies, modify them for the local context, employ them successfully, and share knowledge through connections between academia and industry (Mamo, 2015).The outcomes of research projects are expected to influence the advancement of the country.

A STEM education program was launched by the Ethiopian Ministry of Education in 2016 in an effort to enhance the country‘s educational system. STEM seeks to improve the quality of education in these fields and give students the skills they need to be successful in the contemporary workforce. The program plays an important role in promoting innovation and furthering the nation‘s technological advancement. Through STEM education, the initiative hopes to develop a workforce that can promote innovation and further the expansion of a knowledge-based economy.

The Investment Proclamation (1180/2020), which was issued by the Ethiopian Investment Commission (EIC), provides investors with protection, assurances, and incentives that motivate them to engage in different areas of the Ethiopian economy. The commission acts as a point of contact between the business community and government organizations, providing direction, encouragement, and assistance throughout the investment process. The Investment Proclamation serves as a tool for the national innovation system, encouraging creativity and technology transfer by providing incentives for investments in vital sectors like as R&D, innovation, and technology. The declaration also encourages the use of innovative technologies and the development of innovative businesses.

The Intellectual Property Law (320/2003) of Ethiopia provides researchers, inventors, and entrepreneurs with the legal tools to protect their intellectual property in order to foster technological advancement and innovation. The proclamation outlines the procedures for registering and defending intellectual property rights in Ethiopia and ensures that business owners and innovators have the exclusive right to their endeavours, including designs, ideas, and works. Enforcing intellectual property rights ensure that creators may make money off of their creations and encourages more investment and creativity in the country, all of which help to create an atmosphere that is favourable to innovation.

A National Research and Development Strategy was passed by Ethiopia in 2021 with the goal of promoting technical advancement, innovation, and research across a number of domains. The strategy outlines the major R&D priorities, which include raising educational standards, promoting industry-academia collaborations, and building out the research infrastructure. The ministry intends to employ research and innovation to address societal concerns, encourage sustainable economic growth, and increase national competitiveness by focusing on three areas.

The National Research and Development Strategy offers a road map for orchestrating R&D activities with national priorities, encouraging stakeholder partnerships, and optimising resources to foster economic growth and innovation. Through the explicit articulation of particular goals and practical strategies, the strategy facilitates the creation of a favourable environment that supports research and development activities, stimulates the creation and sharing of information, and helps to commercialize research findings. Employing these initiatives, the ministry strives to strengthen Ethiopia‘s innovation ecosystem, cultivate a research and innovation culture, and propel sustainable growth within the nation.

Ethiopia enacted the Industrial Parks Development Proclamation (886/2015) to inspire the foundation of industrial parks throughout the nation to foster industrialisation and economic growth. The proclamation lays forth guidelines for designing, building, and operating industrial parks to bring in foreign and domestic capital, encouraging local businesses to integrate into global value chains and create employment opportunities. Beyond and above, the proclamation aspires to promote manufacturing operations, boost exports, and advance Ethiopia‘s socio-economic development by offering incentives and infrastructure support to companies working within industrial parks.

Creating a digital strategy for Ethiopia (2021) is crucial to leveraging the capacity of technology to boost the national economy, enhance social services, and generate employment. The National Innovation System must be taken into consideration while formulating a digital strategy for Ethiopia, as must the establishment of a collaborative ecosystem that can capitalize on the advantages enjoyed by the government, business, academia, and civil society. Ethiopia has the capacity to create a vibrant innovation ecosystem that fosters cooperation and information sharing, accelerating digital transformation and economic advancement. This plan comprises investing in R&D, supporting tech companies, and fostering a creative culture that values creativity and entrepreneurship. Through the alignment of digital initiatives with national priorities and the utilization of current resources, Ethiopia can establish itself as a frontrunner in the digital economy and promote sustainable and inclusive growth for all of its residents.

An innovation and incubation policy was formed by Addis Ababa University in 2022 with the goal of supporting the growth and prosperity of start-ups and small enterprises in the technology industry. The strategy states that the incubators provide new companies with access to resources such as office space, capital, networking opportunities, and mentorship in

a supportive setting. Conversely, innovation policies offer frameworks and tenets to promote technology transfer, research and development, and entrepreneurship. Strong innovation policies combined with technological incubation can help nations create an environment that is favorable to innovation, economic growth, and increased global competitiveness. Policies for innovation and technology incubation are essential for fostering technology transfer, university-industry connections, and the growth of local talent.

The Professional and Program Mix Policy (MoE, 2008) provides a comprehensive examination of the annual intake, enrollment growth, and professional program mix in Ethiopian public higher education institutions. It provides a detailed explanation of the 70:30 undergraduate-professional balances that prioritizes science and technology over the arts and social sciences. This strategy has implications for industry-university collaboration on research and training. This policy‘s potential impact on Ethiopia‘s national innovation system makes it relevant.

The Higher Education Proclamation (650/2009) serves as the fundamental legislative framework governing the education system at the national level. This legislation outlines the establishment, functioning, and regulatory compliance of higher education institutions within the country. It sets forth standards for curriculum development, accreditation processes, academic autonomy, and the administration of higher education. The primary goals of the Higher Education Proclamation include ensuring the delivery of high-quality education, fostering innovation and research, and cultivating a skilled workforce capable of contributing to the socioeconomic development of the nation. The proclamation mandates universities to identify their main research areas and themes during conversations with key stakeholders, taking into account the nation‘s top priorities and the institution‘s competitive advantages; university partnership on research schemes with other domestic and foreign institutes, research centres, and businesses is authorised under the proclamation; the proclamation makes it apparent that collaborations with business are important for research and technology transfer.

The implementation of directives concerning research, technology transfer, university-industry collaboration, and community services for higher education institutions in Ethiopia, as outlined in Directive No: Research 01/2019, aims to strengthen the research and innovation capacities of these institutions. It is clearly stated under the preamble as:

— It is mandatory to put in a place and coordinate a well-developed system or research, technology transfer, university-industry linkage, and community services to contribute in ensuring sustainable and holistic development across the nation.‖ p1

The objective of the directive is to cultivate an environment of innovation and cooperation among higher education institutions, which will ultimately result in the creation of new technologies, products, and services that serve the broader interests of society. Through fostering cooperation between researchers and business partners and fostering community involvement, these programs seek to boost economic growth and strengthen the area‘s competitive advantage. Most significantly, the order pushes academic institutions to use grants and seed funds to commercialize discoveries developed in their labs and departments.

2.6. SWOT-TOWS Analysis of Policies and Legal Frameworks (RRI-AIRR framework)

The notion of Responsible Research and Innovation (RRI) has been a prominent scientific policy framework in the past ten years (Samara et al., 2024). Public engagement, science education, ethics, gender, open access, and governance are the six structuring themes of RRI, which is regarded as a policy framework in which various national innovation actors, including businesses, civil society organizations, researchers, individual citizens, and policymakers, team up in order to better align processes and outcomes with the needs, values, and expectations of society (Andronikidis et al., 2025; Fitjar et al., 2019). It has been presented as a framework to promote both ideas at the regional level and to connect research and innovation with broader social ideals (Bidstrup et al., 2024). Informed, inclusive, sustainable, and responsible regional development is the goal of this partnership (Burget et al., 2017). In this context, the Anticipation, Inclusiveness, Reflexivity and Responsiveness (AIRR) dimensions of governance, have gained particular importance as a base for enhancement of the RRI framework at territorial level (Andronikidis et al., 2025; Stilgoe et al., 2020). Thus, adopting RRI themes and AIRR dimensions, the study examined the current Science, Technology, and Innovation (STI) policies and regulatory frameworks. Lastly, the following table offers the Strength, Weakness, Opportunity, and Threats analysis (SWOT-TOWS).

	Strength	Weakness
Internal	• Promoting the ecosystem for research and innovation: R&D, innovation, and technology transfer are specifically highlighted in the National Science and Technology Policy, National Research and Development Strategy, and directives (such as Directive No: Research 01/2019). • Legal Foundation for IP Protection: The Intellectual Property Law (320/2003) offers a foundation for intellectual property protection, which is essential for supporting innovation and drawing in capital. • Development of Public-Private Partnerships: To support technological research and commercialization, a number of policies (such as the National Science and technological Policy) promote collaborations between government, business, and academia. • Investment Incentives: To promote investment, particularly in the technology and research and development industries, the Investment Proclamation (1180/2020) provides incentives that may spur innovation. • Targeted Approaches: Certain programs, such as STEM Education (2016), fill skills shortages and advance a knowledge-based economy. • Infrastructure development: Manufacturing operations are supported	• Bureaucratic Setting: Despite investment incentives, bureaucratic and regulatory obstacles may still exist and impede the rate of innovation. • Implementation Gaps: Although policies may exist in theory, they may not be properly applied or enforced. • Limited R&D Funding: Adequate funding for infrastructure, innovation, and research is essential to the success of these initiatives. • Coordination Issues: There is need for improvement in the way various government departments, academic institutions, and the commercial sector coordinate with one another. • Skills Gap: Although there are STEM programs in place, closing the skills gap may take time and money. • Misalignment of Industry-Academia: It may be difficult to close the gap between scholarly research and practical industrial use. • Technology Access: Obstacles may arise from issues with the availability and cost of technological infrastructure and resources.

	and industrialization is encouraged by the Industrial Parks Development Proclamation (886/2015).	
External	**Opportunities**	**Threats**
	• Enabling Global Partnerships: The policies make it possible to work with companies, funders, and research institutions around the world. • Promoting Entrepreneurship: By offering resources like money and incubation facilities, policies can encourage an entrepreneurial culture, particularly in tech businesses. • Attracting Foreign Investment: Opportunities to draw in foreign investment in technology and R&D are made possible by robust IP regulations and investment incentives. • Digital Economy: Ethiopia is able to take use of the digital economy's potential for economic transformation thanks to its digital strategy. • Sustainable Development: Research that is in line with national priorities creates opportunities for innovative solutions to societal problems. • Promoting Industry-Academia Collaboration: Technology transfer and commercialization can be facilitated by robust policy support for industry-academia cooperation.	• Political Instability: Investor confidence can be damaged and long-term strategy implementation impeded by political instability or inconsistent policies. • • Financial Issues: Funding for R&D and innovation projects may be restricted by economic downturns or volatility. • Fierce global competition must contend with competition from both African and international countries to draw in investment and promote innovation. • Global Economic Disruptions: Changes in the world economy may have an impact on foreign investment and finance. • A shortage of qualified staff: The impact of the programs may be lessened by a lack of qualified workers, especially in the STEM fields. • Rapid technological change: Because of the speed at which technology is developing, policies and initiatives may need to be adjusted on a regular basis.

Table 2.1: SWOT analysis

Strengths - Opportunity Strategies	Strengths - Threats Strategies
• Promotion of investment and use of the intellectual property incentive to draw foreign direct investment in technology and innovation where the country has its competitive advantage, such as in energy, tourism, and agriculture. • • Building capability and enhancing innovation by means of international innovation initiatives. • • To foster technology and knowledge transfer and commercialize research findings, national innovation actors and their network should be strengthened. • • Promote tech start-ups and entrepreneurship by utilizing the digital strategy. • • Strengthening the digital platform and strategy to support tech start-ups and entrepreneurship.	• To attract international investment, make use of government incentives and intellectual property laws. • Create connections and provide incentives to take advantage of chances to collaborate with the international community. • Boost tech start-ups and entrepreneurship by leveraging the digital strategy.
Weaknesses - Opportunity Strategies	**Weakness - Threat Strategies**
• Fostering the innovation system by bringing the players together to ensure that laws and policies are applied correctly. • Strengthening the financial system to fill a deficit in R&D and innovation efforts, with a focus on projects that support national development objectives. • Enhancing workforce skill and graduates' employability through dedicated educational initiatives. • To encourage investment and innovation, simplify laws and lower administrative barriers. • Develop and commercialize research discoveries, academic and business ties should be strengthened.	• Close the skills gap by implementing education and training initiatives that concentrate on fields with strong market demand. • To promote investment and innovation, simplify regulations and reduce administrative roadblocks. • Provide incentives and cultivate connections to open doors to collaboration with the international community.

Table 2. 2: TOWS matrix

2.7. Opportunities for National Innovation System (NIS)

The Ethiopian National Innovation System (NIS) has the unrealized potential to use innovation, science, and technology to greatly improve economic growth, social development, and global competitiveness. By leveraging its strengths, addressing its present issues, and promoting collaboration in and outside the nation, Ethiopia may become a hub for innovative excellence and advance the African continent‘s innovation scene. Ethiopia has the potential to play a significant role in determining the direction of science, technology, and innovation in the area through collaborations, strategic investments, and the implementation of laws that encourage innovation and entrepreneurship. Ethiopia has made significant strides in creating an environment that is supportive of innovation through the use of laws, programs, and alliances that facilitate knowledge sharing, technology transfer, and research. Science and technology have developed a strong basis as a result of the establishment of research institutes, incubation centers, and innovation hubs that serve as catalysts for entrepreneurship and innovation.

Ethiopia‘s national development is influenced by a number of important elements. The nation‘s strategic location in the Horn of Africa and plenty of natural resources are its main advantages, as they allow it to be close to the Middle East and its rich markets. Ethiopia‘s ability to develop a robust economy and reach lower-middle-income status by 2025 is highlighted by the country‘s impressive economic growth over the last 20 years. The creation of a National Innovation System (NIS) has been actively sought by the government, which has done so by creating a number of laws and policies pertaining to STI. The adoption of successful STI policies meant to broaden and expand the academic-industry relationship, the expansion of funds for research and development, the improvement of institutional capacity, and the economy.

Ethiopia has made structural restructuring, industrialization, and urbanization its top priorities in line with its goal of becoming a middle-income country by 2025. This emphasis has made it possible for the nation‘s energy, transportation, and telecommunications infrastructure to advance significantly. This economic strategy‘s main component is a large public investment in infrastructure, which attempts to close current gaps and foster an atmosphere that will support future private sector growth. Most notably, the Ethiopian government has been aggressively constructing industrial parks to boost the nation‘s overall economic growth by exporting manufactured goods that generate foreign exchange,

transferring technology, knowledge, and skills, and creating productive jobs for the people (Jote, 2020).

Initiatives are also underway to establish linkages between industrial parks and universities across the nation. Most industrial parks have been located adjacent to universities to accommodate large-scale industrialisation projects. The Hawassa Industrial Park, for example, was built next to Hawassa University and is home to important domestic and international clothing and textile companies with 60,000 workers and an export revenue objective of over US$1 billion. The industrial parks of Bole Lemi-I and II, along with the Kilinto Industrial Park situated in the suburbs of Addis Ababa, demonstrate the broader network of industrial zones across Ethiopia, which includes locations in Dire Dawa, Mekelle, Adama, Kombocha, Jimma, Bahir Dar, Debre Birhan, and Aysha Dewalle (Salmi et al., 2017). In summary, these industrial parks have played a crucial role in advancing Ethiopia‘s industrial landscape by generating employment opportunities, enhancing government revenue and export levels, diversifying the range of industrial products, and attracting both Foreign Direct Investment and foreign exchange (Jote, 2020).

2.8. Challenges in Promoting National Innovation System (NIS)

Meaningful STI policymaking cannot be developed, carried out, monitored, or modified without an in-depth understanding of the nation‘s context, strengths and weaknesses of the nation‘s Science, Technology, and Innovation (STI) agents, their interactions, and incentives as well as barriers that they encounter, all of which are extremely country-specific (Adenle et al., 2023). The obstacles of scaling up Ethiopia‘s innovation ecosystem to keep up with the demands of an increasingly shifting global market persist despite advancements in science, technology, and innovation (Liche & Střelcová, 2023; Gashahun, 2020). The inability to successfully implement the policy is one of the biggest obstacles. The majority of top-down policies have problems with execution. The lack of programs that contributed STI policy objectives into practice and the ―Top-Down‖ approach to policy formulation have hindered efforts to implement the policy effectively, according to Agu et al. (2021). The lack of programs also adds to the inefficiencies in the implementation processes.

Effective policymaking in the field of science, technology, and innovation (STI) requires a thorough grasp of a country‘s unique context, which includes the advantages and disadvantages of its STI stakeholders, as well as their interactions, incentives, and obstacles,

all of which are influenced by the particular circumstances of that country (Adenle et al., 2023). Ethiopia has made great strides in science, technology, and innovation, but there are still major challenges in developing its innovation ecosystem to meet the needs of a rapidly evolving global market. Ineffective policy translation into practical practice is a major problem that is frequently caused by a top-down strategy and a lack of public awareness. This problem is further worse by the lack of concrete action projects (Agu & Ndinda, 2021).

Moreover, there is a significant lack of coordination and cooperation between the several National Innovation players and the scientific, technology, and innovation ecosystem‘s stakeholders. Despite the effective partnerships between government agencies, research institutions, academia, and industry are essential to fostering innovation, knowledge exchange, and technology transfer, the Ethiopian Innovation ecosystem is not conducive and well-orchestrated (Tekle, 2024; Kebebe, 2019). The STI policy aims to facilitate linkages among stakeholders, but in practice, there is immature coordination and collaboration, resulting in a disconnect rather than synergy, despite its commitment (Agu & Ndinda, 2021).

Robust advancement in research and development is thought to promote science, technology, and innovation while also boosting competitiveness and economic growth. Research leadership and administration (motivation, teamwork, salary, external influence, political burden, lack of clear vision), communication and outsourcing of research (lack of funds, lack of communication, lack of industrial linkage, lack of partnership, lack of trained journalists), and lack of national strategy & policy (lack of information centre, lack of funds, lack of teamwork, lack of national research centre) are some of the concerns regarding research outputs (Tesfa, 2015). Furthermore, Gelata et al. (2022) examined e-commerce in Ethiopia and noted that the country‘s business had considerable hurdles, including a lack of infrastructure, a lack of trust, security risks, and a lack of a regulatory framework. The Ethiopian industry‘s barriers include information technology, inadequate personnel training and expertise, a deficiency in IT infrastructure, customer awareness, and behaviour. The absence of well-structured data warehouses, coupled with inadequately designed websites that provide minimal or no information regarding stakeholders, significantly hinders the understanding of advancements within the sector (Agu & Ndinda, 2021). Outdated laboratory facilities, insufficient equipment, and above all the poor telecommunication networks in Ethiopia contribute to the poor performance.

The lack of financial resources is the most significant barrier to STI development in developing countries, and Ethiopia is no exception. The critical challenges associated with funding have been categorized into two primary issues. First, there is a significant dependence on state funding coupled with inadequate involvement from the private sector, which has severely hindered science, technology, and innovation (STI) initiatives (Gobena et al., 2021). Second, the lack of various nationally established guidelines and research evaluation frameworks for the distribution of limited financial resources constitutes an additional obstacle, contributing to inefficiencies and the misallocation of resources (Agu & Ndinda, 2021).

Concerning the University-industry linkage (Partnership), several efforts exist to create a conducive learning environment for actors to engage in partnerships. Partnerships among National Innovation actors, the status of collective learning among actors is very low in Ethiopia is very low, particularly the roles of R&D institute, TVET College, and University Industries Linkage are very low in collaboration (Gobena et al., 2021; Ayenew & Teklay, 2017; Ayenew, 2015). In spite of the government‘s efforts to enhance and maintain a productive linkage between university and industry, the relation remains in its early developmental stage, with a significant number of outstanding tasks yet to be addressed (Degaga & Senapathy, 2021).

2.9. Policy Implication

The role that Science, Technology, and Innovation (STI) policies and legal frameworks play in strengthening RIS and enhancing regional competitiveness has become realised progressively in recent years. Science, Technology, and Innovation (STI) policies significantly determine global, regional, and national social and economic development.

Science, Technology, and Innovation (STI) policies significantly determine global, regional, and national social and economic development. The increasing reliance on knowledge-based innovation was a major factor in the formal recognition of this role in the latter half of the 20th century. The relationships between various ecosystem players, including governmental organizations, educational institutions, research and development organizations, and industry sectors, have become crucial elements throughout this time (Galvao et al., 2019).

Most significantly, building a robust and flexible STI ecosystem is a continuous process that necessitates constant collaboration, adjustment, and tuning. Thus, policymakers need to be flexible, willing to learn from ecosystem participants, and ready to alter their plans when new information becomes available or the situation calls for it. A thriving innovation ecosystem where businesses, scholars, and investors can collaborate effectively to produce new ideas and technologies depends on the creation of agile policies (Ratanawaraha et al., 2024).

Science, Technology, and Innovation (STI) are important, and the Ethiopian government recognizes this. Therefore, in order to create possibilities to promote economic growth, it has implemented a number of STI policies over the years and developed organizations, plans, and initiatives in the main priority areas. Ethiopia spends about 0.51% of its gross domestic product (GDP) on STIs, which is below the African Union‘s (AU) recommended target of 1%. Several stakeholders participate in the STI ecosystem in Ethiopia, with the nature of participation ranging from policy development, regulation, and implementation of STI programs, initiatives, plans, and projects. The different stakeholders have different mandates and exert different levels of power and influence across the STI landscape.

Emerging economies depend on a combination of technological advancement and homegrown innovation to enhance their national innovation systems and policy frameworks, thereby maximizing the advantages of global knowledge transfer for science, technology, and innovation collaboration. This is because many of these nations want to achieve economic growth and competitiveness. Industry, academic institutions, and research centres must change to build mutually beneficial partnerships and complement each other‘s strengths to achieve the goals of STI cooperation. Collaborations ought to be established in critical domains such as institutional policy and governance frameworks, higher education in science and technology, entrepreneurship, research infrastructure, legal systems, and technology transfer (Adenle et al., 2023). The adoption of incremental innovations, prioritizing innovation in sectors with significant economic impacts, concentrating on demand-oriented innovation, implementing spatial innovation, and creating a governmental coordination platform for development priorities and collaboration among ecosystem factors are the five main directions proposed by Shkabatur et al. (2022) for innovation and entrepreneurship

policy. These strategies aim to enhance economic growth, improve productivity, and generate jobs.

The key to maximising the effectiveness of the national innovation system is to strengthen research by creating substantial and long-term funding sources, safeguarding the research council already in place, endorsing the professional association, and figuring out how to leverage the tremendous amount of knowledge and expertise held by professionals from Ethiopia‘s diaspora (Tesfa, 2015). To promote economic growth and optimise Ethiopia‘s economy‘s competitiveness, the national innovation actors ought to be motivated to engage in R&D and learning initiatives, whether by creating new ones or modifying existing ones (Gobena & Kant, 2022).

Policymakers in Ethiopia ought to focus on increasing the number of citable journals, encouraging patent registrations, and promoting technology exports within the context of research and development (R&D) innovation to stimulate economic growth (Agezew, 2024). Merely increasing research funding may prove insufficient for economic advancement unless it is paired with targeted R&D initiatives that have a direct economic impact. This underscores the necessity for policies that facilitate collaboration among government entities, academic institutions, and the private sector to enhance innovation and technology transfer. A supportive policy framework, the expansion of industries, the enactment of intellectual property rights protection laws, a burgeoning economy, the establishment of science and technology universities, the development of industrial parks, and improvements in infrastructure represent significant opportunities (Degaga & Senapathy, 2021). Reviving university-industry links (UIL) and addressing the aforementioned issues require a concerted effort from government agencies, academic institutions, businesses, and other pertinent players. Additionally, it is critical to take use of the newly discovered opportunities and to fortify the supportive environment so that university industry linkages can flourish with greater vigour.

Effectively optimizing the country‘s Science, Technology, and Innovation (STI) policies is essential to promoting economic growth and raising competitiveness. Improving operational efficiency, reducing expenses, and increasing productivity can all help to achieve. STI policies have the potential to have a significant positive impact on the overall economy. Ethiopia must therefore work to maximize STI‘s potential to boost its social well-being and economic prosperity, and this is crucial. The current state of affairs indicates a disparity in the

effective implementation of the aforementioned efforts to establish a National Innovation System (NIS) and to develop comprehensive policies on Science, Technology, and Innovation (STI).

2.10. Conclusion

Ethiopia‘s pursuit of innovation, economic growth, and increased competitiveness depends heavily on the laws and regulations governing science, technology, and innovation (STI). Research, entrepreneurship, technology transfer, and collaborative learning are all made possible by these frameworks. The National Science and Technology Policy, the Strategic Policy for National Science, Technology, and Mathematics Education, the Investment Proclamation, the Intellectual Property Law, the National Research and Development Strategy, the Industrial Parks Development Proclamation, the Digital Strategy for Ethiopia, the Technology Incubation and Transfer Policy, the Professional and Program Mix Policy, and the Higher Education Proclamation are just a few of the policies that have been put in place to ensure the Ethiopian National Innovation System operates without interruptions. Ethiopia can strengthen its STI policies to support a National Innovation System (NIS) that fosters economic growth, technical advancement, and sustainable development by assessing current opportunities, resolving current difficulties, and proposing alternative policies.

Ethiopia has challenges in creating all-encompassing STI policies and successfully implementing them. The study investigated the ecosystem‘s existing challenges. It emphasizes the importance of STI capacity-building for sustainable development and the necessity of utilizing innovative results within a strong policy framework. Policy gaps and the need for more robust institutional support are two issues that require attention. The laws and regulations relating to science, technology, and innovation (STI) are crucial for Ethiopia to pursue innovation, economic growth, and enhanced competitiveness.

These frameworks create an atmosphere that supports technology transfer, research, entrepreneurship, and collaborative education. A strong legal and policy framework is necessary for the Ethiopian National Innovation System to function effectively. This framework is established by the National Science and Technology Policy, the Strategic Policy for National Science, Technology, and Mathematics Education, the Investment Proclamation, the Intellectual Property Law, the National Research and Development

Strategy, the Industrial Parks Development Proclamation, the Digital Strategy for Ethiopia, the Technology Incubation and Transfer Policy, the Professional and Program Mix Policy, and the Higher Education Proclamation that were established. Ethiopia can strengthen its STI policies to support a National Innovation System (NIS) that fosters economic growth, technical advancement, and sustainable development by assessing current opportunities, resolving current difficulties, and proposing alternative policies.

CHAPTER THREE

THE ROLE OF SOCIAL ENTERPRISES IN REGIONAL INNOVATION SYSTEM: BRIDGING UNIVERSITIES AND INDUSTRY- A CASE OF HAWASSA UNIVERSITY

ABSTRACT

In developing countries like Ethiopia, skilled and competent graduates are crucial for fostering Regional Innovation System (RIS). Nonetheless, the graduates' employability is becoming increasingly concerning. This study examines how social enterprises, as key player in the emerging Regional Innovation System (RIS), can help address the employability challenges faced by higher education graduates' and their potential contribution in promoting economic development in Ethiopia. The study employed a qualitative case study design, involving document reviews, interviews with key informants and in-depth discussions with high-level officials, faculty members, and focus groups comprising career development center coordinators, recent graduates, and training facilitators. The data was summarized thematically. The findings highlighted significant gaps in employability skills among higher education graduates, which hinder their job market prospects. These gaps are attributed to the mismatch between academic training and market demands, inadequate curricula that fail to integrate theoretical knowledge with practical skills, insufficient infrastructure, and limited access to technology. Most notably, the study analysed how the social enterprise, Africa Jobs Network (AJN) contribute to enhance the graduates' employability in Hawassa University and other higher education institutions, as well as the employment landscape in Ethiopia as a nation. Finally, this study emphasizes the critical role of social enterprises in bridging the gap between universities and labour market demands, therefore strengthening Ethiopia's Regional Innovation System, enhancing the employability of graduates, and contributing to sustainable regional development.

Key words: *Graduates' Employability, Social Enterprise, Labour Market, Higher Education Institutes, African Jobs Network.*

3.1. Introduction

Higher education institutions are important development agents in knowledge-based economies and are thought to provide skilled and competent employees for the labour market. Hence, they need to produce graduates to compete in the fiercely competitive labour market since employability skills are even more crucial for graduates (Hoque et al., 2023; Sebastiano et al., 2023). Higher education institutions are believed to produce highly competitive graduates who are best suited to the employment landscape (Chekol, 2024; Tamirat, 2024).

Graduate employment and higher education are often interconnected aspects of the same issue, described as ‗two sides of a coin' (Maelekum 2024; Tavares, et al., 2023; Mueller & Robert, 2021). As such, higher education institutions are expected to equip graduates with essential skills, including adaptability to new situations, ethical awareness, independent learning, practical training, problem-solving abilities, knowledge management, self-confidence, and a sense of responsibility – all of which significantly influence graduates' employability (Kassa, 2023; Fenta et al., 2019; Finch et al., 2013). The objectives of higher education can therefore be summarized as preparing graduates to be knowledgeable, skilled, and emotionally mature through demand-driven programs, ultimately leading to a country that is internationally competitive, technologically advanced, and economically self-sufficient (Molla, 2019; Bishaw & Melese, 2017).

Nonetheless, producing a qualified workforce alone is insufficient for economic development; it is essential to create more employment opportunities to better align higher education outputs with industry and labour market needs (Kassa et al., 2024; Tegegn et al., 2024). The effectiveness of higher education in enhancing employability is contingent upon stronger collaboration between training systems, local and regional labour markets, and national economies, as well as the commitment of university stakeholders to continuously improve educational quality and adapt curricula in response to socio-cultural, economic, and technological changes (Van Lieshout et al., 2012; Gines, 2014; Kalaw, 2019). Stakeholders should collaborate and interact to promote technology and knowledge transfer that would lead to economic progress and national development to create a sustainable graduates' employability platform (Menberu, 2024; Bekana, 2024).

Although the terms employability and work readiness interchangeably, there is a distinction: employability refers to an individual's capacity to investigate the opportunities in the labour market, while work readiness refers to an individual's capacity to complete a task

within a specified time frame (Kassa et al., 2024; Pheko & Molefhe, 2017; Rowe & Zegwaad, 2017). Notwithstanding the differences, the employment landscape is periodically deteriorating, and graduates from Ethiopia's higher education institutions face significant challenges in terms of their employability or work readiness (Kassa, 2023; Gedye & Beaumont, 2018). There is a substantial discrepancy between graduates' performance and employers' expectations that they have limitations in both hard and soft abilities (Hoque et al., 2023). Furthermore, the employability of graduates in Ethiopia was significantly impacted by personal limitations such as deficiencies in English language proficiency, skills, and confidence (Kassa et al., 2024; Demissie et al., 2024; Yallew, 2020); and systemic issues such as inadequate education management systems, outdated curricula; corruption, inadequate infrastructure, low staff capacity, microeconomic issues like inflation, and slow industrialization (Tareke et al., 2024; Kassa, 2023; Kiong et al., 2019; Yenew, 2019). Most importantly, graduates' employability in the job market has become ever more concerned with emerging social, economic, and political circumstances (Yizengaw et al., 2023; Yibeltal, 2018).

As the number of graduates‘ increases, the market's ability to absorb them is expected to decline (Demissie et al., 2021). Currently, there are 49 government and 128 accredited private institutions operating in the country (Tareke, 2024; Gonfa et al, 2024). Every year, approximately 2 million new workers join the job market, with over 400,000 of them being graduates from higher education institutions; the unemployment rate among graduates is expected to remain steady over the next four years, which will increase the pressure on available employment opportunities (Gonfa et al., 2024). This situation underscores the pressing need for job creation and enhancements to current employment prospects. Consequently, the employability of graduates has become a pressing issue in Ethiopia (Kassa et al., 2024; Tamrat, 2022), necessitating a reassessment of how the higher education system aligns with labour market needs to ensure graduates are adequately prepared for available jobs (Yimer, 2024; Shimelit, 2021). The enrolment rate has been declining for the past three years in both government and private universities and colleges. Nevertheless, the number of graduates continues to exceed the capacity of the job market, which is struggling to accommodate them.

The academic curriculum in Ethiopia has traditionally emphasized theoretical knowledge at the expense of practical skills, which has negatively impacted the quality and employability of graduates from higher education institutions over the past few years

(Yibeltal, 2018; Mijena et al., 2018). At its core, the management system of higher education is outdated, featuring a limited number of competent faculty members and rigid, inadequate structures (Chekol, 2024). This has resulted in subpar educational quality and research outputs.

Numerous academic studies have been conducted to evaluate the employability of graduates from higher education institutions, focusing on various aspects. Key areas of investigation include the alignment of curricula and systems with labour market needs (Chekol, 2024; Kassa et al., 2024; Suarta et al., 2017). Additionally, research highlights the urgency of revising existing curricula to address emerging social, economic, political, and technological challenges (Kassa et al., 2024; Kassa, 2023; Kalaw, 2019). Systemic issues such as limited infrastructure, poor staff quality, inadequate technology and funding, governance problems, inflation, limited job opportunities, corruption, slow industrial growth, and weak university-industry linkages have also been examined (Bekana, 2024; Menberu, 2024; Demissie et al., 2024; Tamirat, 2024; Pitan & Atiku, 2017). To the best of our knowledge, even though extensive research has been done regarding the employability of graduates from a range of perspectives, there is still a research gap when considering the role that government, civil society, and industry higher education institutions play. As a result, this study assesses the roles and practices of social enterprises in enhancing graduates' employability in Ethiopian higher education institutions.

3.2. Literature Review

3.2.1. Graduates' employability

Employability is the set of achievements – skills, understandings and personal attributes – that makes graduates more likely to gain employment and be successful in their chosen occupations which benefit themselves, the workforce, the community and the economy (Yorke, 2006). In the employment discourse, the employability of graduates is becoming a global concern (Monteiro et al., 2024). Higher education institutions have been making all possible attempts to adapt their strategies and carry out activities in more applicable ways to produce employable graduates who maintain their level of competency and satisfy market demands (Davies et al., 2019; Tomlinson, 2008). Also, there are emerging concepts such as sustainable employment that emphasize enhancing graduates' employability through personal skills and labour market and career adaptation (Arokiasamy et al., 2024). Aligning graduates' competencies with the complicated employability landscape is a key

component of sustainable employment (Alcover et al., 2021; Fleuren et al., 2016). Additionally, it's critical to preserve the balance between the labour market's demand for graduates with applicable skills and the competent graduates supplying higher education (Le Blanc et al., 2024; Deng, 2021).

In knowledge-based economies, highly qualified graduates are valued assets; nonetheless, employability is becoming a significant social issue on a global scale (Farashah et al., 2023). It has implications for policymakers and academics who are striving to transform the educational system to address the most critical issues, such as the misalignment of hard and soft skills among higher education graduates and the labour market problem worsened by globalization and technological advancement (Ngoc et al., 2021; Singh & Ehlers, 2020; Peeters et al., 2019).

Higher education enrolment has greatly increased the employability and inclusion of graduates. In developing nations like Nigeria, Kenya, and Pakistan, women and other marginalized social groups have benefited greatly from higher education enrollment; in developed countries like Germany, however, vocational training is also effective in equipping graduates with marketable skills (Yahya & Ogunyemi, 2024; OECD, 2023; Liu et al., 2022; Ajayi & Ross, 2020; Hung et al., 2020). Ethiopia, on the other hand, finds it difficult to strike a balance between the development of higher education and student enrollment with the nation's economic growth, while the United States issues with inequalities in access to higher education; correspondingly, in developing countries like Brazil, India, and South Africa, the inaccuracy and mismatch of graduates' skills to industry expectations leads to employability issues; most significantly, private universities are offering high-quality, market-relevant instruction that is more expensive for low-income students (Bisht & Pattanaik, 2020; McCowan & Bertolin, 2020; Termes et al., 2020; Graham et al., 2019; Nega, 2017).

3.2.2. Factors affecting employability

The employability of graduates in the labour market depends on a multitude of components, such as systemic issues, personal constraints, institutional reputation, political connections and the overall social, economic, and political landscape in a country (Monterio et al., 2024; Griffin & Coelhoso, 2019; Suleman, 2018; Grossman & Johnson, 2015). Focusing on the education system reform along with providing graduates with soft skill training, such as emotional intelligence, creativity, and entrepreneurship, is essential to addressing these issues (Al-Tekreeti et al., 202; Hossain et al., 2018). Key determinants of

employability encompass soft skills, problem-solving abilities, functional knowledge, and academic reputation (Sahudin, 2022). Othman et al. (2018) identified critical factors such as age, faculty, field of study, involvement in co-curricular activities, marital status, industrial internships, and English proficiency.

Ethiopia's rapid economic growth is largely driven by agriculture and its growing young population; however, the lack of structural transformation toward industrialization and insufficient job creation in the manufacturing sector presents significant challenges for graduate employability (World Bank, 2021; Demissie, 2021). Despite GDP growth, the economy struggles to generate enough jobs to meet demand, resulting in what is termed "jobless growth." The labour market faces numerous challenges, including a mismatch between graduates' skills and market demands, bureaucratic inefficiencies, and inadequate infrastructure, which are significant obstacles within the ecosystem (Tamirat, 2023). The existing employability issues among graduates are attributed to various factors, such as poor English proficiency, lack of soft skill training, and systemic issues including inadequate infrastructure and limited access to technology (Tareke et al., 2024; Kassa, 2023; Yibeltal, 2018). Furthermore, the predominantly theoretical knowledge-based curriculum, which overlooks practical skills, and other contributing factors like a poor academic system lacking qualified faculty members, also play a role (Chekol, 2024; Yibeltal, 2018; Mijena et al., 2018). Despite these challenges, emerging initiatives, such as the mushrooming of industrialization efforts including the expansion of industrial parks, are seen as promising developments that could enhance graduates' employability and contribute to broader economic growth (World Bank, 2024). Notwithstanding the existence of such barriers, the World Bank (2024) study notes that there are opportunities to improve the employment setting and increase the employability of graduates owing to the country's industrial park expansion and the government's focus on small and medium enterprises (SMEs).

3.2.3. University-industry linkage efforts

University-industry linkage is of increasing importance in literature dealing with economic development and innovation since it references the relationship between higher education and industry that both parties benefit from the transfer of technology and knowledge (Figueiredo & Ferreira, 2022; Freitas et al., 2013). The partnership brings economic opportunities and regional development because the industries benefit from higher education in exploiting research outputs, while the higher education institutions have the

leverage to allow their expertise and researchers to address practical problems and develop new inventions (Rossoni et al., 2024; Perkmann et al., 2013). Employability initiatives for graduates are closely linked to university-industry partnerships, which include collaborative research projects, internship and externship programs, and the sector in curriculum development (Ishengoma & Vaaland, 2016). Students benefit substantially from internships by getting mentors and training that improves their employability skills (Lowden et al., 2011; Aliu & Aigbavboa, 2018; Kamp et del 2017). Furthermore, students have the opportunity to evaluate their level of proficiency and determine areas in which they need to devote additional time to be eligible for employment (McCleary & Weaver, 2009; DeWitt & Storksdieck, 2008; Lee & Joung, 2017).

O'Connor and Bodicoat (2016) define internships as a type of experiential learning that is directly relevant to one's field of study and that combines classroom theory and knowledge with real-world application and skill development in a professional context. Internships are frequently promoted as extracurricular activities that might improve students' future work opportunities and incomes while also satisfying the talent requirements of employers (Hora et al., 2020). The programs expose students to real-world knowledge and the workplace help them become familiar with the industrial setting, network, and improve their employability skills overall (Predovic et al., 2021; Ankrah & Omar, 2015; Guimón, 2013; Bozeman & Gaughan, 2007). Social enterprises play a pivotal role in fostering employment opportunities, enhancing graduates' employability, and promoting inclusivity by facilitating creative approaches to adapt to evolving market demand (Calderini et al., 2023; Weaver & Blakery, 2022; Renkinen et al., 2016).

Social enterprises provide a mechanism of support to counteract this disparity, especially in disadvantaged areas where socially excluded populations are disproportionately affected (Hazenberg, 2021; Bonnici and May 2020). This is one of the primary mechanisms by which social enterprises support upskilling and employment creation by focusing on creating social value. In the Italian context, social enterprises have undoubtedly been shown to be more effective and efficient than government programs (Defourny and Depedri, 2013). Consequently, it is necessary to investigate how social enterprises in emerging economies, using Ethiopia as a case, contribute to the graduates‘ employability.

3.2.4. Social Enterprises in RIS

Social enterprises (SEs) play an important role in improving the inclusivity and effectiveness of RIS through serving as bridges between industry and university while tackling major social problems that include unemployment. Social enterprises, unlike traditional innovation actors, combine economic, social, and environmental goals, allowing them to effectively respond to a wide range of local and regional needs (Mogotsi & Baron, 2025). Through the facilitation provided by this integrated approach, social enterprises may support social innovation, which is crucial for circumstances where conventional commercial or technological approaches are insufficient, in along with moving forward innovations in technology (Bovy et al., 2023).

Beyond the traditional Triple Helix model, which often limits civil society to a reactive role, the Quadruple Helix model highlights the imperative of engaging civil society—especially social enterprises—into innovation processes (Bovy et al., 2023). Social enterprises contribute to more inclusive and socially responsible innovation pathways by actively working together with businesses, universities, and governments to co-create collective learning ecosystems (Tartaruga et al., 2024). Social enterprises enable collective learning by connecting academic studies with real-world applications in neighbourhoods and industries, promoting regional innovation (Li et al., 2023; Aithal & Maiya, 2023). Such collaborations help to bridge the gap between knowledge exploration and exploitation systems by transforming knowledge into inventions that are economically and socially valuable.

Accordingly, social enterprises are essential in enabling regions in diversifying their economies and establishing sustainable innovation ecosystems that are cognizant of regional issues (Blagoycheva, 2019). Additionally, Social enterprises foster inclusion to support RIS through generating employment for those who are underrepresented, which fosters financial inclusion and social cohesiveness (Alborno & Kalaji, 2024). Most importantly, the capability of social enterprises to integrate social goals with economic objectives makes them important participants in regional smart specialization programs that seek to align innovation efforts with local resources and societal demands (Blagoycheva, 2019).

Notwithstanding their potential, social enterprises have limitations including inadequate funding, insufficient institutional support, and governance issues, which may impede their capacity to drive regional innovation (Li et al., 2023). To deal with these hurdles, policy frameworks that acknowledge and support social enterprise' innovative

potential should be established in position. This will enable them to expand their partnerships with universities and business sectors and contribute to the innovations that they generate (Calderini et al., 2023). Regarding this, governments can capitalize on the opportunity of social enterprise willingness and preparedness to drive sustainable and inclusive innovation, which will eventually increase regional development's socioeconomic and spatial inclusiveness (Calderini et al., 2023; Tartaruga et al., 2024).

3.3. Methods

We used a descriptive case study design that allowed for an in-depth assessment of graduates' employability from various perspectives and provided rich contextual insight to achieve the study's purpose of assessing the role of social enterprise in boosting graduates' employability underneath the framework of Ethiopian higher education institutions (Upright & Forsythe, 2021). As part of our data collection tool, we primarily reviewed documents from the Africa Jobs Network since 2015. To triangulate the information, we also interviewed 15 key informants, including staff members of the Africa Jobs Network (AJN), Ministry of Education staff, higher education high officers, teachers, researchers, experts, training facilitators, and in-depth interviews with 5 university graduating class students. Additionally, DAAP facilitators from eight universities, career centre coordinators from eight institutions, and DAAP alumni from ten universities participate in three groups for focus group discussions. The data collection period extended from September to December using a document review and semi-structured interview guides.

The Institutional Review Board at Addis Ababa University provided ethical clearance, and the entire data-gathering procedure complied with the highest ethical standards possible. Qualitative data from interviews, FGDs, and document reviews were transcribed and analyzed thematically to identify significant patterns and insights related to graduate employability and work readiness. This analysis aimed to link participants' experiences with broader employment initiatives in Ethiopia. The study's findings are supported by direct quotes from interviews and documents, enriching the narrative and allowing readers to form their conclusions. Thematic analysis revealed four primary themes: the current state of graduate employability in Ethiopia, key demand-side challenges affecting graduate employability, the role of social enterprises in enhancing graduate employability, and major initiatives under the Dereja program. These themes encapsulate the study's core findings,

addressing complex challenges and potential strategies to improve the employability landscape for graduates in Ethiopia.

3.4. Results

3.4.1. The graduates' employability

The study's findings indicate that several factors influence the employability of graduates in Ethiopia, including poorly designed academic curricula, inadequate university industry linkage, limited resources, and insufficient infrastructure. These factors collectively impact the employability of graduates from higher education institutions. Key informant 1, a high officer at the Hawassa University, stated that "there is a mismatch between the supply from higher education and the market demand." Additionally, it was noted that the curriculum is predominantly theoretical. A graduating student of the university highlighted this issue, stating as follows:

> The academic system often prioritizes theoretical knowledge over practical skills, which can make it difficult for graduates to transition into the labour market. This issue is also reflected in the experiences of my friends who have entered the workforce, as they too have encountered challenges due to a lack of practical skills.

The study's findings indicate a substantial gap in the educational system, highlighting that although theoretical knowledge is valuable, there is an immediate need for curricula to incorporate practical skills and hands-on training to better prepare graduates for the job market and boost their employability. Correspondingly, there are notable disparities in employability across various academic disciplines, with significant differences in skill acquisition observed among these fields. Key informant 2, a faculty member at the university remarked, "Health colleges tend to offer more practical training that enhances skill development compared to other areas of study". Moreover, an in-depth interview 1, a graduating class student verified as follows:

> As social science students, we have the unique privilege of engaging in field practice education throughout our entire academic journey, from our first year to our fourth year. This hands-on experience allows us to apply theoretical knowledge in real world settings, enhancing our understanding of social issues and interventions. In contrast, many other students in different programs do not have access to similar practical learning opportunities.

This underscores the disparity in how different programs equip their graduates for the workforce, highlighting the necessity for a more standardized approach to skill development across various disciplines. Key informant 3, an incubation centre coordinator provides the following insight:

> Graduates from business and economics fields exhibit significantly higher employability rates, driven primarily by strong demand in sectors such as banking and finance. However, tracer studies indicate a troubling trend, notably a decline in employability figures at institutions such as Jimma University, where rates plummeted from 87% to 48%.

The research also reveals that graduates from private colleges typically face lower employability rates in comparison to their peers from government institutions. Beyond the concern of employability skills, participants in focus group discussions with career development coordinators highlighted that many students encounter difficulties in passing exit exams. Furthermore, the study finds that the university's internship and externship programs seem to be underperforming due to a lack of mutual understanding of their fundamental objectives among the university, industry, and students. Key informant 4, a coordinator at the Ministry of Education elaborated on this point, stating:

> Presently, students are not receiving sufficient orientation before engaging in internships…. additional challenges include weak university-industry linkages, inadequate mentorship and coaching programs, large class sizes coupled with a low teacher-student ratio, insufficient infrastructure, and a limited number of industries within the local ecosystem.

The evidence suggests that the strategic partnership between higher education institutions and industry or civil society organizations is quite limited. Although some memorandums of understanding have been established, key informants from Africa Jobs Network indicate that only a few of these agreements are genuinely effective. Regional job fairs have shown some success in connecting students with potential employers; for example, as compare with Hawassa University, Arbaminch University and Haromaya University have reported positive outcomes, with several graduates securing employment. Notably, Haromaya University organized four job fairs during the 2023/2024 academic year. Additionally, key informant 5, a higher officer at the university noted that __industrial parks, which are recognized as key institutions for employing graduates, often prefer candidates with technical

and vocational education and training (TVET) or high school diplomas over those with university degrees.

Several factors currently hinder the employability of graduates in Ethiopia. In-depth interviews with research participants, especially those from recent graduating classes, highlight a common perception that being a skilled candidate is not enough. Graduates acknowledge that multiple factors influence their preparedness for the job market. For example, interviewee 2, indicates the labour market changes, as __having a degree alone is insufficient; it is also important to have connections with government officials and staff from non-governmental organizations, rather than just relying on academic performance.‘‘ Furthermore, there is an issue of inclusion that graduates with disabilities face even greater challenges in the employment market; Interview 5, a blind graduating class student gives her expectations, as follows:

> Graduates with disabilities, especially those who are visually impaired, often face challenges in the labour market. The current ecosystem tends to marginalize us, perpetuating a misconception that individuals with disabilities are incapable and less competent. Consequently, it is difficult for them to secure employment in private companies.

The study reveals that various civil society organizations in Ethiopia are actively addressing graduate employability issues. For instance, the Africa Jobs Network, through its Dereja program, is a notable social enterprise that enhances graduate capabilities by offering soft skills training and mentorship initiatives. The findings also highlight that the large group size presents a significant challenge in providing effective training. The compressed schedule creates difficulties for students who frequently struggle to balance the three-month training program with the demands of their final year, which entails various academic responsibilities. Key informant 7, a faculty member at the university remarked:

> Since the training is primarily delivered online, limited access to internet services hinders students' effectiveness, leading many to fall behind. Additionally, a lack of understanding and awareness of the program has resulted in a considerable number of graduating students choosing to opt out of the training. There is also a notable issue with digital literacy, particularly among social science students, many of whom lack the necessary skills. Furthermore, the timing of the training, which coincides with the academic calendar, significantly affects student engagement.

3.4.2. Key demand-side issues to graduates' employability

The employability of graduates is significantly influenced by employers' recruitment capacity, and the findings of this study reveal that both global and local factors play a crucial role in shaping employers' ability to hire fresh graduates in Ethiopia, particularly in Hawassa. Numerous challenges hinder companies from operating at their full potential, underscoring the need for a coordinated effort to enhance their hiring capabilities.

Globally, the COVID-19 pandemic has had a profound impact on employment capacities, resulting in the closure of certain businesses and workforce reductions for others. Key informant 7, an officer at the regional investment bureau remarked, "Many companies have struggled to return to pre-pandemic employment levels, which has directly affected their ability to recruit new graduates.'' Additionally, Ethiopia's economic instability, compounded by the loss of benefits from the African Growth and Opportunity Act (AGOA), has severely hampered foreign direct investment. Growing security issues are creating obstacles that affect social enterprises' ability to help graduates apply their skills effectively. Political instability is further complicating the work of social entrepreneurs by limiting their ability to organize logistics for educational purposes. For example, Key informant 1, a program officer at the African Jobs Network, underscores that ―security concerns have led to the rescheduling and cancellation of training sessions''. Furthermore, findings from focus group discussions reveal that the absence of standardized career development centres is perceived as an obstacle hindering the seamless transition of graduates from higher education to the workforce.

The findings indicate that there are civil societies play a crucial role in enhancing graduate employability by collaborating closely with higher education institutions, industrial parks, and development bodies. Organizations like the Hawassa Industrial Park Investors' Association are key players in bridging the gap between graduates and industry. They work in tandem with career development centres at higher education institutes to provide hands-on training opportunities within industrial parks. Key informant 10, project manager Of the Hawassa Industrial Parks Investors Association (HIPA), highlighted the missions of the association, "Since 2016, HIPIA has been dedicated to enhancing the employability skills of graduates by elevating professional standards and facilitating internship programs. These programs are designed to increase graduates' job readiness and competitiveness in the workforce."

3.4.3. Social enterprise in capacitating graduates' employability

The study indicates that the Africa Jobs Network (AJN) is a social enterprise that was established to address unemployment issues, particularly youth unemployment. Dereja is a special program of the African Jobs Network (AJN) that is designed to capacitate graduate employability by providing different programs in higher education institutes since 2015 in Ethiopia. The enterprise extended its presence across the country, operating in 18 towns including Hawassa. The evidence indicates that Dereja has several success stories in bridging the skill gap of graduates in partnership with higher education institutes, government offices, and industry and other social enterprises. The Key informant 12, the knowledge management coordinator, at Africa Jobs Network (AJN), highlights Dereja‘s program initiatives as follows:

> The Dereja Academy Accelerator Program (DAAP) is a three-month intensive training initiative aimed at equipping graduating students with essential professional and soft skills tailored for entry-level positions. This program plays a crucial role in connecting graduates with potential employers through various career development activities, including job fairs, to enhance their employability and job readiness. We are setting up career clubs at universities, enabling students to join and enrich their awareness of employability and work readiness. Additionally, we have created the Dereja alumni network, which allows us to monitor the employment progress of our trainees.

All focus group participants, key informant interviewees, and document reviews indicate that Dereja, in collaboration with universities, is facilitating resident-based job fairs targeted specifically at graduates in various towns. This initiative aims to reach a significant number of graduates who are outside of traditional university environments. Key informant 11, training manager at Africa Jobs Network (AJN) noted: __Dereja provides internship opportunities at various companies, including AJN, where the current country director is a distinguished alumnus who completed Dereja's internship program.‘‘ Additionally, DAAP facilitators in focus group discussions underscored this connection, highlighting the importance of such internships in enhancing graduates' employability. Furthermore, Dereja organizes breakfast forums to help identify the challenges that employers‘ faces, enabling them to better equip graduates with the necessary skills. Through its mentorship program,

Dereja connects students with potential companies that can aid in further developing their skills.

3.4.4. Major initiatives of Social Enterprise

The research findings point out that, within the framework of the Young Africa Works initiative, Dereja has introduced three major projects: the Dereja Academy Accelerator Programme (DAAP), the Employability Skills and Job Readiness program, and Technical Skills Training.

1. Academy Accelerator Programme (DAAP),

Academy Accelerator Programme (DAAP) aims to enhance the employability of graduates. Since its inception in 2019, the program has trained a total of 5,605 students, focusing on developing high-calibre graduates dedicated to personal and professional growth. As a result, it has successfully placed 1,781 candidates in jobs, comprising 1,038 males and 743 females. The number of trainees has significantly increased over the years, starting with just 65 participants in 2019 and reaching 2,098 in 2023. The program also emphasizes inclusivity, having trained 16 individuals with disabilities by 2022. All focus group participants agreed that DAAP contributes to increasing graduates‘ employability, particularly by enhancing their job search techniques and interview skills. Key informant 15, a faculty member at the university noted, "DAAP has a comprehensive approach that not only enhances graduates' employment prospects but also empowers them to identify their career paths and personal goals, effectively addressing youth unemployment in Ethiopia."

Year	Training Type	Number of Trainees	Male	Female	PWD	Status
2019	DAAP	65	35	30	-	Completed
2020	DAAP	500	240	260	-	Completed
2021	DAAP	302	162	140	-	Completed
2022	DAAP	799	480	319	16 (6 male and 10 Female)	Completed
2023	DAAP	2098	1,489	609	0	Completed
2024	DAAP	1838	1,387	451	0	Ongoing
	Total	5,602	3,793	1,809	16	

Table 3. 1: Total number of DAAP graduates since 2019

The research findings suggest that DAAP is positively influencing students' academic performance. The training provided through DAAP directly affects both employability and academic success, as highlighted by key informant 6, a faculty member at the University:

> We noted that every graduate from Hawassa University who participated in the DAAP training passed the exit exam with a perfect success rate. This program effectively bridges the gap between soft and professional skills for students, as graduating classes possess theoretical knowledge but often lack the practical skills needed in the job market. One of the most significant improvements observed was in communication; students who previously felt hesitant to express themselves in small groups are now able to engage confidently and openly during presentations and various activities.

2. Employability Skills and Job Readiness Training

The study reveals that the 'Employability Skills and Job Readiness training program has been conducted in person, benefiting a total of 96,271 students since 2000 (62,056 males and 34,215 females). Focus group discussion with career centre coordinators indicated that the program consists of a two-day training course, facilitated by university academic staff, covering essential topics such as job searching techniques, industry analysis, application processes, tailored CV writing, interview skills, communication, professionalism, and work ethics. Participants also have the opportunity to engage in job fair clinics, which include one on-one CV reviews and mock interviews. Following the training, key informants from Gondar University reported that, "students receive sample CVs and worksheets to assist in their job readiness efforts". Additional details about this training program are provided in the accompanying table.

Year	Number of Trainees	Male	Female	PWD	Status
2019	NA	NA	NA	NA	NA
2020	5,820	2,794	3,026	NA	Completed
2021	21,803	12,430	9,373	NA	Completed
2022	22,542	15,205	7,337	51 (20 Male and 31 Female)	Completed
2023	29,976	20,445	9,531	131 (60 Male and 71	Completed

				Female)	
2024	16,130	11,182	4,948	137 (86 Male and 51 Female)	Ongoing
Total	**96,271**	**62,056**	**34,215**	**319**	

Table 3. 2: Total number of trainees who took Employability & Job Readiness Training and Job Fair Clinic

The research findings indicate that the training extends beyond merely improving employability. Participants from two focus group discussions, which included career centre coordinators and DAAP facilitators, agreed that the training is fundamentally reshaping the mindset, not just that of the trainees. Key informant 2, a faculty member at the university shared his personal experience, stating, __I was initially recruited by Dereja to serve as a facilitator for the DAAP program; however, from the very first day, I gained a clearer understanding of my life‘s purpose and was able to identify my talents, which are crucial for building a successful career.‘‘ In addition to benefiting student trainees, the training also provides significant advantages to the trainers, who participate in Train-the-Trainer (TOT) sessions to enhance their instructional skills. Key informant 6, a faculty member remarked __Personally, I discovered that the training improved my self-awareness and time management skills as I engaged with the materials to prepare for my sessions‘‘. Both focus group participants - career centre coordinators and DAAP facilitators – agreed that the training has a substantial impact that extends beyond employability by also influencing students' mind-sets. Additionally, In-depth interviewee 3, a graduating student, shared her perspective on the training she received; she remarked, "The program included essential components that directly connect graduates to the professional environment. As a result, I feel well-prepared and excited to enter the job market." Her insights reflect a strong sense of readiness and enthusiasm among graduates, indicating that the training has effectively equipped them for future employment opportunities.

Moreover, the research findings revealed that the training significantly impacts not only the trainees but also the trainers. Key informant 13, a faculty at the university noted, "I gained a clearer understanding of my life's purpose and identified my talents, which are essential for building a successful career". Also, key informant 6, a faculty member at the university commented, __During the Training of Trainers (TOT) session, I greatly benefited from the opportunity to enhance my communication skills, which I had not developed during my teaching career, I further refined these skills while preparing for and delivering training to

students‘‘. Additionally, key informant 4, a faculty member at the university stated, "I discovered that the training improved my self-awareness and time management skills as I engaged with the materials to prepare for my sessions."

3. Technical Skills Training

The study suggests that the program targets 1,000 recent graduates, offering essential competencies in project management and business development through a month-long hand on curriculum that incorporates job shadowing. The Digital Literacy Skills Training program, which lasts two months, is designed to equip university students at beginner and intermediate levels with vital digital skills such as internet navigation and online safety. Additionally, key informant 12, a knowledge management coordinator at Africa Jobs Network describes it as, a "Career Compass program, which provides first-year university students with guidance on major selection and career planning over a month, focusing on self-awareness and decision making". The document review reveals that, as of 2023, 18 trainees have completed the Technical Skills Training, while upcoming programs involve 2,606 students enrolled in Digital Literacy Training and 4,123 participating in Career Compass orientation.

These research findings indicate that Dereja has created an online platform called 'Dereja.com,' aimed at connecting graduates with employment opportunities and promoting networking through technology. Key informant 11, training manager at the Africa Jobs Network reported that _the platform provides job and internship listings, career advice, learning content, and employer profiles, which help graduates access high-quality job prospects. In addition to its website, the document review shows that Dereja actively engages users on social media, with 46,362 subscribers on Telegram, 34,000 followers on LinkedIn, 19,000 followers on Facebook, and 1,477 followers on Instagram. As of July 6, 2024, Dereja.com has amassed a total of 144,992 subscribers, of which 72.36% (104,914) are male and 27.64% (40,078) are female.

In terms of job placement opportunities, Dereja has successfully facilitated placements for a total of 83,544 candidates, comprising 48,966 males and 34,578 females. These placements were achieved through various interventions, primarily via the website, job fairs, and the Dereja Academy Accelerator Programme (DAAP). A focus group discussion with interns from the African Jobs Network revealed that the website serves as a comprehensive portal where job seekers can access a wide range of employment opportunities. By leveraging the platform's extensive database and job-matching algorithms,

Dereja has helped many candidates‘ secure suitable positions within various organizations. Notably, the most significant number of placements occurred through Dereja's website, with 72,461 candidates (42,597 male and 29,864 Female) finding opportunities via this platform.

The research findings also indicate that job fairs act as in-person platforms connecting graduates with employers, thereby aiding their job search before graduation. Key informant 11, training manager at Africa Jobs Network stated, "Before these fairs, a two-week Job Fair Clinic program is offered at university career centres, focusing on job readiness training and employability skills such as resume writing and interview preparation‘‘. During the reporting period, Dereja, in partnership with the Mastercard Foundation, organized 12 regional and 2 national job fairs, resulting in the placement of 9,302 candidates (5,331 males and 3,971 females). Focus group participants confirm that these events facilitated direct interaction between job seekers and employers, enhancing networking opportunities and improving graduates' chances of securing employment.

Furthermore, Dereja's training initiative serves to build the capacity of university faculty, enhancing their abilities to provide quality training and familiarize themselves with digital materials. A key informant 4, a faculty member at the university: This training inherently increases their capacity as educators, empowering them to adopt innovative teaching methods. Additionally, Dereja plays a role in supporting incubation centres established at various universities by assisting in developing selection criteria, helping students present their ideas, and guiding them through the process of turning those ideas into tangible outcomes.

3.5. Discussion

Graduate employability is increasingly recognized as a critical development challenge in emerging economies (Monteiro et al., 2024), and the Ethiopian context is no exception. Structural barriers—ranging from misaligned curricula to limited exposure to workplace environments—continue to undermine graduates‘ transition into the labour market. This underscores the growing need for integrated strategies that bridge the domains of higher education, industry engagement, and innovation systems (Li, 2023; Aithal & Maiya, 2023). Within this context, the Regional Innovation System (RIS) framework provides a valuable analytical lens for understanding how coordinated action among universities, industries, civil society organizations, and government institutions can enhance graduate employability. By

fostering collaborative learning environments and aligning educational outputs with the evolving demands of local and regional economies, RIS offers a pathway for more inclusive and responsive workforce development. The study's findings suggest that such multi-actor engagement has the potential to not only reduce skills mismatches but also improve the relevance and adaptability of higher education institutions in meeting the needs of dynamic labour markets.

Even though higher education institutes are primarily responsible for producing competent graduates that would best fit with the existing labour market (Chekol, 2024); Ethiopian higher education institutes have been making all possible attempts to adapt their strategies and carry out activities in more applicable ways to produce employable graduates that maintain their level of competency and satisfy market demands (Yimer et al., 2024; Kassa et al., 2024), the research findings also align with these and higher education institutes, Hawassa university in particular, doing their level best to equip and engage their students in capacity development initiatives.

However, systemic problems, individual limitations, institutional reputation, political connections, and the nation's general social, economic, and political climate are some of the factors that impact graduates' employability (Monterio et al., 2024; Griffin & Coelhoso, 2019; Grossman & Johnson, 2015; Suleman, 2018). Key determinants of employability include soft skills, problem-solving abilities, functional knowledge, and academic reputation (Sahudin, 2022). Other important factors include age, faculty, field of study, and participation in extracurricular activities, marital status, industrial internships, and English proficiency (Othman et al., 2018). The study results are consistent with the literature in that all of the aforementioned issues are influencing the employability of graduates in higher education institutions, and the problem is becoming worse over time. As a result, quick and coordinated action is needed to address the situation.

To address these issues, strategic actions centred on reforming the educational system are crucial; these actions include curriculum review, aligning education with market demands, creating an environment that is conducive to expanding the employment landscape, and training graduates in soft skills like emotional intelligence, creativity, and entrepreneurship (Al-Tekreeti et al., 202; Hossain et al., 2018). Above all, the most urgent step that should be taken is to give them soft skills. Additionally, the university-industry linkage programs can be crucial for economic and regional growth, which will benefit both

parties (Figueiredo & Ferreira, 2022; Freitas et al., 2013). Most significantly, research continually shows that internship programs are an integral aspect of university-industry linkage partnerships and that many students are improving their employability skills as graduates at higher education institutions.

University-industry linkage is of increasing importance in literature dealing with economic development and innovation since it references to interaction between higher education and industry both parties benefit from the transfer of technology and knowledge (The partnership brings economic opportunities and regional development because the industries benefit from higher education in exploiting research outputs, while the higher education institutions have the leverage to allow their expertise and researchers to address practical problems and develop new inventions (Rossoni et al., 2024; Perkmann et al., 2013). University-industry linkages, such as joint research projects, internship and externship programs, and involving the industry in curriculum creation, are directly related to employability initiatives for graduates (Ishengoma & Vaaland, 2016).

Since graduates' employability constitutes one of many significant challenges concerning Ethiopia, all development actors—including government agencies, businesses, civil society organizations, and higher education institutions—should band collectively and link up to boost the nation's employment landscape (Yimer et al., 2024). By promoting innovative ways of adapting to changing market demands, social enterprises play an essential part in generating job opportunities, enhancing graduates' employability, and advancing inclusion (Calderini et al., 2023; Weaver & Blakery, 2022; Renkinen et al., 2016). As a best practice, the Africa Jobs Network (AJN) Dereja program's pointed out initiative to improve graduates' employability through various activities, such as soft skill training and organizing a job fair that connects graduating class students with potential hiring professionals, should be multiplied and noticed by all stakeholders in the ecosystem.

3.6. Conclusion

Knowledge-based economies greatly value highly skilled human capital that can compete in a highly competitive labour market. Nevertheless, graduates' employability has emerged as one of the most pressing global issues, particularly in emerging economies like Ethiopia. Higher education institutions are one of the primary stakeholders that are supposed to offer the job market with highly competent employees. Graduate employability in Ethiopia is compressed by a variety of factors, including personal limitations, poor language

proficiency, a lack of training in critical skills, low self-confidence, and systemic problems like out-dated curricula, restricted access to infrastructure, inadequate educational resources, governance problems, unstable economic conditions, a lack of job opportunities, and other external factors.

In addition to higher education, the government, industry, and civil society are some of the main development actors that are working to improve the employment ecosystem and the graduates‘ employability in particular. This study was carried out to assess the contribution of social entrepreneurship to Ethiopian graduates' employability, and the role of other players ought to be examined as well. Most importantly, social enterprises play an important role in regional innovation systems, serving as bridges connecting higher education outputs and labour market demands. They foster networks of partnership between universities, industry, government entities, and civil society, which promotes economic growth and the exchange of knowledge. By fostering social inclusion, supporting experiential learning, and offering diverse employment prospects, social enterprises improve the employability of graduates in Ethiopia.

CHAPTER FOUR

CHALLENGES AND OPPORTUNITIES FOR TECHNOLOGY TRANSFER AND COMMUNITY ENGAGEMENT: THE CASE OF HAWASSA UNIVERSITY IN ETHIOPIA.

ABSTRACT

Research universities in emerging economies are increasingly recognised as crucial actors in promoting sustainable regional development through research, technology transfer, and community engagement. To better understand the situation of Ethiopia as an emerging economy, this study critically examines the contributions of Hawassa University to the evolving Regional Innovation Systems (RIS). Employing a qualitative design, data were collected through document analysis, 40 key informant interviews, and three focus group discussions. Thematic analysis revealed significant progress over the last fifteen years, with notable growth in staff research projects (1,414 projects) and intellectual property registration (12 patents since 2020). However, the university faces systemic challenges including suboptimal research impact (with 90% of projects underperforming against intended benchmarks), chronic underfunding (allocating only 2.2% of its budget to R&D), bureaucratic procurement inefficiencies (i.e. red tape), and insufficient community engagement frameworks. Opportunities for synergy exist, particularly through industrial clusters and indigenous knowledge integration. The study concludes that Hawassa University's transformative role in regional development can be amplified through strategic policy reform, enhanced resource allocation, and recalibrated community engagement models. These findings contribute to the broader understanding of the entrepreneurial university paradigm in low-resource settings.

Keywords: Community Engagement, Entrepreneurial University, Ethiopia, Regional Innovation Systems, Technology Transfer, Transformative Innovation Policies.

4.1. Introduction

In emerging economies such as Ethiopia, the role of education has evolved to become a crucial component in enhancing national competitiveness and securing sustainable economic growth over the long term (Ildikó et al., 2024). While universities have traditionally focused on teaching and research, there is now a growing expectation that they contribute more actively to the development of their surrounding regions. Research-intensive universities, in particular, are seen as important drivers in stimulating regional innovation, facilitating technological upgrades, and supporting broader socioeconomic progress (Thomas et al., 2023; Gebreab & Tekle, 2024; Corsi et al., 2023).

According to Rådberg and Löfsten (2024), universities need to branch out beyond their traditional role in research commercialization so as to promote an extensive regional socioeconomic development strategy. Particularly in knowledge-based economies, universities are increasingly viewed as important players in regional development and policy implementation. Problems including inadequate funding, out-dated curriculum, and inadequate infrastructure, however, limit their capacity to fulfil their mission as knowledge hubs.

The expectation that universities should actively promote economic growth, innovation, and development is a relatively recent development (Thomas et al., 2023; Pugh et al., 2022). Traditionally, universities followed the Humboldtian model, which emphasized the integration of teaching and research. Over time, this model has evolved to include a _third mission,‘ whereby universities contribute directly to regional economic and social development through knowledge transfer and community engagement (Etzkowitz & Leydesdorff, 2000; Etzkowitz & Klofsten, 2005).

This shift is particularly evident in research universities, which are increasingly expected to serve as bridges between academia, industry, and local communities (Borah et al., 2023; Delgado-Verde & Díez-Vial, 2024; Ursić et al., 2024). Nevertheless, this development has raised concerns. An excessive focus on economic outcomes may threaten the traditional roles of universities, particularly critical thinking and the dissemination of knowledge (Marginson, 2016). Furthermore, it risks sidelining the social sciences and humanities, disciplines essential to democratic citizenship and the broader development of society (Nussbaum, 2010).

The frameworks for innovation systems and entrepreneurial ecosystems offer significant details on how universities could operate as catalysts for regional development and innovation in technology (Wanger et al., 2021). Although providing pertinent theoretical instruments for analyzing universities' evolving role in regional development, these frameworks are not universally applicable across institutional or regional contexts (Pidorycheva et al., 2020; Reichert, 2019). It's imperative to critically analyze the premise that universities inherently support sustainable and equitable development in light of the pressures of commercialization and potential discrepancies between academic outputs and local community needs (Sedlacek, 2013). Knowledge and technology transfer, along with community engagement, are crucial components of research institutions' efforts to transform academic research into feasible alternatives for critical social issues. According to Guerrero and Urbano (2012), entrepreneurial universities are institutions that have established in place systems that foster innovation, facilitate technology transfer, and contribute to regional development.

African universities continue to be quite young and have yet to produce a considerable contribution to research and development, innovation, and economic growth in their respective regions (Bezeng et al., 2025; Wenham et al., 2021). Despite making up 12% of the world's population, Sub-Saharan Africa has the fewest researchers per million people and contributes only 1% of global research production (Jowi, 2021; World Bank 2014). The slow progress of innovation's contribution to the region's development trajectory may have been credited with impediments to the development and execution of innovation policies (Forson, 2020; Van't Land 2016; Jowi & Obamba 2013).

These days, prominent African universities dealing with transformative innovation policies to address grand continental critical issues like housing, water, sanitation, and infrastructure continue to be at the forefront of redefining development (Katsamudanga & Nhamo, 2025). Africa must make investments in education, research and development, and innovation as it expects to realize sustainable economic development. Correspondingly, innovation is essential for long-term growth, economic competitiveness, and improved societal welfare (Carnoy & Castells 2001, World Bank 2009).

African universities, like the University of Nairobi, Makerere University, and Eduardo Mondlane University, are embracing innovation as a strategic institutional mission, driving social and organizational change through policy frameworks and development

projects, requiring local expertise and collaboration (Langa, 2024). Universities in East Africa recognize community engagement and technology transfer as means of contributing to sustainable development. Institutions such as the University of Nairobi and Makerere University have established policies that enhance academic capacity, finance, and research management (Rwakijumba & Okaka, 2017). However, barriers such as insufficient finance and poor inter-university networking prevent the best possible performance

Universities in Ethiopia have both the potential as well as constraints when regards to employing their research output to address the local communities' issues along with promoting socioeconomic development. The commercialization of university research has gained more attention, both as a means of contributing to competitiveness and as a way for institutions to generate revenue from their research projects (Berggren, 2017; Ambos et al., 2008). Universities are considered to be the most important institutions and advocates in the national innovation system (Zaidan et al., 2024; Audretsch, 2014). Consequently, through establishing incentives towards innovation, policymakers should aspire to enhance universities' capability to innovate and to successfully apply it (Wanger et al., 2021).

Ethiopian higher education has a relatively recent history, dating back to the 1950s, and it is still evolving. While the sector has grown rapidly—it now includes 49 public and 128 private institutions—it has not yet been matched with adequate investment, with education consuming only about 3% of GDP, falling below the Sub-Saharan African average (Tareke et al., 2024; Tessema & Abebe, 2011). Such underfunding has exacerbated long-standing problems with research capacity, instructional quality, and infrastructure. The rapid expansion of higher educational institutions poses a further burden on the system, raising concerns that currently underway insufficient staffing and the absence of institutional and financial resources could compromise academic standards.

The Higher Education Proclamations of 2009 and 2019 constitute two recent government efforts that highlight the vital role of universities in national development, particularly in the areas of technology transfer and community participation. However, their implementation is still uneven. In Ethiopia's broader innovation landscape, the transformational potential of higher education is limited with limited organizational capacity and enforcement gaps that continue to hinder the realistic achievement of these targets (FDRE, 2009; FDRE, 2019; Ildikó et al., 2024).

In Ethiopian Universities, the old "community service" paradigm of community participation has given way to a more cooperative "community engagement" strategy. The evolution reflects the growing realization that universities have to actively collaborate with their local communities in addressing societal issues through partnerships and reciprocal knowledge sharing, in addition to serving them (Ildikó et al., 2024). As Community Engagement Directive for Higher Education Institutions (MoEDR1, 2019), Community Engagement (CE) refers to the cooperation between higher education institutions and their larger communities (local, regional/state, national, and global) for the mutually beneficial exchange of knowledge, resources, and practices to address urgent societal issues in a context of partnership and reciprocity.

While the Community Engagement Directive for Higher Education Institutions (MoEDR1) aims to foster transformational collaborations between institutions and communities, it often overlooks core practical challenges. The effectiveness of engagement initiatives may be undermined by limited resources, disparities in power, and financial constraints. Furthermore, when academic objectives take precedence over local concerns, power asymmetries may lead to one-sided partnerships. A detailed evaluation of community engagement's socio-political dynamics and practical effectiveness is necessary to fully appreciate its capacity to transform.

Even with significant improvements, Ethiopia's higher education system continues to encounter difficulties. While financial limitations as well as quality concerns are the primary barriers, the education system also has flaws in terms of relevance, academic freedom, and equality (Molla, 2018).Most significantly, there is a misalignment between industries and universities since industry-university relations are still in their early stages (Gebreab & Tekle, 2024). The existing relations are limited to short-term training programs, consulting services, and student internship programs. When it comes to engaging the community, universities confront two challenges. The growing demand from their local communities and the government's limited allocation of financial resources for social development initiatives (Ildikó et al., 2024).

There have been several studies on the role of Ethiopian HEIs, but few have looked at the potential and difficulties of technology transfer and community engagement. Notable studies have focused on the impact of community engagement on student performance (Belete, 2024) and the sustainability of public universities' societal roles (Reda, 2024), but the

dual focus on both technology transfer and community engagement in the Ethiopian context remains underexplored. Consequently, this study intends to investigate Hawassa University's technology transfer and community engagement as an opportunity and challenge to demonstrate how Ethiopian research universities could foster transformational innovation and regional development.

4.2. Literature Review

This section discusses substantial theoretical frameworks and empirical debates regarding universities' growing roles in national and regional development, in particular emerging economies. The "triple mission" of universities—teaching, research, and social engagement—is first discussed globally. The feasibility and adaption of the entrepreneurial university model and Transformative Innovation Policies (TIP) in resource-constrained environments are then examined. After delving further into empirical research on technology transfer and community engagement, highlighting both effective tactics and persistent challenges, it ends by presenting the conceptual framework that guides this study.

4.2.1. Universities and the Triple Mission: Global Debates

Historically, the primary roles of universities have been teaching and research. In recent decades, universities have begun introducing their "third mission"—to promote regional and national development. The most notable example of this evolution is the transformation of universities into entrepreneurial organizations that prioritize knowledge creation and dissemination for the advantage of society and the economy rather than just teaching and research (Guerrero et al., 2016; Thomas et al., 2023). This development is consistent with a global movement that views universities as essential engines of innovation, economic expansion, and social change (Menter, 2024).In developing nations like Ethiopia, where universities are still relatively young and have major budget constraints, this emerging role becomes particularly relevant. Nonetheless, shifting from exclusively academic roles to one of regional development presents challenges, particularly in light of structural gaps in resources and policy (Gebreab & Tekle, 2024).

Ethiopian universities' "third mission" is commencing to be recognized, especially through community engagement and technology transfer (Ildikó et al., 2024). The entrepreneurial university concept, which is commonly used in financially secure environments, must be tailored to the local context, though, as it must be appreciated. For

example, Ethiopian universities, including Hawassa University, have distinctive challenges in resource-constrained settings, such as insufficient funding, facilities, and human capital (Tessema & Abebe, 2011).Therefore, it becomes essential to have a contextual awareness of how Ethiopian universities could integrate their teaching, research, and community engagement initiatives towards regional development.

4.2.2. Transformative Innovation Policies (TIP) and Emerging Economies

As stated by Schot and Steinmüller (2018), transformational innovation policies (TIP) are a type of policy approach intended to alleviate pertinent socioeconomic issues including injustice, social and environmental sustainability, and economic development. TIP shifts from the traditional emphasis on market-driven technology improvements to a focus on social goals and inclusive progress (Hekkert et al., 2020). Although TIP frameworks have been extensively studied in high-income countries, little emphasis has been placed on how useful they are in emerging economies, especially in Africa.

TIP may prove to be an effective instrument for promoting sustainable development in Ethiopia. Its implementation, however, necessitates a substantial alteration to current systems. Ethiopian universities possess the capacity to effectively communicate with TIP frameworks owing to infrastructural and financing restrictions (Pugh et al., 2022). TIP emphasizes the need of combining innovation with societal demands, but its execution is severely hampered by Ethiopia's low industry engagement and poor governmental support. Therefore, a cutting-edge TIP strategy that is specifically tailored to the specific needs of Ethiopian universities is essential.

Furthermore, TIP discourse has to incorporate African innovation research that emphasizes local context and indigenous knowledge. The lack of African-centric models that recognize the historical relevance of Indigenous knowledge systems in fostering transformative innovation is the primary gap in the body of present TIP research (Babalola, 2024; Muwanga-Zake & Kibukamusoke, 2024). For Ethiopian universities to flourish in a sustainable and inclusive manner, it is crucial to take into account how contemporary science and traditional knowledge could produce TIP.

4.2.3. Entrepreneurial Universities in Resource-Constrained Contexts

Rådberg and Löfsten (2024) characterize entrepreneurial universities as those which promote the setup of regional innovation ecosystems and the commercialization of knowledge. In low-income and resource-constrained nations like Ethiopia, typical entrepreneurial university models—which often rely on models from high-income countries—present significant challenges. In this regard, the successful uptake of entrepreneurial university models is significantly hampered by Ethiopian institutions' poor resources, which include limited funding, subpar facilities, and an acute lack of qualified staff (Checkol. 2024; Mohammed, 2024).

Several African nations have adapted the entrepreneurial university model for contexts with limited resources (Breznitz, 2014). These modifications include using Indigenous knowledge systems to strengthen local capacity, collaborating with non-governmental organizations (NGOs), and establishing low-cost incubators for innovation (Ozor et al., 2025; Moleka, 2024). These developments could benefit Ethiopian universities, particularly in terms of developing collaborations with local businesses and regional players. Furthermore, universities may need to focus on promoting low-risk, collaborative innovation models that can be sustained under current limitations on resource availability, as Ethiopia has no a sizable venture capital ecosystem (Haregwoin, 2022).

An inclusive and sustainable innovation ecosystem that serves local development needs while strengthening the university's position as an economic and social actor depends on highlighting resource-constrained entrepreneurial university models (Kamuriwo, 2024; Gallage, 2023). Universities must adopt a more flexible, adaptable approach to the entrepreneurial university model in light of the lack of a dependable start-up financing program and the fragile interactions among academics and business.

4.2.4.Technology Transfer and Community Engagement: Best Practices and Challenges

4.2.4.1. Technology Transfer

Technology transfer (TT) plays an integral role in integrating research from academia into practical applications that might address societal issues. According to Pohlmann et al. (2022), TT is the process that ensures academic research and innovation are shared with the general public and industries, hence aiding the commercialization and greater diffusion of scientific information. However, in emerging economies including Ethiopia, TT encounters substantial challenges such as inadequate infrastructure, the absence of industrial

engagement, and a limited realisation of how to commercialize studies (Hailu, 2024). Numerous ways may be employed to overcome all of these challenges. These include establishing multidisciplinary research institutes to bridge academic and industrial knowledge gaps, strengthening industry-academic relationships, and building incentive schemes to encourage researchers to engage in commercialization activities (Gao, 2024; Pohlmann et al., 2022). Ethiopian universities could personalize their approach to TT by focusing on sectors that coincide with national development priorities, such as agriculture, renewable energy, and health, where local discoveries can have the greatest immediate impact (Sube et al., 2024).

4.2.4.2. Community Engagement

Community engagement is a core element of universities' third mission, in which universities collaborate diligently with their local communities to address societal problems. In Ethiopia, community engagement began as a "community service" concept but has subsequently evolved into a more inclusive and reciprocal approach (Ildikó et al., 2024). This shift toward community participation is consistent with the overarching goal of ensuring colleges play an active role in regional development and social impact (Gebremariam et al., 2025).

Co-producing knowledge with regional stakeholders, ensuring that engagement activities are in line with the needs of the neighbourhood, and cultivating long-term partnerships that go beyond short-term projects are all highlighted by best practices in community involvement (Sánchez-Barrioluengo & Bennéworth, 2019). Hawassa University has the chance to enhance its involvement in the community by concentrating on projects that tackle urgent local concerns like environmental sustainability, healthcare, and rural development. The government's limited funding for social development initiatives and the changing demands of local communities for more participation in decision-making processes are two obstacles the university must overcome.

4.2.5. Conceptual Framework for the Study

The conceptual framework of this study aims to explore the challenges and opportunities of technology transfer and community engagement efforts in research universities in emerging economies (resource-constrained economies such as Ethiopia), with a focus on Hawassa University in Ethiopia. Universities, particularly research universities, have a responsibility to engage in the Third Mission along with their traditional

responsibilities of teaching and research. Assuming the conceptual framework steps to bring together four distinct components: transformative innovation policies (TIP), the entrepreneurial university model, technology transfer, and community engagement. Through these dimensions, it is readily apparent that universities offer an indispensable part in contributing as an important innovation player to ensure equitable and inclusive development to address local and regional issues.

Starting Transformative Innovation Policies (TIP) presents a theoretical approach for aligning the innovation system alongside current societal issues including social justice, equity and environmental sustainability. The adaptation of Transformative Innovation Policies (TIP) to the Ethiopian context calls for contextualizing the global framework into the local context, stimulating indigenous knowledge, and focusing on handling institutional barriers including limited infrastructure and insufficient funding for research and development (RD). Similarly, the Entrepreneurial University Models are designed to enable universities, particularly research universities, to evolve into more innovative, commercialize knowledge, and constitute collaborations with various regional innovation system actors such as government agencies, private enterprises, and civil society organizations. Both of the frameworks stated above provide a road map for universities, particularly research universities in Ethiopia, to contribute a catalyst role to bring about economic growth and social development.

In operational terms, the framework highlights Technology Transfer and Community Engagement as vital tools for universities to successfully carry out their third mission. While technology transfer generates opportunities as aligning research outputs to regional demands in different sectors, whereas encounters constraints including poor university-industry linkages along with limited commercialization capabilities. Community engagement, which has developed from a linear service paradigm to a more reciprocal and collaborative approach, has the potential for significant collaborations with local communities, nevertheless, it also challenges such as resource constraints and policy misalignment. While addressing these double dimensions, the framework attempts to demonstrate how universities in research-constrained economies, such as Ethiopia, may overcome institutional and contextual barriers to more efficiently fulfil their developmental roles.

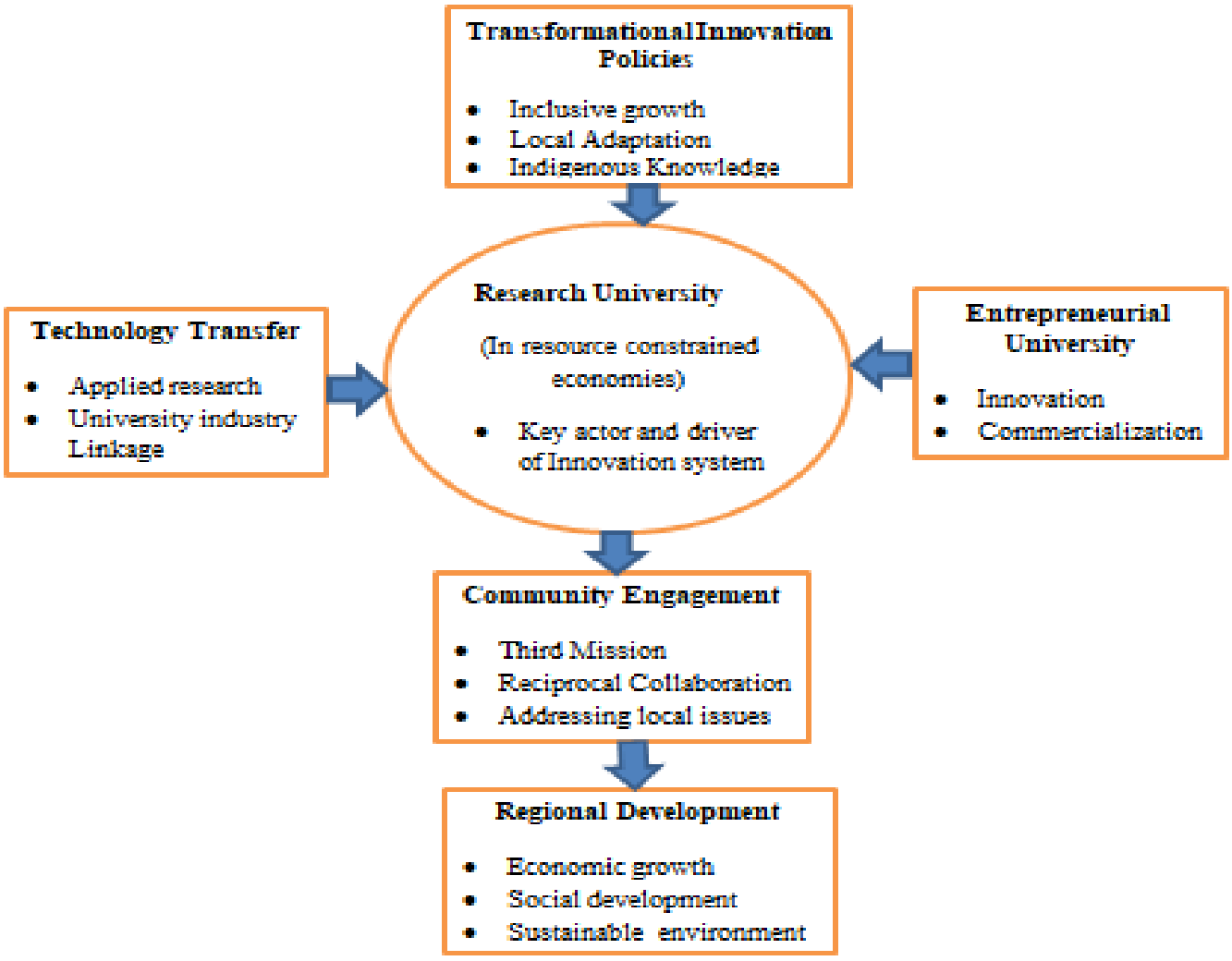

Figure 4.1: Conceptual framework (Own Source)

4.3. Methods

The research used a qualitative approach to get an in depth understanding of Hawassa University's role in regional development initiatives, including potential opportunities and issues related to research, technology transfer, and community engagement programs. This qualitative design, as described by Oranga and Matere (2023), focuses on addressing the "how" and "why" questions. It carefully reviews the perspectives, experiences, and behaviors of participants, making it an invaluable asset to learn about Hawassa University's engagement with regional development activities.

The study employed a non-probability, purposeful sampling technique to choose participants who had provided detailed information about Hawassa University's stance on technology transfer and community engagement programs; more precisely, the selection criteria focused on those who were believed to have direct collaboration with the university,

positions, or personal engagement or expertise. The study employed multiple types of techniques to collect data that included focus groups, key informant interviews, and institutional document reviews. Eight Ministry of Education specialists, eight high-ranking university officials, ten faculty members, eight government employees, six researchers, and six members of the local community were among the experts who participated in key informant interviews. We interviewed 46 significant informants in all.

An extensive understanding of the institutions‘ role in research, technology transfer and community engagement was given by the interviewees. Three focus group discussions with, faculty members (eight members), career centre coordinators (eight members), and recent graduates (ten members) were conducted. The focus group discussions aimed to collect multiple perspectives and first-hand information on transferring technologies and community engagement at Hawassa University. This participatory approach contributed to recognizing shared challenges and opportunities by facilitating participants to discuss while developing the thoughts of one another.

This study conducted a systematic assessment of numerous institutional documents to comprehend Hawassa University's engagement with research, technological transfer, and community participation. It reviewed R&D project documentation, partnership agreements, patent applications, intellectual property records, technology transfer reports, community engagement campaign reports, policy and guidance documents, and budget allocation reports. The objective of the review was to analyse the university's progress, variability, and research engagement trends over the last fifteen years, assess the impact of collaborative research initiatives, evaluate the university's progress in innovation and technology transfer, and comprehend the scope, implementation, and outcomes of outreach activities.

Once data is collected, the study adheres to the six-phase theme analysis process put forth by Braun and Clark (2006). These phases include: understanding the data by turning spoken data into written form and translating it from Amharic to English for analysis; generating initial codes by turning collected data into codes that condense information into meanings that can be easily understood; creating codes by identifying potential themes or patterns within the data; creating codes by matching codes with data extracts to support each code; creating codes by identifying probable themes or patterns to cut down on the amount of The thematic analysis played a crucial role in organizing the responses and revealing key themes. The major themes that emerged were Research and Development (R&D) initiatives; promoting knowledge/ technology transfer; community outreach and engagement; existing

and emerging opportunities; and existing and emerging challenges. Document assessment was used to identify patterns and trends in staff research projects, and intellectual property rights granted inventions.

To ensure quality, the study relies on four criteria: credibility to internal validity, transferability to external validity/generalizability, dependability to reliability, and conformability to objectivity. Credibility is achieved through prolonged engagement, peer debriefing, and data triangulation. Transferability is assessed by assessing the applicability of findings to other groups and situations. Dependability is ensured by consulting faculty members, PhD fellow students, and dissertation supervisors. Conformability is achieved by considering the researcher's perspective and double-checking transcripts. These methods help ensure the reliability and validity of qualitative research.

The study follows ethical guidelines, emphasizing social justice, beneficence, and respect for participants. It gained ethical clearance from Addis Ababa University's Institutional Review Board (IRB) before data collection, guaranteeing adherence to established guidelines. The study obtained informed consent by giving detailed explanations, answering queries, and translating materials into Amharic for accessibility. Participants were guaranteed privacy and the responsible use of their contributions to avoid potential harm. The researcher circulated institutional support letters and got gatekeeper permission while complying with ethical standards.

4.4. Results

4.4.1. Research and Development (R&D) Initiatives

4.4.1.1. Growth Trends in Research Activities

The research findings indicate that the Ministry of Education has differentiated Hawassa University as a research university, with a particular emphasis on expanding knowledge in five major thematic areas: education, social sciences and humanities, STEM (science, technology, engineering, and mathematics), agriculture and natural resources, and health and human nutrition. The university's differentiation as a research university is a significant turning point in turning research initiatives into significant results. For instance, Key Informant 1, a research directorate of the university stated as follows:

> The university aspires to establish a centre of excellence and a demand-driven environment with adaptable systems to promote research. This includes

engaging faculty, staff, and students in national and global collaborations to tackle important research issues, improving the quality and applicability of research outputs, and driving national growth.

While the vice deans of each college coordinate research activities, the university's vice president oversees all research activities to ensure that all initiatives are being handled effectively. A collaborative environment that supports both innovative research initiatives and academic education is created by this integrated approach, which makes it easier to coordinate research and teaching responsibilities.

The document reviews show that staff research projects have grown and diversified over the last 15 Academic Years (2008/2009 to 2022/2023), with a significant increase from 37 projects in the 2008/2009 Academic Year to 114 in the 2022/2023 Academic Year. Over fifteen years, 1,414 projects were carried out, demonstrating a robust research presence across all fields. Every year, there are discernible variations in the quantity of initiatives. For example, there was a notable decline to just 14 initiatives in the Academic Year 2017–2018, whereas the number of projects peaked in the Academic Year 2013–2014 at 182. The years after 2017/2018 have shown a progressive increase, with 114 initiatives in the 2022/2023 Academic Year.

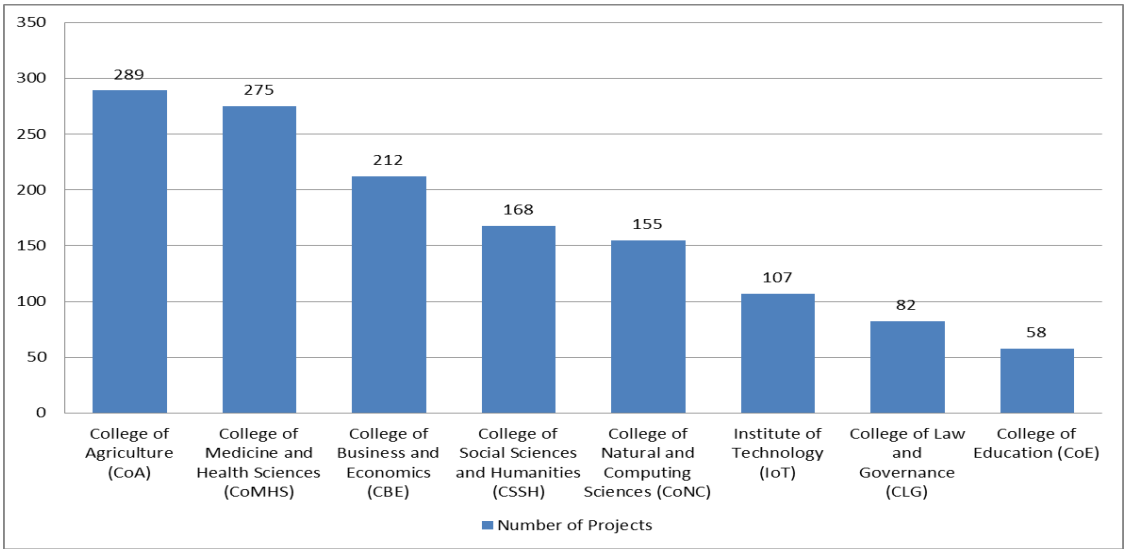

Figure 4. 2: Hawassa University's staff research projects (2008/2009 to 2022/2023)

Hawassa University's collaborative research projects have grown considerably in recent years, bringing in international recognition as a result of the academic staff's remarkable research and practical project administration. Presently, the institution

oversees 65 joint projects with 112 domestic and 69 foreign partners from nations including Norway, Canada, Germany, the United States, the United Kingdom, Italy, the Netherlands, the Czech Republic, and Sweden. Key Informant 3, a joint research director, provided more insight into how joint research projects operate, as follows:

> These initiatives, which emphasize research, technology transfer, capacity building, and community engagement, help the university grow by increasing staffing, supplying necessary resources, and transferring relevant technologies. Through sponsorships, these partnerships help more than 250 PhD and Master's students pursue their education, enhancing the university's standing as a centre for collaborative research and development.

The research findings highlight the research projects listed in a range of sectors, including agriculture, health, education, and environmental conservation. The agricultural projects include climate-smart agriculture and improving crop resilience; the health-related projects include clinical trials and public health education initiatives; the environmental projects focus on wetland management and afforestation, and the educational projects highlight capacity building in renewable energy and higher education.

4.4.1.2. Impact Assessment of R&D Initiatives

Evidence indicates that the university conducted a comprehensive impact assessment to evaluate the effectiveness of its research projects during the period spanning 2009 to 2015. This assessment involved surveying to gauge the impact of the research projects based on several key criteria: publication in reputable journals, successful patent applications, and technology transfer to the community. The findings revealed that nearly 90% of the projects failed to meet these criteria, resulting in significantly poor outcomes. Most importantly, the research projects sponsored by the university continue to face difficulties. Accordingly, to address these issues, the university implemented a new guideline in 2023, which requires principal investigators to have prior publications before applying for new projects. Key Informant 1, the research directorate of the university provided the following insight, stating as follows:

> The strategy intends to enhance the overall calibre and effect of our research initiatives by providing incentives for researchers to prioritize publication. We intend

to increase the overall effectiveness of our research efforts and motivate scholars to participate in projects more successfully by promoting a culture of publishing.

The study highlights that multiple barriers impede the advancement and efficacy of research initiatives at universities and throughout Ethiopia. One of the primary issues is that research projects, especially in science, fail to receive adequate funding. This problem is made worse by the absence of well-equipped labs required for thorough scientific investigations. Consequently, there is a poor system of incentives for researchers, which demotivates them and reduces their productivity. It might take longer to acquire materials and equipment due to the government's complicated and lengthy procurement procedure than it does to conduct the study. This inefficiency frustrates researchers and deters senior researchers from participating. Key informant 12, a senior researcher, at the university highlights the following:

> Research engagement is discouraged by an intersection of insufficient facilities, ineffective incentives, and poor procurement procedures, which has an impact on the calibre and volume of research. To promote a thriving research culture and guarantee that research initiatives have the time and assistance they require to succeed, these issues must be addressed.

4.4.2. Technology Transfer Achievements and Gaps

4.4.2.1. Achievements in Patent Registration

Although there was no formal documentation system in existence before 2020, the institution has a systematic approach to maintaining and registering patents in relation to technology transfer. The institution applied for and received 12 patent rights from the Ethiopian Intellectual Property Office (EIPO) between 2020 and 2023. In 2024, the university submitted seven intellectual property applications, which not only underscores its growing commitment to innovation but also implies an increasing engagement of the university in knowledge and technology transfer towards the local community this engagement contributes a pivotal role to regional development through transferring research findings to address pressing social issues. Most significantly, patented innovations such as the Sand-Plastic Interlocking Blocks Construction system and the Biogas Semi-Gasfer Stove benefit the regional industrial clusters. These innovations can enhance sustainable energy solutions and innovative building techniques, respectively, and improve living standards through equipping environmentally friendly alternatives in the region. In a similar vein, research participants from industrial bureaus highlight patents such as the Gluten-free starch producing methods

and composition from _*Enstet'* and the poultry feed processing. These patents can support regional economic growth and improve local livelihood. Notably, key informant 5, a technology transfer director, explained as follows:

> These inventions have the potential to improve industrial efficiency with the Packaging Machine, improve environmental monitoring with the Automatic Real-Time Water Quality Measurement System, and improve educational delivery by utilizing technology like the Blended Learning Platform. In doing so, they strengthen Hawassa University's position in promoting regional development by offering innovative solutions that meet pressing demands in industry, education, and environmental sustainability.

4.4.2.2. Gaps and Systemic Bottlenecks

The research findings point out that the challenges associated with university-industry linkages are as complicated in Hawassa, as they are in many other places of Ethiopia. The missing link between academia and business, which prevents efficient cooperation and information exchange, is one of the fundamental problems. This is made worse by the minimal flow of information, which makes people unaware of the positive benefits and possibilities that these kinds of collaborations may provide. Furthermore, the amount of financial resources allotted for technology transfer initiatives is severely limited. Due to this budgetary constraint, universities are unable to make the investments in facilities and research infrastructure required for fruitful industry engagement. Key informant 15, a faculty member stated, as follows:

> Along with impeding innovation, these issues also restrict universities' ability to conduct applied research that addresses pressing issues and industries' access to skilled labour. Addressing these problems calls for collaboration from both parties as well as backing from the government to create a better organized and financially supported strategy for developing these collaborations.

4.4.5. Community Engagement Initiatives

4.4.5.1. Successful Initiatives

The university ensures that the research findings are properly disseminated to the community, and participates in the local community in a number of engagement initiatives that are rooted in applied research that addresses particular local issues. The Science, Technology, Engineering, and Mathematics (STEM) centres of the university, which were

founded in September 2015, are important educational centres for improving the abilities and knowledge of primary and secondary school instructors and students. The centre aims to develop students‘ capacity for creativity, innovation, and problem-solving. Most importantly, the Science Shared Campus (SSC) program is an initiative designed to enhance STEM education for top-talented public high school students. Key informant 9 described the scope of the STEM centre, as follows:

> For students in grades 9 through 12, the Science Shared Campus (SSC) Program provides practical laboratory instruction that is in line with the curriculum. Likewise, STEM outreach programs involve talented students in grades 7 through 12 through a range of activities, such as science fairs and after-school programs. The STEM centre offers robotics classes that include computer skills and programming for middle and high school students, runs competitive science competitions, and provides field trips to businesses and organizations to highlight practical STEM applications. In general, the STEM centre seeks to develop community members' specific abilities and expand knowledge.

Furthermore, it was discovered that the university acknowledges indigenous knowledge since community points of view may contribute significantly to the generation of novel insights. The institution promotes more effective and inclusive solutions that connect with the community by integrating Indigenous traditions and ideas into research. In addition to enhancing the research process, the collaboration approach ensures that the findings are lasting and appropriate for the culture being studied. Above all, Key Informant 10 emphasized how the institution might be able to improve results by utilizing indigenous expertise.

> By embracing community-driven research and valuing indigenous knowledge, the university plays a pivotal role in empowering local communities and contributing to their socio-economic development. This model of engagement can serve as a powerful tool for bridging the gap between academic research and practical community needs, ultimately leading to more equitable.

4.4.5.2. Challenges and Misperceptions

It has been found that the university's challenge in fostering community engagement stems from a limited understanding of its mission that considers it exclusively as a benefactor rather than establishing partnerships. Indigenous knowledge is essential for creating

sustainable and culturally relevant solutions, yet this view frequently results in a lack of respect and acknowledgement for it. The university is working to create an improved understanding of its role as a collaborative partner rather than only a donor to overcome these obstacles. This may also be accomplished by incorporating indigenous knowledge into research and educational initiatives, which guarantees community members' participation in project development and execution. Findings likewise indicate that there may be reluctance and uncertainty when the institution approaches the community for assistance with initiatives, especially those which are related to STEM (science, technology, engineering, and mathematics). Despite their advantages, the university's STEM programs are sometimes seen as nothing more than high school mathematics tutors. These initiatives are sometimes seen as stand-alone endeavours rather than essential parts of a more comprehensive framework for collaboration. The scarcity of resources is still another important issue. Concerning the financial limitations, key informant 15, and faculty member stated as follows:

> It is challenging to maintain long-term relationships or carry out comprehensive programs due to financial restrictions that significantly limit the scope and effect of community engagement projects. Accordingly, looking into alternate financing sources or nurturing collaborations with other stakeholders may assist ease financial restrictions and make it possible to implement community engagement programs that are more robust and long-lasting.

4.5.3. Opportunities and Structural Constraints

4.5.3.1. Existing and Emerging Opportunities

Concerning opportunities, there are both existing and emerging opportunities that promote the role of universities in regional innovation systems, particularly in research, technology transfer and community engagement. The university benefits from established research thematic areas, technology villages, and an increasing number of journal publications, along with decentralized research budget administration and annual international research workshops. Incentives for research publications also encourage staff participation. Similarly, Hawassa town is experiencing a surge in opportunities for industrial linkages, largely fuelled by the development of industrial clusters like the Hawassa Industrial Park (HIP), the Yirgalem Integrated Agro Industrial Park (YIAIP), and the Hawassa Industrial Zone, which collectively function as a manufacturing hub in the region. These industrial clusters have proven the region as a model for industrial growth in Ethiopia and

throughout Africa due to their effectiveness in attracting foreign investment and generating job opportunities. Correspondingly, Key informant 17, a representative of Hawassa Industrial Park Investors Association (HIPIA) highlighted the following:

> The collaboration between academia and industry presents a promising solution, as it enables the development of tailored training programs and collaborative research initiatives that can enhance the competitiveness of local businesses. We are actively working to strengthen connections between universities and industries. This is achieved through the establishment of internship and externship programs, which help align academic curricula with the needs of the industrial sector.

Evidence indicates that the university and regional industrial clusters have a mutually beneficial, symbiotic relationship. The university contributes by providing skilled human resources, innovative research findings, and transferring knowledge based on new insights. In turn, the industrial clusters absorb this human capital by offering university students internships and staff externship programs, making a cycle of collaboration that enhances both parties' capabilities.

The research findings on community engagement reveal that Hawassa University capitalized on the COVID-19 epidemic to develop innovative strategies that enable the institution to introduce asset-based community development practices in an effort to address problems within the community, particularly in terms of resource allocation and community engagement. Hawassa University reacted by releasing a multitude of research projects and community-based initiatives. For example, key informant 12 stated as follows:

> During the pandemic, the university initiated 18 research projects dealing with different dimensions of the COVID-19 pandemic, which not only improved worldwide comprehension of the pandemic but also contributed to the development of regional approaches to combat it.

Furthermore, there is evidence to suggest that the pandemic experience underscored the need to utilize local knowledge and indigenous assets. The institution successfully customized its responses by communicating with the local community to understand their specific needs. This strategy promoted neighbourhood resilience and solidarity while strengthening the university's ability to effectively utilize local resources. The value of community-based initiatives and the strategic use of local resources to solve local problems

were highlighted by key informant 14, who stated that "the pandemic served as a provocateur for Hawassa University to explore new ways of addressing local challenges." As a result of this experience, the university is now seen as a model for how universities may respond to emergencies while promoting sustainable growth and the welfare of their communities. Besides, key informant 22, the researcher emphasized the value of universities' engagement in regional development, and stated as follows:

> Through community engagement and a particular emphasis on feasible alternatives, universities have to demonstrate that they are dedicated to addressing urgent problems in a way that is effective and sustainable. This approach ensures that universities will be able to continue playing a vital role in regional development and community empowerment while also addressing other social and economic issues.

4.5.3.2. Challenges in fostering research, technology transfer, and Community engagement

Hawassa University, like other Ethiopian universities, is expected to set aside a certain amount of its budget for research and development. Typically, these institutions must allocate a minimum of 5% of their budgets to these types of projects. In reality, though, the actual allocation frequently falls short of this goal due to the absence of commitment to invest in research projects. For instance, key informant 1 underscored, the research directorate stated as follows:

> Research and development at Hawassa University has been reported to have a maximum budget allocation of 2.2%, which is less than half of the Ministry of Education's indicated proportion of 5%. This disparity might affect the university's capacity to promote innovation and academic excellence as it shows how difficult it is to strike a balance between its financial obligations to research and development and other operational requirements.

Notwithstanding emerging prospects, there are still substantial financial gaps and administrative bottlenecks. Often, the research budget is less than the 5% threshold. Scientific projects are halted by procurement delays, and the institutional structure for connections between academia and industry is still in its infancy. Furthermore, the impartiality of reported accomplishments is limited by the absence of critical external voices, such as independent observers, community organizations, or local industry leaders. Administrative self-reporting forms the basis of much of the present narrative.

4.6. Discussion

The emergence of Transformative Innovation Policies (TIP), as noticed by Schot and Steinmüller (2018) and other scholars, points out the shift from conventional linear models of innovation to more complex and collaborative methods that encompass a wider range of stakeholders and encompass economic, social, technological, and environmental elements (Ghazinoory et al., 2024). The implementation of such frameworks is essential for African institutions that aim to include innovation within their institutional goals. It is still difficult to translate this into significant societal ramifications, though. Recent initiatives at Hawassa University, including the development of 65 collaborative research projects and the publication of more than 1,400 articles during the previous 15 years, indicates that research engagement is increasing.

Its commitment to innovation complements TIP's fundamental objectives, notably in terms of comes to addressing pressing societal issues. In this regard, technology villages and other community engagement initiatives target essential sectors including legal assistance, healthcare, and agriculture. Such initiatives align with the concept presented by Calderini et al. (2023) that, when established in community-driven needs, innovation policy may serve as an engine for sustainable and inclusive development. In a similar vein, Hawassa appears to be gradually institutionalizing the requirement that transformational innovation be sensitive to contextual societal issues (Hekkert et al., 2020).

Notwithstanding these optimistic developments, there continues to be still an essential barrier to integrating innovation along with impact. While the institution has made progress in patent development and is expanding its technology transfer ecosystem through technology transfer offices (TTOs), it continually encounters significant challenges. Nearly 90% of its research initiatives have failed to produce real-world results. This deficiency is due in part to a poor research culture, low commercialization capabilities, and systemic governance inadequacies. Petersen et al. (2022) underline that universities must consciously complete the loop between research and society requirements, which Hawassa is aiming to do through projects like STEM centres and Indigenous knowledge integration.

Hawassa University's entrepreneurial attention, which is characterized by strengthened applied research, innovation networks, and collaborative efforts between stakeholders, distinguishes it from traditional academic paradigms. These developments have significance for universities that intend to become entrepreneurial (Guerrero et al., 2016; Rådberg & Löfsten, 2024). The institution's affiliations with regional

industrial clusters including Hawassa Industrial Park (HIP), Yirgalem Agro Processing Industrial Park (YIAIP), and Hawassa Industrial Zone (HIZ) are a signal of an emerging relational innovation ecosystem. Nevertheless, these improvements would remain episodic rather than systematic in the absence of sufficient institutional support.

Comparable to other East African universities like Makerere University and the University of Nairobi, Hawassa University has a commitment to employing research and innovation to accelerate regional development. Hawassa University has made progress through themed research initiatives and increasing patent activity, despite institutional and financial restrictions. As a research university, Hawassa has driven an increase in local innovation projects, partnerships abroad, and research initiatives. Nonetheless, the institution continues to struggle with structural limitations including inadequate funding for research, poor lab facilities, and limited inter-university collaboration.

Community engagement, a critical component of third-mission activity, is undeveloped. Despite Hawassa University's engagement with development-oriented initiatives and technology transfer platforms community engagement appears to be unpredictable. As O'Brien et al. (2022) point out, meaningful community engagement entails trust, continuous dedication, and collaborative culture, among other requirements characteristics many African universities are failing to institutionalize. At Hawassa, local people have a limited awareness of STEM's potential and the university's societal role, which impedes increased engagement.

As a result, universities might consider a multitude of strategies, including taking advantage of expats' collaborations for funding and mentorship, building innovative centres to bring in private-sector partnerships, and aligning research agendas with local development strategies to secure government and donor funding (World Bank, 2020; Altbach et al., 2018). The practical approaches may additionally promote collaborative systems of governance at universities that promote inclusive decision-making and accountability in research planning.

4.7. Conclusion and Policy Recommendations

4.7.1. Conclusion

As the transformative Innovation policy suggests, universities, particularly research institutions, have been mandated to engage in research initiatives, technology transfer, and community engagement activities that deal with critical societal issues. African and other emerging nations' research institutions have resource constraints. This study addresses both the challenges and prospects of technology transfer and community engagement initiatives in

research universities, using Hawassa University as a case study. The research findings indicate that Hawassa University growing more engaged in third missions, including applied research projects, patented innovations, and community outreach initiatives, in addition to research. Through the generation of 1400 staff-led published research outputs and 63 collaborative research projects jointly with global partners, the institution engaged in viable knowledge exploration activities. Additionally, its portfolio of patented technologies—which includes indigenous starch extraction methods, eco-hydrology-based restoration systems, and the biogas semi-gratifier stove— shows an essential contribution to local innovation and dealing with issues. Many of these inventions have been shared with the surrounding community, highlighting the university's recognition of its developmental roles.

Community engagement initiatives, including the development of STEM centres and the integration of indigenous knowledge into research, signify a positive shift toward participatory and locally grounded academic practices. Such initiatives align with broader efforts to transform the university into an institution that is not only research-intensive but also socially embedded and responsive to its regional context. Notwithstanding these developments, structural issues still restrict the efficacy and scaling of Hawassa University's technology transfer and community engagement efforts. Lack of performance-based incentives for academic personnel, restricted access to advanced laboratory facilities, insufficient and unpredictable research funding, and an ineffective and bureaucratic procurement system (i.e. red tape) are some of the main obstacles. Additionally, community engagement in strategic planning is still lacking, often driven by outreach principles rather than collaborative partnerships.

Structural issues related to Ethiopia's higher education governance structure aggravate these challenges by restricting the institutions' capabilities to effectively adapt to local developmental demands through adaptability and autonomy. While the university takes advantage of its proximity to flourishing technological villages and regional industrial clusters, these resources are underutilized due to poor collaboration and inadequate innovation ecosystems.

4.7.2. Policy recommendation

The study offers a set of strategic policy recommendations targeted at addressing substantial barriers to technology transfer and community engagement at universities, along with identifying structural catalysts. These recommendations intend to strengthen the role that universities including Hawassa University contribute to regional innovation systems.

Regarding community-based frameworks to be successful and innovative, strategic financing arrangements ought to be consolidated, procurement and governance systems are required to be reformed, and a partnership-oriented strategy regarding community engagement might be adopted as well. Universities should embrace a co-creative paradigm founded on reciprocity and collective learning. Redesigning scholastic incentive schemes to acknowledge contributions to innovation, technology transfer, and community engagement is essential. The university's relevance to its regional setting may be improved by devoting the highest priority to fostering the development of innovation hubs that are consistent with local industry demands. This would promote entrepreneurship, applied research, hands-on training, and the dissemination of technology.

4.7.3. Limitations and Future Research Directions

Although informative, this case study has some limitations. Primarily, it depends on qualitative data, which offers richness but excludes the capacity to extrapolate findings or measure effect. Additionally, the study concentrates exclusively on a single university and therefore restricts its potential of drawing comparisons between other national or regional contexts. Third, it was challenging to engage with a greater range of stakeholders, in particular those from the business sector and marginalized groups, due to time constraints and logistical limitations. Furthermore, the study acknowledges several limitations, including unjustified swings regarding project figures, unidentified consequences of partnerships on tangible outcomes, missing relevant figures and an absence of analysis on study quality, including citation impact, journal rankings, and real-world applications beyond patent counts, which are attributed by undocumented factors such as insufficient funding data, policy changes, and the broader context of academic and industry partnerships.

Future studies must incorporate comparative assessments of university engagement across different regional settings to identify context-specific effectiveness drivers and impediments. Longitudinal research is additionally valuable for analysing the long-term impact and sustainability of the transfer of technologies and community engagement initiatives. Further research should also focus on the ways that university cultures and governance structures affect universities' capabilities to fulfil their roles as catalysts for social transformation.

CHAPTER FIVE

DETERMINANATS OF INNOVATIVENESS AND THEIR ROLE IN REGIONAL INNOVATION SYSTEMS (RIS) IN EMERGING ECONOMIES: A CASE OF REGIONAL INDUSTRIAL CLUSTERS IN HAWASSA

ABSTRACT

Innovativeness is an indispensable tool to realize sustainable and competitive economic growth; particularly in emerging economies. This study examines the determinants of innovativeness in regional industrial clusters in Sidama Regional State including Hawassa Industrial Park (HIP), Hawassa Industrial Zone (HIZ), and Yirgalem Integrated Agro-Industrial Park (YIAIP) in Ethiopia. The results of the study demonstrate how a multitude of variables determine the innovativeness of regional industrial clusters, including R&D expenditure, engagement with universities, business size, management styles, and access to resources. Although the country aims to be on the list of Lower-middle-income countries by 2025, its innovative performance remains extremely poor partially due to factors including inadequate amount of funding for research and development, poor government support, and a shortage of highly skilled resources. The results highlight the need for reforms in policy, which includes strengthening capacity-building programs, to overcome the aforementioned obstacles, boost firm-level innovation, and encourage competitiveness at the national, regional, and firm levels within the industrial ecosystem.

Keywords: Innovation, Regional Industrial Clusters, Research and Development (R&D), University-Industry Linkage, Ethiopia, Competitive Advantage, competitiveness.

5.1. Introduction

Innovation continues to be a hot topic for academic and policy debate to achieve sustainable competitive advantage in the global competition (Gunday et al., 2008). In these debates, innovation has been considered as an essential instrument for driving economic and social progress in both developed and emerging economies (Bate et al., 2023; Barrichello et al., 2020). In a knowledge-based economy, sustaining economic performance and growth for the country needs innovation-driven competitiveness. Businesses are increasingly relying on new products and services, as well as the implementation of critical procedures, to maintain a competitive edge. Businesses have to continuously reinvent themselves to continue to be competitive while additionally making sure that their goods and services keep up with the ever evolving technical landscape and market (Kebede & Fikire, 2023).

Innovation is a vital part of business strategies used by companies to increase their market share, break into new markets, and get a competitive advantage (Gunday et al., 2008). The development of intellectual capital and the ability of society to innovate are now emphasized as being necessary for the ability to innovate (Kassa & Mirte 2022). Also, it may be characterized as the introduction of novel products or services, new procedures, new markets, and the use of new resources to provide value to the market (Bate et al., 2023; Obunike & Udu, 2019). Technological and non-technological innovativeness are the two categories into which scholars divide innovation (Rahman et al., 2016; Tseng, 2014). Businesses become more competitive when they combine technology and non-technological innovation (Zawawi et al., 2016). In a similar vein, Pisano (2015) distinguishes four categories of innovation: radical, routine, disruptive, and architectural. As stated by Damanpour and Wischnevsky (2006), to be able to achieve an advantage over their competitors, large companies should prioritize regular or incremental innovation, whereas start-ups and small enterprises should prioritize radical innovation.

The Oslo Manual (2015) introduces four different types of innovation: process innovation, marketing innovation, organizational innovation, and product innovation (Bate et al., 2023). Hassan et al. (2013) outlined four crucial innovation domains that businesses must prioritize in order to be considered competitive in the market. These include: First, product innovation, which is the introduction of a good or service that is either completely new or significantly improved in terms of its properties or intended applications; Second, process innovation, which is the use of a new or significantly developing method of production and

delivery for the development and supply of services; and Third, organizational innovation, which is the application of a new organizational method in the business practices of the firm, workplace organization, or external relations.

There are several variables which affect the inventiveness of firms in emerging as well as developed countries. Nevertheless, a multitude of external as well as internal variables affect emerging nations, notably those in sub-Saharan Africa. Some of the primary hurdles that hinder innovation efforts include inadequate investment in research and development (R&D), a lack of competent personnel, poor government policies, and limited availability of funds (Kassa & Kegne, 2025; Dutta et al., 2019). Age, size, management style, staff capabilities, and interdepartmental collaboration are firm-specific factors that also have a major impact on innovation outcomes (Egbetokun et al., 2016). According to Kassa and Mirete (2022) and Santamaría et al. (2010), external factors including competition, infrastructure accessibility, and networking with outside knowledge sources also influence the likelihood that businesses would embrace innovative practices. Furthermore, weak organizational culture and governmental backing aggravate these issues by limiting the ability of businesses for productive innovation (Bate et al., 2023; Kebede & Fikire, 2023). Through targeted policies and capacity-building activities, these barriers must be addressed in order to foster innovation and quicken economic growth in these areas.

Out of the 133 economies assessed in 2024, Ethiopia was placed 130th by the Global Innovation Index (2024); nations located in Sub-Saharan Africa, including Mauritius (55th), South Africa (69th), Botswana (87th), Cabo Verde (90th), Senegal (92nd), and Kenya (96th), were ranked higher. Ethiopia ranked among the lowest in the world in the following measures out of the seven Global Innovation Index (GII) indicators: Market sophistication 5.0 (133rd), business sophistication 13.3 (128th), infrastructure 21.5 (123rd), creative outputs 5.5 (122nd), human capital and research 7.2 (133rd), and institutions 25.6 (117th) ranks based on relevance. Ethiopia, nevertheless had a better score (14.7, placed 88th) in Knowledge and Technology Outputs.

By 2025, the Ethiopian government intends to achieve a middle-income level, recognizing the essential part that businesses play in fostering economic growth, generating employment, and alleviating poverty (GTP, 2010; MoFED, 2015). Ethiopia's innovation performance remains one of the lowest, particularly compared to other low-income countries, as just 68% of major firms, 48% of medium-sized businesses, and 38% of small businesses report product or process innovations (Kuriakose & Kylasam Iyer, 2016). SMEs, which are

crucial for economic growth, have relatively low rates of innovation, as demonstrated by the fact that only 60% of assessed SMEs reported innovations between 2012 and 2014 (STIC, 2015). Ethiopia's inventive mindset is further illustrated by its reliance on traditional evolutionary procedures and lack of novel ideas, which represent local and national market stagnate (Dessie et al., 2022).

Having an emphasis on Micro and Small Enterprises (MSEs), several research have studied the factors that affect innovativeness in Ethiopian enterprises. Ayinaddis (2022), Kassa and Mirete (2022), Wakeford et al. (2017), Talegeta (2012), Gebreeyesus (2011), Kebede and Fikire (2023), Bate et al. (2023), Kassa and Kegne (2025), and others have studied the variables influencing the innovativeness of MSEs in Ethiopia. Nonetheless, a substantial knowledge gap still exists about the elements influencing regional industrial clusters' inventiveness in Ethiopia and other developing nations. In an effort to address this gap, this study examines the factors that affect innovativeness in Ethiopian regional industrial clusters, with a particular emphasis on Sidama's industrial hubs, such as Yirgalem Integrated Agro-Industrial Park (YIAIP), Hawassa Industrial Park (HIP), and Hawassa Industrial Zone (HIZ). The purpose of the research is to shed light on these clusters with the intent to improve competitiveness and economic growth by fostering innovation within Ethiopia's industrial ecosystem.

5.2. Literature review

5.2.1. What is innovation?

Innovation could be described as the capacity to develop new value propositions by introducing novel products and services and using innovative business procedures (Li et al., 2025; Price et al., 2013)**.** The word 'Innovation' is derived from the Latin word 'Novus', meaning new (Ayinaddis, 2022). A new concept, approach, or product is referred to as "the introduction of something new" (Ayinaddis, 2022). The introduction of new and improved products or processes is frequently associated with the development of a sustainable market (Kassa & Mirte 2022). Generally, it is defined as the introduction of a new or muchenhanced product, process, practice, knowledge, marketing strategy, or technology and its spread throughout the workplace, business, or organization (World Bank, 2010; OECD, 2005)

Innovation has traditionally been driven by novel knowledge and/or technology that is fundamentally different from anything that has before been produced (Kotey & Sorensen, 2014). Technological innovation is specifically defined as the introduction of a new product that is based on technology (Carayannis et al., 2015). In contrast, Baregheh et al. (2009)

describe innovation as a multi-phase process that companies use to implement ideas into new or enhanced products, procedures, or services in order to grow, compete, and set themselves apart in a competitive market. Therefore, innovations are vibrant and essential for businesses for a variety of reasons, including applying more productive and efficient manufacturing processes, improving market performance, enhancing customer perception of the company, and gaining an advantage over competitors (Gunday et al., 2008).

5.2.2. Determinants of Innovation

Emerging economies, particularly those in sub-Saharan Africa, have extremely low levels of innovation due to factors, including poor R&D investment, policy problems, a limited resource (human and financial resources), and high innovation costs (Kassa & Kegne, 2025; Dutta et al., 2019). Similarly, Daksa et al. (2018) listed the following as major barriers to a business's ability to innovate: a lack of technological knowledge; a lack of technical and vocational education training capabilities; a lack of access to financial and other resources; a lack of consulting support; a poor infrastructure base; and unfriendly government policies that hinder innovation efforts.

Notwithstanding their substantial contribution to generating employment and economic growth, businesses deal with several challenges to their preservation (Kebede & Fikire, 2023). These problems affect businesses from the inside as well as the outside (Bate et al., 2023). Most importantly, inadequate government support, an absence of inventiveness culture, technical incompetence, insufficient facilities for research and development, and an inadequate number of skilled personnel are the most significant obstacles to firms' innovativeness (Kassa & Kegne, 2025). Access to finance, access to training, access to technology, availability of incentive schemes, gender of the owner/manager of the enterprises, and networking with external knowledge, respectively, affected the enterprises' Innovativeness (Kebede & Fikire, 2023).

Enterprise innovation is influenced by a number of factors, including firm size and age, R&D efforts, the calibre or skill level of managers and staff, employee motivation and engagement, managerial practices, interdepartmental cooperation and knowledge exchange, the firm's network and its interactions with external organizations, and industry-specific factors (Egbetokun et al., 2016). Additionally, the competition between businesses is another element that encourages innovation in businesses. Businesses can embrace innovations when there is fierce rivalry (Kassa & Mirete, 2022; Santamaría et al., 2010). Additionally, rivalry

aids in an organization's survival, expansion, ongoing maintenance of the environment and a substantial portion of its external state, and enhancement of operational performance (Ngibe & Lekhanya, 2020; Pickard-Whitehead, 2018; Zelga, 2017).

For example, Talegeta (2014) presented that a number of factors, such as a lack of qualified staff, insufficient R&D, business size, and excessive innovation spending expenses, are major impediments to innovation. The innovation of service and manufacturing micro and small businesses was also impacted by government backing, infrastructure access, owner leadership, entrepreneurial training, and an entrepreneurial mindset (Kassa & Mirete, 2022). Wakeford et al. (2017) point out that the primary barriers to innovation include excessive technological prices, insufficient funding, and a lack of knowledge.

5.2.3. Hypothesis development

5.2.3.1. Research and development

Innovation is contingent towards a business's capacity to engage in research and development (R&D) as a core competency. Research and development (R&D) serves as an essential element of business competitiveness and innovation (Jaziri & Sakly, 2022); it drives innovation, competitive advantage, and sustained development, along with a department within a business (Taherdoost, 2024). The Research and development (R&D) networks are crucial for fostering innovation and establishing a competitive advantage (Januarty et al., 2024). Thus, to generate knowledge, develop patents and inventions, and enhance the profitability of competitive firms, research and development activities have become crucial (Taherdoost, 2024).

Timely and adequate investments in R&D and innovative initiatives provide businesses with a competitive edge and ensure their sustainability in the highly competitive setting of the knowledge-based economy (Jaziri & Sakly, 2022). Firm innovation is mostly derived from R&D expenditure (Zhang et al., 2022; Tse et al., 2021). Business enterprise R&D expenditures, government R&D expenditures, higher education R&D expenditures, and private non-profit R&D expenditures contribute to the gross domestic development expenditures (Wyrwa, 2022). Investments in research and development are through nature themselves forward-looking, emphasizing long-term benefits above short-term results (Abrar-ul-haq, 2025; Huo et al, 2025; Huang et al., 2015)

Hypothesis 1a: Research and development (R&D) affects the firm innovativeness.

Hypothesis 1b: Availability of resources affects the firm innovativeness.

Hypothesis 1c: Internal sources of Innovation affect the firm innovativeness.

5.2.3.2. Collaboration with University

University-industry collaboration is a proactive partnership between universities and businesses, aiming to improve competitive advantages and enhance scientific and technical infrastructure (Cohen et al., 2024; Hailu, 2024; Galan-Muros & Davey, 2019; Apa et al., 2021). As a long-term development approach, it is crucial for regions' limited developments which are missing a local knowledge base. Leveraging university and scientific research knowledge sources, firms can increase innovation and achieve economic growth. A nation's economic growth is significantly affected by university-industry linkage, which gives access to advanced laboratories and technology (Rossoni et al., 2023; Cui & Li, 2022). Since knowledge transfer offers access to funds, resources, and expertise for research and development, it is essential for the development of innovative products and technologies (Hailu, 2024; Teressa, 2022; Thomas et al., 2021; Abebe, 2018). Universities have an important role in imparting scientific knowledge to enterprises while fostering innovation, entrepreneurship, and economic growth through research which has been sponsored by the government (Chen & Esangbedo, 2018).

Regarding the varieties of collaboration, the engagements may differ significantly in the nature of their collaborative relationships including employment of graduates, conferences, joint publications, informal meetings, training, researcher movement, sabbatical leave, collaborative research, contract research, use of university facilities, licensing of university patents, purchasing prototypes, support for undergraduate education, use of intellectual property rights by public scientific organizations, and technology-driven start-ups founded by researchers (Chryssou, 2020; Canhoto et al., 2016; Galán-Muros & Plewa, 2016; Lee et al., 2010; Perkmann &Walsh, 2007).

Hypothesis 2: The collaboration between University and Industry firms innovativeness

5.2.3.3. Business location affects the firm innovativeness.

The location of a business significantly impacts its ability to innovate and boost productivity (Surya et al., 2021). It's crucial to choose a location that suits the business type and is close to urban centres and business hotspots that are readily available to potential customers (Shaikh et al., 2022). Geographic proximity to these centres can lead to multiple levels of innovation (Scott, 1998). Spatial considerations also affect transactions, reducing

economies of scale and complicating irregular transactions (Porter, 2003). Innovative local clusters in the USA have a significant impact on regional economies, stimulating local businesses to innovate. Regional growth is dependent on local enterprises' capacity for innovation (Ferreira et al., 2017).

Geographical spill-over effects and the level of digital industrialization in a firm's territory have an impact on innovation in adjacent regions (Ključnikov et al., 2021). Businesses' technical innovation model is influenced by their internal and external resources as well as their place in the innovation ecosystem (Chen et al., 2021; Nason, Wiklund, McKelvie, Hitt & Yu, 2019). Innovation inside clusters is stimulated by external variables including sophisticated demand, local competition, and specialized inputs (Ferreira et al., 2017; Porter, 2003). Instead of concentrating only on costs or taxes, businesses should actively connect with local assets to enhance regional inventive ability for long-term competitive advantage (Surya et al., 2021; Porter, 2003; Ključnikov et al., 2021).

Hypothesis 3: The business location determines firm innovativeness

5.2.3.5. Primary Market

The primary market is a key driver of innovation in businesses given that it enables businesses to secure the resources that they require to undertake multiple stages of innovation, from R&D to commercialization (Zhang et al., 2023; Morozov & Taskaeva, 2016). Throughout the development process, innovation might take place in a business at multiple phases, including conception, technology transfer, production, and marketing application (Haessler et al., 2023; Atkinson, 2013). Businesses' potential to innovate is affected by variables including business size and maturity, as well as external market orientation and capacity building (Hadhri et al., 2016; Stojčić and Hashi, 2014).

Exporting and forming strategic alliances are essential for businesses to reach international markets, which fosters innovation and exposes them to wider markets and foreign exchange earnings (Anand et al., 2021; Avermaete et al., 2004). Because of their experience and strategic alliances with countries throughout the world, these collaborations allow enterprises to be more creative (Avenyo & Tregenna, 2025; Stojčić and Hashi, 2014; Zakic et al., 2008). For developing countries in particular, exporting is crucial because it gives them access to intangible resources like technological know-how, experience, and vital connections that promote product and process innovation (Anjaningrum et al, 2025; Odei et al., 2024). The learning-by-exporting theory emphasizes how crucial international commerce is for fostering innovation and organizational development (Li, 2024; Zaman & Tanewski, 2024; Love & Roper, 2015; Un &Asakawa, 2015). Exporting encourages innovation,

competitive advantage, and long-term success in a globalized and cutthroat business environment by empowering developing countries to transition from copycats of technical innovation to rapid innovators (Edeh et al., 2024; You et al., 2024; Muchie & Ezezew, 2022).
Hypothesis 4: The Primary market orientation determines firm innovativeness

5.2.4. Firm Age and Innovativeness

A firm's Age determines a business's capacity for innovation and success in many different ways (Sewpersadh & Dalwai, 2024). Business innovation depends upon firm age, particularly newer businesses investing more in R&D than those who are older (Coad et al., 2021). According to Withers et al. (2011), older businesses are more actively engaged in innovation activity when both companies possess highly developed capabilities, whereas younger enterprises are more involved when these skills are lacking. The relationship between firm age and innovation, however, is not entirely understood (Asimakopoulos et al., 2023; Chaston et al., 2001); some research studies determine a negative effect (Huergo & Jaumandreu, 2004; Lee & Sung, 2005; Shefer & Frenkel, 2005), while others find a positive one (Sørensen & Stuart, 2000; Withers et al., 2011). The multifaceted function that maturity plays in innovation dynamics is shown by the fact that a firm's age also affects the association between entrepreneurship and SME success (Yin, 2022; Fan & Wang, 2019; Baregheh et al., 2016).

Innovation is influenced by a firm's age, which has a multidimensional effect on its capabilities and outcomes (Zhou & Gumbo, 2021). Firm age is a key driver of business innovativeness, with younger firms investing more in R&D than older firms (Aiello et al., 2024; Coad et al., 2013; Zahra & George, 2002; Bolívar-Ramos, 2017; Rossi, 2016). Older firms show higher engagement in innovation activity when both have highly developed capabilities, while younger firms tend to show greater engagement when these capabilities are missing (Zhou & Gumbo, 2021). However, the relationship between firm age and innovation is inconsistent, with some studies finding a negative impact, while others find a positive effect. Firm age also affects the association between SME success and entrepreneurship, highlighting the complex role of maturity in innovation dynamics (Leyva-De la Hiz & Bolívar-Ramos, 2022).

Hypothesis 5: The Firm age determines firm innovativeness

5.2.5. Conceptual Framework

Numerous researches have been carried out globally to determine the variables that affect innovativeness of firm. Nevertheless, the findings of this study have varied, as have the implications for businesses' innovativeness. A comprehensive evaluation of relatively recent research was conducted with the intention to determine the most often utilized variables as innovation factors. The forward-looking nature of R&D investments is highlighted by Huo et al. (2025) and Huang et al. (2015), as well as significant contributions from Jaziri and Sakly (2022), Taherdoost (2024), Januarty et al. (2024), Zhang et al. (2022), Tse et al. (2021), Wyrwa (2022), and Abrar-ul-haq (2025) regarding R&D as a key driver of innovation and competitiveness. Fundamental research in the field of university-industry collaboration include Cohen et al. (2024), Hailu (2024), Galan-Muros and Davey (2019), Apa et al. (2021), Rossoni et al. (2023), Cui and Li (2022), Teressa (2022), Thomas et al. (2021), Abebe (2018), and Chen and Esangbedo (2018). Chryssou (2020), Canhoto et al. (2016), Galán-Muros and Plewa (2016), Lee et al. (2010), and Perkmann and Walsh (2007) provide additional insights on the types of collaboration. Scott (1998), Porter (2003), Ferreira et al. (2017), Chen et al. (2021), Surya et al. (2021), Shaikh et al. (2022), Nason, Wiklund, McKelvie, Hitt, and Yu (2019), and Ferreira et al. (2017) all examine how business location affects innovation. References for market orientation and the role of primary markets in fostering innovation include Zhang et al. (2023), Morozov and Taskaeva (2016), Haessler et al. (2023), Atkinson (2013), Hadhri et al. (2016), Stojčić and Hashi (2014), Anand et al. (2021), Avermaete et al. (2004), Avenyo and Tregenna (2025), Zakic et al. (2008), Anjaningrum et al. (2025), Odei et al. (2024), Li (2024), Zaman and Last but not least, Sewpersadh and Dalwai (2024), Coad et al. (2021), Withers et al. (2011), Asimakopoulos et al. (2023), Chaston et al. (2001), Huergo and Jaumandreu (2004), Lee and Sung (2005), Shefer and Frenkel (2005), Sørensen and Stuart (2000), Yin (2022), Fan and Wang (2019), Baregheh et al. (2016), Zhou and Gumbo (2021), Aiello et al. (2024), Zahra and George (2002), Bolívar-Ramos (2017), Rossi (2016), and Leyva-De la Hiz and Bolívar-Ramos (2022) address the complex relationship between firm age and innovation. When all taken together, these sources offer availability of resources, business location, primary market, Engagement in R&D, collaboration with University, year of establishment, working with suppliers, internal sources of Innovation are affactors identified in the litatrure affecting innovativness of firm.

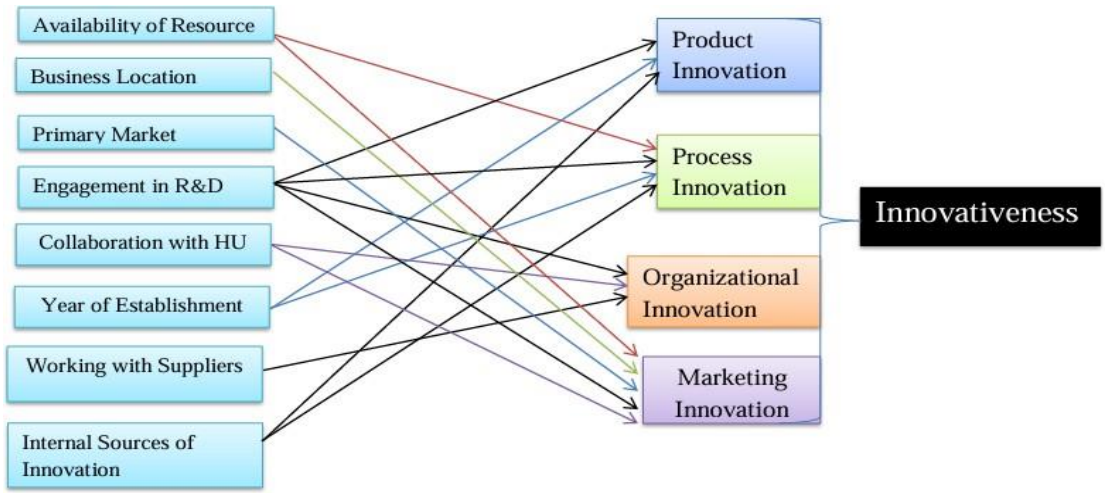

Figure 5. 1 Conceptual Framework: determinant factors of firm Innovativeness (own source)

5.3. Methods

Using a cross-sectional survey approach, the study collected data on innovation in three Sidama regional industrial clusters throughout four months from October 2024 to January 2025: Yirgalem Integrated Agro-Industrial Park (YIAIP), Hawassa Industrial Park (HIP), and Hawassa Industrial Zone (HIZ). The Hawassa Industrial Park began operations in 2015. The park is expected to employ over 60,000 people working double hours and create US$1 billion in export value yearly (Gebrechristos, 2025). Nevertheless, the industrial park is not operating at full capacity, and there are now fewer than 20,000 employees. Another industrial cluster in Hawassa town is the Hawassa Industrial Zone (HIZ), which is run by the Hawassa City Investment Bureau and has about 11,454 employees. One of the integrated agro-processing companies, Yirgalem Agro-Industrial Park, was established in 2018. It is located a short drive from Hawassa in Yirgalem town, Ethiopia.

5.3.1. Population and sample

A multistage sampling design was employed to choose a sample from three distinct industrial clusters. The study's goals were accomplished by using primary data that was gathered from the companies being investigated. A survey was the primary tool used to collect data from management members of the firms. The Oslo Innovation Manual's guidelines and principles for collecting and analysing innovation data served as the foundation for the questionnaire (OECD, 2005). Descriptive and inferential statistics that examined relationships between variables were used to analyse the data. We employed multiple regressions to examine how determinant variables affected innovativeness.

Regression's underlying statistical assumptions were tested using a variety of diagnostic tests prior to regression analysis Normality, linearity, homoscedasticity, and multicollinearity tests were among them.

In the Oslo Manual (2015) four different innovation types are introduced. These are product innovation, process innovation, marketing innovation and organizational innovation. Product innovation and process innovation are closely related to the concept of technological development. On the other hand, marketing innovation is strongly related to pricing strategies, product package design, and product placement and promotion activities. Finally, organizational innovation is strongly related to business practices. Indicators from the 2005 Oslo Manual were used to measure the dependent variables. Accordingly, product innovation has six indicators including increasing product variety, increasing service, lowering production costs, replacing old products, increasing product quality, increase the standard of services; process innovation has three indicators, including increased manufacturing flexibility, increased service providing flexibility, to increase capacity of service provision; Organizational Innovation has three indicators including: improving efficiency in organizational structure, improving the efficiency of the organizational structure, to improving external relations with other enterprises; and Marketing innovation has three indicators including pricing techniques, the efficiency retail channel, the promotion efficiency. Whereas, the independent variables include a business location (HIP, HIZ, and YIAIP), year of Establishment (below 2 years, 2-5 years, 5-10 years, and above 10 years), collaboration with a university (Yes/No), Primary Market (International/Local), Collaboration with input Suppliers (Yes/No), Internal sources of innovative ideas (Yes/No).

5.3.2. Method of data analysis

The data analysis in this study used the SPSS version 26th software, a combination of descriptive statistics, correlation analysis, and multiple linear regressions to examine the associations between various independent factors and innovation results. Descriptive statistics were used to summarize key variables such as marketing and process innovation, business location, resource availability, primary market, collaboration with universities, R&D engagement, establishment year, and internal sources of innovative ideas. The strength and direction of linear correlations between pairs of variables were thereafter assessed using Pearson correlation coefficients, with significance levels showing the statistically significant value of these relationships.

Multiple linear regression analysis was used to examine the collective and individual effects of the independent factors on the dependent variables, marketing innovation and process innovation. Standard error of the estimate, R, R2, and modified R2 were used to evaluate the model fit, and the F-test was used to determine the overall significance of the model. Furthermore, multicollinearity tests were conducted using VIF and tolerance settings. Business location, resource availability, university collaboration, and R&D engagement emerged as key drivers of marketing innovation, while establishment year, internal sources of ideas, resource availability, and R&D engagement significantly influenced process innovation. These predictors were identified by the regression coefficients and their significance levels.

5.4. Findings

5.4.1. Marketing Innovation

1. Descriptive Statistics			
	Mean	**Std. Deviation**	**Number**
Marketing Innovation	3.0483	.85821	119
Business Location	2.61	.702	119
Availability of resource	1.4118	.49423	119
Primary Market	1.0840	.27861	119
Collaboration with HU	1.4118	.49423	119
Engagement in R&D	1.64	.482	119

Table 5. 1: Marketing Innovation- descriptive statistics

The dependent variable "Marketing Innovation" has a mean of 3.0483 and a standard deviation of 0.85821, demonstrating considerable variability in the mean level of marketing innovation. "Business Location" has a standard deviation of 0.702 and a mean of 2.61. The mean (1.4118) and standard deviation (0.49423) of the independent variables "collaboration with HU" and "availability of resources" are identical. "Primary Market" has the lowest mean of 1.0840 with a standard deviation of 0.27861. "Engagement in R&D‘‘ has a mean of 1.64 with a standard deviation of 0.482

Correlations							
		Marketing Innovation	Business Location	Availability of resource	Primary Market	Collaboration with HU	Engagement in R&D
Pearson Correlation	Marketing Innovation	1.000	.611	.212	-.389	.118	.585
	Business Location	.611	1.000	.023	-.439	-.172	.735
	Availability of resource	.212	.023	1.000	.054	.167	.061
	Primary Market	-.389	-.439	.054	1.000	-.007	-.403
	Collaboration with HU	.118	-.172	.167	-.007	1.000	-.010
	Engagement in R&D	.585	.735	.061	-.403	-.010	1.000
Sig. (1-	Marketing Innovation	.	.000	.010	.000	.102	.000

tailed)	Business Location	.000	.	.402	.000	.030	.000
	Availability of resource	.010	.402	.	.279	.034	.256
	Primary Market	.000	.000	.279	.	.469	.000
	Collaboration with HU	.102	.030	.034	.469	.	.455
	Engagement in R&D	.000	.000	.256	.000	.455	.
N	Marketing Innovation	119	119	119	119	119	119
	Business Location	119	119	119	119	119	119
	Availability of resource	119	119	119	119	119	119
	Primary Market	119	119	119	119	119	119
	Collaboration with HU	119	119	119	119	119	119
	Engagement in R&D	119	119	119	119	119	119

Table 5. 2: Marketing Innovation – Correlation

The correlation table presents the relationships between several variables, including "Marketing Innovativeness" and other factors such as "Business Location, "Availability of resources "Primary Market," "Collaboration with University‘‘ and ―Engagement in R&D". Pearson correlation coefficients (r) quantify the strength and direction of linear relationships between pairs of variables. The corresponding significance values (Sig. (1-tailed)) indicate the probability of observing such correlations if there were no true relationships between the variables. The sample size (N) for each correlation is 119.

"Marketing Innovation" and "Business Location" have a significant positive correlation ($r = 0.611$, $p < 0.001$), indicating that businesses with more innovative marketing strategies are more likely to be positioned in attractive business settings. In contrast, there is a modest positive correlation between "Marketing Innovation" and "Availability of resources" ($r = 0.212$, $p = 0.010$), suggesting that businesses with greater resources are somewhat more likely to be marketing innovative. "Marketing Innovation" and "Primary Market" showcase a somewhat negative connection ($r = -0.389$, $p < 0.001$), suggesting that businesses in more competitive markets could be less inventive in their marketing. The variables "Marketing Innovation" and "Collaboration with University" have a very weak positive correlation ($r = 0.118$, $p = 0.102$), indicating a poor link. "Marketing Innovation" and "Engagement in R&D" show a significant positive correlation ($r = 0.585$, $p < 0.001$), implying that businesses are more likely to be innovative in their marketing strategies.

Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.699[a]	.488	.465	.62753	.488	21.540	5	113	.000	1.977
a. Predictors: (Constant), Business Location, Availability of resources, Primary Market, Collaboration with HU, and Engagement in R&D										
b. Dependent Variable: Marketing Innovation										

Table 5. 3: Marketing Innovation: Model Summary

The table provides key metrics for assessing the overall fit and validity of the multiple linear regression models predicting "Marketing innovation". The model incorporates five predictors including business location, availability of resources, primary market, collaboration with HU, and engagement in R&D. The multiple correlation coefficient (R = 0.699) indicates a strong linear relationship between the predictors and the dependent variable. The $R^2 = 0.488$ reveals that 48.8% of the variance in marketing innovation is explained by the model. The adjusted $R^2 = 0.465$ penalizes for model complexity, confirming that the predictors retain substantive explanatory power despite potential over-fitting. The standard error of the estimate (0.628) reflects moderate dispersion of observed values around the regression surface, suggesting reasonable predictive accuracy.

The F-test for overall model significance ($F(5, 113) = 21.540$, $p < 0.001$) confirms that the predictors jointly explain a statistically significant proportion of variance in marketing innovation. The Durbin-Watson statistic (1.977) is close to 2, indicating no significant autocorrelation in residuals, satisfying the independence assumption. The model‘s R^2 aligns with typical social science benchmarks, where moderate effect sizes are common. The absence of multi-collinearity (evidenced by VIF values < 5 in prior analyses) and the significant predictors (Business Location, Availability of resources, Primary Market, Collaboration with HU, and Engagement in R&D) underscore the model‘s robustness. The results suggest that organizational location, resource allocation, collaborative strategies, and research activities are critical drivers of marketing innovation, collectively accounting for nearly half its variability.

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	42.411	5	8.482	21.540	.000[b]
	Residual	44.499	113	.394		
	Total	86.910	118			
a. Dependent Variable: Marketing innovation						
b. Predictors: (Constant), Business Location, Availability of resources, Primary Market, Collaboration with HU, and Engagement in R&D						

Table 5. 4: Marketing Innovation- ANOVA

The ANOVA table assesses the overall significance of the multiple regression models. The "Regression" row shows that the model explains a significant portion of the variance in "Marketing Innovation" (Sum of Squares = 42.411, df = 5). The F-statistic of 21.540 with a p-value of .000 indicates that the model is statistically significant, meaning that the set of predictor variables (Business Location, Availability of resources, Primary Market, Collaboration with HU, and Engagement in R&D) collectively have a significant effect on "Marketing Innovation." The "Residual" row represents the unexplained variance (Sum of Squares = 44.499, df = 113). Together, the explained and unexplained variance add up to the "Total" variance in "Marketing" (Sum of Squares = 86.910, df = 118).

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.675	.495		1.363	.176	-.306	1.656		
	Business Location	.515	.129	.422	3.998	.000	.260	.770	.408	2.453
	Availability of Resource	.294	.119	.169	2.461	.015	.057	.530	.959	1.042
	Primary Market	-.386	.234	-.125	-1.645	.103	-.850	.079	.782	1.278
	Collaboration with HU	.283	.123	.163	2.311	.023	.040	.526	.908	1.101
	Engagement in R&D	.385	.181	.216	2.129	.035	.027	.743	.439	2.277
a. Dependent Variable: Marketing										

$$Y = Bo+B1X1+\ldots. + BnXn + e$$

- Y= the predicted value of the dependent variable
- Bo= the y-intercept (value of y when all other parameters are set to 0)
- B1X1= the regression coefficient (B1) of the first independent variable (X1) (a..a. the effect that increasing the value of the independent variable has on the predicted y value)
- … = do the same for however many independent variables you are testing
- BnXn= the regression coefficient of the last independent variable
- e= modeYl error (a.k.a. how much variation there is in our estimate of $\hat{y}$)

The multiple linear regression analysis aims to determine the influence of several independent variables on "Marketing Innovation." The general form of the multiple linear regression equation is:

From the output, the specific regression equation is:

$$\begin{aligned} &Marketing \text{ Innovation} \\ &= 0.675 + 0.515 \text{ (Business Location)} + 0.294 \text{ (availability of resources)} \\ &- 0.386 \text{ (Primary Market)} + 0.283 \text{ (Collaboration of University)} \\ &+ 0.385 \text{ (Engagement in R\&D)} \end{aligned}$$

It seems that "Business Location," with a very significant p-value of 0.000 and a coefficient of 0.515, is the most important predictor. For every unit increase in "Business Location," "Marketing Innovation" should rise by 0.515 units, assuming all other factors remain the same. Furthermore, the variables "Resources" (β=0.294, p=0.015), "Collaboration with University" (β=0.283, p=0.023), and "Research" (β=0.385, p=0.035) all significantly improve the results. Despite having a negative coefficient of -0.386, the "Primary Market" variable is not statistically significant (p=0.103p = 0.103p=0.103).

The "Standardized Coefficients" (Beta) show the relative importance of each predictor. "Business Location" has the highest standardized coefficient (0.422), confirming its substantial impact on "Marketing Innovation." The tolerance values are all above 0.1, and the VIF values are all below 5, indicating that multicollinearity is not a significant issue in this model. In summary, "Business Location," "Resource availability," "Collaboration with HU," and ―Engagement in R&D" are significant predictors of "Marketing Innovation," while

the "Primary Market" variable does not have a significant effect. The model suggests that strategic location, resource allocation, unique collaborations, and a research-oriented approach are key factors driving marketing innovation.

5.4.2. Process Innovation

Descriptive Statistics			
	Mean	Std. Deviation	N
Process Innovation	2.4229	.73882	121
Available Resources	1.4132	.49446	121
Engagement in R&D	1.63	.485	121
Establishment Year	2.17	1.121	121
Internal sources of innovative ideas	1.2645	.44288	121

Table 5. 5: Process Innovation- Descriptive Statistics

The descriptive statistics provide a brief overview of the key factors that were employed in this study. The dependent variable "Process Innovation" has a mean of 2.4229 and a standard deviation of 0.73882, meaning that there is moderate variability in the sample and an average level of 2.42. A mean of 1.4132 and a standard deviation of 0.49446 for "Availability of Innovation" indicate that innovative resources are generally somewhat present in businesses with little variability. A large number of the firms in the sample engage in some sort of research, shown by the mean of 1.63 and standard deviation of 0.485 for R&D engagement. "Establishment Year" has some diversity with a mean of 2.17 and a standard deviation of 1.121. "Internal sources of innovative ideas" has a standard deviation of 0.44288 and a mean of 1.2645. The central tendency and score distribution for each variable are highlighted by these statistics, which offer a glimpse of the sample's features and are crucial for contextually evaluating the regression analysis findings.

1. Correlations						
		Process Innovation	Availability of resources	Engagement in R&D	Establishment Year	Internal Sources of Innovative Ideas
Pearson Correlation	Process Innovation	1.000	.293	.415	-.469	.360
	Availability of Resources	.293	1.000	.055	-.079	.372
	Engagement in R&D	.415	.055	1.000	-.530	.229
	Establishment Year	-.469	-.079	-.530	1.000	-.173
	Internal Source of Innovation	.360	.372	.229	-.173	1.000
Sig. (1-	Process Innovation	.	.001	.000	.000	.000

tailed)	Availability of Resources	.001	.	.273	.194	.000
	Engagement in R&D	.000	.273	.	.000	.006
	Establishment Year	.000	.194	.000	.	.029
	Internal Source of Innovation	.000	.000	.006	.029	.
N	Process Innovation	121	121	121	121	121
	Availability of Resources	121	121	121	121	121
	Engagement in R&D	121	121	121	121	121
	Establishment Year	121	121	121	121	121
	Internal Source of Innovation	121	121	121	121	121

Table 5. 6: Process Innovation- Correlations

The correlation table that is presented shows how "Process Innovation" is related to a number of independent variables, such as "Availability of Resources," "Engagement in R&D," "Establishment Year," and "Internal Sources of Innovative Ideas." Pearson correlation coefficients (r) measure how strongly and in which direction two variables are linearly related. The significance levels (Sig. (1-tailed)) show the likelihood of finding such a connection if there is no real link between the variables. For every correlation, the sample size (N) is 121.

"Process Innovation" and "Availability of resources" have a weakly positive connection ($r = 0.293$, $p = 0.001$), indicating a minor propensity for businesses with more resources available to have higher levels of "Process Innovation." "Process Innovation" and "Engagement in R&D" had a relatively positive correlation ($r = 0.415$, $p < 0.001$), indicating that research-conducted enterprises possibly exhibited higher levels of "Process Innovation." There is a strong negative correlation between "Process Innovation" and "Establishment Year" ($r = -0.469$, $p < 0.001$), implying that more mature companies often have lower "Process Innovation." Strong correlations between "Process Innovation" and "Internal Sources of Innovative Ideas" ($r = 0.360$, $p < 0.001$) reveal that companies with more internal sources of creative ideas are more likely to have higher levels of "Process Innovation."

2. Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.594[a]	.353	.331	.60433	.353	15.839	4	116	.000	2.197
a. Predictors: (Constant), Internal Source of innovative ideas, Establishment Year, Availability of Resources, Engagement in R&D)										
b. Dependent Variable: Process Innovation										

Table 5. 7: Process Innovation- Model Summary

The model summary provides information on the goodness-of-fit of the multiple linear regression models. A moderately positive correlation between the dependent variable (Process Innovation) and the independent variables (Availability of Resources, Engagement in R&D, Establishment Year, and Internal Source of Innovation) is indicated by the R-value of 0.594. With a R Square of 0.353, the model is able to explain 35.3% of the variation in "Process Innovation." Taking into consideration the sample size and the number of variables in the model, the Adjusted R Square of 0.331 offers a more cautious assessment of the model's explanatory ability. The Estimate's Standard Error is 0.60433, which is the usual difference of the observed values from the model's projected values. With a Durbin-Watson statistic of 2.197, the residuals appear to be mostly uncorrelated (autocorrelation is indicated by values near 2). The change statistics show that the inclusion of the independent variables significantly improves the model's fit (R Square Change = 0.353, F Change = 15.839, $p < 0.001$). The model appears to be uncorrelated, and it accounts for a significant amount of the variance in "Process Innovation" overall. There could be space for improvement, though, and more research or model enhancement might be taken into consideration.

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	23.138	4	5.784	15.839	.000[b]
	Residual	42.364	116	.365		
	Total	65.502	120			
a. Dependent Variable: Process						
b. Predictors: (Constant), Internal Source of Innovative ideas, Establishment Year, Resources, Engagement in R&D						

Table 5. 8: Process Innovation- ANOVA

The multiple regression models' overall significance is evaluated in the ANOVA table. A considerable amount of the variance in "Process Innovation" can be explained by the model, according to the "Regression" row (Sum of Squares = 23.138, df = 4). The F-statistic

of 15.839 and the p-value of.000 demonstrates the fact that the model is statistically significant. This shows that the generation of predictor factors, which include an internal source of innovation, establishment year, R&D engagement, and resource availability, all significantly affect "Process Innovation." The unexplained variation is shown in the "Residual" row (Sum of Squares = 42.364, df = 116). The "Total" variance in "Process Innovation" is the sum of the explained and unexplained variances (Sum of Squares = 65.502, df = 120). The multiple linear regression analysis aims to determine the influence of several independent variables on "Marketing Innovation." The general form of the multiple linear regression equation is:

From the output, the specific regression equation is:

$$\begin{aligned} Process\ \text{Innovation} &= 1.608 + 0.278\ (\text{Availability of resources}) \\ &+ 0.292\ (\text{Engagement in R\&D}) \\ &+ 0.320\ (\text{Internal sources of innovative ideas}) \\ &- 0.211\ (\text{Establishment Year}) \end{aligned}$$

"Process Innovation" is expected to have an intercept of 1.608 when all independent variables are at zero. The context of the variables, however, determines how the intercept should be used practically; if zero values for every predictor are meaningless, the intercept primarily functions as a mathematical element of the model. With a significant p-value of 0.022 and a coefficient of 0.320, "Internal sources of Innovative ideas" seems to be the most important predictor. This indicates that, while all other factors are held constant, a rise of 0.320 units is anticipated for every unit increase in "Internal Sources of Innovation of Innovative Ideas." Similarly, "Availability of Resources" and "Engagement in R&D" (β=0.278, p=0.023 and β=0.292, p=0.034, respectively) exhibited strong positive effects.

A very significant p-value of 0.000 and a negative coefficient of -0.211 for the variable "Establishment Year" indicate that "Process Innovation" tends to decrease as the start-up year increases. The "Standardized Coefficients" (Beta) indicate each predictor's relative relevance. Its significant influence on "Process" is acknowledged by the fact that "Establishment Year" has the greatest standardized coefficient (-0.320), followed by "Internal Sources of Innovative Ideas" (0.192) and "Engagement in R&D" (0.192). Multi-collinearity is not a major problem in this model, as shown by the tolerance values being all over 0.1 and

the VIF values being all below 5. In conclusion, the following factors significantly predict "Process": "Availability of Resources," "Engagement in R&D," "Establishment Year," and "Internal Sources of Innovations."

5.4.3. Organizational Innovation

1. Descriptive Statistics			
	Mean	Std. Deviation	N
Organizational Innovation	2.5902	.64109	122
Engagement in R&D	1.62	.487	122
Internal Sources of Innovative ideas	1.2623	.44170	122
Working with input Supplier	1.4262	.49657	122

Table 5. 9: Organizational Innovation- Descriptive Statistics

Descriptive statistics, given a sample size of 122, present a description of the overall pattern and variability of the variables employed. Given that the dependent variable "Organizational Innovation" has a mean of 2.5902 and a standard deviation of 0.64109, there is a substantial amount of variation around the mean level of "Organizational Innovation." The standard deviation of "Engagement in R&D" is 0.487, while the average statistic is 1.62. The standard deviation is 0.44170 while the mean of "Internal Sources of Innovative ideas" is 1.2623. The standard deviation of "Working with Supplier" is 0.49657, while the mean is 1.4262. The results of this statistic offer a summary of the sample's characteristics, including the average levels and distribution of scores for each variable, which is critical for understanding the context of the forthcoming regression analysis.

Correlations					
		Organizational Innovation	Engagement in R&D	Internal Sources of Innovative ideas	Working with Supplier
Pearson Correlation	Organizational Innovation	1.000	.516	.470	.164
	Engagement in R&D	.516	1.000	.233	.260
	Internal Sources of Innovative ideas	.470	.233	1.000	.277
	Working with Supplier	.164	.260	.277	1.000
Sig. (1-tailed)	Organizational Innovation	.	.000	.000	.036
	Engagement in R&D	.000	.	.005	.002
	Internal Sources of Innovative ideas	.000	.005	.	.001
	Working with Supplier	.036	.002	.001	.
N	Organizational	122	122	122	122

	Innovation				
	Engagement in R&D	122	122	122	122
	Internal Sources of Innovative ideas	122	122	122	122
	Working with Supplier	122	122	122	122

Table 5. 10: Organizational Innovation- Correlation

The correlation table shown illustrates the connections between "Organizational Innovation" and the following variables: "Working with input supplier," "Internal Sources of Innovative ideas," and "Engagement in R&D." Pearson correlation coefficients (r) measure how strongly and in which direction two variables are linearly related. The probabilities of finding such correlations in the absence of a real link between the variables are shown by the corresponding significance levels (Sig. (1-tailed)). Each correlation has a sample size (N) of 122.

The statistically significant positive correlation between "Organizational Innovation" and "Engagement in R&D" ($r = 0.516$, $p < 0.001$) points out that research-conducted firms commonly exhibit higher levels of "Organizational Innovation." The moderately positive correlation between "Internal Sources of Innovative ideas" and "Organizational Innovation" ($r = 0.470$, $p < 0.001$) indicates that businesses with more internal sources often have higher levels of "Organizational Innovation." "Organizational Innovation" and "Working with Supplier" have a moderate connection ($r = 0.164$, $p = 0.036$), indicating that businesses that work with input suppliers are somewhat more likely to engage with "Organizational Innovation."

2.1. Model Summary

Model	R	R^2	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df 1	df2	Sig. F Change	
	.631 a	.399	.383	.50339	.399	26.084	3	118	.000	2.404

a. Predictors: (Constant), Working with Supplier, Engagement in R&D, Internal Sources of Innovative ideas

b. Dependent Variable: Organizational

Table 5. 11: Organizational Innovation- Model Summary

The table presents key metrics for evaluating the overall fit and validity of the multiple linear regression models predicting "Organizational Innovation". The model's multiple correlation coefficient ($R = 0.631$), which takes into account three predictors (involvement in R&D, internal sources of innovative ideas, and working with input

suppliers), shows a strong linear correlation between the predictors and the dependent variable. The model explains 39.9% of the variation in "Organizational Innovation," according to the R2 = 0.399. Model complexity is affected by the modified R2 = 0.383, which verifies that the predictors maintain significant explanatory power in spite of possible over-fitting. Reasonable predictive accuracy is shown by the standard error of the estimate (0.50339), which shows a moderate dispersion of observed values across the regression surface.

The null hypothesis is rejected by the F-test for overall model significance ($F(3, 118) = 26.084$, $p < 0.001$), indicating that the predictors together account for a statistically significant percentage of the variation in "Organizational Innovation." Since there is no discernible autocorrelation in the residuals, the independence assumption is achieved by the Durbin-Watson statistic (2.404) which is close to 2. The model's R^2 aligns with typical benchmarks in social sciences, where moderate effect sizes are common. The absence of significant multi-collinearity (as evidenced by tolerance and VIF values in prior analyses) underscores the model's robustness. The results suggest that conducting research and leveraging internal sources of innovative ideas are critical drivers of "Organizational", collectively accounting for nearly 40% of its variability. The "Working with Supplier" variable does not contribute significantly to the model's explanatory power.

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	19.829	3	6.610	26.084	.000[b]
	Residual	29.901	118	.253		
	Total	49.730	121			
a. Dependent Variable: Organizational						
b. Predictors: (Constant), Working with Supplier, Engagement in R&D, Internal Sources of Innovative ideas						

Table 5. 12: Organizational Innovation- ANOVA

The "Regression" row shows that the model explains a significant portion of the variance in "Organizational Innovation" (Sum of Squares = 19.829, df = 3). The F-statistic of 26.084 with a p-value of .000 indicates that the model is statistically significant, meaning that the set of predictor variables (Engagement in R&D, Internal sources of Innovative ideas, and Working with Supplier) collectively have a significant effect on "Organizational Innovation." The "Residual" row represents the unexplained variance (Sum of Squares = 29.901, df = 118). Together, the explained and unexplained variance add up to the "Total" variance in

"Organizational Innovation" (Sum of Squares = 49.730, df = 121). This suggests that the model effectively captures a substantial portion of the variability in "Organizational Innovation," while also highlighting areas where additional factors might contribute to further explanation.

Coefficients[a]										
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.049	.201		5.215	.000	.651	1.448		
	Engagement in R&D	.582	.099	.442	5.882	.000	.386	.778	.904	1.106
	Internal Sources of Innovative ideas	.556	.110	.383	5.080	.000	.339	.773	.895	1.117
	Working with input supplier	-.074	.098	-.057	-.754	.452	-.268	.120	.883	1.133
a. Dependent Variable: Organizational Innovation										

Table 5. 13: Organizational Innovation- Coefficients

From the output, the specific regression equation is:

$Organizational$ Innovation = 1.049 + 0.582 (Engagement in R&D+ 0.556 (Internal sources of Innovative ideas) - 0.074 (Collaboration with input supplier)

The intercept, 1.049, represents the predicted value of "Organizational Innovation" when all independent variables are zero. The most influential predictor appears to be "Engagement in R&D", with a coefficient of 0.582 and a significant p-value of 0.000. This means that for every unit increase in "Engagement in R&D", "Organizational Innovation" is expected to increase by 0.582 units, holding all other variables constant. Similarly, the "Internal Sources of Innovative ideas" variable has a significant positive impact (β=0.556, p=0.000). The "Collaboration with Supplier" variable has a negative coefficient of -0.074, but it is not statistically significant (p = 0.452).

The "Standardized Coefficients" (Beta) show the relative importance of each predictor. "Engagement in R&D" has the highest standardized coefficient (0.442) followed by "Internal Sources of Innovative ideas" (0.383), confirming its substantial impact on "Organizational Innovation". The tolerance values are all above 0.1, and the VIF values are all below 5, indicating that multi-collinearity is not a significant issue in this model. Finally, "Engagement in R&D" and "Internal Sources of Innovative ideas" are significant predictors

of "Organizational Innovation". The model suggests that conducting research and leveraging internal sources of innovative ideas are key factors driving "Organizational Innovation".

5.4.1. Product Innovation

Descriptive Statistics			
	Mean	Std. Deviation	N
Product	2.8907	.77518	122
Internal sources of innovative ideas	1.2623	.44170	122
Business Location	2.60	.712	122
Establishment Year	2.18	1.128	122
Collaboration with HU	.68	.468	122

Table 5. 14: Product innovation-Descriptive Statistics

The descriptive statistics provide a summary of the central tendency and variability of the variables used in the analysis, based on a sample size of 122. "Product Innovation" (the dependent variable) has a mean of 2.8907 with a standard deviation of 0.77518, indicating moderate variability around the average level of "Product Innovation". "Internal sources of innovative ideas has a mean of 1.2623 with a standard deviation of 0.44170. "Business Location" has a mean of 2.60 with a standard deviation of 0.712. "Establishment Year" has a mean of 2.18 with a standard deviation of 1.128, showing the highest variability among the independent variables. "Collaboration with HU" has a mean of 0.68 with a standard deviation of 0.468. These statistics offer a snapshot of the characteristics of the sample, showing the average levels and the spread of scores for each variable, which is useful for understanding the context of the subsequent regression analysis.

Correlations						
		Product Innovation	Internal sources of innovative ideas	Business Location	Establishment Year	Hawassa university
Pearson Correlation	Product Innovation	1.000	.358	.674	-.623	-.245
	Internal sources of innovative ideas	.358	1.000	.206	-.179	-.350
	Business Location	.674	.206	1.000	-.506	.107
	Establishment Year	-.623	-.179	-.506	1.000	.188
	Collaboration with HU	-.245	-.350	.107	.188	1.000
Sig. (1-tailed)	Product Innovation	.	.000	.000	.000	.003
	Internal sources of innovative ideas	.000	.	.011	.025	.000
	Business Location	.000	.011	.	.000	.119
	Establishment Year	.000	.025	.000	.	.019
	Collaboration with HU	.003	.000	.119	.019	.
N	Product Innovation	122	122	122	122	122
	Internal sources of innovative ideas	122	122	122	122	122
	Business Location	122	122	122	122	122
	Establishment Year	122	122	122	122	122
	Collaboration with HU	122	122	122	122	122

Table 5. 15: Product innovation-Correlation

The provided correlation table displays the relationships between "Product Innovation" and other variables: "Internal sources of innovative ideas ", "Business Location", "Establishment Year", and "Collaboration with HU". Pearson correlation coefficients (r) quantify the strength and direction of linear relationships between pairs of variables. The corresponding significance values (Sig. (1-tailed)) indicate the probability of observing such correlations if there were no true relationships between the variables. The sample size (N) for each correlation is 122.

A strong positive correlation exists between "Product Innovation" and "Business Location" ($r = 0.674$, $p < 0.001$), suggesting that firms with more favourable business locations tend to have higher levels of "Product". A moderate positive correlation is found between "Product" and" Internal sources of innovative ideas " ($r = 0.358$, $p < 0.001$), indicating that organizations with greater internal sources tend to have higher levels of "Product". A strong negative correlation is observed between "Product" and "Establishment Year" ($r = -0.623$, $p < 0.001$), suggesting that older organizations tend to have lower levels of "Product". A weak negative correlation exists between "Product" and "Agents of innovation:

Hawassa University" (r = -0.245, p = 0.003), indicating a slight tendency for organizations collaborating with Hawassa University to have lower levels of "Product Innovation‘‘

Model Summary[b]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.794[a]	.630	.617	.47950	.630	49.809	4	117	.000	1.930
a. Predictors: (Constant), Collaboration with input suppliers , Business Location, Internal sources of innovative ideas, Establishment Year										
b. Dependent Variable: Product Innovation										

Table 5. 16: Product innovation-Model Summary

The table provides key metrics for assessing the overall fit and validity of the multiple linear regression models predicting "Product Innovation". The model, incorporating four predictors (Collaboration with HU, Business Location, Internal sources of innovative ideas, and Establishment Year), has a multiple correlation coefficient (R = 0.794), indicating a very strong linear relationship between the predictors and the dependent variable. The $R^2 = 0.630$ reveals that 63% of the variance in "Product Innovation" is explained by the model. The adjusted $R^2 = 0.617$ penalizes for model complexity, confirming that the predictors retain substantial explanatory power despite potential over-fitting. The standard error of the estimate (0.47950) reflects moderate dispersion of observed values around the regression surface, suggesting good predictive accuracy.

The F-test for overall model significance ($F(4, 117) = 49.809$, $p < 0.001$) rejects the null hypothesis, confirming that the predictors jointly explain a statistically significant proportion of variance in "Product Innovation". The Durbin-Watson statistic (1.930) is somewhat below 2, indicating potential autocorrelation in residuals, which may require further investigation. The model's R^2 is high compared to typical benchmarks in social sciences, suggesting a strong explanatory power. The results indicate that business location, internal sources, establishment year, and collaboration with Hawassa University are critical drivers of "Product", collectively accounting for a substantial portion of its variability.

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	45.809	4	11.452	49.809	.000[b]
	Residual	26.901	117	.230		
	Total	72.709	121			
a. Dependent Variable: Product						
b. Predictors: (Constant), Agents of innovation Suppliers Others / (Specify)/Hawassa university, Business Location, INternal Sources, Estabilishment Year						

Table 5. 17: Product innovation-ANOVA

The ANOVA table assesses the overall significance of the multiple regression models. The "Regression" row shows that the model explains a significant portion of the variance in "Product Innovation" (Sum of Squares = 45.809, df = 4). The F-statistic of 49.809 with a p-value of .000 indicates that the model is statistically significant, meaning that the set of predictor variables (Collaboration with HU, Business Location, Internal Sources of Innovation, establishment Year) collectively have a significant effect on "Product Innovation". The "Residual" row represents the unexplained variance (Sum of Squares = 26.901, df = 117). Together, the explained and unexplained variance add up to the "Total" variance in "Product Innovation" (Sum of Squares = 72.709, df = 121). This suggests that the model effectively captures a substantial portion of the variability in "Product Innovation", while also highlighting areas where additional factors might contribute to further explanation.

Coefficients[a]										
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.823	.278		6.558	.000	1.273	2.374		
	Internal sources of innovative ideas	.224	.109	.128	2.055	.042	.008	.441	.816	1.225
	Business Location	.562	.075	.516	7.471	.000	.413	.711	.663	1.509
	Establishment Year	-.207	.047	-.302	-4.438	.000	-.300	-.115	.684	1.462
	Collaboration with HU	-.329	.105	-.199	-3.127	.002	-.538	-.121	.782	1.280
a. Dependent Variable: Product										

Table 5. 18: Coefficients

This multiple linear regression analysis aims to determine the influence of several independent variables on a dependent variable, "Product Innovation". The general form of the multiple linear regression equation is:

Product Innovation = 1.823 + 0.224 (Internal Sources Innovative ideas) + 0.562 (Business Location) - 0.207 (Establishment Year) - 0.329 (Collaboration with HU)

The intercept, 1.823, represents the predicted value of "Product Innovation" when all independent variables are zero. The most influential predictor appears to be "Business Location", with a coefficient of 0.562 and a highly significant p-value of 0.000. This means that for every unit increase in "Business Location", "Product Innovation" is expected to increase by 0.562 units, holding all other variables constant. Similarly, "Internal sources of innovative ideas" has a significant positive impact (β=0.128, p=0.042). "Establishment Year" has a negative coefficient of -0.207, indicating that as the establishment year increases, "Product Innovation" tends to decrease (p=0.000). "Collaboration with HU" also has a significant negative effect (β=-0.199, p=0.002).

The "Standardized Coefficients" (Beta) show the relative importance of each predictor. "Business Location" has the highest standardized coefficient (0.516), followed by "Establishment Year" (-0.302), confirming their substantial impact on "Product". The tolerance values are all above 0.1, and the VIF values are all below 5, indicating that multi-collinearity is not a significant issue in this model. In summary, Business Location, Internal sources of innovative ideas, Establishment Year, and Collaboration with HU are significant predictors of "Product Innovation".

5.4.2. Binary Logistics regression

Case Processing Summary			
Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	120	98.4
	Missing Cases	2	1.6
	Total	122	100.0
Unselected Cases		0	.0
Total		122	100.0
a. If weight is in effect, see the classification table for the total number of cases.			

Table 5. 19: Binary Logistics regression- Case Processing Summary

The case processing summary from the binary regression output provides an overview of how the data was handled during analysis. Out of a total of 122 cases, 120 were included in the analysis, representing 98.4% of the data. This indicates that only 2 cases (1.6%) were missing and thus excluded from the analysis. There were no unselected cases, meaning all available data points were considered for inclusion. The high percentage of included cases suggests that the analysis is robust and representative of the overall dataset, with minimal data loss due to missing values. This is beneficial for maintaining statistical power and ensuring that the results are reliable and generalizable.

Spearman correlation

Correlations							
			Process Innovation	Organizational Innovation	Marketing Innovation	Product Innovation	Level of Innovation
Spearman's rho	Process Innovation	Correlation Coefficient	1.000	.529**	.469**	.610**	.072
		Sig. (2-tailed)	.	.000	.000	.000	.429
		N	121	121	120	121	121
	Organizational Innovation	Correlation Coefficient	.529**	1.000	.554**	.441**	-.060
		Sig. (2-tailed)	.000	.	.000	.000	.509
		N	121	122	121	122	122
	Marketing Innovation	Correlation Coefficient	.469**	.554**	1.000	.687**	-.035
		Sig. (2-tailed)	.000	.000	.	.000	.707
		N	120	121	121	121	121
	Product Innovation	Correlation Coefficient	.610**	.441**	.687**	1.000	-.181*
		Sig. (2-tailed)	.000	.000	.000	.	.046
		N	121	122	121	122	122
	Level of Innovation	Correlation Coefficient	.072	-.060	-.035	-.181*	1.000
		Sig. (2-tailed)	.429	.509	.707	.046	.
		N	121	122	121	122	122
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Table 5. 20: Binary Logistics regression- Spearman correlation

The Spearman‘s correlation analysis reveals significant relationships among the variables Process**,** Organizational**,** Marketing, and Product**.** All correlations are statistically significant at the 0.01 level, indicating strong associations between these factors. The Process variable is positively correlated with Organizational (r = 0.544), Marketing (r = 0.465), and Product (r = 0.622), suggesting that improvements in process quality are linked to enhancements in organizational capabilities, marketing efforts, and product development. The Organizational variable also shows strong correlations with Marketing (r = 0.561) and Product (r = 0.501), highlighting the interconnectedness of organizational capabilities with marketing strategies and product offerings. Furthermore, Marketing is highly correlated with Product (r = 0.748), indicating that effective marketing is closely tied to successful product development. Overall, these correlations suggest that these variables are interdependent, and improvements in one area can positively impact others.

Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Product Innovation	-1.449	.579	6.271	1	.012	.235	.076	.730
	Process Innovation	1.231	.485	6.443	1	.011	3.424	1.324	8.855
	Organizational Innovation	-.540	.505	1.143	1	.285	.583	.217	1.568
	Marketing Innovation	.558	.433	1.666	1	.197	1.748	.749	4.080
	Constant	-.693	1.063	.425	1	.514	.500		
a. Variable(s) entered on step 1: Product Innovation, Process Innovation, Organizational Innovation, and Marketing Innovation.									

Table 5. 21: Binary Logistics regression- Variables in the Equation

The logistic regression analysis presented evaluates the effect of four independent variables—Product, Process, Marketing, and Organizational—on a binary outcome (Level of Innovation, high or low). Below is a detailed interpretation of the results, including a mathematical model and implications.

Mathematical Model

The logistic regression equation can be expressed as:

$$\ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1(\text{Product Innovation}) + \beta_2(\text{Process Innovation}) + \beta_3(\text{Marketing Innovation}) + \beta_4(\text{Organizational Innovation})$$

Where:

- P is the probability of the outcome occurring.
- $\ln\left(\frac{P}{1-P}\right)$ is the log-odds of the outcome.
- The coefficients (β_i) represent the log-odds change for a one-unit increase in the respective predictor variable.

Using the coefficients provided:

$$\ln\left(\frac{P}{1-P}\right) = -0.693 - 1.449(\text{Product Innovation}) + 1.231(\text{Process Innovation}) + 0.558(\text{Marketing Innovation}) - 0.540(\text{Organizational Innovation})$$

The interpretation of the logistic regression results reveals key insights into how different variables influence the outcome. For the Product Innovation variable, a coefficient of -1.449 indicates that each unit increase in Product decreases the log-odds of the outcome by 1.449, corresponding to a 76.5% reduction in odds (odds ratio = 0.235). This negative relationship is statistically significant (p = 0.012). Conversely, the Process Innovation variable shows a positive effect, with a coefficient of 1.231 indicating a log-odds increase of 1.231 per unit increase in Process, translating to a 242% increase in odds (odds ratio = 3.424), which is also statistically significant (p = 0.011). In contrast, Marketing Innovation and Organizational Innovation variables do not significantly impact the outcome, despite suggesting potential increases and decreases in odds, respectively. The Constant term provides the baseline log-odds when all predictors are zero. The implications of these findings highlight Product Innovation and Process Innovation as significant predictors, with Product Innovation negatively affecting and Process Innovation positively affecting the outcome.

5.5. Discussion and analysis

Innovation is the capacity to generate new goods, services, and business practices that offer novel value propositions (Ayinaddis, 2022; Kassa & Mirte, 2022; Price et al., 2013). The findings of this study demonstrate that a multitude of variables, such as the availability of resources, the location of the business, R&D activities, collaboration with higher education (the university), firm age, and internal sources for innovative ideas, determine business enterprises' Innovativeness throughout Ethiopia, particularly in the study area. The study examined all four dimensions of business enterprises' innovativeness—product, process, marketing, and organizational—that are impacted by all of these factors. Also, the results of the study correspond with studies that look at the factors that influence innovativeness in developing economies, which involve external challenges (the absence of government support, unfriendly policies, and inadequate infrastructure) and internal challenges (technical incapacity, lack of qualified staff, and inadequate R&D facilities) (Kassa & Kegne, 2025; Bate et al., 2023; Dutta et al., 2019; Daksa et al., 2018).

The results show that business location has a significant effect on marketing innovation ($r = 0.611$, $p < 0.001$), showing that organizations placed strategically in environments promoting innovation have more opportunities to innovate. This finding is consistent with previous studies that demonstrate the influence of industry-specific traits and the firm's network on business innovation (Egbetokun et al., 2016). Additionally, R&D engagement shows strong positive correlations with marketing innovation ($r = 0.585$, $p < 0.001$) and process innovation ($r = 0.415$, $p < 0.001$), confirming that internal knowledge from R&D illustrates a company's commitment to continuous improvements and increases the likelihood of innovation.

The results indicate that resource availability is a statistically significant predictor of both marketing innovation ($\beta = 0.294$, $p = 0.015$) and process innovation ($r = 0.293$, $p = 0.001$), though the strength of these associations is moderate. These findings are consistent with the arguments presented by Dutta et al. (2019) and Kassa and Kegne (2025), who highlight financial constraints and high innovation costs as key barriers to innovation, particularly in countries where infrastructure is underdeveloped.

In the case of marketing innovation, the regression analysis identifies business location, resource availability, university collaboration, and R&D participation as significant contributing factors, collectively explaining 48.8% of the variance ($R^2 = 0.488$). Regarding process innovation, resource availability, R&D involvement, the age of the enterprise ($r =$ –

0.469, $p < 0.001$), and internal sources of innovative ideas ($r = 0.360$, $p < 0.001$) emerge as key influencing variables. These results align with the findings of Talegeta (2014), who identified the lack of R&D and the high cost of innovation as major impediments to innovation performance.

Furthermore, the analysis confirms that collaboration with universities has a positive and statistically significant effect on marketing innovation ($\beta = 0.283$, $p = 0.023$), supporting earlier studies which argue that such partnerships enhance innovative capacity through access to resources and the transfer of knowledge (Hailu, 2024; Teressa, 2022). A positive correlation between process innovation and internal sources of innovative ideas ($r = 0.360$, $p < 0.001$) also underscores the role of internal capabilities and market-driven knowledge in shaping innovation outcomes, consistent with the observations of Thanh et al. (2020). Taken together, these findings imply that similar dynamics may influence product innovation in the Ethiopian context, particularly through R&D engagement, resource accessibility, and institutional collaboration. Although specific data on product innovation were not presented in the current analysis, the identified patterns suggest a comparable influence of structural and organizational factors across innovation types.

Although it isn't explicitly assessed in the results, it may be assumed that organizational innovation is influenced by the same variables as process and marketing innovation. The review of the literature indicates that employee motivation, interdepartmental collaboration, management practices, and company size and age all have an impact on organizational innovation (Egbetokun et al., 2016). Process innovation and start-up year have a negative correlation ($r = -0.469$, $p < 0.001$), which implies that start-ups are more flexible and adaptable to modifications to their organization. This is in line with Gebreeyesus's (2011) emphasis on the way business size affects the innovativeness of Ethiopian micro and small enterprises, as younger and maybe smaller companies may have more flexible organizational structures.

The findings reveal the multifaceted nature of Ethiopia's innovation hurdles, which is in line with previous studies that found that elevated innovation expense, insufficient numbers of skilled personnel, and inadequate R&D were the main obstacles (Talegeta, 2014). Marketing Innovation = 0.675 + 0.515 (Business Location) + 0.294 (Availability of Resources) - 0.386 (Primary Market) + 0.283 (University Collaboration) + 0.385 (R&D Engagement) is the regression equation for marketing innovation. This model explains almost half of the variance in marketing innovation. Similar to this, the model explains 35.3% of the variance in process innovation, which is impacted by internal sources of creative ideas, R&D

participation, establishment year, and resource availability (R2 = 0.353). The results obtained indicate that, in the Ethiopian context, each of the four types of innovation—product, process, organizational, and marketing—are correlated with one another and impacted by analogous underlying variables.

6. Conclusion

The results of this study demonstrate multiple factors that contribute to the innovativeness of firms and the broader Regional Innovation System (RIS) by impacting all four dimensions of innovation: product, process, marketing, and organizational innovation. The study finds interconnected variables such as firm age, university partnership, R&D involvement, business location, resource availability, and internal sources of creative ideas. The significant effect a business's location has on marketing innovation emphasizes the importance that it is to be spatially close to innovation centers, resource pools, and cooperative networks—all essential components of a robust RIS. Businesses established within dynamic regional ecosystems have a greater opportunity for leveraging knowledge flows, specialized infrastructure, and competitive human resource—all of which constitute essential elements for sustained innovation—as further evidenced by the positive effects of resource availability, university collaboration, and R&D engagement. The comparatively diminished influence of primary market orientation implies that, in the absence of institutional connections and localized innovation assets, external market forces alone are insufficient.

Ethiopian policies and legal frameworks that foster RIS are vital for promoting growth and innovation. Nonetheless, these impacts could have been more amplified by institutional support, collaborative learning, and spillover effects. The study underlines the need of RIS strategies that foster both the restitution of responsive institutions and the development of innovative, agile businesses. Also, the value of a strong regional innovation system, in which collaborations among industries, universities, governmental organizations, civil socities and other stakeholders generate a framework that is conducive to innovation. Regional planners and policymakers ought to prioritize on developing collaborative platforms, strengthening resource accessibility, and fortifying systemic interconnections with the aim to optimize regional innovative potential and promote sustainable economic growth.

7. Recommendation, Limitation and Future research

7.1. Recommendations

On the basis of the results of the research, numerous of recommendations could be made for enhancing Ethiopian businesses' capacity for innovation and fortify the RIS in general. To begin with, policy maker should focus on creating an ideal business enabling ecosystem where both existing and new start up business flourish through fostering capacity development and substantial macro-economic reforms.

Corresponding to this, regional development plans have to concentrate on establishing settings that are conducive to innovation via enhancing infrastructure, encouraging industry clusters, and facilitating access to business support services. Financial institutions, particularly those in the public and private business sectors, should place a high priority on increasing the availability of resources by providing targeted funding to mitigate the financial barriers to R&D and innovation activities.

Increasing university-industry collaborating is also necessary; institutionalized platforms and incubation centers may assist with technological commercialization, cultivation of talent, and knowledge transfer. Additionally, social entrepreneurs and other civil societies should expand their role in bridging the gaps between higher education and regional businesses that would offer the knowledge and human resources; and supporting spin-offs and start-up businesses in thriving and embracing the dynamic market through enabling firms to capitalize on localized knowledge spill overs. Companies themselves should invest in developing internal innovation capabilities by promoting employee training, innovative organizational cultures, and cross-departmental collaboration. Congruently, supporting younger firms through incubation programs, mentorship, and entrepreneurship training can harness their innovative potential.

7.1.2. Limitations, and Future Research Directions

Nonetheless, it is imperative to take into account the limitations of this study. The findings' applicability to other regions with distinct institutional or financial circumstances may be limited by a regional focus on one region of Ethiopia. Longitudinal research might more accurately capture innovation dynamics and patterns throughout time and indicate causal relationships, which are limited by the cross-sectional approach. Self-reported

information, in which respondents may exaggerate their availability of resources or innovative activities, may have an effect on survey results.

The future investigations should take on to deal with these limitations through carrying out longitudinal studies that track innovation outcomes over time and find causal relationships. Additionally, broadening the focus to include a variety of regions and industries might help identify contextual variability in innovation drivers. Lastly, evaluating the results of certain innovation policies and programs would be helpful in creating more efficient strategies for getting beyond challenges like infrastructure deficiencies and resource constraints. Collectively, these initiatives will extend expertise and support in the development of sophisticated innovation strategies tailored to the specific demands of emerging economies.

CHAPTER SIX

SYNTHESIS

This chapter presents a comprehensive synthesis of the study‘s key findings, framing innovation within the context of Ethiopia‘s pursuit of a knowledge-based economy in the Global South. It examines the multi-layered science, technology, and innovation (STI) policy landscape at global, regional, and local levels shaping Ethiopia‘s innovation system, highlighting structural barriers and institutional determinants that affect innovation performance. The chapter also addresses graduates‘ employability and labour market integration challenges, emphasizing the role of knowledge flows, collaborative innovation, and regional competitiveness in driving development. It concludes by outlining the study‘s contributions across policy, empirical, methodological, and theoretical domains, and offers recommendations and directions for future research to strengthen Ethiopia‘s innovation ecosystem and support sustainable development.

6.1. Comprehensive Synthesis of the Key Findings

In this section, the primary empirical conclusions across the four articles developed during this PhD project are summed up. The synthesis prioritizes policy-relevant findings and empirical evidence beyond theoretical arguments that are abstract, which is consistent with the primary objective of the dissertation. Particularly in light of emerging and frontier economies that have low-income and resource constrained regions like Ethiopia, the chapter outlines the research's tangible contributions to the existing body of knowledge on RIS.

The first article brought up RIS as an approach to development in Ethiopia. It identified that, while Science, Technology, and Innovation (STI) policies and legal frameworks roughly recognize the value of innovation, their application is challenged by a fragmented system of governance, insufficient institutional capacity, and poor coordination among key stakeholders. The top-down policy-making process with little engagement from regional stakeholders including businesses and civil society offered evidence for this. The takeaway is readily apparent that decentralized governance and regionally responsive policies are both vital to any substantial development of the RIS.

The second article explores the crucial role of social enterprises in strengthening the regional innovation system, particularly an emphasis on the employability of graduates. The

evidence from the empirical data indicates the Africa Jobs Network as an example of how social enterprises may help bridge university graduates with employment opportunities by providing different soft skill training and equipping them for the job market. Additionally, the organization presents internship and practice-oriented initiatives, as well as job fairs, which enable graduates to network more effectively. The study acknowledges that civil society organizations must step up and fill the gaps left by the market and the government. As a result, social enterprises' proactive efforts toward improving graduates' job prospects play an essential role in dealing with the disparities between market demand and university graduates in emerging economies.

The second article investigated the challenges and opportunities related to technology transfer and community engagement in the knowledge exploration system, at Hawassa University. The findings highlighted the university's vital role in research and innovation dissemination. These contributions, however, are restricted by bureaucratic hurdles, under-resourced technology transfer offices, and a lack of incentive mechanisms for faculty members to engage in partnerships with outside entities. These hurdles have limited the possibility of successful university-industry-community partnerships, implying the need for structural adjustments to match academic interests with local economic goals.

The fourth Article primarily concentrated on the determining variables influencing firm-level inventiveness within regional industrial clusters in Sidama National Regional States, including Hawassa Industrial Park, Hawassa Industrial Zone, and Yirgalem Integrated Industrial Agro-processing Park. The study results reveal that a multitude of variables affect a firm's innovativeness, including collaboration with universities and proximity to innovation clusters. Nonetheless, these initiatives are limited by inadequate infrastructure, restricted access to resources, and the firms' lack of internal research expertise. As a result, regional competitiveness by carrying out regional innovation systems demands network coordination and systematic support in particular to foster firm-level innovations.

Afterwards, this synthesis integrates the findings of multiple empirical evidences to generate a wide-ranging, context-dependent perspective on Ethiopia's emerging Regional Innovation System. This section extends beyond abstract theorizing to offer practical insights by emphasizing the discussion in concrete evidence. The study portrays that, despite structural constraints, innovation systems might develop through adaptable, collaborative, and locally embedded initiatives. Thus, this study offers a pathway towards enhancing regional competitiveness in the Ethiopian setting as well as a contextualized application to the global RIS literature.

6.1.1. Reframing Innovation for Development: Toward a Knowledge-Based Economy in the Global South

Although there is no universally applicable model for development, nevertheless, the ability to innovate, entrepreneurship-friendly policies, and business enabling environment that promotes an innovative ecosystem have been considered to be the main drivers of economic growth and competitiveness. In an increasingly globalized environment, the knowledge-based economy has emerged as an overriding paradigm shaping patterns of national, regional, and local development. Characterized by the centrality of knowledge as a key productive asset, the knowledge-based economy underpins economic growth, societal development, and long-term sustainability (Chaaben et al., 2025; Kouskoura et al., 2024). This transition reflects a shift away from traditional resource-dependent economic models toward systems in which the generation, diffusion, and application of knowledge—particularly through science, technology, and innovation (STI)—serve as the primary drivers of competitiveness and transformation.

Knowledge-based economies have recently experienced a substantial evolution in innovation governance, with the traditional Triple Helix (TH) model constituting the fundamental framework. This model facilitates the development of knowledge, transfer, and dissemination by focusing on the collaboration among government, industry and university. However, the TH model has been critiqued for its limitations in facilitating adequate expertise transfer throughout the innovation process. As a result, the Quadruple Helix (QH) model has been revised to include civil society as a fourth helix, highlighting the multidirectional as well networked links observed in innovation networks. The "bottom-up" viewpoint from civil society is incorporated into the QH model to offer a more thorough examination of the institutional framework of knowledge generation and dissemination in a worldwide economy.

This paradigm might increase the possibility of inclusive and sustainable development while enabling the innovation system to achieve its economic and social goals. The QH model promotes more collaboration between local governments, businesses, and universities for regional development, policymaking, and scientific research. Furthermore, the model provides an in-depth understanding of how knowledge and innovation are co-produced and dispersed by articulating the interactions between the primary players in the innovation ecosystem. This knowledge provides innovative ideas for guiding regional development

processes and informs strategies for more successfully involving regional actors in the quest for innovation-led growth.

The RIS is a concept that intends to bring regional innovation stakeholders together in a collaborative ecosystem that fosters collective learning and sustainable economic growth. It highlights the significance of institutional embeddedness in promoting systematic collective learning. The two subsystems that makeup RIS are the knowledge exploitation subsystem, which is mostly composed of businesses, and the knowledge exploration subsystem, which consists of universities, research institutes, and technology transfer organizations. The evolution of regional governance and institutions must be examined by policymakers to promote innovation while fostering a space for innovation that reflects social, cultural, and economic values.

Since its inception in Europe, RIS has expanded all over the world, with nations in Latin America, Africa, Canada, Australia, and the US applying RIS-based policies that foster development in their regions. Smart Specialization strategies have been implemented by Brazil, Chile, Colombia, Mexico, and Peru, while African nations including South Africa, Tunisia, Côte d'Ivoire, and Cameroon have sought to apply similar schemes. Regional innovation policies, however, remain under-exploited throughout the continent, and Ethiopia is no exception.

In the Global Innovation Index, Ethiopia ranks 125th overall, compared to Kenya (100th) and Rwanda (103rd). As a low-income nation, Ethiopia experiences multiple institutional framework issues, especially in its business and regulatory environments, which impede innovation. In terms of infrastructure (particularly ICT), market sophistication (specifically investment), business sophistication, and creative outputs, Ethiopia runs behind Kenya and Rwanda, in spite of demonstrating some strength in knowledge creation and impact outputs. The GII's report points out that Ethiopia must enhance the strength of its institutions, make investments in education and research, improve infrastructure, and support investment from the private sector to further develop its entrepreneurial capacity and national competitiveness, possibly learning from Rwanda and Kenya's progress in particular fields.

6.1.2. The Global, Regional, Local Science, Technology and Innovation (STI) Policy Landscape Shaping Innovation System in Ethiopia

The study examined science, technology, and innovation (STI) policies and regulatory frameworks at the global, regional, and local levels that shape Ethiopia's innovation ecosystem. Existing sets of legal and policy frameworks have an impact on the regional innovation system, either directly or indirectly. Ethiopia's efforts toward fostering inclusive growth and sustainable development are further inspired by international and regional frameworks, including the Sustainable Development Goals (SDGs), the Science, Technology, and Innovation Strategy for Africa 2024 (STISA-2024), the African Union's Agenda 2063, recognized as "The Africa We Want," and the which place a special focus on collective effort for economic, social, and environmental progress. Regional organizations such as the Pan-African Intellectual Property Organization (PAIPO), the African Scientific Research and Innovation Council (ASRIC), and the African Observatory for Science, Technology, and Innovation (AOSTI) also play a substantial role in shaping Ethiopia‘s policy environment. Collectively, these frameworks aim to promote research, innovation, technology transfer, and university-industry collaboration, thereby supporting Ethiopia‘s transition to a knowledge-based and innovation-driven economy.

Congruently, Ethiopia's National Innovation System (NIS) landscape is supported by a comprehensive set of local policy and legislative frameworks in addition to the global and regional frameworks. At the national level, these include the Home-Grown Economic Reform (HGER) launched in 2021, the National Science, Technology, and Innovation (STI) Policy, and the National Science, Technology, and Mathematics Education Policy. Other important frameworks are the Investment Proclamation, the Industrial Parks Development Proclamation, the Technology Incubation and Transfer Policy, and the Higher Education Proclamation (650/2009).

The country also relies on the Intellectual Property Law and the Intellectual Property (IP) Rights System, which was established in 2003, as well as the National Research and Development Strategy. The Professional and Program Mix Policy, which mandates a 70:30 ratio favouring science and technology over humanities and social sciences, and the Research and Technology Transfer Conceptual and Governance Framework of Ethiopian Higher Education Institutions, are also integral to Ethiopia‘s STI ecosystem. The 1994 Education and

Training Policy laid the foundation for many of these legislative frameworks, particularly in higher education and research.

Although the nation has legislative and policy frameworks that are strategically aligned with global and regional development goals, they have not yet been enabled by successfully implementing these or developing the national and regional innovation system that they were meant to contribute to. Developing an innovation-driven knowledge-based economy along with setting up a national innovation system are challenged by several issues, including inadequate funding for R&D, fragile institutional capacity, inadequate intellectual property management, and weak linkages between academia and industry.

Ethiopia's research and development (R&D) budget is 0.3% of the total GDP, much below the 1% African target. This is also a smaller investment than its neighbouring countries, for instance, Kenya (0.8%) and Rwanda (0.7%). This under-investment indicates an underdeveloped R&D infrastructure, lesser incentives for researchers, fewer research outputs, and little contribution to national innovativeness and competitiveness. A further issue contributing to the fragmented failure to establish strong university-industry linkages has turned out to be an inadequate research infrastructure. Also, although the Ethiopian Intellectual Property Office was established to protect and promote innovation and the 70:30 policies in higher education look to offer priority to science and technology over the humanities, the shortage of institutionalized IP policies in universities and R&D facilities continues to be a substantial barrier. Furthermore, the broader innovation system is characterized by inadequate competencies among key actors, weak collaboration, and a lack of pathways for integrating research outputs with market needs.

6.1.3. Graduates Employability and Labour Market Integration and the role of Regional Innovation System (RIS) in Ethiopia

Graduate employability continues to be a grand social issue in higher education systems all over the world, and Ethiopia is no exception. Universities have been urged to produce graduates who are not only competent in their fields but who are adaptive and have soft skills which meet the labour market demands. In Ethiopia, realizing sustainable employment implies a two-pronged strategy: strengthening individual capacities and removing structural obstacles in the education-to-work transition.

Poorly linked curricula, weak university-industry linkages, underdeveloped infrastructures, and a lack of resources are among the challenges, particularly at private colleges and universities, which typically have fewer employment opportunities compared with their public counterparts. Furthermore, fair access to jobs is made more difficult by socio-political elements like political patronage and institutional reputation. Schemes like the Africa Jobs Network's Dereja program, which connects over 83,000 graduates with career prospects, integrates employment networking and provides job preparation training, and mentorship to overcome these structural barriers. In a similar vein, the DAAP program has improved employability by encouraging graduates to change their mindsets and develop digital skill sets.

Apart from university-led initiatives, Ethiopia's expanding social entrepreneurship ecosystem is essential for improving job opportunities, especially in areas with limited resources. These businesses have frequently generated inclusive and socio-economically responsive remedies, surpassing state-driven employment programs. Small and medium-sized enterprises (SMEs) and growing industrial initiatives such as industrialization drive more employment opportunities for recent graduates; however that only happens when they are supported by designed soft skills training in domains consisting of emotional intelligence, creativity, and entrepreneurship.

Regional industrial clusters including the Hawassa Industrial Park (HIP), Yirgalem Integrated Agro-Industrial Park (YIAIP), and the Hawassa Industrial Zone offer noteworthy prospects for generating employment and community engagement. These domains operate as hubs for applied research collaborations and employment development along with attracting foreign direct investment. Investing in interdisciplinary research facilities, developing strategic alliances with local industries, as well as developing incentive systems that foster the commercialization of academic research are all necessary for universities to have the greatest possible impact. Furthermore, utilizing low-cost innovation platforms and indigenous knowledge systems may strengthen community resilience and promote more inclusive development pathways.

6.1.4. Structural Barriers and Institutional Determinants of Innovation in Ethiopia

Ethiopia lacks an innovation-enabling ecosystem, even though it is crucial for economic growth and competitiveness. The nation's innovation performance is among the lowest in the world upon account of structural issues including insufficient R&D investment, poorly implemented policies, inadequate infrastructure, and limited employment opportunities. Also, Business enterprises are limited by excessive technological costs, minimal support from the government, and inadequate access to technology knowledge.

Firm size, age, internal leadership, employee engagement, and interdepartmental collaboration are some organizational traits that have a big impact on innovativeness. While theoretically encouraging innovation, competitive pressure is frequently inhibited by the absence of efficient knowledge networks and dynamic market systems. Furthermore, the location of a company is crucial; companies in urban or industrial locations typically enjoy increased access to resources, infrastructure, and talented workers, while those in more rural areas tend to be cut off from innovation ecosystems.

Ethiopian innovation system outcomes are further weakened by the fragmentation among universities, businesses, and government agencies. Research universities and business enterprises, particularly the manufacturing sectors continue to have fragile linkages, even with the implementation of various STI programs. Opportunities for knowledge transfer and applied research are undermined by the continued lack of depth and breadth of university-industry collaboration. These systemic obstacles still stand in the way of the growth of a strong regional and national innovation system.

6.1.5. Knowledge Flows, Collaborative Innovation, and Regional Competitiveness

In emerging economies, innovation is driven by the capability to explore, produce, and use knowledge in ways that meet the demands of regional markets and available resources. Evidence from industrial clusters in the Sidama region demonstrates that enterprises that undertake research, establish linkages with Hawassa University, and cultivate internal innovation sources have considerably higher levels of product, process, and marketing innovation. These businesses can harness scientific knowledge, create new value propositions, and adapt to changes in market dynamics more effortlessly.

Regional innovation and competitiveness have been proven to be significantly facilitated by university-industry collaboration. These collaborations encourage the commercialization of academic information by providing businesses with access to cutting-edge technology, lab space, and research skills. A sustainable innovation culture is fostered and the scientific infrastructure is reinforced through collaboration. For example, Hawassa University and other institutions have promoted innovative skills in the Sidama industrial clusters.

The study further identified that firm location, R&D engagement, and collaboration with universities are significant indicators of innovation performance, particularly in marketing and process innovation. Internal elements like motivational systems and management techniques have an impact on organizational innovation. Ethiopia possesses to get involved in institutional capacity-building, develop localized knowledge networks, and create integrated policies that connect educational institutions with industry demands to realize this potential. These initiatives would create the groundwork for a regional innovation environment that is inclusive and competitive.

6.2. Concluding Remark

The knowledge-based economy has emerged as a dominant paradigm in shaping national, regional, and local development patterns. It underpins economic growth, societal development, and sustainability, with the generation, diffusion, and application of knowledge, particularly through science, technology, and innovation (STI), serving as the primary drivers of innovativeness and competitiveness. The innovation system has evolved significantly, with the traditional Triple Helix model being critiqued for its limitations in facilitating adequate expertise transfer throughout the innovation process. The Quadruple Helix (QH) model was expanded to incorporate civil society as a fourth helix, recognizing the multidirectional, networked linkages seen in innovation systems.

The Regional Innovation System (RIS) is a notion that intends to bring regional innovation players together in a collaborative ecosystem to promote collective learning and competitiveness. In this regard, Ethiopia counts among those countries with the lowest rankings globally, despite the long-standing establishment of innovation actors and policy and legal frameworks. For instance, Ethiopia ranks 125th overall in the Global Innovation Index, facing multiple institutional framework issues, especially in its business and regulatory environments. To strengthen its entrepreneurial capabilities and national competitiveness, Ethiopia needs to transform its institutions, invest in education and research, upgrade infrastructure, and support private sector investment.

The National Science, Technology, and Innovation (STI) Policy, the Home-Grown Economic Reform (HGER), and the National Science, Technology, and Mathematics Education Policy are only a few examples of the extensive set of legal and policy frameworks that support Ethiopia's innovation system and STI landscape. However, insufficient funding for research and development, fractured institutional capacity, poor intellectual property management, a lack of collaboration, insufficient competences among key actors, and a lack of pathways for integrating research outputs with market needs all impede Ethiopia's ability to successfully establish a national innovation system alongside building an innovation-driven knowledge-based economy. Most significantly, promoting regional innovation and competitiveness is an issue for Ethiopia's higher education system. The absence of formalized intellectual property rules at universities and R&D institutions continues to be a major obstacle, despite the nation's 70:30 policies and intellectual property office favouring science and technology over the humanities.

Notably, graduate employability is a major social issue in higher education systems worldwide, and Ethiopia is no exception. Universities must produce graduates who are adaptive and have soft skills that meet labour market demands. To achieve sustainable employment, Ethiopia's expanding social entrepreneurship ecosystem is essential. However, there are still structural barriers that prevent universities from realizing their full potential, such as inadequate funding, poor infrastructure for knowledge transfer, and lack of alignment between academic and industry sectors.

Regional industrial clusters like Hawassa Industrial Park (HIP), Yirgalem Integrated Agro-Industrial Park (YIAIP), and the Hawassa Industrial Zone offer opportunities for generating employment and community engagement. Investing in interdisciplinary research facilities, developing strategic alliances with local industries, and developing incentive systems that foster the commercialization of academic research is necessary for universities to have the greatest possible impact. Innovation plays an essential role in economic growth and competitiveness, but Ethiopia's innovation performance is among the lowest in the world due to structural issues such as insufficient R&D investment, poorly implemented policies, inadequate infrastructure, and labour shortages. Firm size, age, internal leadership, employee engagement, and interdepartmental collaboration are some organizational traits that impact innovativeness.

Regional innovation and competitiveness can be significantly facilitated by university-industry collaboration, which provides businesses with access to cutting-edge technology, lab space, and research skills. Ethiopia must engage in institutional capacity-

building, develop localized knowledge networks, and create integrated policies to realize this potential and create a more inclusive and competitive regional innovation environment. Ethiopia's regional innovation system offers fascinating prospects to enhance regional competitiveness while simultaneously posing substantial hurdles.

Notwithstanding extensive government policy and legal framework, Ethiopia's innovation ecosystem is limited by a lack of funding for research and development, institutional weakness, insufficient ties between academia and business, and poor infrastructure. Unlocking the full potential of Ethiopia's regional innovation clusters requires removing these obstacles and encouraging closer collaboration among key regional stakeholders. Ethiopia's regional innovation system may be strengthened by investing in education, research, and localized knowledge networks, therefore contributing to long-term economic growth and competitiveness in the global knowledge economy.

6.3. The contribution of the study

6.3.1. Contribution to Policy

This study offers key policy insights by systematically examining how Ethiopia's institutional, legal, and strategic frameworks intersect while considering how this affects regional innovation and competitiveness as a whole. With policies like the Home-Grown Economic Reform (HGER), the National Science, Technology, and Innovation (STI) Policy, and the Higher Education Proclamation, Ethiopia established the foundations for science, technology, and innovation, nevertheless, the research indicates that there continues to be little synergy across these frameworks. The results highlight the desire for a more comprehensive approach that fosters meaningful partnerships among innovation players, including government, business, academia, and civil society while guaranteeing that policy instruments are not only consistent with one another as well as reinforce one another. This alignment is essential for fostering the ecosystem that supports regional competitiveness driven by innovation.

Additionally, the study pinpoints specific legislative and institutional flaws including the absence of policy coherence and integration, fragile systemic coordination and governance, insufficient legal frameworks for technology transfer and intellectual property, insufficient funding and resource allocation mechanisms, restricted engagement from the private sector and incentives, fragmented innovation support infrastructure that inhibit the smooth functioning of the regional innovation system. In this regard, there is a lack of

practical guidance as well as clarity over the right procedures for universities, businesses, and government agencies to collaborate at the regional level, especially in terms of intellectual property rights and research transfer governing systems. The study calls for policies that actively support entrepreneurship, technological commercialization, and knowledge transfer instead of just enforcing regulations. Along with this, Ethiopia may strengthen its position in achieving its development targets including those outlined in the Sustainable Development Goals (SDGs) and the African Union's Agenda 2063, while also addressing its poor rank on global innovation and competitiveness indexes.

Furthermore, this study provides policymakers with concrete recommendations. Leveraging Ethiopia's distinct advantages—such as its natural resources and advantageous geographic location—it fosters the emergence of targeted regional innovation initiatives. Public-private collaborations, research infrastructure investment, and capacity-building initiatives are also emphasized in the report as critical components of enhancing institutional efficiency. The study intends to provide guidance for the development and use of more successful innovation policies that can promote sustainable economic growth, reduce regional inequalities, and support Ethiopia's transition to a lower-middle-income country using such policy recommendations.

Finally, the research study strongly proposes establishing and carrying out an integrated National Innovation System (NIS) policy that effectively fosters the emergence of RIS across the country. Along with outlining a national innovation vision, such policies should establish the institutional connections, incentives, and regulatory clarity called for to enable regional actors—including civil society organizations, private businesses, universities, and local governments—to actively and collectively engage in the innovation ecosystem. The policy would facilitate more specific and context-sensitive initiatives in innovation that highlight the local strengths and developmental objectives through the establishment of local pathways for coordination, funding allocation, and exchange of knowledge. The NIS policy additionally needs to fill in the gaps in practical collaboration guidelines, especially regarding the domains of intellectual property management, research commercialization, and entrepreneurial support, while ensuring alignment with current frameworks. This integrated policy approach must be adopted to enhance regional competitiveness, facilitate inclusive, bottom-up innovation processes, and substantially contribute to Ethiopia's broader goals for growth, including Agenda 2063 and the SDGs.

6.3.2. Empirical Contribution

Empirically, this study provides a significant development by providing an in-depth investigation of the structure and dynamics of Ethiopia's flourishing regional innovation systems. Key actors, including universities, research institutes, business, government, and civil society, are thoroughly mapped in the study, which highlights the advantages as well as disadvantages of present collaboration processes. The study puts the development of regional innovation within broader development trajectories by referring to Ethiopia's experience with national planning, including the First and Second Five-Year Development Plans, the Ten-Year Perspective Plan, and the more recent Growth and Transformation Plans (GTPs).

According to the study's empirical results, Ethiopia's innovation system is still disjointed even with the existence of legislative and policy frameworks. There are significant barriers, which include inadequate R&D investment, poor industry-university ties, inadequate infrastructure, and inconsistent policy implementation. Nonetheless, the study also points to developments notably the emergence of industrial parks and the emphasis on science and technology in higher education. The empirical results presented here offer a sophisticated knowledge of the elements that potentially support or impede Ethiopia's regional competitiveness and innovation.

Furthermore, the research provides useful empirical data for comparing Ethiopia's innovation performance to across-the-globe benchmarks. The study demonstrates Ethiopia's standing globally and pinpoints areas that require development, including market sophistication, business environment, and human capital, employing data from the World Economic Forum's Global Competitiveness Index and the Global Innovation Index. This empirical study not only addresses a gap in the literature on low-income nations' regional innovation systems but also lays the foundation for further comparative research in adjacent fields.

In general, this study delves deeply into the country's regional innovation systems, highlighting the positions and interactions that involve significant players including universities, research institutes, industry, government, and civil society. The national innovation system is still fragmented and performs poorly in spite of the Higher Education Proclamation and the National STI Policy. Inadequate R&D investment, weak industry-university linkages, misaligned policies, inadequate infrastructure, and limited institutional capacity are some of the main barriers. Nonetheless, the study draws attention to new opportunities, such as the development of industrial parks and the growing emphasis on

science and technology in higher education. Along with examining the legal and policy frameworks that promote or hinder regional innovation, the study also identifies operational and regulatory gaps that impede innovation actors' collective learning.

6.3.3. Methodological Contribution

Methodologically, using a comprehensive, multi-actor approach, this study strengthens the understanding of regional innovation systems in emerging economies. To accurately reflect the complexity of Ethiopia's innovation landscape, the study integrates qualitative and quantitative data, referencing national development goals, international indexes, and documents on policy. This mixed-methods approach makes it practicable to fully understand the collaborations between multiple stakeholders and how their integrated activities determine regional competitiveness more comprehensively.

The Triple Helix and Quadruple Helix frameworks are two well-known theoretical models that have been tailored for the Ethiopian context in this study. The study underlines the value of adapting global models to local contexts by taking into account the different functions of government, education, business, and civil society. This methodological innovation becomes particularly relevant in cases where the institutional frameworks continue to evolve and knowledge access could be limited. Considering further research on regional innovation systems in other emerging economies, the actor-centred analysis of the study offers a repeatable paradigm.

The study additionally points out how crucial it is to triangulate data from multiple sources with the intent to ensure the reliability of results. The research establishes a methodological framework for examining complex systems in resource-constrained environments by meticulously examining the interactions among policy, institutional capacity, and innovation results. This approach not only enhances the research's credibility but also provides useful advice for academics and professionals looking to assess and improve regional innovation systems in comparable settings.

6.3.4. Theoretical Contribution

Theoretically, this study contributes to the existing body of knowledge on innovation systems by placing the RIS framework in the context of a swiftly emerging, low-income nation. The study illustrates how regional, national, and international factors determine innovation, competitiveness, and sustainable development.

The research extends to the implementation of popular frameworks including the Triple and Quadruple Helix, demonstrating both their applicability and limits in the Ethiopian context through applying the RIS concepts to Ethiopia's distinctive possibilities and challenges as well.

Triple Helix and Quadruple Helix models serve as fundamental instruments for understanding innovation processes in resource-constrained contexts such as Ethiopia. The models' implementation in Ethiopia, nonetheless, points out serious flaws including the dominance of government as a key player in the ecosystem, an absence of synergy between business and higher education, and inadequate private sector representation level. Although the Quadruple Helix model was created to take civil society into account, it has theoretical flaws and may overlook more significant progress in society. Future research and policy interventions shall concentrate on fostering diversity and inclusion within innovation systems, synchronizing collaborations across university settings, business, government, and civil society to increase their relevance and effectiveness. This study contributes to a theoretical framework that is more contextually relevant for understanding and promoting innovation in emerging economies.

Additionally, the study deepens our theoretical knowledge of how innovation systems could drive positive social change while promoting economic growth in emerging economies. It underlines how important interaction and cooperative learning among regional actors are to promoting sustainable innovation. The research provides a more comprehensive view of the purpose of innovation in regional and national development through integrating the RIS model within Ethiopia's broader development desired outcomes, which include the SDGs and Agenda 2063.

Finally, the study identifies the circumstances under which regional innovation systems may operate most successfully, consequently establishing the foundation to conduct further philosophical inquiry. It implies that the effectiveness of RIS is dependent on the quality of collaboration among players, the alignment of innovation strategies with local development prerequisites, and the availability of enabling policies and institutions. This theoretical understanding is helpful to academics and decision-makers alike because it guides the creation of innovation systems that are sensitive to the particular possibilities and problems faced by developing economies.

6.4. Recommendations of the Study

For policymakers, universities, entrepreneurs, and other stakeholders, a number of practical recommendations are put forth in light of the study of Ethiopia's emerging RIS and its contribution to regional competitiveness. The first is that Ethiopia has to take steps to make sure that its existing legislative and policy frameworks— such as the Higher Education Proclamation, the National Science, Technology, and Innovation (STI) Policy, and the Home-Grown Economic Reform (HGER)—have stronger operational consistency and harmony. These frameworks should seamlessly integrate as a means to promote a smooth partnership among government, business, academia, and civil society. This would increase the efficiency of regional research, innovation, and technology transfer efforts.

Second, focused investment in research and development (R&D) infrastructure is necessary. Ethiopia's poor position on global innovation indices might be partly ascribed to inadequate infrastructure, limited university-industry linkages, and the absence of R&D funding. Building and renovating research labs, technological hubs, and innovation centres at universities and industrial parks must be among the highest priorities for policymakers. To promote entrepreneurship and the commercialization of research results, incentives for private sector involvement in innovation should also be created, including tax breaks, grants, and public-private partnership models.

Third, initiatives for improving the capability of key players in the innovation ecosystem need to be reinforced. Faculty at universities, entrepreneurs, and government representatives are all likely to benefit from training sessions on technology transfer, joint research, and intellectual property management. Notably, universities should also officially establish policies that support multidisciplinary research and promote collaboration with regional communities and businesses. They may improve the employability of young professionals and produce graduates with appropriate competencies while doing this. Lastly, to ensure that policies continue to be flexible and responsive to new possibilities and problems, the government should set up monitoring and evaluation procedures to keep tabs on the development of regional innovation initiatives.

6.5. Future research direction

Although the contribution of RIS to Ethiopia's regional competitiveness has been thoroughly examined in this study, there nevertheless remains an extensive number of regions that could potentially be explored further. In-depth case studies which concentrate on the distinct possibilities and challenges that each component of Ethiopia encounters are primarily essential. These studies might examine how local contexts—such as industry clusters, the availability of resources, and sociocultural elements—affect RIS performance and the pathways to regional competitiveness.

Furthermore, it is imperative that future studies examine how certain government policies and efforts to innovate affect measurable consequences like knowledge transfer, productivity, and employment. Studies that follow the development of RIS over time could provide important information on the adaptability and sustainability of development strategies driven by innovation. The success or failure of regional innovation systems could be affected as well by contextual variables and best practices, which might be found through comparative studies with other growing economies in Africa and beyond.

Subsequently, it makes sense to figure out how Ethiopia's innovation landscape continues to be affected by digital transformation and new technologies. The use of e-governance, smart specialization approaches, and digital infrastructure developments to spur innovation and regional development might be an area of future research. Additional research on the trust, incentive, and legal framework challenges to successful university-industry-government-civil society collaboration will also improve our knowledge of RIS dynamics in Ethiopia.

The given study is based on the quadruple helix model, which highlights the interactions among government, academia, industry, and civil society, research on development and innovation is conducted. Future studies, however, need to use the quintuple helix model that includes the environmental factor as a fifth pillar of the innovation ecosystem. Sustainability is particularly significant in Ethiopia, where resource limitation, climate change, and environmental degradation have made sustainable development the most pressing issue. Researchers may examine how ecological concerns shape innovation processes, regional policy targets, and the sustainability of innovation-driven development by taking into account the natural environment as a contextual component and active stakeholder. This approach additionally makes way for a broader comprehension of how

innovation can promote economic competitiveness, social inclusion, and environmental future researchers‘ sustainability.

The gender and inclusion components of the RIS promote innovation. The systematic integration of RIS frameworks is necessary for ensuring gender equity by eliminating barriers that limit women as well as other marginalized groups from getting involved with significant industries including research, science, technology, and entrepreneurship. Gender equity-promoting policies and behaviors ought to be recognized. The RIS could also be made more inclusive, benefiting historically disadvantaged regions like rural and remote areas. Ethical regional development is possibly accomplished by including these areas in the larger innovation ecosystem through focused policies, capacity building, and context-sensitive support systems. Future studies that concentrate on gender and inclusion can help create an innovation framework in Ethiopia that is more socially legitimate and geographically coherent.

REFERENCE

Abebe, G., McMillan, M. S., & Serafinelli, M. (2018). *Foreign direct investment and knowledge diffusion in poor locations* (No. w24461). National Bureau of Economic Research.

Abibo, A., Muchie, M., Sime, Z., & Ezezew, W. (2023). Factors affecting the innovation ecosystem in public universities in Ethiopia. *African Journal of Science, Technology, Innovation and Development*, *15*(1), 135-150.https://hdl.handle.net/10520/ejc-aa_ajstid_v15_n1_a135

Abrar-ul-haq, M. (2025). Board Structure and Executive Compensation for R&D Spending in Innovative Companies Amid COVID-19. *Journal of Risk and Financial Management*, *18*(2), 69. https://doi.org/10.3390/jrfm18020069

Adenle, A. A., De Steur, H., Mwongera, C., Rola-Rubzen, F., de Barcellos, M. D., Vivanco, D. F., ... & Scholes, B. (2023). Global UN 2030 agenda: how can science, technology and innovation accelerate the achievement of sustainable development goals for all?. *PLOS Sustainability and Transformation*, *2*(10), e0000085. https://doi.org/10.1371/journal.pstr.0000085

Agezew, B. H. (2024). The effect of research and development on economic growth in Ethiopia: The untapped potential for prosperity. *Education Research International*, *2024*(1), 5562940. https://doi.org/10.1155/2024/5562940

Agu, A. G., Kalu, O. O., Esi-Ubani, C. O., & Agu, P. C. (2021). Drivers of sustainable entrepreneurial intentions among university students: an integrated model from a developing world context. *International Journal of Sustainability in Higher Education*, *22*(3), 659-680. https://doi.org/10.1108/IJSHE-07-2020-0277

Agu, A., & Ndinda, C. (2021). Strengthening gender and inclusivity in the national system of Science, Technology, and Innovation (STI): literature review: Ethiopia. http://hdl.handle.net/20.500.11910/19381

Aiello, F., Errico, L., & Rondinella, S. (2024). Innovative SMEs in Italy. Explaining profitability patterns in inner areas. *Journal of Economic Studies*, *51*(9), 306-322.https://doi.org/10.1108/JES-02-2024-0094

Aithal, P. S., & Maiya, A. K. (2023). Innovations in higher education industry–Shaping the future. *International Journal of Case Studies in Business, IT, and Education (IJCSBE), 7*(4), 283-311. https://ssrn.com/abstract=4674658

Ajayi, K. F., & Ross, P. H. (2020). The effects of education on financial outcomes: Evidence from Kenya. Economic Development and Cultural Change, 69(1), 253-289. https://doi.org/10.1086/702996

Albarico, G., & Galigao, R. P. (2024). Exploring education and labor market outcomes: insights from diverse global contexts. Albarico, G., & Galigao, R. P. (2024). Exploring... - Google Scholar

Alborno, N., & Kalaji, G. (2024). Social entrepreneurship – inclusive disability employment in the UAE. *International Journal of Developmental Disabilities*, *70*(6), 1044–1055. https://doi.org/10.1080/20473869.2024.2378241

Alcover, C. M., Mazzetti, G., & Vignoli, M. (2021). Sustainable employability in the mid and late career: an integrative review. https://doi.org/10.5093/jwop2021a16

Alemu, G. T. 2018. ―Towards a dynamic job creation framework in Ethiopia.‖ Addis Standard. https://addisstandard.com/economic-analysis-towards-a-dynamic-job-creation-framework-for-ethiopia/(open in a new window).

Al- Hakim, L., & Hassan, S. (2013). Knowledge management strategies, innovation, and organisational performance: An empirical study of the Iraqi MTS. *Journal of Advances in Management Research*, *10*(1), 58-71. https://doi.org/10.1108/09727981311327767

Ali, M. A., Kamraju, M., & Sonaji, D. B. (2024). Economic policies for sustainable development: Balancing growth, social equity, and environmental protection. *ASEAN Journal of Economic and Economic Education*, *3*(1), 23-28.

Aliu, J., & Aigbavboa, C. O. (2021). Structural determinants of graduate employability: impact of university and industry collaborations. *Journal of Engineering, Design and Technology*, *19*(5), 1080-1100. https://doi.org/10.1108/JEDT-05-2020-0189

Al-Tekreeti, T., Al Khasawneh, M., & Dandis, A. O. (2024). Factors affecting entrepreneurial intentions among students in higher education institutions. *International Journal of Educational Management*, *38*(1), 115-135. https://doi.org/10.1108/IJEM-09-2023-0470

Ambos, T. C., Mäkelä, K., Birkinshaw, J., & d'Este, P. (2008). When does university research get commercialized? Creating ambidexterity in research institutions. *Journal of management Studies*, *45*(8), 1424-1447. https://doi.org/10.1111/j.1467-6486.2008.00804.x

Anand, J., McDermott, G., Mudambi, R., & Narula, R. (2021). Innovation in and from emerging economies: New insights and lessons for international business research. *Journal of International Business Studies*, *52*, 545-559. https://doi.org/10.1057/s41267-021-00426-1

Andabayeva, G., Movchun, V., Dubovik, M., Kurpebayeva, G., & Cai, X. (2024). Labor market dynamics in developing countries: analysis of employment transformation at the macro-level. *Journal of Innovation and Entrepreneurship*, *13*(1), 65.https://doi.org/10.1186/s13731-024-00417-0

Andrade, R., Pinheiro, P., Carvalho, L., & Rocha, R. (2022). Building a bridge: Knowledge sharing flows into entrepreneurial ecosystems. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(3), 144.https://doi.org/10.3390/joitmc8030144

Anjaningrum, W. D. (2025). Vosco group employee performance enhancement through proactivity and growth mindset-evidence from a perceived usefulness mediation model. *Jurnal apresiasi ekonomi*, *13*(1), 132-143.https://doi.org/10.32815/jibeka.v19i1.2013

Ankrah, S. and Omar, A.T. (2015), ―*Universities–industry collaboration: a systematic review*‖, Scandinavian Journal of Management, Vol. 31 No. 3, pp. 387-408. https://doi.org/10.1016/j.scaman.2015.02.003

Apa, R., De Marchi, V., Grandinetti, R., & Sedita, S. R. (2021). University-SME collaboration and innovation performance: the role of informal relationships and absorptive capacity. *The Journal of Technology Transfer*, *46*, 961-988. https://doi.org/10.1007/s10961-020-09802-9 .

Aparicio, J., Perelman, S., & Santín, D. (2022). Comparing the evolution of productivity and performance gaps in education systems through DEA: an application to Latin American countries. Operational Research, 1-35. https://doi.org/10.1007/s12351-020-00578-2

Arimoto, T. (2024). The transformation of science, technology and innovation (STI) policy in Japan. *Asia Pacific Business Review*, *30*(3), 485–498. https://doi.org/10.1080/13602381.2024.2320539

Arokiasamy, A. R. A., Tan, R. S. E., Deng, P., Krishnasamy, H. N., Liu, M., Wu, G., & Wider, W. (2024). A bibliometric deep-dive: uncovering key trends, emerging innovations, and future pathways in sustainable employability research from 2014 to 2024. *Discover Sustainability*, *5*(1), 450. https://doi.org/10.1007/s43621-024-00664-x

Asheim, B. T., Isaksen, A., & Trippl, M. (2020). The role of the Regional Innovation System approach in contemporary regional policy: is it still relevant in a globalised world?. In *Regions and innovation policies in Europe* (pp. 12-29). Edward Elgar Publishing.

Ashraf, R. U., Hou, F., Kirmani, S. A. A., Ilyas, M., Zaidi, S. A. H., & Ashraf, M. S. (2018). Student employability via university-industry linkages. *Human Systems Management*, *37*(2), 219-232. https://doi.org/10.3233/HSM-18269

Asimakopoulos, G., Revilla, A., & Rodríguez, A. (2023). International R&D sourcing, innovation and firm age: The advantage of ‗born-international sourcers'. *Technovation*, *122*, 102662.https://doi.org/10.1016/j.technovation.2022.102662

Assefa, B., M. Gebreyesus, and M. Weldeyes. 2017. *Alleviating the Barriers to Domestic Investment in Addis Ababa: Underlying Causes and Proposed Solutions*. Addis Ababa: Ethiopian Development Research Institute. Retrived from:

EDRI_WP022_Alleviating_the_Barriers_toDomestic_Investment_in_Addis_Ababa.pdf

Atkinson, R. D. (2013). Competitiveness, innovation and productivity. *The Information Technology & Innovation Foundation.–August*, 2-7.

Audretsch, D. B. (2014). From the entrepreneurial university to the university for the entrepreneurial society. *The Journal of Technology Transfer*, *39*, 313-321. https://doi.org/10.1007/s10961-012-9288-1

Avenyo, E. K., & Tregenna, F. (2025). _Learning to Export'and _Learning By Exporting': Revisiting the Relationship Between Innovation and Exports in African Firms. *African Development Review*, *37*(1), e70001. https://doi.org/10.1111/1467-8268.70001

Avermaete, T., Viaene, J., Morgan, E. J., Pitts, E., Crawford, N., & Mahon, D. (2004). Determinants of product and process innovation in small food manufacturing firms. *Trends in food science & technology*, *15*(10), 474-483. https://doi.org/10.1016/j.tifs.2004.04.005

Ayarkwa, J. Adinyira, E. and Osei- Asibey, D. (2012), ―*Industrial training of construction students: perceptions of training organizations in Ghana*‖, Education + Training. https://doi.org/10.1108/00400911211210323

Ayenew, Y. (2015). Assessment of the status of linkage between universities and industries in Ethiopia (A study on four selected universities). *Adigrat University*.

Ayenew, Y., & Teklay, A. (2017). University-industry linkage in Ethiopia, a study on two selected Universities. *Indo–Asian Journal of Multidisciplinary Research (IAJMR)*, *3*(1), 992-998.

Ayinaddis, S. G. (2022). Exploring firm-specific deterrents of innovation in micro and small enterprises in Ethiopia. *Journal of Innovation and Entrepreneurship*, *11*(1), 57.https://doi.org/10.1186/s13731-022-00256-x

Babalola, J. B.(2024) Indigenous Knowledge: A Driver of Innovation and Societal Transformation.

Baregheh, A., Rowley, J., & Hemsworth, D. (2016). The effect of organisational size and age on position and paradigm innovation. *Journal of Small Business and Enterprise Development*, *23*(3), 768-789.https://doi.org/10.1108/JSBED-06-2015-0065

Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management decision*, *47*(8), 1323-1339.https://doi.org/10.1108/00251740910984578

Barrichello, A., Santos, E. G. D., & Morano, R. S. (2020). Determinant and priority factors of innovation for the development of nations. *Innovation & Management Review*, *17*(3), 307-320.https://doi.org/10.1108/INMR-04-2019-0040

Basheer, M., Nechifor, V., Calzadilla, A., Ringler, C., Hulme, D., & Harou, J. J. (2022). Balancing national economic policy outcomes for sustainable development. *Nature Communications*, *13*(1), 5041. https://doi.org/10.1038/s41467-022-32415-9

Bate, A. F., Wachira, E. W., & Danka, S. (2023). The determinants of innovation performance: an income-based cross-country comparative analysis using the Global Innovation Index (GII). *Journal of innovation and entrepreneurship*, *12*(1), 20.https://doi.org/10.1186/s13731-023-00283-2

Behle, H. (2020). Students‘ and graduates‘ employability. A framework to classify and measure employability gain. *Policy reviews in higher education*, *4*(1), 105-130. https://doi.org/10.1080/23322969.2020.1712662

Belete, Y. (2024). The Link Between Students‘ Community Engagement Activities and Their Academic Achievement. *Educatione*, *3*(1), 61-84. https://doi.org/10.58650/educatione.1358541

Bennett, R., L. Eagle, W. Mousley, and R. Ali-Choudhury. 2008. ―Reassessing the Value of Work-experience Placements in the Context of Widening Participation in Higher Education.‖ *Journal of Vocational Education & Training* 60 (2): 105–122. doi:10.1080/13636820802042339. https://doi.org/10.1080/13636820802042339

Benneworth, P., & Hospers, G. J. (2007). Urban competitiveness in the knowledge economy: Universities as new planning animateurs. *Progress in planning*, *67*(2), 105-197. https://doi.org/10.1016/j.progress.2007.02.003

Berggren, E. (2017), "Researchers as enablers of commercialization at an entrepreneurial university", *Journal of Management Development*, Vol. 36 No. 2, pp. 217-232. https://doi.org/10.1108/JMD-06-2016-0117

Beyene, B. M., and T. G. Tekleselassie. 2018. *The State, Determinants and Consequences of Skills Mismatch in the Ethiopian Labour Market, Ethiopian Development Research Institute, EDRI Working Paper 21*. Addis Ababa: EDRI. Retrived from: The State, Determinants, and Consequences of Skills Mismatch in the Ethiopian Labour Market

Bezeng, B. S., Ameka, G., Angui, C. M. V., Atuah, L., Azihou, F., Bouchenak-Khelladi, Y., ... & Savolainen, V. (2025). An African perspective to biodiversity conservation in the twenty-first century. *Philosophical Transactions B*, *380*(1917), 20230443. https://doi.org/10.1098/rstb.2023.0443

Bishaw, A., & Melesse, S. (2017). Historical analysis of the challenges and opportunities of higher education in Ethiopia. *Higher Education for the Future*, *4*(1), 31-43. https://doi.org/10.1177/2347631116681212

Bisht, N., & Pattanaik, F. (2020). Youth labour market in India: education, employment, and sustainable development goals. In International perspectives on the youth labor market: Emerging research and opportunities (pp. 172-196). IGI Global. DOI:10.4018/978-1-7998-2779-5.ch009

Blagoycheva, H. (2019). Social Enterprises' Position in Regional Sustainable Development. *Trakia Journal of Sciences*, *17*(1), 488-495.

Boffo, S., & Cocorullo, A. (2019). University Fourth Mission, Spin-Offs and Academic Entrepreneurship: Connecting Public Policies with New Missions and Management Issues of Universities. In *Higher Education Forum* (Vol. 16, pp. 125-142). Research Institute for Higher Education, Hiroshima University. 1-2-2 Kagamiyama, Higashi-hiroshima, Hiroshima City, Japan 739-8512.

Bolívar-Ramos, M. T. (2017). The relation between R&D spending and patents: The moderating effect of collaboration networks. *Journal of Engineering and Technology Management*, *46*, 26-38.https://doi.org/10.1016/j.jengtecman.2017.11.001

Borah, D., Massini, S., & Malik, K. (2023). Teaching benefits of multi-helix university-industry research collaborations: Towards a holistic framework. *Research Policy*, *52*(8), 104843. https://doi.org/10.1016/j.respol.2023.104843

Bovy, P., Coletti, M., & Vernay, A.-L. (2023). Quadruple Helix Stakeholders and Social Innovation in the Energy Transition. *Symphonya. Emerging Issues in Management*, (2), 30–55. https://doi.org/10.4468/2023.2.04bovy.coletti.vernay

Bozeman, B. and Gaughan, M. (2007), ―*Impacts of grants and contracts on academic researchers' interactions with industry*‖, Research Policy, Vol. 36 No. 5, pp. 694-707. https://doi.org/10.1016/j.respol.2007.01.007

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Breznitz, S. M. (2014). *The fountain of knowledge: The role of universities in economic development*. Stanford University Press.

Breznitz, S. M., Lawton Smith, H., & Bagchi-Sen, S. (2022). The contribution of students to regional economies: reframing the regional innovation systems approach. *Regional Studies*, *56*(6), 885-891. https://doi.org/10.1080/00343404.2022.2053097

Brown, P., Hesketh, A. and Wiliams, S. (2003), ―*Employability in a knowledge- driven economy*‖, Journal of Education and Work, Vol. 16 No. 2, pp. 107-126. https://doi.org/10.1080/1363908032000070648

Cadorin, E., Klofsten, M. & Löfsten, H. Science Parks, talent attraction and stakeholder involvement: an international study. *J Technol Transf* **46**, 1–28 (2021). https://doi.org/10.1007/s10961-019-09753-w

Calderini, M., Fia, M., & Gerli, F. (2023). Organizing for transformative innovation policies: The role of social enterprises. Theoretical insights and evidence from Italy. *Research Policy*, *52*(7), 104818. https://doi.org/10.1016/j.respol.2023.104818

Calderini, M., Fia, M., & Gerli, F. (2023). Organizing for transformative innovation policies: The role of social enterprises. Theoretical insights and evidence from Italy. *Research Policy*, *52*(7), 104818. https://doi.org/10.1016/j.respol.2023.104818

Carayannis, E. G., Sindakis, S., & Walter, C. (2015). Business model innovation as lever of organizational sustainability. *The Journal of Technology Transfer*, *40*, 85-104. https://doi.org/10.1007/s10961-013-9330-y

Carnoy, M., & Castells, M. (2001). Globalization, the knowledge society, and the Network State: Poulantzas at the millennium. *Global networks*, *1*(1), 1-18. https://doi.org/10.1111/1471-0374.00002

Castillo-Canales, D., Mejías, L., Roque-Gutierrez, E., Valentini, A., & Rüebcke, J. (2023). Ed-Tech landscape and challenges in Latin America and the Caribbean. Castillo-Canales, D., Mejías, L., Roque-Gutierrez,... - Google Scholar

Chaston, I., Badger, B., & Sadler- smith, E. (2001). Organizational Learning: An Empirical Assessment of Process in Small U.K. Manufacturing Firms. *Journal of Small Business Management*, *39*(2), 139–151. https://doi.org/10.1111/1540-627X.00013

Chauhan, A., Trikha, R., Singh, K. (2024). Reinvigorating Science, Technology, and Innovation in the Country by Factoring Components of the Innovation System. In: Singh, K., Chongtham, N., Trikha, R., Bhardwaj, M., Kaur, S. (eds) Science, Technology and Innovation Ecosystem: An Indian and Global Perspective. Springer, Singapore. https://doi.org/10.1007/978-981-97-2815-2_4

Chekol, F. (2024). Reviewing the macroeconomic relevance of education system in Ethiopia: the role of skill gap. *Cogent Education*, *11*(1). https://doi.org/10.1080/2331186X.2024.2365584

Chekol, F. (2024). Reviewing the macroeconomic relevance of education system in Ethiopia: The role of skill gap. *Cogent Education*, *11*(1), 2365584. https://doi.org/10.1080/2331186X.2024.2365584

Chen, C., & Esangbedo, M. O. (2018). Evaluating university reputation based on integral linear programming with grey possibility. *Mathematical Problems in Engineering*, *2018*(1), 5484326.https://doi.org/10.1155/2018/5484326

Chen, J., Yin, X., Fu, X., & McKern, B. (2021). Beyond catch-up: could China become the global innovation powerhouse? China‘s innovation progress and challenges from a

holistic innovation perspective. *Industrial and Corporate Change*, *30*(4), 1037-1064. https://doi.org/10.1093/icc/dtab032

Chryssou, C. E. (2020). University–industry interactions in the Sultanate of Oman: Challenges and opportunities. *Industry and Higher Education*, *34*(5), 342-357.https://doi.org/10.1177/0950422219896748

Civelek, M., Ključnikov, A., Fialova, V., Folvarčná, A., & Stoch, M. (2021). How innovativeness of family-owned SMEs differ depending on their characteristics?. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *16*(2), 413-428.

Clarke, M. (2018). Rethinking graduate employability: The role of capital, individual attributes and context. *Studies in higher education*, *43*(11), 1923-1937. https://doi.org/10.1080/03075079.2017.1294152

Coad, A., & Srhoj, S. (2023). Entrepreneurial ecosystems and regional persistence of high growth firms: A _broken clock'critique. *Research Policy*, *52*(6), 104762. https://doi.org/10.1016/j.respol.2023.104762

Coad, A., Segarra, A., & Teruel, M. (2013). Like milk or wine: Does firm performance improve with age?. *Structural Change and Economic Dynamics*, *24*, 173-189.https://doi.org/10.1016/j.strueco.2012.07.002

Cohen, M., Fernandes, G., & Godinho, P. (2024). Measuring the impacts of university-industry R&D collaborations: a systematic literature review. *The Journal of Technology Transfer*, 1-30.https://doi.org/10.1007/s10961-024-10114-5

Corsi, S., Feranita, F., Hughes, M., & Wilson, A. (2023). Universities as internationalization catalysts: Reversing roles in university–industry collaboration. *British Journal of Management*, *34*(4), 1992-2014. https://doi.org/10.1111/1467-8551.12676

Cosenz, F. (2022). University's ―Third Mission‖ Assessment Through Outcome-Based Dynamic Performance Management. In: Managing Sustainable Performance and Governance in Higher Education Institutions . System Dynamics for Performance Management & Governance, vol 5. Springer, Cham. https://doi.org/10.1007/978-3-030-99317-7_4

Cui, W., Li, L., & Chen, G. (2022). Market-value oriented or technology-value oriented?——location impacts of industry-university-research (IUR) cooperation bases on innovation performance. *Technology in Society*, *70*, 102025. https://doi.org/10.1016/j.techsoc.2022.102025

Dacre Pool, L., and P. Sewell. 2007. ―The Key to Employability: Developing a Practical Model of Graduate Employability.‖ *Education & Training* 49 (4): 277–289. https://doi.org/10.1108/00400910710754435

Dahal, N., Neupane, B. P., Pant, B. P., Dhakal, R. K., Giri, D. R., Ghimire, P. R., & Bhandari, L. P. (2024). Participant selection procedures in qualitative research: experiences and some points for consideration. *Frontiers in Research Metrics and Analytics*, *9*, 1512747. https://doi.org/10.3389/frma.2024.1512747

Daksa, M. D., Yismaw, M. A., Lemessa, S. D., & Hundie, S. K. (2018). Enterprise innovation in developing countries: an evidence from Ethiopia. *Journal of Innovation and Entrepreneurship*, *7*, 1-19.https://doi.org/10.1186/s13731-018-0085-4

Dalmarco, G., Hulsink, W., & Blois, G. V. (2018). Creating entrepreneurial universities in an emerging economy: Evidence from Brazil. *Technological forecasting and social change*, *135*, 99-111. https://doi.org/10.1016/j.techfore.2018.04.015

Damanpour, F., & Wischnevsky, J. D. (2006). Research on innovation in organizations: Distinguishing innovation-generating from innovation-adopting organizations. *Journal of engineering and technology management*, *23*(4), 269-291.https://doi.org/10.1016/j.jengtecman.2006.08.002

De Vos, A., De Hauw, S. and Van der Heijden, B. (2011), ―*Competency development and career success: the mediating role of employability*‖, Journal of Vocational Behaviour, Vol. 79 No. 2, pp. 438-447. https://doi.org/10.1016/j.jvb.2011.05.010

Degaga, A., & Senapathy, M. (2021). Challenges and opportunities of university and industry nexus in Ethiopia: A systematic review. *Shanlax International Journal of Management*, *9*(2), 97-111.http://https//doi.org/10.34293/management.v9i2.4357

Delgado-Verde, M., Díez-Vial, I. New product development and supplier involvement: the role of R&D collaboration with supporting organisations. *J Technol Transf* **49**, 518–541 (2024). https://doi.org/10.1007/s10961-023-09998-6

Demissie, M. M., Herut, A. H., Yimer, B. M., Bareke, M. L., Agezew, B. H., Dedho, N. H., & Lebeta, M. F. (2021). Graduates' unemployment and associated factors in Ethiopia: analysis of higher education graduates' perspectives. *Education Research International*, *2021*(1), 4638264. https://doi.org/10.1155/2021/4638264

Deng J, Liu J, Deng W, Yang T, Duan Z. redefinition and measurement dimensions of sustainable employability based on the swAge-model. Int J Environ Res Public Health. 2021;18(24):13230. https://doi.org/10.3390/ijerph182413230

Dessie, W. M., Mengistu, G. A., & Mulualem, T. A. (2022). Communication and innovation in the performance of weaving and pottery crafts in Gojjam, Ethiopia. *Journal of Innovation and Entrepreneurship*, *11*(1), 9.https://doi.org/10.1186/s13731-022-00204-9

DeWitt, J. and Storksdieck, M. (2008), ―*A short review of school field trips: Key findings from the past and implications for the future*‖, Visitor Studies, Vol. 11 No. 2, pp. 181-197. https://doi.org/10.1080/10645570802355562

Dias, A., Selan, B. How does university-industry collaboration relate to research resources and technical-scientific activities? An analysis at the laboratory level. *J Technol Transf* **48**, 392–415 (2023). https://doi.org/10.1007/s10961-022-09921-5

Dutta, S., Lanvin, B., & Wunsch-Vincent, S. (2019). The global innovation index 2017. *Cornell University, INSEAD, & WIPO (Eds.), Global innovation index*, 1-39.

Edeh, J., Nuhu, N., Tajeddin, M., & Simba, A. (2024). Dealing with adversity: innovation among small and medium-sized enterprises in developing economies. *International Journal of Entrepreneurial Behavior & Research*, *30*(10), 2578-2600. https://doi.org/10.1108/IJEBR-02-2023-0183

Egbetokun, O. A., Shittu, B. A., & Ayoade, M. O. (2017). Determinants of market participation among maize farmers in Ogbomoso zone, Oyo State, Nigeria. https://repository.iuls.ro/xmlui/handle/20.500.12811/898

Etzkowitz, H., & Klofsten, M. (2005). The innovating region: toward a theory of knowledge- based regional development. *R&D Management*, *35*(3), 243-255. https://doi.org/10.1111/j.1467-9310.2005.00387.x

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and ―Mode 2‖ to a Triple Helix of university–industry–government relations. *Research policy*, *29*(2), 109-123. https://doi.org/10.1016/S0048-7333(99)00055-4

Fan, F., Lian, H., & Wang, S. (2020). Can regional collaborative innovation improve innovation efficiency? An empirical study of Chinese cities. *Growth and Change*, *51*(1), 440-463. https://doi.org/10.1111/grow.12346

Fenta, H. M., Asnakew, Z. S., Debele, P. K., Nigatu, S. T., & Muhaba, A. M. (2019). Analysis of supply side factors influencing employability of new graduates: A tracer study of Bahir Dar University graduates. *Journal of Teaching and Learning for Graduate Employability*, *10*(2), 67-85. https://ojs.deakin.edu.au/index.php/jtlge/

Ferreira, J. J., Ratten, V., & Dana, L. P. (2017). Knowledge spillover-based strategic entrepreneurship. *International Entrepreneurship and Management Journal*, *13*, 161-167. https://doi.org/10.1007/s11365-016-0415-6

Figueiredo, N. L., & Ferreira, J. J. (2022). More than meets the partner: a systematic review and agenda for University–Industry cooperation. *Management Review Quarterly*, *72*(1), 231-273. https://doi.org/10.1007/s11301-020-00209-2

Finch, David J., et al. "An exploratory study of factors affecting undergraduate employability." *Education+ training* 55.7 (2013): 681-704. https://doi.org/10.1108/ET-07-2012-0077

Fithri, E., & Januarty, T. A. (2024). The Infuence of Leverage and Sales Growth on Financial Distress. *JASa (Jurnal Akuntansi, Audit dan Sistem Informasi Akuntansi)*, *8*(3), 737-747. https://doi.org/10.36555/jasa.v8i3.2712

Fleuren B, de Grip A, Jansen NW, Kant I, Zijlstra FR. Critical reflections on the currently leading definition of sustainable employability. Scand J Work Environ Health. 2016;42(6):557–60. Fleuren B, de Grip A, Jansen NW, Kant I, Zijlstra... - Google Scholar

Freitas, I. M. B., Marques, R. A., & e Silva, E. M. D. P. (2013). University–industry collaboration and innovation in emergent and mature industries in new industrialized

countries. *Research Policy*, *42*(2), 443-453. https://doi.org/10.1016/j.respol.2012.06.006

Fussy, D. S. (2017). Policy directions for promoting university research in Tanzania. *Studies in Higher Education*, *43*(9), 1573–1585. https://doi.org/10.1080/03075079.2016.1266611

Gabrhelová, G., Lajčin, D., Barnová, S., & Krásna, S. (2020). Dual System of Education and Training as a Pathway to the Labour Market. Retrived from: Gabrhelová, G., Lajčin, D., Barnová, S., & Krásna,... - Google Scholar

Gachie, W., & Govender, D. W. (2017). Commercialization of higher education institutions' research within the National System of Innovation. *African Journal of Science, Technology, Innovation and Development*, *9*(4), 387-397. https://hdl.handle.net/10520/EJC-8fa9f00f6

Galan-Muros, V., & Davey, T. (2019). The UBC ecosystem: putting together a comprehensive framework for university-business cooperation. *The Journal of Technology Transfer*, *44*, 1311-1346.https://doi.org/10.1007/s10961-017-9562-3

Galán- Muros, V., & Plewa, C. (2016). What drives and inhibits university- business cooperation in E urope? A comprehensive assessement. *R&d Management*, *46*(2), 369-382.https://doi.org/10.1111/radm.12180

Gallage, N., & Laferriere, R. (2023). Book review: Heritage Entrepreneurship Cultural and Creative Pursuits in Business Management Vanessa Ratten. *International Small Business Journal*, *41*(7), 796-798. https://doi.org/10.1177/02662426231185687

Galvao, A., Mascarenhas, C., Marques, C., Ferreira, J., & Ratten, V. (2019). Triple helix and its evolution: a systematic literature review. *Journal of Science and Technology Policy Management*, *10*(3), 812-833.https://doi.org/10.1108/JSTPM-10-2018-0103

Gashahun, A. D. (2020). University–industry linkage practice in Ethiopia: A study on Debre Markos Institute of Technology, Debre Markos University. *International Journal of Scientific and Engineering Research*, *11*, 1913-1920.

Gebreab, F. T., & Tekle, K. C. (2024). Assessment of the Status and Challenges of The Linkage Between Universities and Industries in Ethiopia: The Case of Two Universities and Six Industries. *Asian Journal of Engineering, Social and Health*, *3*(1), 198-212. https://doi.org/10.46799/ajesh.v3i1.171

Gebrechristos, N. (2025). Manufacturing Firms, Retention, and Workforce Development. In *Industrialisation and Workforce Development in Africa: Policy Dynamics, Firms, and Industrial Ecosystems* (pp. 81-127). Cham: Springer Nature Switzerland.https://doi.org/10.1007/978-3-031-76055-6_3

Gebreeyesus, M. (2011). Innovation and microenterprises growth in Ethiopia. *Entrepreneurship, innovation, and economic development*, *31*, 1-30. http://www.merit.unu.edu/

Gedye, S., & Beaumont, E. (2018). ―The ability to get a job‖: student understandings and definitions of employability. *Education+ Training*, *60*(5), 406-420. https://doi.org/10.1108/ET-10-2017-0159

Gelata, F. T., Gemada, S. C., & Jiqin, H. (2022). Review on the E-commerce business models in Ethiopia. *European Journal of Applied Sciences*, *10*(5).DOI:10.14738/aivp.105.12882

Ghazinoory, S., Khazdoozi, L., & Afshari-Mofrad, M. (2024). Demand-oriented Science and Technology Parks: a New Tool for Innovation Policy. *Triple Helix*, *10*(3), 359-395. https://doi.org/10.1163/21971927-bja10045

Gines, A. C. (2014). Tracer study of PNU graduates. *American International Journal of Contemporary Research*, *4*(3), 81-98. Retrived from: Gines, A. C. (2014). Tracer study of PNU graduates.... - Google Scholar

Gobena, A. E., & Kant, S. (2022). Assessing the effect of endogenous culture, local resources, eco-friendly environment and modern strategy development on entrepreneurial development. *Journal of Entrepreneurship, Management, and Innovation*, *4*(1), 118-135.

Gobena, S. T., Gopal, M., & Abeya, T. G. (2021). Status of technology transfer and innovation in Ethiopia. *Educational Research (IJMCER)*, *3*(4), 122-130.

Gonfa, D. K., Gibbons, P., Sugrue, C., & Kuma, B. (2024). Internationalisation of Higher Education in Ethiopia: A Strategic Process?. *Journal of Studies in International Education*, 10283153241235696. https://doi.org/10.1177/10283153241235696

Graham, L., Williams, L., & Chisoro, C. (2019). Barriers to the labour market for unemployed graduates in South Africa. Journal of Education and Work, 32(4), 360-376. https://doi.org/10.1080/13639080.2019.1620924

Griffin, M. and Coelhoso, P. (2019), ―*Business students' perspectives on employability skills post internship experience: lessons from the UAE*‖, Higher Education, Skills and Work-based Learning, Vol. 9 No. 1, pp. 60-75. https://doi.org/10.1108/HESWBL-12-2017-0102

Grossman, A.M. and Johnson, L.R. (2015), ―*Employer perceptions of online accounting degrees*‖, Issues in Accounting Education, Vol. 31 No. 1, pp. 91-109. https://doi.org/10.2308/iace-51229

Guerrero, M., Urbano, D. (2012). The development of an entrepreneurial university. *J Technol Transf.* **37**, 43–74 https://doi.org/10.1007/s10961-010-9171-x

Guerrero, M., Urbano, D., Fayolle, A. *et al.* Entrepreneurial universities: emerging models in the new social and economic landscape. *Small Bus Econ* **47**, 551–563 (2016). https://doi.org/10.1007/s11187-016-9755-4

Guimón, J. (2013), ―*Promoting university-industry collaboration in developing countries*‖, World Bank, Vol. 3, pp. 12-48. Retrived from: Guimón, J. (2013), ―Promoting university-industry... - Google Scholar

Gunday, G., Ulusoy, G., Kilic, K., & Alpkan, L. (2011). Effects of innovation types on firm performance. *International Journal of production economics*, *133*(2), 662-676. https://doi.org/10.1109/ICMIT.2008.4654462

Haddad, M., Boukhdir, K., & Belaissaoui, M. (2025). Can university follow the digital transformation models applied in companies? *EDPACS*, *70*(3), 22–41. https://doi.org/10.1080/07366981.2025.2450875

Hadhri, W., Arvanitis, R., & M'henni, H. (2016). Determinants of innovation activities in small and open economies: the Lebanese business sector. *Journal of Innovation Economics & Management*, *21*(3), 77-107.

Haessler, P., Giones, F., & Brem, A. (2023). The who and how of commercializing emerging technologies: A technology-focused review. *Technovation*, *121*, 102637. https://doi.org/10.1016/j.technovation.2022.102637

Hailu, A. T. (2024). The role of university–industry linkages in promoting technology transfer: implementation of triple helix model relations. *Journal of Innovation and entrepreneurship*, *13*(1), 25.https://doi.org/10.1186/s13731-024-00370-y

Hailu, A. T. (2024). The role of university–industry linkages in promoting technology transfer: implementation of triple helix model relations. *Journal of Innovation and Entrepreneurship*, *13*(1), 25. https://doi.org/10.1186/s13731-024-00370-y

Hailu, A.T. (2024). The role of university–industry linkages in promoting technology transfer: implementation of triple helix model relations. *J Innov Entrep.* **13**, 25 https://doi.org/10.1186/s13731-024-00370-y

Haregwoin, B. (2022). *Assessment of Capital Structure of Startup Firms: The Case of Ethiopian Startups* (Doctoral dissertation, ST. MARY'S UNIVERSITY). http://hdl.handle.net/123456789/713

Hazenberg, R. (2021). The role of social enterprise in developing skills and creating employment opportunities in the UK. Hazenberg, R. (2021). The role of social enterprise... - Google Scholar

Hekkert, M. P., Janssen, M. J., Wesseling, J. H., & Negro, S. O. (2020). Mission-oriented innovation systems. *Environmental innovation and societal transitions*, *34*, 76-79. https://doi.org/10.1016/j.eist.2019.11.011

Heng, K. (2024). Challenges and developments in university research in Cambodia: a case study of two universities. *High Educ* **87**, 1593–1613 https://doi.org/10.1007/s10734-023-01080-2

Hillage, P., and E. Pollard. 1998. *Employability: Developing a Framework for Policy Analysis*. London: Department of Education and Employment. Retrieved from Hillage, P., and E. Pollard. 1998. Employability:... - Google Scholar

Hinchliffe, G.W. and Jolly, A. (2011), ―*Graduate identity and employability*‖, British Educational Research Journal, Vol. 37 No. 4, pp. 563-584. https://doi.org/10.1080/01411926.2010.482200

Hogan, R., T. Chamorro-Premuzic, and R. Kaiser. 2013. ―Employability and Career Success: Bridging the Gap Between Theory and Reality.‖ *Industrial and Organizational Psychology* 6 (1): 3–16.10.1111/iops.12001. https://doi.org/10.1111/iops.12001

Hora, M. T., Parrott, E., & Her, P. (2020). How do students conceptualise the college internship experience? Towards a student-centred approach to designing and implementing internships. *Journal of Education and Work*, *33*(1), 48–66. https://doi.org/10.1080/13639080.2019.1708869

Hossain, M. M., Alam, M., Alamgir, M., & Salat, A. (2020). Factors affecting business graduates' employability–empirical evidence using partial least squares (PLS). *Education+ Training*, *62*(3), 292-310. https://doi.org/10.1108/ET-12-2018-0258

Huang, K. F., Lin, K. H., Wu, L. Y., & Yu, P. H. (2015). Absorptive capacity and autonomous R&D climate roles in firm innovation. *Journal of Business Research*, *68*(1), 87-94. https://doi.org/10.1016/j.jbusres.2014.05.002

Huergo, E., & Jaumandreu, J. (2004). How does probability of innovation change with firm age?. *Small Business Economics*, *22*, 193-207. https://doi.org/10.1023/B:SBEJ.0000022220.07366.b5

Hung, M., Smith, W. A., Voss, M. W., Franklin, J. D., Gu, Y., & Bounsanga, J. (2020). Exploring student achievement gaps in school districts across the United States. Education and Urban Society, 52(2), 175-193. https://doi.org/10.1177/0013124519833442

Huo, X., Wang, S., Zheng, B., & Wu, X. (2025). R&D Subsidies and Radical Innovation: Innovative Mindset and Competition Matter. *Systems*, *13*(4), 282. https://doi.org/10.3390/systems13040282

Ildikó, R., Alemu, G. K., & Getachew, T. E. (2024). The New Paradigm of Integrating Community Engagement Concept in Ethiopian Public Universities: Challenges and Opportunities. *Opus et Educatio*, *11*(2).

Ishengoma, E., & Vaaland, T. I. (2016). Can university-industry linkages stimulate student employability?. *Education+ training*, *58*(1), 18-44. https://doi.org/10.1108/ET-11-2014-0137

Jaziri, R., & Sakly, S. (2022). Key influences on innovativeness of women entrepreneurs in Tunisia: The mediating role of entrepreneurial self-efficacy. *International Journal of Gender Studies in Developing Societies*, *4*(3), 262-282.https://doi.org/10.1504/IJGSDS.2022.121099

JOTE, A. (2020). *The Economic Contribution of Industrial Parks in Ethiopia* (Doctoral dissertation, St. Mary's University). http://hdl.handle.net/123456789/5308

Jowi, J. O. (2021). Doctoral training in African universities: recent trends, developments and issues. *Journal of the British Academy*, *9*(1), 159-181. DOI https://doi.org/10.5871/jba/009s1.159

Jowi, J. O., & Obamba, M. O. (2013). Internationalization in Africa: Where to focus funding for real impact. *Going Global: Identifying Trends and Drivers of International Education*, 75-84.

Kalaw, M. T. B. (2019). Tracer Study of Bachelor of Science in Mathematics. *International Journal of Evaluation and Research in Education*, *8*(3), 537-548. DOI: 10.11591/ijere.v8i3.17343

Kamp, A. and Milke, M. (2019), ―*Times of change in the engineering industry: practising engineers*‖, Undergraduate Students and Mentoring, Barbara E. Stalder and Christof Nägele (Editors), p. 207. Retrived from Kamp, A. and Milke, M. (2019), ―Times of change... - Google Scholar

Kamuriwo, D. S., Jones, S., Marshall, N., & Kinoti, M. (Eds.). (2024). *Developing University Entrepreneurial Ecosystems in Sub-Saharan Africa*. World Scientific.

Kassa, E. T. (2023). Exploring employability of business graduates: Evidence from Woldia University. *Journal of the Knowledge Economy*, *14*(2), 1033-1051. https://doi.org/10.1007/s13132-021-00856-0

Kassa, E. T., & Getnet Mirete, T. (2022). Exploring factors that determine the innovation of micro and small enterprises: the role of entrepreneurial attitude towards innovation in Woldia, Ethiopia. *Journal of innovation and entrepreneurship*, *11*(1), 26. https://doi.org/10.1186/s13731-022-00214-7

Kassa, T., & Kegne, M. (2025). Factors affecting innovativeness of small and medium enterprises in Benishangul Gumuz Regional State, Ethiopia. *Journal of Innovation and Entrepreneurship*, *14*(1), 1-32. https://doi.org/10.1186/s13731-024-00458-5

Kassa, T., Andualem, T., Desie, Y., Admas, F., Minaye, A., Teklu, F., ... & Zeleke, S. (2024). Practices of active learning in public universities in Ethiopia: student and faculty perceptions. *Studies in Higher Education*, 1-11. https://doi.org/10.1080/03075079.2024.2343953

Katsamudanga, S., & Nhamo, A. (2025). Reimagining the Role of African Universities in the Context of Archaeology and Development. *African Archaeological Review*, 1-6. https://doi.org/10.1007/s10437-025-09624-w

Kebebe, E. (2019). Bridging technology adoption gaps in livestock sector in Ethiopia: A innovation system perspective. *Technology in Society*, *57*, 30-37. https://doi.org/10.1016/j.techsoc.2018.12.002

Kebede, A. G., & Fikire, A. H. (2023). Exploring factors affecting product innovation practice among micro and small scale enterprises: the case study of Debre Berhan Town, Ethiopia. *Cogent Business & Management*, *10*(2). https://doi.org/10.1080/23311975.2023.2246746

Kelly, W. B., & Given, L. M. (2023). The *community engagement for impact (CEFI) framework*: an evidence-based strategy to facilitate social change. *Studies in Higher Education*, *49*(3), 441–459. https://doi.org/10.1080/03075079.2023.2238762

Keraga, M. N., & Araya, M. (2023). R&D, innovations, and firms‘ productivity in Ethiopia. *African Journal of Science, Technology, Innovation and*

Development, *15*(3), 311-324. https://hdl.handle.net/10520/ejc-aa_ajstid_v15_n3_a311

Khan, M. S. (2022). Absorptive capacities approaches for investigating national innovation systems in low and middle income countries. *International Journal of Innovation Studies*, *6*(3), 183-195. https://doi.org/10.1016/j.ijis.2022.07.004

Kiong, T. P., Cheng, E. H., Pei, O. S., & Siew, H. K. (2019). Factors influencing employability of Chinese graduates in Malaysia upon returning to China. *Asia Proceedings of Social Sciences*, *4*(1), 118-121. https://doi.org/10.31580/apss.v4i1.630

Ključnikov, A., Civelek, M., Fialova, V., & Folvarčná, A. (2021). Organizational, local, and global innovativeness of family-owned SMEs depending on firm-individual level characteristics: Evidence from the Czech Republic. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *16*(1), 169-184.

Kotey, B., & Sorensen, A. (2014). Barriers to small business innovation in Australia. *Australasian Journal of Regional Studies, The*, *20*(3), 405-429.

Krammer, S. M. (2017). Science, technology, and innovation for economic competitiveness: The role of smart specialization in less-developed countries. *Technological Forecasting and Social Change*, *123*, 95-107. https://doi.org/10.1016/j.techfore.2017.06.028

Kuriakose, F., & Kylasam Iyer, D. (2016). Exploring university-industry technology transfer in India: Two models. *Available at SSRN 2838103*. https://ssrn.com/abstract=2838103

Langa, D. (2024). *The relevant university: African universities and innovation in times of transition* (Doctoral dissertation, KTH).

Lange, M. F., Lauwerier, T., & Locatelli, R. (2021). The impact of privatization on teachers in Francophone sub-Saharan African countries. In UNESCO Global Education Monitoring Report (No. December, pp. 1-76). https://archive-ouverte.unige.ch/unige:159336

Lau, A. (2022). Investigating young professionals‘ psychological contracts to advance human-centred human resources management strategies: A multi-method qualitative

research (Doctoral dissertation, University of Worcester). https://eprints.worc.ac.uk/id/eprint/12778

Le Blanc PM, Van der Heijden BI, van Vuuren T. ―I WILL SURVIVE‖ a construct validation study on the measurement of sustainable employability using different age conceptualizations. Front Psychol. 2017;8:1690. https://doi.org/10.3389/fpsyg.2017.01690

Lee, C. Y., & Sung, T. (2005). Schumpeter's legacy: A new perspective on the relationship between firm size and R&D. *Research Policy*, *34*(6), 914-931. https://doi.org/10.1016/j.respol.2005.04.006

Lee, S., Park, G., Yoon, B., & Park, J. (2010). Open innovation in SMEs—An intermediated network model. *Research policy*, *39*(2), 290-300.https://doi.org/10.1016/j.respol.2009.12.009

Lee, K.W. and Joung, H.W. (2017), ―*An examination of students' perceptions for guest speakers in hospitality and tourism programs*‖, Journal of Teaching in Travel and Tourism, Vol. 17 No. 4, pp. 300-312. https://doi.org/10.1080/15313220.2017.1361888

Leyva-De la Hiz, D. I., & Bolívar-Ramos, M. T. (2022). The inverted U relationship between green innovative activities and firms' market-based performance: The impact of firm age. *Technovation*, *110*, 102372. https://doi.org/10.1016/j.technovation.2021.102372

Li, X. (2024). Learning by exporting: the moderating role of employee human capital. *International Marketing Review*, *41*(6), 1560-1576. https://doi.org/10.1108/IMR-07-2023-0147

Li, X., Chen, W., & Alrasheedi, M. (2023). Challenges of the collaborative innovation system in public higher education in the era of industry 4.0 using an integrated framework. *Journal of Innovation & Knowledge*, *8*(4), 100430. https://doi.org/10.1016/j.jik.2023.100430

Liao, J. (jon), Kickul, J. R., & Ma, H. (2009). Organizational Dynamic Capability and Innovation: An Empirical Examination of Internet Firms. *Journal of Small Business Management*, *47*(3), 263–286. https://doi.org/10.1111/j.1540-627X.2009.00271.x

Liche, M. B., & Braun Střelcová, A. (2023). The Pathway towards Triple Helix: Technology Development Evaluation in Ethiopian Science & Technology Universities. *Triple Helix*, *10*(1), 12-39. https://doi.org/10.1163/21971927-bja10038

Liu, F., Li, L., Zhang, Y., Ngo, Q. T., & Iqbal, W. (2021). Role of education in poverty reduction: macroeconomic and social determinants form developing economies. Environmental Science and Pollution Research, 28, 63163-63177. https://doi.org/10.1007/s11356-021-15252-z

Love, J. H., & Roper, S. (2015). SME innovation, exporting and growth: A review of existing evidence. *International small business journal*, *33*(1), 28-48. https://doi.org/10.1177/0266242614550190

Lowden, K., Hall, S., Ellio, D.D. and Lewin, J. (2011), Employers' Perceptions of the Employability Skills of New Graduates, Edge Foundation, London. Retrieved from Lowden, K., Hall, S., Ellio, D.D. and Lewin, J. (2011),... - Google Scholar

Lundvall, B. Å. (2023). Transformative innovation policy – lessons from the innovation system literature. *Innovation and Development*, *14*(2), 297–314. https://doi.org/10.1080/2157930X.2022.2158996

Magalhaes Queiroz, P. (2019). Intention, tensions and mediations in and out the National Qualification Framework (Master's thesis). http://urn.nb.no/URN:NBN:no-74245

Mamo, F. P. (2015). Revenue generation strategies in Sub-Saharan African universities. http://hdl.handle.net/123456789/2300

Mavhunga, C. (2017). *What do science, technology, and innovation mean from Africa?*. The MIT Press. http://library.oapen.org/handle/20.500.12657/31335

McCleary, K.W. and Weaver, P.A. (2009), ―*The effective use of guest speakers in the hospitality and tourism curriculum*‖, Journal of Teaching in Travel and Tourism, Vol. 8 No. 4, pp. 401-414. https://doi.org/10.1080/15313220903152910

McClure, K.R., Barringer, S.N., Brown, J.T. (2020). Privatization as the New Normal in Higher Education. In: Perna, L. (eds) Higher Education: Handbook of Theory and

Research. Higher Education: Handbook of Theory and Research, vol 35. Springer, Cham. https://doi.org/10.1007/978-3-030-31365-4_13

McCowan, T., & Bertolin, J. (2020). Inequalities in higher education access and completion in Brazil (No. 2020-3). UNRISD working paper https://hdl.handle.net/10419/246235

Mekonnen Yimer, B., Herut, A. H., Demissie, M. M., Bareke, M. L., Agezew, B. H., Dedho, N. H., & Lebeta, M. F. (2024). Trends of higher education enrolment, graduation, and employment in Ethiopia: an empirical analysis. *Cogent Education*, *11*(1), 2302623. https://doi.org/10.1080/2331186X.2024.2302623

Menberu, A. W. (2024). Technology-mediated financial education in developing countries: A systematic literature review. *Cogent Business & Management*, *11*(1), 2294879. https://doi.org/10.1080/23311975.2023.2294879

Menter, M. (2024). From technological to social innovation: toward a mission-reorientation of entrepreneurial universities. *J Technol Transf* **49**, 104–118. https://doi.org/10.1007/s10961-023-10002-4

Mihret, Y. A. (2019). Factors associated with women unemployment in Ethiopia. *International Journal of theoretical and applied mathematics*, *5*(5), 68. Retrieved from Mihret, Y. A. (2019). Factors associated with women... - Google Scholar

Mijena, E., Olana, T., Legesse, H., & Raghavendra, H. L. (2018). Quality Education in Ethiopia: The Missing Link between Theory and Practices. Retrieved from Mijena, E., Olana, T., Legesse, H., & Raghavendra,... - Google Scholar

Ministry of Education (2008): *Annual Intake and Enrolment Growth and Professional and Program Mix of Ethiopian Public Higher Education: Strategy and Conversion Plan, 2008/09-2011/12. Unpublished.* Addis Ababa: Federal Democratic Republic of Ethiopia; 2008.

MoFED (Ministry of Finance and Economic Development) (2010). Growth and Transformation Plan (GTP) 2010/112014/15 Draft, the Federal Democratic Republic of Ethiopia, Addis Ababa

MoFED. (2015). *Federal Democratic Republic of Ethiopia Growth and Transformation Plan: (2010/11–2014/15). Addis Ababa, Ethiopia: Ministry of Finance and Economic Development (MoFED).*

Mogotsi, K. S., & Baron, N. (2025). Local solutions for local problems: the contributions of social enterprises to resilient urban communities in South Africa. *Cogent Social Sciences*, *11*(1). https://doi.org/10.1080/23311886.2025.2474187

Moleka, P. B. (2024). *Innovationology: A Comprehensive, Transdisciplinary Framework for Driving Transformative Innovation in the 21st Century* (No. f3scj_v1). Center for Open Science.

Molla, T. (2018). *Higher education in Ethiopia: Structural inequalities and policy responses* (Vol. 2). Singapore: Springer. https://doi.org/10.1007/978-981-10-7933-7

Molla, T., Harvey, A., & Sellar, S. (2019). Access to languages other than English in Australian universities: An educational pipeline of privilege. *Higher education research & development*, *38*(2), 307-323. https://doi.org/10.1080/07294360.2018.1522620

Monteiro, S., Santos, S., Teixeira, J. N., Torres, L., & Palhares, J. (2024). Determinants of higher education graduates' employability: a scoping review. *Education+ Training*. https://doi.org/10.1108/ET-04-2024-0190

Morozov, V. S., & Taskaeva, N. N. (2016). Basic market factors affecting innovative activities. *Journal of Internet Banking and Commerce*, *21*(S4), 1.

Morrison, A. (2012), ―*Absolute and relative employability: lecturers' views on undergraduates' employability*‖, Paper Presented at the British Educational Research Association Annual Conference, University of Manchester, 4-6 September. Retrieved from Morrison, A. (2012), ―Absolute and relative employabili... - Google Scholar

Mseleku, Z. (2024). Transitioning from higher education to the labour market: the role of graduate internship on youth graduate employability. *Cogent Education*, *11*(1), 2428069. https://doi.org/10.1080/2331186X.2024.2428069

Muchie, M., & Ezezew, W. (2022). Analysis of the Relationship between Innovation and Ethipian Economic Growth. https://doi.org/10.21203/rs.3.rs-1576170/v1

Muchira, J. M., Kiroro, F., Mutisya, M., Ochieng, V. O., & Ngware, M. W. (2023). Assessing technical vocational education and training institutions‘ curriculum in Kenya: What strategies can position the youth for employment?. Journal of Adult and Continuing Education, 29(2), 563-582 https://doi.org/10.1177/14779714221145863

Mueller, B., & Robert, J. (2021). Two sides of the same coin?: Internationalisation and employability: Students' perceptions of employability and career outcomes from international studies. *Journal of Teaching and Learning for Graduate Employability*, *12*(2), 19-35. https://ojs.deakin.edu.au/index.php/jtlge/

Mulu, N. K. (2017). The Links between Academic Research and Economic Development in Ethiopia: The Case of Addis Ababa University. *European Journal of STEM Education*, *2*(2), 5.

Muwanga-Zake, J. W. F., & Kibukamusoke, M. (2024). Sustainability of Africa through technological innovations and indigenous knowledge systems: a discussion of key factors and way forward. *African Journal of Social Work*, *14*(2), 59-69. https://doi.org/10.4314/ajsw.v14i2.2

Nason, R. S., Wiklund, J., McKelvie, A., Hitt, M., & Yu, W. (2019). Orchestrating boundaries: The effect of R&D boundary permeability on new venture growth. *Journal of Business Venturing*, *34*(1), 63-79. https://doi.org/10.1016/j.jbusvent.2018.05.003

Nega, M. (2017). The Public-Private Divide in Ethiopian Higher Education: Issues and Policy Implications. *Universal Journal of Educational Research*, *5*(4), 591-599. DOI: 10.13189/ujer.2017.050408

Ngibe, M., & Lekhanya, L. M. (2020). A proposed integrated model for business innovative leadership to attain sustainable growth of Small and Medium manufacturing Enterprises in KwaZulu-Natal. *Journal of Contemporary Management*, *17*(1), 118-141.https://hdl.handle.net/10520/ejc-jcman-v17-n1-a6

Ngoc, V. T. B., Lan, P. T., Van Nhi, N., Hanh, D. T. M., & Yen, N. T. H. (2024). The role of employability skills and university support towards employability: A mediation of self-efficacy. *American Journal of Business Science Philosophy (AJBSP)*, *1*(1), p1-15. https://doi.org/10.70122/ajbsp.v1i1.9

Niemi, H. (2021). Teacher Education in at the Crossroads—Educational Ecosystems for Equity and Quality of Learning. Envisioning Teaching and Learning of Teachers for Excellence and Equity in Education, 3-21. https://doi.org/10.1007/978-981-16-2802-3_1

Nussbaum, M. C. (2009). Education for profit, education for freedom. *Liberal Education*, *95*(3), 6-13.

O'Connor, H., & Bodicoat, M. (2016). Exploitation or opportunity? Student perceptions of internships in enhancing employability skills. *British Journal of Sociology of Education*, *38*(4), 435–449. https://doi.org/10.1080/01425692.2015.1113855

Obunike, C. F., & Udu, A. A. (2019). Innovativeness and growth: a study of small scale manufacturing firms in lagos state.

Odei, S. A. (2024). The relationship between perceived institutional conditions and firm-level innovations in emerging markets: Moderating effects of firm ownerships. *Plos one*, *19*(1), e0291290. https://doi.org/10.1016/j.techfore.2024.123664

OECD. (2005). *Guidelines for collecting and interpreting innovation data*. OECD Publishing.

Ogada, T. P., Partey, S., Ramasamy, J., Obunga, P., & Mibey, S. (2022). Overview of the science, technology and innovation landscape of Eastern Africa.

Okolie, U. C., Igwe, P. A., Nwosu, H. E., Eneje, B. C., & Mlanga, S. (2020). Enhancing graduate employability: Why do higher education institutions have problems with teaching generic skills?. *Policy Futures in Education*, *18*(2), 294-313. https://doi.org/10.1177/1478210319864824

Oranga, J., & Matere, A. (2023). Qualitative research: Essence, types and advantages. *Open Access Library Journal*, *10*(12), 1-9. https://doi.org/10.4236/oalib.1111001

Othman, Z., Shan, S. W., Yusoff, I., & Kee, C. P. (2018). Classification techniques for predicting graduate employability. *International Journal on Advanced Science, Engineering and Information Technology*, *8*(4-2), 1712-1720. Retrived from : Othman, Z., Shan, S. W., Yusoff, I., & Kee, C. P.... - Google Scholar

Ozor, N., Nwobodo, C., & Onwualu, P. (2025). Towards the Establishment of a National Research and Innovation Council and a National Research and Innovation Fund in Nigeria.

Park, T., & Kim, J. Y. (2022). An exploratory study on innovation policy in eight Asian countries. *Journal of Science and Technology Policy Management, 13*(2), 273-303.https://doi.org/10.1108/JSTPM-03-2021-0036

Perkmann, M., & Walsh, K. (2009). The two faces of collaboration: impacts of university-industry relations on public research. *Industrial and Corporate Change, 18*(6), 1033-1065.https://doi.org/10.1093/icc/dtp015

Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D'Este, P., Fini, R., Geuna, A., Grimaldi, R., Hughes, A., Krabel, S., Kitson, M., Llerena, P., Lissoni, F., Salter, A., & Sobrero, M. (2013). Academic engagement and commercialisation: A review of the literature on university-industry relations. *Research Policy, 42*(2), 423-442. https://doi.org/10.1016/j.respol.2012.09.007

Phale, K., Li, F., Adjei Mensah, I., Omari-Sasu, A. Y., & Musah, M. (2021). Knowledge-based economy capacity building for developing countries: a panel analysis in Southern African Development Community. *Sustainability, 13*(5), 2890. https://doi.org/10.3390/su13052890

Pheko, M. M., & Molefhe, K. (2017). Addressing employability challenges: a framework for improving the employability of graduates in Botswana. *International Journal of Adolescence and Youth, 22*(4), 455-469. https://doi.org/10.1080/02673843.2016.1234401

Pickard-Whitehead, G. (2018). Wow! African American Small Business Ownership Up 400% in a Year, Survey Reveals. *Small Business Trends*.

Pidorycheva, i. (2021). Ukraine's European integration in the field of research and innovation: state, challenges, acceleration measures. *Journal of european economy, 20*(4), 678-699. https://doi.org/10.35774/jee2021.04.678

Pisano, G. P. (2015). A normative theory of dynamic capabilities: connecting strategy, know-how, and competition. *Harvard Business School Technology & Operations Mgt. Unit Working Paper*, (16-036). https://ssrn.com/abstract=2667018

Pitan, O. S., & Atiku, S. O. (2017). Structural determinants of students‘ employability: Influence of career guidance activities. *South African Journal of Education*, *37*(4). https://doi.org/10.15700/saje.v37n4a1424

Pohlmann, J.R., ten Caten, C.S. & Ribeiro, J.L.D. Exploring university‘s role in academic spin-off generation and sustainable evolution: a multiple cases study. *J Technol Transf* (2025). https://doi.org/10.1007/s10961-025-10200-2

Porter, M. E. (2003). Michael E. Porter. *Fifty Key Figures in Management*, *272*.

Predovic, D., Dennis, J., & Jones, E. (2021). International internships and employability: a game- based assessment approach. *Higher Education Research & Development*, *41*(4), 1231–1246. https://doi.org/10.1080/07294360.2021.1889994

Priya, P., & Sharma, C. (2023). Do financial constraints and corruption limit firms' innovation capability? Evidence from developing economies. *Managerial and Decision Economics*, *44*(4), 1935-1961. https://doi.org/10.1002/mde.3792

Pugh, R., Hamilton, E., Soetanto, D., Jack, S., Gibbons, A., & Ronan, N. (2022). Nuancing the roles of entrepreneurial universities in regional economic development. *Studies in Higher Education*, *47*(5), 964–972. https://doi.org/10.1080/03075079.2022.2055320

Qiao, J., & Yang, Z. (2015). Mechanism of R&D network formation based on a network embeddedness game model. *Journal of Management Analytics*, *2*(2), 154–174. https://doi.org/10.1080/23270012.2015.1047904

Rådberg, K. K., & Löfsten, H. (2024). The entrepreneurial university and development of large-scale research infrastructure: Exploring the emerging university function of collaboration and leadership. *The Journal of Technology Transfer*, *49*(1), 334-366.https://doi.org/10.1007/s10961-023-10033-x

Rahman, N. A., Yaacob, Z., & Radzi, R. M. (2016). An overview of technological innovation on SME survival: a conceptual paper. *Procedia-Social and Behavioral Sciences*, *224*, 508-515.https://doi.org/10.1016/j.sbspro.2016.05.427

Rasmussen, E., Moen, Ø., & Gulbrandsen, M. (2006). Initiatives to promote commercialization of university knowledge. *Technovation*, *26*(4), 518-533. https://doi.org/10.1016/j.technovation.2004.11.005

Ratanawaraha, A., Torquato Cruz, R., & Perez Cuso, M. (2024). Policies to promote private sector engagement in Science, Technology and Innovation: Workbook.Retrieved from: https://hdl.handle.net/20.500.12870/6836.

Reda, N. (2024). *Understanding the Benefits of Universities' Societal Engagement in Ethiopia*. (Tampere University Dissertations - Tampereen yliopiston väitöskirjat; Vol. 1070). Tampere University. https://urn.fi/URN:ISBN:978-952-03-3558-8

Rinkinen, S., Oikarinen, T., & Melkas, H. (2015). Social enterprises in regional innovation systems: a review of Finnish regional strategies. *European Planning Studies*, *24*(4), 723–741. https://doi.org/10.1080/09654313.2015.1108394

Rodríguez-Abitia, G., Martínez-Pérez, S., Ramirez-Montoya, M. S., & Lopez-Caudana, E. (2020). Digital gap in universities for Spain. Sustainability, 12(21), 9069. https://doi.org/10.3390/su12219069

Rosa Kuipers-Dirven, Matthijs Janssen, Jarno Hoekman, (2023) Assessing university policies for enhancing societal impact of academic research: A multicriteria mapping approach, *Research Evaluation*, Volume 32, Issue 2, Pages 371–383, https://doi.org/10.1093/reseval/rvac045

Rossi, M. (2016). The impact of age on firm performance: A literature review. *Corporate Ownership & Control*, *13*(2), 217-223.

Rossoni, A. L., de Vasconcellos, E. P. G., & de Castilho Rossoni, R. L. (2024). Barriers and facilitators of university-industry collaboration for research, development and innovation: a systematic review. *Management Review Quarterly*, *74*(3), 1841-1877.https://doi.org/10.1007/s11301-023-00349-1

Rossoni, A. L., de Vasconcellos, E. P. G., & de Castilho Rossoni, R. L. (2024). Barriers and facilitators of university-industry collaboration for research, development and innovation: a systematic review. *Management Review Quarterly*, *74*(3), 1841-1877. https://doi.org/10.1007/s11301-023-00349-1

Rossoni, A. L., de Vasconcellos, E. P. G., & Sbragia, R. (2024). Influence of social capital, market orientation, and technological readiness on researchers‘ interactions with companies. *Future Business Journal*, *10*(1), 69. https://doi.org/10.1186/s43093-024-00359-9

Rowe, A. D., & Zegwaard, K. E. (2017). Developing graduate employability skills and attributes: Curriculum enhancement through work-integrated learning. https://hdl.handle.net/10289/11267

Sagar, S. (2023). Innovation and sustainability in business: Navigating the future landscape. *IOSR Journal of Business and Management (IOSR-JBM)*, *25*(12), 51-60.

Sahudin, S. (2022). Literature review on the factors affecting employability of engineering graduates. *Asean Journal of Engineering Education*, *6*(1), 13-22. https://doi.org/10.11113/ajee2022.6n1.75

Salami, R., & Soltanzadeh, J. (2012). Comparative analysis for science, technology and innovation policy; Lessons learned from some selected countries (Brazil, India, China, South Korea and South Africa) for other LdCs like Iran. *Journal of technology management & innovation*, *7*(1), 211-227. http://dx.doi.org/10.4067/S0718-27242012000100014

Salmi, J., Sursock, A., & Olefir, A. (2017). Improving the performance of Ethiopian universities in science and technology: A policy note. *Improving the Performance of Ethiopian Universities in Science and Technology: A Policy Note, World Bank Group*.

Salomaa, M. (2019). Third mission and regional context: assessing universities‘ entrepreneurial architecture in rural regions. *Regional Studies, Regional Science*, *6*(1), 233-249. https://doi.org/10.1080/21681376.2019.1586574

Sánchez-Barrioluengo, M., & Benneworth, P. (2019). Is the entrepreneurial university also regionally engaged? Analysing the influence of university's structural configuration on third mission performance. *Technological forecasting and social change*, *141*, 206-218. https://doi.org/10.1016/j.techfore.2018.10.017

Sanders, J., and A. de Grip. 2004. ―Training, Task Flexibility and the Employability of Low-skilled Workers.‖ *International Journal of Manpower* 25 (1): 73–89. doi:10.1108/01437720410525009. https://doi.org/10.1108/01437720410525009

Sanders, J. and de Grip, A. (2004), ―*Training, task flexibility and the employability of low-skilled workers*‖, International Journal of Manpower, Vol. 25 No. 1, pp. 73-89. https://doi.org/10.1186/s13731-024-00370-y

Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research policy*, *47*(9), 1554-1567. https://doi.org/10.1016/j.respol.2018.08.011

Scott, J. E. (1998). Organizational knowledge and the intranet. *Decision Support Systems*, *23*(1), 3-17.

Sedlacek, S. (2013). The role of universities in fostering sustainable development at the regional level. *Journal of cleaner production*, *48*, 74-84. https://doi.org/10.1016/j.jclepro.2013.01.029

Seifu, M., van Paassen, A., Klerkx, L., & Leeuwis, C. (2022). A state-initiated multi-stakeholder platform as an instrument to build agricultural innovation system capacity: a case study from Ethiopia. *Innovation and Development*, 1–22. https://doi.org/10.1080/2157930X.2022.2064959

Sewpersadh, N. S., & Dalwai, T. (2024). Managerial ability, intellectual property rights, R&D: does firm age play a role?. *Competitiveness Review: An International Business Journal*, *34*(7), 25-51.https://doi.org/10.1108/CR-10-2023-0248

Shaikh, R., Li, Z., Wang, X., & Nazir, M. R. (2022). Firm innovation and ultimate control mechanism: Case of emerging market. *Managerial and Decision Economics*, *43*(2), 440-456. https://doi.org/10.1002/mde.3392

Shefer, D., & Frenkel, A. (2005). R&D, firm size and innovation: an empirical analysis. *Technovation*, *25*(1), 25-32.https://doi.org/10.1016/S0166-4972(03)00152-4

Shimekit, T. (2021). Ethiopian Public Universities Graduates Employability Enhancement At The Labor Market: Policies, Strategies, and Actions in Place. *Academy of Educational*

Leadership Journal, *25*(7), 1-19. Shimekit, T. (2021). Ethiopian Public Universities... - Google Scholar

Shkabatur, J., Bar-El, R., & Schwartz, D. (2022). Innovation and entrepreneurship for sustainable development: Lessons from Ethiopia. *Progress in Planning*, *160*, 100599. https://doi.org/10.1016/j.progress.2021.100599

Simpson, Z., van Rensburg, N.J. and Benecke, D.R. (2017), ―*Engineering students' visual metaphors for mentorship: Implications for the candidacy period*‖, In 2017 IEEE Global Engineering Education Conference (EDUCON). IEEE, pp. 219-225. https://doi.org/10.1109/EDUCON.2017.7942851

Sin, C. and Amaral, A. (2017), ―*Academics' and employers' perceptions about responsibilities for employability and their initiatives towards its development*‖, Higher Education, Vol. 73 No. 1, pp. 97-111. https://doi.org/10.1007/s10734-016-0007-y

Singh, R. B., Paroda, R. S., & Dadlani, M. (2022). Science, technology and innovation. *Indian agriculture towards*, *2030*(821), 51.

Skorge, O. (2024). Bottlenecks and Innovation Performance: A Case Study of Kenya.

Small, L., Shacklock, K. and Marchant, T. (2018), ―*Employability: a contemporary review for higher education stakeholders*‖, Journal of Vocational Education and Training, Vol. 70 No. 1, pp. 148-166. https://doi.org/10.1080/13636820.2017.1394355

Sørensen, J. B., & Stuart, T. E. (2000). Aging, obsolescence, and organizational innovation. *Administrative science quarterly*, *45*(1), 81-112.https://doi.org/10.2307/2666980

Spânu, P., Ulmeanu, M. E., & Doicin, C. V. (2024). Academic third mission through community engagement: An empirical study in European universities. *Education Sciences*, *14*(2), 141. https://doi.org/10.3390/educsci14020141

STIC. (2015). *Ethiopian Innovation Survey* United Nations Conference on Trade and Development, Ethiopian Science and Technology Information Centre (STIC): Addis Ababa

Stojčić, N., & Hashi, I. (2014). Firm productivity and type of innovation: evidence from the Community Innovation Survey 6. *Croatian Economic Survey*, *16*(2), 121-146.https://orcid.org/0000-0001-6638-8771

Stojčić, N., & Hashi, I. (2014). Firm productivity and type of innovation: evidence from the Community Innovation Survey 6. *Croatian Economic Survey*, *16*(2), 121-146.https://orcid.org/0000-0001-6638-8771

Stolze, A., & Sailer, K. (2022). Advancing HEIs‘ third-mission through dynamic capabilities: The role of leadership and agreement on vision and goals. *The Journal of Technology Transfer*, *47*(2), 580-604. https://doi.org/10.1007/s10961-021-09850-9

Suarta, I. M., Suwintana, I. K., Sudhana, I. F. P., & Hariyanti, N. K. D. (2017, September). Employability skills required by the 21st century workplace: A literature review of labor market demand. In *International Conference on Technology and Vocational Teachers (ICTVT 2017)* (pp. 337-342). Atlantis Press. https://doi.org/10.2991/ictvt-17.2017.58

Sube, K., Belay, T., Hando, F., & Bayinesagn, A. (2025). Regional Innovation System (RIS) as a means for development: Policies, opportunities and challenges in Ethiopia. *F1000Research*, *14*, 34.

Suleman, F. (2018), ―*The employability skills of higher education graduates: insights into conceptual frameworks and methodological options*‖, Higher Education, Vol. 76 No. 2, pp. 263-278. https://doi.org/10.1007/s10734-017-0207-0

Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H., & Idris, M. (2021). Economic growth, increasing productivity of SMEs, and open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 20.https://doi.org/10.3390/joitmc7010020

Taherdoost, H. (2024). Fundamentals of R&D. In: Innovation Through Research and Development. Signals and Communication Technology. Springer, Cham. https://doi.org/10.1007/978-3-031-52565-0_1

Talegeta, S. (2012). Innovation and barriers to innovation: small and medium enterprises in Addis Ababa. *Addis Ababa University, College of Business and Economics, School of Graduate Studies, Addis Ababa, Ethiopia*.

Tamrat, W. (2023). The shifting landscape of graduate employment in Ethiopia: changes, challenges and responses. *Policy Reviews in Higher Education*, *7*(2), 211-228 https://doi.org/10.1080/23322969.2023.2196552 .

Tamrat, W. 2022. ―Graduate Employability and Responsiveness: The Need for Aligning Policy Directions and Institutional Readiness in Ethiopia.‖ In *Graduate Employability Across Contexts*, edited by T. L. H. Nghia, B. C. Bui, J. K. N. Singh, and V. N. Lu. Singapore: Springer. https://doi.org/10.1007/978-981-19-3959-4_8

Tareke, T. G., Woreta, G. T., Zewude, G. T., Amukune, S., Oo, T. Z., & Józsa, K. (2024). Overview of Ethiopian Public Higher Education: Trends, System, Challenges, and Quality Issues. *Education Sciences*, *14*(10), 1065. https://doi.org/10.3390/educsci14101065

Tareke, T. G., Woreta, G. T., Zewude, G. T., Amukune, S., Oo, T. Z., & Józsa, K. (2024). Overview of Ethiopian Public Higher Education: Trends, System, Challenges, and Quality Issues. *Education Sciences*, *14*(10), 1065. https://doi.org/10.3390/educsci14101065

Tartaruga, I., Sperotto, F., & Carvalho, L. (2024). Addressing inclusion, innovation, and sustainability challenges through the lens of economic geography: Introducing the hierarchical regional innovation system. *Geography and Sustainability*, *5*(1), 1-12. https://doi.org/10.1016/j.geosus.2023.10.002

Tavares, O., Sin, C., Sá, C., Pereira, F., & Amaral, A. (2023). Graduate employment: Does the type of higher education institution matter?. *Bulletin of Economic Research*, *75*(4), 1140-1156. https://doi.org/10.1111/boer.12400

Tegegne, H. R., Girmay, H. A., Gebremedhen, Y. B., Olle, B. O., Domez, G. A., & Gebreyesus, M. A. (2024). Status and challenges of university-industry linkage in the Tigray Regional State of Ethiopia. *Industry and Higher Education*, 09504222241237028. https://doi.org/10.1177/09504222241237028

Tekle, K. (2024). Role of knowledge management practices in enhancing innovation and competitiveness in the Ethiopian leather industry. *African Journal of Information and Knowledge Management*, *3*(1), 26-39.

Teressa, T. D. (2022). The Function of University-Industry Linkages in the Implementation of Undergraduate Field-Based Learning in Higher Learning Institutions in Ethiopia. *Creative Education*, *13*(6), 1811-1825. https://doi.org/10.4236/ce.2022.136114

Termes, A., Edwards Jr, D. B., & Verger, A. (2020). The development and dynamics of public–private partnerships in the Philippines' education: A counterintuitive case of school choice, competition, and privatization. Educational Policy, 34(1), 91-117. https://doi.org/10.1177/0895904819886323

Tesfa, B. (2015). Challenges of ethiopian researchers and potential mitigation with ethiopian science, technology and innovation policy.

Tessema, A., & Abebe, M. (2011). Higher education in Ethiopia: challenges and the way forward. *International Journal of Education Economics and Development*, *2*(3), 225-244. https://doi.org/10.1504/IJEED.2011.042403

Thomas, E., Pugh, R., Soetanto, D., & Jack, S. L. (2023). Beyond ambidexterity: Universities and their changing roles in driving regional development in challenging times. *The Journal of Technology Transfer*, *48*(6), 2054-2073. https://doi.org/10.1007/s10961-022-09992-4

Tight, M. (2023). Employability: a core role of higher education?. *Research in Post-Compulsory Education*, *28*(4), 551-571. https://doi.org/10.1080/13596748.2023.2253649

Togoontumur, T., & Cooray, N. S. (2024). Does collaboration matter: the effect of university-industry R&D collaboration on economic growth. *Journal of the Knowledge Economy*, *15*(2), 9482-9496. https://doi.org/10.1007/s13132-023-01469-5

Tse, C. H., Meyer, K. E., Pan, Y., & Chi, T. (2024). Evolution of MNE strategies amid China's changing institutions: a thematic review. *Journal of International Business Studies*, *55*(6), 657-675. https://doi.org/10.1057/s41267-024-00715-5

Tseng, C. Y. (2014). Technological innovation capability, knowledge sourcing and collaborative innovation in Gulf Cooperation Council countries. *Innovation*, *16*(2), 212–223. https://doi.org/10.1080/14479338.2014.11081983

Tushar, H., & Sooraksa, N. (2023). Global employability skills in the 21st century workplace: A semi-systematic literature review. *Heliyon*. https://doi.org/10.1016/j.heliyon.2023.e21023

Un, C. A., & Asakawa, K. (2015). Types of R&D collaborations and process innovation: The benefit of collaborating upstream in the knowledge chain. *Journal of Product Innovation Management*, *32*(1), 138-153.https://doi.org/10.1111/jpim.12229

Upright, P. A., & Forsythe, S. A. (2021). A review of qualitative research in sport management: utilizing a descriptive case study design. *Ky. SHAPE J*, *58*(2), 64-70. Retrieved from: Upright, P. A., & Forsythe, S. A. (2021). A review... - Google Scholar

Ursić, L., Bralić, N., Žuljević, M. F., Puljak, L., & Buljan, I. (2024). Exploring the understanding of reproducibility among stakeholders within academia and their expectations for a web-based education tool: A qualitative study. *Accountability in Research*, 1–30. https://doi.org/10.1080/08989621.2024.2345723

van der Sijde, P. C. (2012). Profiting from Knowledge Circulation: The Gains from University–Industry Interaction. *Industry and Higher Education*, *26*(1), 15-19. https://doi.org/10.5367/ihe.2012.0082 (Original work published 2012)

Van‘t Land, H. (2016). The changing nature of Doctoral Studies in sub-Saharan Africa.

Vivarelli, M. (2015). Innovation and employment. *IZA World of Labor*. http://dx.doi.org/10.15185/izawol.154

Wakeford, J. J., Gebreeyesus, M., Ginbo, T., Yimer, K., Manzambi, O., Okereke, C., ... & Mulugetta, Y. (2017). Innovation for green industrialisation: An empirical assessment of innovation in Ethiopia's cement, leather and textile sectors. *Journal of Cleaner Production*, *166*, 503-511. https://doi.org/10.1016/j.jclepro.2017.08.067

Wang, L., Lin, S., Zhang, M., Ding, J., & Zhang, L. (2024). Technological innovation through complex networks: a study of 100 listed companies on China‘s growth

enterprise market. *Journal of the Knowledge Economy*, 1-48. https://doi.org/10.1007/s13132-024-01798-z

Wanger, L. (2021). The future, present. Reflections and searches for the school to come. *Voices of Education*, (4), 12.

Wazza, M. (2022). Ten Years Development Plan of Ethiopia (2021-2030): A Critical Review.

Weaver, R., & Blakey, C. L. (2022). Winter always comes: social enterprise in times of crisis. *Social Enterprise Journal*, *18*(3), 489-502. https://doi.org/10.1108/SEJ-11-2021-0087

Wenham, C., Wouters, O., Jones, C., Juma, P. A., Mijumbi-Deve, R. M., Sobngwi-Tambekou, J. L., & Parkhurst, J. (2021). Measuring health science research and development in Africa: mapping the available data. *Health Research Policy and Systems*, *19*, 1-13. https://doi.org/10.1186/s12961-021-00778-y

Williams, S., Karypidou, A., Steele, C. and Dodd, L. (2019), ―*A personal construct approach to employability: comparing stakeholders' implicit theories*‖, Education + Training, Vol. 61 No. 4, pp. 390-412. https://doi.org/10.1108/ET-08-2017-0112

Withers, M. C., Drnevich, P. L., & Marino, L. (2011). Doing More with Less: The Disordinal Implications of Firm Age for Leveraging Capabilities for Innovation Activity*. *Journal of Small Business Management*, *49*(4), 515–536. https://doi.org/10.1111/j.1540-627X.2011.00334.x

World Bank. (2010). *Innovation policy: A guide for developing countries*. The World Bank.

World Bank. 2018. *Ethiopia Economic Update: Reform imperatives for Ethiopia's Services Sector*. Washington: World Bank. Retrieved from Ethiopia Economic Update: Reform Imperatives for Ethiopia‘s Services Sector

World Bank. 2021. *Ethiopia Economic Update: Ensuring Resilient Recovery from COVID-19*. Washington: World Bank. Retrieved from: Ethiopia Economic Update: Ensuring Ethiopia‘s Full Recovery from COVID-19

World Bank. AFTHD., & World Bank. DECRG. (2009). *Accelerating catch-up: Tertiary education for growth in sub-Saharan Africa*. World Bank Publications.

Wyrwa, D. (2022). Expenditure on research and development as a factor stimulating innovativeness of European Union economy. *Scientific Papers of Silesian University of Technology. Organization & Management [Zeszyty Naukowe Politechniki Śląskiej. Seria Organizacji i Zarzadzanie]*, *163*, 715-725. http://dx.doi.org/10.29119/1641-3466.2022.163.44

Yahya, L. O., & Ogunyemi, E. O. (2024). Human Empowerment and Financial Resource Utilisation as a Panacea For Poverty Eradication In Nigeria. EDUCATIONAL. Retrived from: EDUCATIONAL-PERSPECTIVES-VOLUME-12-ISSUE-1-2024.pdf

Yallew, A. (2020). Higher education in Ethiopia: recent developments and challenges. *AfricArXiv Preprints*. DOI: 10.14293/111.000/000009.v1

Yibeltal Yizengaw, J. (2018). Skills gaps and mismatches: private sector expectations of engineering graduates in Ethiopia. https://doi.org/10.19088/1968-2018.174

Yin, P. (2024).Spatial-temporal Patterns and Characteristics Analysis of the Development of Specialized, Fined, Peculiar, Innovative Small and Medium-sized Enterprises in Jiangsu Province based on MGWR Model.

Yin, R. K. (2009). *Case study research: Design and methods* (Vol. 5). sage. Yin, R. K. (2009). Case study research: Design and... - Google Scholar

Yizengaw, J. Y., & Weidman, J. C. (2024). Higher education, gender, and job opportunities of engineering graduates in Ethiopia: An exploratory study. *International Journal of Educational Development*, *109*, 103078. https://doi.org/10.1016/j.ijedudev.2024.103078

Yongabo, P., & Göransson, B. (2020). Constructing the national innovation system in Rwanda: efforts and challenges. *Innovation and Development*, *12*(1), 155–176. https://doi.org/10.1080/2157930X.2020.1846886

Yorke, Mantz. 2006. *Learning and Employability Series One, Employability in Higher Education: What it Is – what it Is Not*. York: The Higher Education Academy. https://www.advance-he.ac.uk/knowledge-hub/embedding-employability-curriculum

Yorke, M. (2006), Employability in Higher Education: What It Is-What It Is Not, Vol. 1, Higher Education Academy, York. Retrieved from: Yorke, M. (2006), Employability in Higher Education:... - Google Scholar

You, Z., Lin, C., Guo, M., & Qi, K. (2024, December). AI Literacy and Sustainable Competitive Advantage of Chinese Corporations: Mediating Role of Innovation Consciousness. In *Proceedings of the 4th Asia-Pacific Artificial Intelligence and Big Data Forum* (pp. 194-201).https://doi.org/10.1145/3718491.3718524

Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of management review*, *27*(2), 185-203. https://doi.org/10.5465/amr.2002.6587995

Zaidan, E., Momani, R., & Al-Saidi, M. (2024). Entrepreneurial universities and integrated sustainability for the knowledge-based economy: self-perception and some structural challenges in the Gulf region. *Humanities and Social Sciences Communications*, *11*(1), 1-14. https://doi.org/10.1057/s41599-024-03032-2

Zakić, N., Jovanović, A., & Stamatović, M. (2008). External and internal factors affecting the product and business process innovation. *Facta universitatis-series: Economics and Organization*, *5*(1), 17-29.

Zaman, M., & Tanewski, G. (2024). R&D investment, innovation, and export performance: An analysis of SME and large firms. *Journal of Small Business Management*, *62*(6), 3053–3086. https://doi.org/10.1080/00472778.2023.2291363

Zelga, K. (2017). The importance of competition and enterprise competitiveness. *World Scientific News*, *72*, 189-194.

Zhang, Y. (2023). The sustainability of regional innovation in China: insights from regional innovation values and their spatial distribution. *Sustainability*, *15*(13), 10398.https://doi.org/10.3390/su151310398

Zhang, Z., Zhu, H., Zhou, Z., & Zou, K. (2022). How does innovation matter for sustainable performance? Evidence from small and medium-sized enterprises. *Journal of Business Research*, *153*, 251-265.https://doi.org/10.1016/j.jbusres.2022.08.034

Zhou, H., & Zondo, R. W. D. (2023). The role of business incubation programmes on the performance of small and medium enterprises in South Africa. *The Seybold Report; Vol. 18, Issue 05*.https://hdl.handle.net/10520/ejc-ajims_v3_n1_a14

Zin Zawawi, M. I., Kulatunga, U., & Thayaparan, M. (2016). Malaysian experience with public-private partnership (PPP) Managing unsolicited proposal. *Built Environment Project and Asset Management*, *6*(5), 508-520. https://doi.org/10.1108/BEPAM-10-2015-0059

ANNEX I: ETHICAL CLERANCE

Addis Ababa University
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SEEK WISDOM, ELEVATE YOUR INTELLECT AND SERVE HUMANITY!

COLLEGE OF DEVELOPMENT STUDIES (CDS)

Institutional Review Board (IRB)

Approved

No: 070/03/2024

Ph.D. Proposal Ethical Clearance Certificate

1. **Student's name:** Kasahun Aman Sube **Gender**:Male **Birth Date:** 22 August, 1992
   Id No: ID no/2599/14 **E-mail:** kassahunaman1912@gmail.com

2. **Home Center:** Centre for Regional and Local Development Studies **Stream**: Regional and Local Development
3. **PhD Dissertation Supervisors**:

   Tegegn Gebreegiabher (Professor) Email: tegegn.gebregizeabiher@aau.edu.et
   Filimon Hadaro (PhD) Email: filimon.hadaro@aau.edu.et
   Ashenafi Hagos (PhD) Email: ashenafi.hagos@aau.edu.et

4. **Title of the Proposal:** THE ROLE OF REGIONAL INNOVATION SYSTEM (RIS) FOR REGIONAL COMPETITIVENESS IN ETHIOPIA: A CASE HAWASSA

   a. **Proposal No**: N.A. **Date accepted:** February 25, 2024 **Completed:** April 25, 2024
   b. **Amendment No (if any):** N.A. **Date:** N.A.

5. **A clear statement of the decision:** The Academic Commission of the Centre for Regional and Local Development Studies has reviewed this proposal and found it to be in compliance with the University's standards and academic rules. The proposal indicated the requirements of an Ethical Clearance Certificate for data collection and subsequent publication. As a result, the IRB CDS examined the proposal's content, its associated research tools, and the informed consent of the respondents. The proposal has been deemed eligible for ethical clearance based on these evaluations.

6. **Decision:** This proposal fulfills the standard requirements described in IRB-CDS Standard operating Procedure (SoP) and ethical clearance is hereby awarded.
7. **This certificate is issued upon the consent of:** IRB-CoDS.

IRB-CoDS

Addis Ababa University College of Development Studies Institutional Review Board (IRB)

Name: Teshome Tafesse (Ph.D.)
Designation: Chairperson of CDS/IRB
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Signature.....
Date: April 26, 2024

ANNEX II: DOCUMENT REVIEW: TREND OF RESEARCH AND DEVELOPMENT IN HAWASSA UNIVERSITY

	Collage	**Year (2009-2023) 16 years trend analysis** Rc: Number of totally conducted researches Ra: Number of applied researches Rp: Number of published researches											
		2009.				**.. 2016..**				**..2023…**			
		Rc	Ra	Rp									
1	Agriculture												
	1.1.												
2	FBE												
	2.1.												
3	Social Science and humanities												
	3.1.												
4	Institute of science and technology												
	4.1. Civil engineering												
	4.1.1.												
	4.2. Electrical engineering												
	4.2.1.												
	4.3. Mechanical and Industrial Engineering												
	4.3.1.												
	4.4. Chemical engineering												
	4.4.1.												
	4.6. Water resource engineering												
	4.6.1												

ANNEX III: IN-DEPTH INTERVIEW GUIDELINE

1. **Lists of research participants**

   1. ***Academia (Hawassa University)***

      i. Hawassa university‘s vice president for research and community service
      ii. Hawassa university‘s president office chief of staff
      iii. Hawassa university‘s research directorate director/ experts
      iv. Hawassa university‘s community service directorate director/ experts
      v. Hawassa university‘s industry linkage directorate director/ experts
      vi. Hawassa university‘s career development directorate director/ experts
      vii. Hawassa university‘s Textile engineering department head
      viii. Hawassa university‘s industrial engineering department head
      ix. Hawassa university‘s Water supply engineering department head
      x. Hawassa university‘s College of Business and economics head

   2. ***Industry***

      i. Hawassa Industry park‘s managements
      ii. Hawassa Industry park‘s experts
      iii. Hawassa city private and government industries owners/ managers

   3. ***Government***

      i. Federal government
         1. Ministry of Science, Technology and Innovation (MoSTI)
         2. Ministry of Planning and Development
         3. Ministry of Trade and Industry
      ii. Sidama regional State
         1. Sidama regional state‘s planning and development bureau officers
         2. Sidama regional state‘s trade and industry bureau officers
         3. Sidama regional state‘s spatial development coordination office
      iii. Hawassa city Administration
         1. Hawassa city Administration mayor‘s office
         2. Hawassa city administration‘s planning and development office
         3. Hawassa city administration‘s trade and industry office

   4. ***Civil societies***

      i. International civil society organizations
      ii. Local civil society organization

2. General Regional Innovation System (RIS) Eco-system potential assessment

Dear Respondent, I am a doctoral student at Addis Ababa University, College of Development Studies, and Centre for Urban, Regional Development and Governance program. I am undertaking a dissertation entitled ***''The Role of Emerging Regional Innovation System to Regional Competitiveness in Ethiopia: A Case of Hawassa"***.You are one of the respondents selected to participate in this study. I would kindly request you to answer these questions; your honesty would greatly help in many aspects. The information that you will share will be kept confidential and will only be used for academic purposes.

Thank you in advance!

Kassahun A. Sube
PhD Candidate, AAU
Cell no. +251926464420
Email: kassahunaman1912@gmail.com

I: Demographic Information

1. **Sex**: 1. Male_____2. Female _____
2. **Age** (in years): _____
3. Educational Qualification:

   1. Certificate:_____2.Diploma:____3.BA/BSc Degree:_____4.MA/MSc: _____5. Ph.D.:_____

4. Departments:

   1. College of technology_____

   2. Others (specify) _____

5. Academic rank

   1. Lecturer_____2. Assistant Proffessor_____3. Associate Professor and Above_____

6. Position

   1. None_____ 2. Lower level management_____

   3. Middle level Management_____4. Higher level management_____

7. Number of years you have served in the institution _____

1. Scientific environment (Input)	
1.1. Human resource for innovation	
1	How many research and development personnel in the university?
2	How many researchers are there in the university?
3	How many students are enrolled in Science technology and innovation fields in university?
4	How many students are enrolled in science, technology, and innovation enrolled in PhD studies?
1.2. Creation of knowledge	
1	How much of the public expenditure does is invested in the higher education sector compared with other sectors?
2.	How much is the research and development expenditure in higher education sector compared with other missions?
2.1. Transmission and application of knowledge	
1	How many of interface structures are exist in the region?
2	How many of tech transfer offices are exist in the region?
3. Institutional framework (Input)	
3.1. Human resourcesfor innovation	

1	What is the rate of employment of university graduates in the region?
2	How much portion of population is with tertiary education in the region?
4. Path dependence (Input)	
4.1. Human resourcesfor innovation	
1	How many campuses of the universities and colleges exist in the region?
2	How many staffs are active human resources for innovation?
3	How many staffs is occupied population for innovation?
4.2. Transmission and application of knowledge	
1	Is there a significant investment in the ICT sector in the university?
2	How is the access and efficiency for internet?
5. Scientific environment (Output)	
5.1. Human resourcesfor innovation	
	How many graduates of tertiary education did the university produce?
	How many students were graduates in engineering, manufacturing and construction?
	How many students were graduated in science, mathematics and computing?
	How many PhD theses are defended in science, technology, and innovation fields?
	How many publications are produced in ISI journals
6. Institutional framework (Output)	
6.1. Creation of knowledge	
	How many patent right applicants are/were there?
	How many high tech patent right are/were acquired?

3. LEVEL OF REGIONAL ENGAGEMENT ACTIVITIES WITHIN UNIVERSITIES PER DOMAIN (FOR HU ONLY)

No	Engagement activities within domain	
1.	Teaching and training (students)	• How the university does engage in teaching and training? • Are the curriculum centred on the regional demand?
2.	Academic status of the human resource	• What does the university‘s human resources personnel‘s academic status look like!? • Could you bring the human resource documents that deal with the academic status of the personnel?
3.	R&D, technological development, and Knowledge transfer	• How is the university engaged in Research and Development? • How is the university engaged in technological development? • How is the university engaged in knowledge transfer activities?
4.	Entrepreneurship and enterprise development	• How the university does engaged in entrepreneurship activities? • How the university and enterprise development activities?
5.	Physical infrastructure	• How the university does engage in building physical infrastructure in the region?

4. GENERAL REGIONAL INNOVATION SYSTEM (RIS) ECO-SYSTEM POTENTIAL ASSESSMENT

1. Technological environment (Input)	
Human resourcesfor innovation	• What are the employments in research and development services? • What are the employments in knowledge-intensive high-technology services?
Transmission and application of knowledge	• Are there any technology transmission and application centers?
2. Productive environment (Input)	
Human resourcesfor innovation	• How many opportunities for employment are there in the manufacturing industry? • How many employment opportunities are in high and medium-high-technology manufacturing sectors? • How much of employment opportunities are in low and medium-low-technology manufacturing sectors? • How many R&D personnel are in the business enterprise sector? • How many there are adequate researchers in the business enterprise sector?
Creation of knowledge	• What percentage of total innovation spending goes into intramural R&D? • Is the central government providing enough public funding for firms? • Are government authorities providing enough public funding for firms? • Is local government funding for businesses sufficient?
Transmission and application of knowledge	• How many enterprises are engaged in innovation activities? • What are the High and medium high technology imports? • What are the Low and medium technology imports? • What is an acceptable number of firms' cooperation arrangements on innovation activities?
Innovation finance, outputsand markets	• How much is invested in innovation expenditures? • What are the innovation expenditures in high and medium-high-technology manufacturing sectors • What are the innovation expenditures in low and medium-low-technology manufacturing sectors
3. Institutional framework (Input)	
Innovation finance, outputsand markets	• Who are the newly created firms? • What are the newly created high and medium-high technology firms? • What are the newly created low and medium-low technology firms?
4. Path dependence (Input)	
Transmission and application of	• **Is there a significant investment in the ICT sector?** • Is there an accessible and efficient internet net service?

knowledge	
5. Technological environment (Output)	
Transmission and application of knowledge	• How do the penetration of technological advances (ICT) in firms?
Innovation finance, outputsand markets	• What are the advanced gross values added knowledge-intensive high-technology services?
6. Productive environment (Output)	
Innovation finance, outputsand markets	• How many firms have value-added high and medium high-technology manufacturing firms? • How many gross values added to low and medium-low technology manufacturing firms are available? • How many firms are high and medium-high technology exports? • How many gross value-added manufacturing sectors (%) • How many firms are low and medium low technology exports? • Are there an adequate number of gross value-added high and medium-high technology manufacturing firms/gross value-added manufacturing sectors (%) • Is there any increment in % of exports due to new or improved products to the market? • Is there any increment in % of exports due to new or improved products to the firm? • Is there any increment in % of turnover of new or significantly improved products to the firm/total turnover? • Is there any increment in % of turnover of new or significantly improved products new to the market/ total turnover?
Innovation finance, outputsand markets	• How many venture capital investments are there? • How many venture capital entities are there?
Institutional framework (Output)	
Creation of knowledge	• How many patent rights applicants? • How many high-tech patent rights exist in your firm?

5. General Regional Innovation System (RIS) Firm Eco-system potential assessment (for private sectors)

1. Technological environment (Input)	
Human resourcesfor innovation	• What are the employments in research and development services? • What are the employments in knowledge-intensive high-technology services?
Transmission and application of knowledge	• Are there any technology transmission and application centers?
2. Productive environment (Input)	

Human	• How many opportunities for employment are there in the manufacturing

resources for innovation	industry? • How many employment opportunities are in high and medium-high-technology manufacturing sectors? • How much of employment opportunities are in low and medium-low-technology manufacturing sectors? • How many R&D personnel are in the business enterprise sector? • How many adequate researchers are available in the business enterprise sector?
Creation of knowledge	• What percentage of total innovation spending goes into intramural R&D? • Is the central government providing enough public funding for firms? • Are government authorities providing enough public funding for firms? • Is local government funding for businesses sufficient?
Transmission and application of knowledge	• How many enterprises are engaged in innovation activities? • What are the High and medium high technology imports? • What are the Low and medium technology imports? • What is an acceptable number of firms' cooperation arrangements on innovation activities?
Innovation finance, outputs and markets	• How much is invested in innovation expenditures? • What are the innovation expenditures in high and medium-high-technology manufacturing sectors • What are the innovation expenditures in low and medium-low-technology manufacturing sectors
3. Institutional framework (Input)	
Innovation finance, outputs and markets	• Who are the newly created firms? • What are the newly created high and medium-high technology firms? • What are the newly created low and medium-low technology firms?
4. Path dependence (Input)	
Transmission and application of knowledge	• Is there a significant investment in the ICT sector? • Is there an accessible and efficient internet net service?
5. Technological environment (Output)	
Transmission and application of knowledge	• How do the penetration of technological advances (ICT) in firms?
Innovation finance, outputsand markets	• What are the advanced gross values added knowledge-intensive high-technology services?
6. Productive environment (Output)	

Innovation finance, outputsand markets	• **How many firms have value-added high and medium high-technology manufacturing firms?** • How many gross values added to low and medium-low technology manufacturing firms are available? • How many firms are high and medium-high technology exports? • How many firms are low and medium low technology exports? • How many gross value-added manufacturing sectors (%)? • Are there an adequate number of gross value-added high and medium-high technology manufacturing firms/gross value-added manufacturing sectors (%)? • Is there any increment in % of exports due to new or improved products to the market?

	• Is there any increment in % of exports due to new or improved products to the firm? • Is there any increment in % of turnover of new or significantly improved products to the firm/total turnover? • Is there any increment in % of turnover of new or significantly improved products new to the market/ total turnover?
Innovation finance, outputsand markets	• How many venture capital investments are there? • How many venture capital entities are there?
7. Institutional framework (Output)	
Creation of knowledge	• How many patent rights applicants? • How many high-tech patent rights exist in your firm?

F. Ministry of education and Hawassa University

1. Policy frame work for Regional Innovation System (RIS)

- What are the existing policy frameworks that provide the foundation for the Regional Innovation system, in Ethiopia?
- What are the major policy issues in the science, technology, and innovation arena?
- Who are the major policy actors in the existing policy practice platform?
- What are the major responsibilities of each policy actor?

2. The existing practices of Regional Innovation System (RIS)

- Who are your major stakeholders that you are engage with to bring about Regional Innovation System (RIS)?
- What are the existing efforts that you are doing to work in collaboration with regional development actors.
- How do you engage with each regional development actor?

i. What strategies do you employ to engage with the Industry Park and other

small scale industries in Hawassa?

ii. What strategies do you employ to engage with Sidama regional state?
iii. What strategies do you employ to engage with Hawassa City administration?
iv. What strategies do you employ to engage with local and international civil societies?

- What research theme areas have been given attention by the institution since 2016?

- What proportion of research projects is practical and focused on improving regional competitiveness?

3. The Impediments of Regional Innovation System (RIS)

- What were the major challenges you have encountered previously and managed?
- What are the existing problems that hinder the institutions to work hand in hand with Industry (Hawassa Industry Park, industries and small and micro enterprises), Government, and civil society?
- What are the major challenges with regards to ‗developing or implementing regional orientation and engagement initiativesor activities'?
- What could be the possible traits that might hinder the institution from actively engaged with other regional actors to bring about competitiveness.

4. Coping method to produce more positive outcomes

- What coping mechanisms are in place to generate desirable results that will empower actors in the future?
- What innovative insights does the institution want to apply in order to encourage more fruitful outcomes?
- What were the coping mechanisms that were successful in the past but are no longer working?

No	***Challenges***	
1.	Strategic priorities	• What are the limitations of executive-level strategic priority setting to develop/implement innovation initiatives?
2.	Attracting or allocating dedicated funding	• What are the limitations of attracting or allocating dedicated funding to develop/implement innovation initiatives?
3.	Attracting or allocating dedicated Human Resources	• What are the limitations of Attracting or allocating dedicated Human Resources to develop/implement innovation initiatives?
4.	Awareness creation	• What are the limitations of creating general awareness among students to develop/implement innovation initiatives? • What are the limitations of creating general staff awareness to develop/implement innovation initiatives?
5.	Educational curriculum	• What are the limitations of designing a dedicated educational curriculum to develop/implement innovation initiatives?

		• What are the limitations of designing a dedicated research program to develop/implement innovation initiatives?
6.	Upgrading infrastructure	• What are the limitations of creating/upgrading infrastructure to develop/ implement innovation initiatives?
7.	Engaging local and regional partners	• What are the limitations of engaging local and regional partners to develop/ implement innovation initiatives?

G. General Regional Innovation System (RIS) Firm Eco-system potential assessment (for Business sectors)

8. Technological environment (Input)	
Human resources for innovation	• What are the employments in research and development services? • What are the employments in knowledge-intensive high-technology services?
Transmission and application of knowledge	• Are there any technology transmission and application centers?
9. Productive environment (Input)	
Human resources for innovation	• How many opportunities for employment are there in the manufacturing industry? • How many employment opportunities are in high and medium-high-technology manufacturing sectors? • How much of employment opportunities are in low and medium-low-technology manufacturing sectors? • How many R&D personnel are in the business enterprise sector? • How many adequate researchers are available in the business enterprise sector?
Creation of knowledge	• What percentage of total innovation spending goes into intramural R&D? • Is the central government providing enough public funding for firms? • Are government authorities providing enough public funding for firms? • Is local government funding for businesses sufficient?
Transmission and application of knowledge	• How many enterprises are engaged in innovation activities? • What are the High and medium high technology imports? • What are the Low and medium technology imports? • What is an acceptable number of firms' cooperation arrangements on innovation activities?

Innovation finance, outputs and markets	• How much is invested in innovation expenditures? • What are the innovation expenditures in high and medium-high-technology manufacturing sectors • What are the innovation expenditures in low and medium-low-technology manufacturing sectors

10. Institutional framework (Input)	
Innovation finance, outputs and markets	• Who are the newly created firms? • What are the newly created high and medium-high technology firms? • What are the newly created low and medium-low technology firms?
11. Path dependence (Input)	
Transmission and application of knowledge	• Is there a significant investment in the ICT sector? • Is there an accessible and efficient internet net service?
12. Technological environment (Output)	
Transmission and application of knowledge	• How do the penetration of technological advances (ICT) in firms?
Innovation finance, outputsand markets	• What are the advanced gross values added knowledge-intensive high-technology services?
13. Productive environment (Output)	
Innovation finance, outputsand markets	• **How many firms have value-added high and medium high-technology manufacturing firms?** • How many gross values added to low and medium-low technology manufacturing firms are available? • How many firms are high and medium-high technology exports? • How many firms are low and medium low technology exports? • How many gross value-added manufacturing sectors (%)? • Are there an adequate number of gross value-added high and medium-high technology manufacturing firms/gross value-added manufacturing sectors (%)? • Is there any increment in % of exports due to new or improved products to the market? • Is there any increment in % of exports due to new or improved products to the firm? • Is there any increment in % of turnover of new or significantly improved products to the firm/total turnover? • Is there any increment in % of turnover of new or significantly improved products new to the market/ total turnover?
Innovation finance, outputsand markets	• How many venture capital investments are there? • How many venture capital entities are there?
14. Institutional framework (Output)	
Creation of knowledge	• How many patent rights applicants? • How many high-tech patent rights exist in your firm?

ANNEX IV: KEY INFORMANT INTERVIEWEE GUIDELINE

1. **Lists of proposed research participants**

   1.1. Ethiopian Investment Commission representatives (EIC) experts

   1.2. Industry Parks Development Corporation (IPDC) experts

   1.3. Investment promotion consultants

   1.4. Ethiopian policy institute experts

   1.5. Ministry of National plan and development of Ethiopia experts

   1.6. National Spatial development committee experts

   1.7. Ministry of educations experts of Highers education institutes

   1.8. Academic staffs from different Higher education institutes

   1.9. Researchers who conducted researches on regional Innovation System (RIS) and competitiveness.

2. **Demographic information**

   2.1. Would you please tell me your name? _____

   2.2. Would you please tell me your phone number? _____

   2.3. Would you please tell me your email address? _____

   2.4. Would you please tell me your role in the institution? _____

   2.5. Would you please tell me how long have you serving in this institution? _____

3. ***General Regional Innovation System (RIS) Questions***

   3.1. Are you familiar with the Regional Innovation System (RIS) concept? If yes, what are your views on it?

   3.2. What do you consider as innovation and what are forms of innovation that you are interested in?

   3.3. What is your view on how innovations emerge and are disseminated?

   3.4. What are your views on the role of Innovation in achieving the regional/national competitiveness?

   3.5. How do you view the role of national/regional policies and legal frameworks in promoting innovation for development?

   3.6. What socio-economic sectors innovation can contribute the greatest to economic transformation or development goals?

   3.7. How shall research and innovation managed?

   3.8. How should institutions promote the move from research to innovation?

   3.9. What are funding mechanisms for Research and Development (R&D)?

3.10. What are mechanisms for funding Innovation activities?

3.11. How shall institutions facilitate (get involved in or support or promote) the move from Innovation to entrepreneurship?

3.12. What factors do you think are hindering or slowing the move from innovation to entrepreneurship?

3.13. What are mechanisms for capacity and competence development for innovation available?

3.14. What is one strategy that you think could boost research and innovation uptake in Ethiopia?

3.15. Is there anything you wish to be done in the future to improve the performance of in Research and Innovation promotion and Ethiopian Regional Innovation System, or regional development in general?

4. Policy frame work for Regional Innovation System (RIS)

4.1. What are the existing policy frameworks that provide the foundation for the Regional Innovation system, in Ethiopia?

4.2. What are the major policy issues in the science, technology, and innovation arena?

4.3. Who are the major policy actors in the existing policy practice platform?

4.4. What are the major responsibilities of each policy actor?

5. The existing practices of Regional Innovation System (RIS)

5.1. Which regional innovation system-building initiatives have you seen in Ethiopia that brings together regional actors?

5.2. How do you assess the effectiveness of initiatives that have strengthened regional competitiveness?

6. The Impediments of Regional Innovation System

6.1. What current major issues threaten to obstruct regional actors' efforts to work together?

6.2. What are the possible issues that would hinder the improvement of the regional innovation system in the long run?

7. Coping method to produce more positive outcomes

7.1. How might regional actors strengthen their capacity for resiliency to overcome current issues and promote regional competitiveness?

7.2. What type of support do regional actors require to employ their full potential in regional innovation system?

7.3. What policy initiatives to be made to encourage regional actors and bring about regional innovation systems?

ANNEX V: Field Observation Checklist

1. What are the existing efforts by each regional actor to bring about regional competitiveness?
2. How regional actors are working to working in collaboration with each other?
3. What key components does Hawassa University bring to the Regional Innovation System (RIS)?
4. What key components does Hawassa Industry Park bring to the Regional Innovation System (RIS)?
5. What key components do private and governmental industries bring to the Regional Innovation System (RIS)?
6. What key components does Sidama Regional State bring to the Regional Innovation System (RIS)?
7. What key components does Hawassa city administration bring to the Regional Innovation System (RIS)?
8. What key components do international civil societies bring to the Regional Innovation System (RIS)?
9. What key components do local civil societies bring to the Regional Innovation System (RIS)?

ANNEX VI: SURVEY QUESTIONER TO KNOWLEDGE EXPLOITATION SUB SYSTEM

Dear Respondent, I am a PhD students at Addis Ababa University, College of Development Studies, Centre of Urban, Regional Development and Governance program. I am undertaking a dissertation titled ***—The Role of Emerging Regional Innovation System to Regional Competitiveness: A Case of Hawassa***‖. You are one of the respondents selected to participate in this study. I would kindly request you to answer these questions; your honesty would greatly help in many aspects. The information that you will share will be kept confidential and will only be used for academic purposes.

Thank you in advance!

Kassahun A. Sube

PhD Candidate, AAU

Cell no. +251926464420

Email: kassahunaman1912@gmail.com

PART I: Demographic Information

1. Code:_____

2. Sex: Male 1. _____ 2. Female _____

3. Age: _____(specify in Number)

4. Educational Qualification:

   1. Certificate:_____2. Diploma:_____3.BA/BSc Degree: _____

   4. MA/MSc: _____ 5. Ph.D:_____

5. Position

   1. None_____ 3. Lower level management_____

   2. Middle level Management_____ 4. Higher level management_____

6. Number of years you have served in the institution_____

7. When did your business established?_____(yy)_____(mm)

8. Number of employee work for your company:_____M:_____F:_____

9. Education qualifications of employees:

   1. Below secondary _____2. Certificate:_____3. Diploma:_____4. BA/BSc _____

   5. MA/MSc: _____ 6. Ph.D:_____

10. Industry your company operate on:

    1. Textile _____ 3. Packaging _____

    2. Garment _____ 4. Chemical _____

    5. Other (Specify if any_____

1. Source of innovative ideas

1-Always; 2-Often; 3-Sometimes; 4- Rarely; 5- Never

No	Sources of innovative ideas	1	2	3	4	5
1.	Innovative ideas originate from internal sources					
2.	Innovative ideas originate from market sources (customers)					
3.	Innovative ideas originate from government sources					
4.	Innovative ideas originate from higher educational institutions					
5.	Innovative ideas originate from civil societies					
6.	Innovative ideas originate from cooperative unions					
7.	Innovative ideas originate from experienced competitors					
8.	Innovative ideas originate from suppliers					
9.	***Specify if there is any other……..***					

2. Purposes of Innovation by Types of Innovation

1-Not at all; 2- To a small extent; 3- To a moderate extent;
4- To some extent; 5- To a very great extent

N	*Purposes of Innovation by Types of Innovation*	1	2	3	4	5
	2.1. Product innovation					
1.	Innovation's primary goal is to increase product variety.					
2.	Innovation's primary goal is to increase service options.					
3.	Innovation's primary goal is to lower production costs.					
4.	Innovation's primary goal is to replace old products.					
5.	Innovation's primary goal is to replace obsolete procedures.					
6.	Innovation's primary goal is to raise product quality.					
7.	To raise the standard of services					
10.	Innovation's primary goal is to raise product quality.					
	2.2. Process Innovation					
1.	Innovation's primary goal is to increase manufacturing flexibility					
2.	Improved service providing flexibility is the primary goal of innovation.					
3.	The basic purpose of innovation is to increase capacity of service provision					
	2.3.Organizational Innovation					
1.	Improve efficiency in organizational structure					
2.	Improve the efficiency of the organizational structure					
3.	Improve external relations with other enterprises					
	2.4. Marketing innovation					
1.	Improve marketing strategies					
2.	Improve pricing techniques					
3.	Improve the efficiency retail channel					
4.	Improve the efficiency promotion					

5. **Agents of Innovation**

1-Yes; 2-No

	Agents of innovation	***1***	***2***
1.	Hawassa university		
2.	Private higher education institution		
3.	Commercial Labs		
4.	Consultants		
5.	Competitors		
6.	Customers		
7.	Suppliers		
8.	Others / (Specify)		

9. Types of collaboration

1-Always; 2-Often; 3-Sometimes; 4- Rarely; 5- Never

	Types of collaboration	1	2	3	4	5
1.	Joint production					
2.	Joint training					
3.	Joint prototype development					
4.	Joint marketing					
5.	Joint distribution					

10. The Means of Innovation

1-Strongly agree; 2-Agree; 3-Neither agree nor disagree; 4- Disagree; 5- Strongly disagree

No	**The Means of Innovation**	**1**	**2**	**3**	**4**	**5**
1.	Our company develops innovative products and services					
2.	Our company make different products using the same equipment					
3.	Our company sells customized products and services					
4.	Customers are always the same					
5.	Our company has a friendly interface with customers					
6.	Our company sells only same products					
7.	Our company continually monitors the efficiency of its processes					
8.	Everybody in the company knows what they must do to perform their job					
9.	Supplier selection is based on a web-based platform					
10.	Our company continuously opens new offices around the world					
11.	Our company has a system for customers to get offers					
12.	Our companies‘ brand means ―innovation‖					

11. Reward for innovative ideas

1-Always; 2-Often; 3-Sometimes; 4- Rarely; 5- Never

No.	*Rewards for innovative ideas*	1	2	3	4	5
1.	Innovative ideas are acknowledged in terms of recognition certificate					
2.	Innovative ideas are acknowledged in terms of financial reward					
3.	Innovative ideas are acknowledged in terms of promotion					
4.	Innovative ideas are acknowledged in terms of salary increment					
5.	Innovation ideas are not recognized					

12. Barriers of Innovation to firms

1- Strongly agree; 2-Agree; 3-Neither agree nor disagree; 4- Disagree; 5- Strongly disagree

No.	Barriers of innovation	1.	2.	3.	4.	5.
1.	Lack of skilled employs					
2.	Too much competition among enterprises					
3.	Lack of collaboration between partners					
4.	Uncertain market demands for ideas for innovation					
5.	Difficulties in obtaining government subsidies for innovation					
6.	Lack of credit is a barrier for innovation					
7.	Lack of internal finance for innovation barrier for innovation					

13. Cooperative arrangements

a. Do you have any cooperative arrangements with external stakeholders

1. Yes _____ 2. No_____

i. ***If your answer is Yes, please answer the following questions***

1-Not at all; 2- To a small extent; 3- To a moderate extent; 4- To some extent; 5- To a very great extent

	Results of Cooperation	1	2	3	4	5
1.	As a result of the collaboration, sales increased					
2.	The collaboration leads to an increase in productivity					
3.	The collaboration leads to decrease in manufacturing costs.					
4.	The collaboration leads to an improvement in client responsiveness					
5.	The collaboration leads to an increase in market exploration. (new customer)					
6.	The collaboration raises the *bar* for workplace safety.					
7.	As a result of the collaboration, energy usage is decreased.					
8.	As a result of the collaboration, government regulatory requirements are met.					

9.	As a result of the collaboration, lessons were taken to protect environment					

14. Research and Development

a. Does your organization conduct a research?

1. Yes: _____ 2. _____

i. If yes fill the following survey under A and B

A. Reasons for conducting research

1-Always; 2-Often; 3-Sometimes; 4- Rarely; 5- Never

	Reasons for conducting research	**1**	**2**	**3**	**4**	**5**
1.	To analyse the current market trends and customer needs					
2.	To taste a new product design or improving an existing one					
3.	To evaluate the current financial processes within a company					
4.	To gather feedback from customers during any stage of the business cycle					
5.	To compare the strengths and weaknesses of competitors					

B. Assessment of Research and Development in the company

1-Strongly disagree; 2-Disagree; 3-Neither agree nor disagree; 4- Agree; 5- Strongly agree

No	**Assessment of Research and development in the company**	**1**	**2**	**3**	**4**	**5**
1.	R&D personnel are submitting frequent oral and written reports concerning what they are doing					
2.	Decision making is extremely decentralized in R& D unit.					
3.	There is considerable more competition than cooperation among the members in R&D department.					
4.	In R&D department changes are made with a great deal of flexibility and speed.					
5.	Top management does not associate with lower or middle management.					
6.	Almost all important decision making in this department is clearly in the hands of top management.					
7.	There is a great deal of desire for self-advancement within R&D department.					
8.	The most deserving members of the department are the ones who get promoted.					
9.	In R&D unit, superiors watch over sub-ordinates carefully to make sure they do things right.					
10.	There are many status symbols here that distinguish one management level from another					

11.	You can tell very accurately a member's level in the departmental hierarchy by a description of his desk, floor covering, office, etc.					

12.	Members at different levels in R&D department treat each other as equals.					
13.	As long as he keeps within broad limits, a staff member can plan and schedule his work as he wants to.					
14.	As long as he keeps within broad limits, an R&D member can plan and schedule his work as he wants to without consulting other members of the department.					
15.	The R&D staff assignments in this department are clearly defined and logically structured.					
16.	In general, good performance is what of personal friendships rather than by merit.					
17.	R&D personnel here must submit frequent oral and written reports to their superiors.					
18.	There are a lot of policies and standard procedures in R&D which a new member must know before beginning a job.					
19.	This unit gives you the feeling that you can depend on it for security					
20.	Written policies and procedures are kept to a minimum in R&D department					
21.	There is very little conflict between members in R&D					
22.	This unit has a real drive to be number one in its field of endeavour					
23.	There are excellent benefits for members of R&D department					
24.	R&D does what is best for itself regardless of whom or what it hurts.					
25.	This company is content with a rather mediocre level of performance from its R&D personnel.					
26.	R&D would be the last to experiment which a novel procedure or method even if it appeared promising.					
27.	Top management is quite insensitive to the interests, needs, and aspirations of the personnel under them					
28.	In this department, R&D personnel are rewarded in proportion to the quality of their work.					
29.	R&D has very detailed reporting procedures for almost all activities and functions.					
30.	R&D department, one man makes all the important decision					
31.	R&D personnel are expected to have very little contact with his boss on a project					
32.	On important jobs or projects, a member of the R&D expected to have little contact with his boss.					
33.	The opportunity for managerial advancement is outstanding here					
34.	There is not much effort the R&D to grow and constantly improve itself					
35.	Top management is more concerned with what's accomplished than with the methods used					

36.	Decision-making in this department is accomplished through shared authority (by which top and lower levels of management arrive at decisions jointly)					

37.	When all rewards are considered, R&D rewards its personnel better than most					
38.	Meaningful cooperation and innovations in R&D are stifled because of too many vested interests					
39.	A member has to be well up the hierarchy before he has the opportunity to make any important decisions.					
40.	Members of R&D department love to tackle **knotty problems**.					
41.	R&D personnel are more interested in achieving the organizational goals than in personal advancement					
42.	The pay for members in this department is lower than for similar departments in other companies					
43.	No matter how good a job they do, R&D personnel seldom get any praise from their superiors					
44.	There is a strong sense of community, a feeling of shared interest and purpose among the members in R&D department					
45.	Supervision is much too close here					
46.	Standard operating procedures within the department are spelled out for almost everything that a member does					
47.	The R&D department is sympathetic with the personal problems of its employees					
48.	Bosses try to supervise too closely here					
49.	This department is truly interested in the welfare of its members, both on and off the job.					
50.	Traditions are so strong in R&D that it is difficult to modify established procedures or undertake new programs.					

ii. If 'No' fill the following survey under C

C. Research for not conducting research

1- Yes; 2- No

No	Reasons not conducting research	1	2
1.	Our company is not conducting researches due to difficulties to find funds		
2.	Our company is not conducting researches because we didn't feel the need		
3.	Our company is not conducting researches due to lack of demand by clients		
4.	Our company is not conducting researches due to difficulty to find internal experts		
5.	Our company is not conducting researches due to difficulty to find external experts		
6.	Our company is not conducting researches due to development time was too long		
7.	Our company is not conducting researches due to rate of recovery of cost was too slow		
8.	Our company is not conducting research due to difficulties to commercialize the findings		
9.	Our company is not conducting research due to the higher risk of research and development		

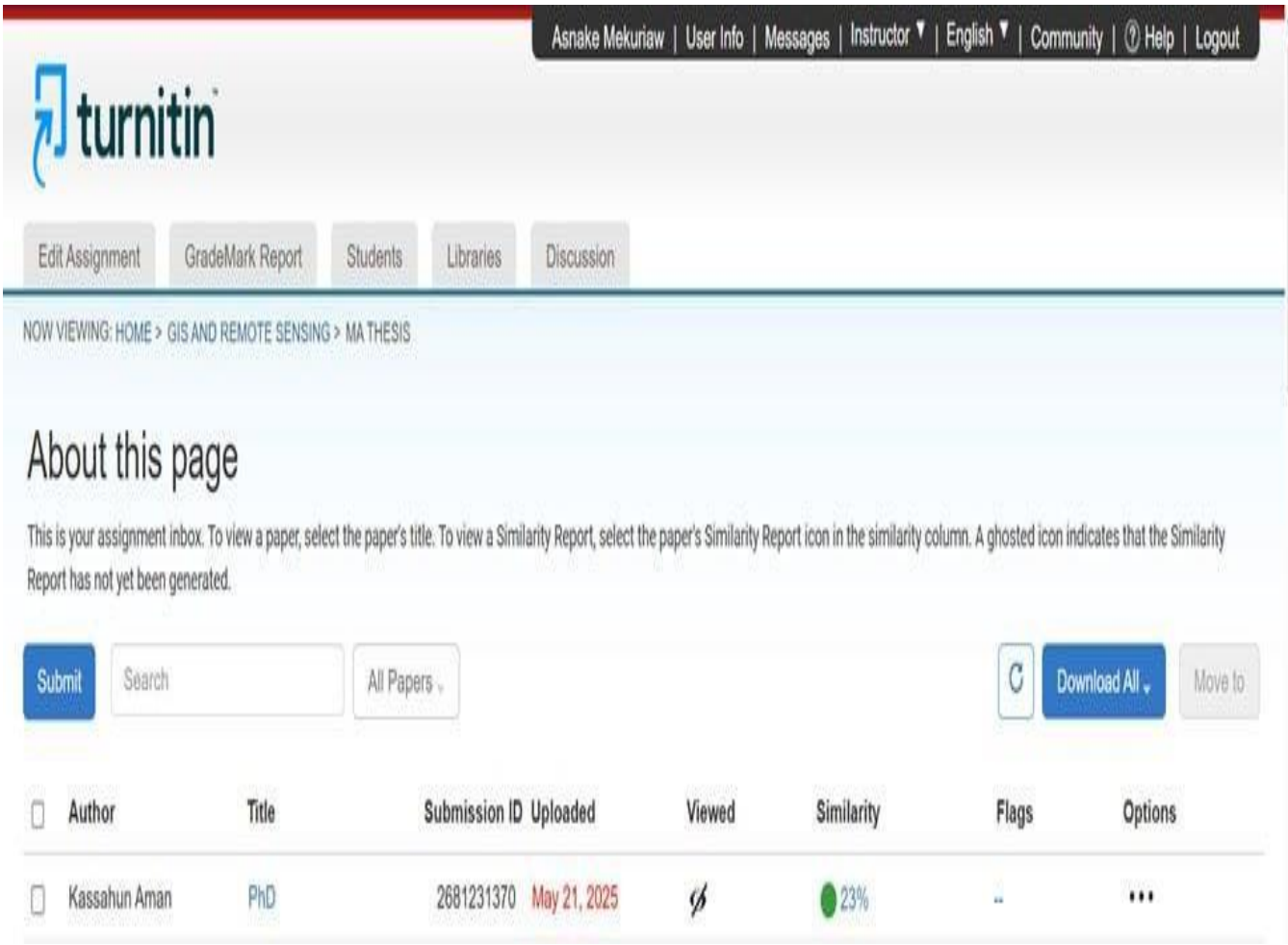
10.	Our company is not conducting research due to the complex and costly options		
11.	Our company is not conducting research due to the difficulties to protecting the innovative research findings arising from R& D		

15. Building blocks of innovation (Innovation quotient)

1-Not at all; 2- To a small extent; 3- To a moderate extent; 4- To some extent; 5- To a very great extent

No	Building blocks of innovation	1	2	3	4	5
	A. Values					
1.	We have a burning desire to explore opportunities and to create new things.					
2.	We have a healthy appetite and tolerance for ambiguity when pursuing new opportunities.					
3.	We avoid analysis paralysis when we identify new opportunities by exhibiting a bias towards action.					
4.	We encourage new ways of thinking and solutions from diverse perspectives.					
5.	Our work place provides us the freedom to pursue new opportunities.					
6.	We take delight in being spontaneous and are not afraid to laugh at ourselves.					
7.	We are good at asking questions in the pursuit of the unknown.					
8.	We are constantly experimenting in our innovation efforts.					
9.	We are not afraid to fail, and we treat failure as a learning opportunity.					
	B. Behaviours					
10.	Our leaders model the right innovation behaviours for others to follow.					
11.	Our leaders inspire us with a vision for the future and articulation of opportunities forthe organization.					
12.	Our leaders frequently challenge us to think and act entrepreneurially.					
13.	Ourleadersdevote time to coach and providefeedback in our innovation efforts.					
14.	In our organization, people at all levels proactively take initiative to innovate.					
15.	Our leaders provide support to project team members during both successes and failures.					
16.	Our leaders use appropriate influence strategies to help us navigate around organizational obstacles.					
17.	Our leaders are able to modify and change course of action when needed.					
18.	Our leaders persist in following opportunities even in the face of adversity.					
	C. Climate					
19.	We have a community that speaks a common language about innovation.					
20.	We appreciate, respect and leverage the differences that exist within our community.					
21.	We work well together in teams to capture opportunities.					
22.	We are consistent in actually doing the things that we say we value.					
23.	We question decisions and actions that are inconsistent with our values.					
24.	We are able to freely voice our opinions, even about unconventional or controversial ideas.					
25.	We minimize rules, policies, bureaucracy and rigidity to simplify our workplace.					
26.	People take responsibility for their own actions and avoid blaming others.					

27.	Our people know exactly how to get started and move initiatives throughthe organization.					
	D. Resources					
28.	We have committed leaders who are willing to be champions of innovation.					
29.	We have access to innovation experts who can support our projects.					
30.	We have the internal talent to succeed in our innovation projects.					
31.	We have the right recruiting and hiring systems in place to support a culture of innovation.					
32.	We have good collaboration tools to support our innovation efforts.					
33.	We are good at leveraging our relationships with suppliers and vendors to pursue innovation.					
34.	We give people dedicated time to pursue new opportunities.					
35.	We have dedicated finances to pursue new opportunities.					
36.	We have dedicated physical and/or virtual space to pursue new opportunities.					
	E. Processes					
37.	We systematically generate ideas from a vast and diverse set of sources.					
38.	We methodically filter and refine ideas to identify the most promising opportunities.					
39.	We select opportunities based on a clearly articulated risk portfolio.					
40.	We move promising opportunities quickly into prototyping.					
41.	We have effective feedback loops between our organization and the voiceof the customer.					
42.	We quickly stop projects based on predefined failure criteria.					
43.	Our processes are tailored to be flexible and context-based rather than control and bureaucracy-based.					
44.	We quickly go to market with the most promising opportunities.					
45.	We rapidly allocate resources to scale initiatives that show market promise.					
	F. Success					
46.	Our customers think of us as an innovative organization.					
47.	Our innovation performance is much better than other firms in our industry.					
48.	Our innovation efforts have led us to better financial performance thanothers in our industry.					
49.	We treat innovation as a long-term strategy rather than a short-term fix.					
50.	We have a deliberate, comprehensive and disciplined approach to innovation.					
51.	Our innovation projects have helped our organization develop new capabilities that we did not have three years ago.					
52.	We are satisfied with our level of participation in our innovation initiatives.					
53.	We deliberately stretch and build our people‘s competencies by their participation in new initiatives.					
54.	We reward people for participating in potentially risky opportunities, irrespective of the outcome.					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Acceptance Letter

Dear authors

(Kassahun Sube, Tegegn Gebre-Egziabher , and Ashenafi Bayinesagn)

This letter serves to testify that the article ***"Challenges and Opportunities for Technology Transfer and Community Engagement at Research Universities: The Case of Hawassa University, Ethiopia"*** is **accepted** to be published in Vol. 48 No. 1 (April 2026 issue) of Ethiopian Journal of Development Research (EJDR).We will send you the final and formatted version for your proof reading and approval when it gets ready.

Sincerely yours,

Nigatu Regassa (Prof.)

Editor-In-Chief

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