Addis Ababa University
Addis Ababa Institute of Technology
School of Mechanical and Industrial Engineering

Post Graduate Program in Mechanical Engineering
MSc. in Industrial Engineering

Identification of the Factors Affecting Capacity Utilization of Metal and Engineering Works

In Small and Medium Enterprises

(Case of Arada sub city)

Prepared by:
Yodit Tolosa

Advisor:
Dr. Gezahegn Tesfaye
Co-advisor:
Yichalewal Goshime (PhD candidate)

Presented for partial Fulfillment of the Requirements for the Degree of Master of Science in Mechanical Engineering (Industrial Engineering)

April, 2021
Addis Ababa, Ethiopia

Declaration

This is to witness that this thesis entitled "**identification of the Factors Affecting Capacity Utilization of Metal and Engineering Works in Small and Medium Enterprises of Arada sub city**" submitted in partial fulfillment of the requirements for the award of the degree of M.Sc. School of Mechanical and Industrial Engineering, Addis Ababa University done by Ms. Yodit Tolosa under my guidance. The work contained in this thesis has not been previously submitted for a degree or diploma at any other higher education institutions to the best of my knowledge and belief.

Approved by:

Advisor:	_____	_____
Dr.Gezahegn Tesfaye	Signature	Date
Co- Advisor:	_____	_____
Yichalewal Goshime (PhD candidate)	Signature	Date
Internal Examiner:	_____	_____
Dr.Gulelat Getaw	Signature	Date
External Examiner:	_____	_____
Dr.Merertu Wakuma	Signature	Date
Chair Person:	_____	_____
Dr.Gezahegn Tesfaye	Signature	Date
School Dean:	_____	_____
Dr.Yilma Tadesse	Signature	Date

AKNOWLEDGEMENT

First and utmost, I would like to thank the **Almighty God** with his beloved mother St. Marry who have been with me throughout my life.

Secondly, I would like to express my special gratitude to my advisor, Dr. Gezahegn Tesfaye and Co-advisor Yichalewal Goshime (PhD candidate), for guidance, encouragement, constructive comments and feedback which were valuable to come up with this thesis.

Thirdly, I would like to express my deepest gratitude to employee & SMEs enterprise operators of Arada sub-city sub city metal and engineering sector who supported me by completing the questionnaire.

Finally yet importantly, I would like to thanks my beloved family and Ms.Tamrnesh Tadesse (my friend and class mate), Mrs. Mistir Biniyam (my friend and class mate), Ms.Beza Akalu (my friend) & Ms. Mahder Dereb (my friend) who give me moral and encouragement while doing the thesis.

Abstract

Small and medium enterprises have been perceived as a dynamic force for sustainable economic growth because they play an important role in creating job opportunity for individuals graduated from a different sector, reducing poverty, enhancing technological innovation, and developing entrepreneurial skills. The general purpose of the study was to identify the factors affecting capacity utilization of metal and engineering work (MEW) in a small and medium enterprise (SME) in the case of Arada sub-city administration. The study determines factors affecting the capacity utilization of the case sector. Both Primary and secondary data were used for this study. Data were collected from 81 respondents of SMEs. The data collected were analyzed using appropriate descriptive statistics and linear multiple regression techniques. The data have been analyzed with the help of Statistical package for social science (SPSS). The findings of this thesis indicated that the significant factors impacting capacity utilization of the case sector are market demand, finical access, human resource, raw material good governess, innovation, and on job training. And also working on each significant factor in such a way to decrease their effect on capacity utilization helps the case sector to use their installed CU more intensively. The conceptual map also developed that helps the enterprise to use the installed capacity efficiently and effectively by improving the significant factors. And it's found that the proposed conceptual map will pose a positive change to the existing capacity utilization of those selected enterprises from the group discussion with the owner of the enterprise that are selected from the sample size.

Key words: Capacity utilization, Small and Medium enterprises (SMEs), metal and engineering sector, and Conceptual map

Table of Contents

Declaration ii

Aknowledgement iii

Abstract iv

List of table vii

List of figures viii

Acronyms ix

1. INTRODUCTION AND PROBLEM JUSTIFICATION 1

1.1 Introduction 1

1.2 Research background 3

1.2.1 Overview on small and medium enterprises 3

1.2.2 Classifications of Small and Medium Enterprises 4

1.2.3 Definition of Micro and Small Enterprises in Ethiopia 4

1.2.4 Basic Metal and Engineering sector 5

1.3 Problem statement 6

1.4 Research questions 7

1.5 Objectives of Study 7

1.5.1 General objective 7

1.5.2 Specific Objectives 7

1.6 Scope and limitation of the Research 7

1.7 Significance of the Study 8

1.8 Organization of the Study 8

2. LITERATURE REVIEW 9

2.1 Introduction 9

2.2 Conceptual Definitions of Terms 10

2.3 Capacity and Capacity utilization 10

2.4 Factors affecting capacity utilization 12

2.4.1 Literature gap 22

3. RESEARCH METHODOLOGY 25

3.1 Background of the Study Area 25

3.2 Research Design 27
3.4 Sampling Technique and Target Populations 27
3.5 Methods of Data Collection 28
3.6 Method of data analysis 28
4. DATA ANALYSIS AND DISCUSSION 31
4.1 Introduction 31
4.2 General background of the respondent 31
4.3 Capacity Utilization 33
4.3.1 Determinant Factors of Capacity Utilization 34
4.4 Correlation Analysis of Factors 39
4.5 Regression Analysis 41
4.6 Proposed conceptual map for Capacity Utilization Improvement 45
4.7 Verification of the proposed conceptual map 49
5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION 52
5.1 Introduction 52
5.2 Major findings 52
5.3 Conclusion 53
5.4 Recommendation 55
5.4.1 Recommendation for MEW in SME of ASCA 55
5.4.2 Recommendation for Woreda and sub-city level SME Bureau 56
5.4.3 Recommendation for further research 56
Reference 57
Appendix-I survey questions 63
Appendix-Ⅱ 72
Appendix-Ⅲ 73
Appendix-Ⅳ 74

List of table

Table2 1Empirical study on capacity utilization 14
Table2 2summery of empirical investigation 18

Table3. 1Number of SME engaged in metal and metal product in Arada sub city 26
Table3. 2 Description of variables 29

Table4. 1 Participant's Demographic Profile 31
Table4. 2 Descriptive statistics of capacity utilization 34
Table4. 3 Capacity Utilization 34
Table4. 4Extent of availability of infrastructure 35
Table4. 5 Extent of Raw Material Availability 35
Table4. 6 Extent of Availability of Finance 36
Table4. 7 Response about the existing tax system 36
Table4. 8 Existence of Qualified Human resource 37
Table4. 9 Availability of market 37
Table4. 10 Opportunity to Obtain on the Job Training 38
Table4. 11 Existence of Good Governance 38
Table4. 12 Innovation Capacity 39
Table4. 13 Correlations 40
Table4. 14 Model Summary 42
Table4. 15 ANOVA 42
Table4. 16 Coefficients 43
Table4. 17 Reliability Analysis 44
Table4. 18 Residuals Statistics 44
Table4. 19 Collinearity Diagnostics 44

List of figures

Figure2. 1 conceptual framework 9
Figure2. 2 Factor affecting capacity utilization 22

Figure3. 1 Map of Arada sub-cities 26
Figure3. 2 Research Framework 30

Figure4. 1 Proposed conceptual map for Capacity utilization Improvement 48

Acronyms

AACA	Addis Ababa City Administration
AAAJCAEDB	Addis Ababa Administration Job Creation and Enterprise Development Bureau
ASCA	Arada sub-city Administration
ASCIDO	Arada sub-city Industrial development office
BMEI	Basic Metal and Engineering Industry
CU	Capacity Utilization
ETB	Ethiopian birr
EDRI	Ethiopia Development Research Institute
FDRE	Federal Democracy republic of Ethiopia
GDP	Gross domestic product
GTP	Growth and Transformation Plan
OECD	Organization for Economic Co-operation and Development
SME	Small and Medium enterprises
SSA	Sub-Saharan Africa
SPSS	Software Package for Social Sciences
TRANSIP	Transportation System Improvement Project
UNDP	United Nation Development Program
UNIDO	United Nations Industrial Development Organization
WEF	World Economic Forum
WHO	World Health Office

1. INTRODUCTION AND PROBLEM JUSTIFICATION

1.1 Introduction

Small and medium enterprises have been given recognition in the developing country industry development plan and have perceived as a dynamic force for sustainable economic growth because they play an important role in creating job opportunity for individuals graduated from different sector, reducing poverty, enhancing technological innovation, and developing entrepreneurial skills (Nega & Hussein, 2016).

In today's competitive environment, every organization has to work hard to increase their capacity utilization. Capacity utilization (CU) is used to define the position of the organization in the global market (Jayanth & Vidyashankar, 2014). Capacity utilization in manufacturing and service industry is important to study the characteristics of productivity, profit, output, investment and inflation of the industry and to measure the extent to which the productive capacity of the industry is being used in the process of generation of goods and services (Augustine et al, 2015). As stated by Augustine, capacity utilization is one of the most critical determinants of productivity characteristic, organizations operating at their full capacity are more likely to increase their capital or to add additional workers in order to increase their output, and the cost of the output may also increase.

Organizations that work at low capacity utilization, on the other hand, increase their productivity by more intensively using their existing labor and resources. (Lane & Rosewall, 2015). Most of the studies which are analysis of cause of under-capacity utilization of the Ethiopian Re-bars Manufacturing Industry Mulugeta (2018), major determinants of capacity utilization in the large-scale manufacturing sector of Pakistanan Kalim (1998), factor affecting CU decision in Nigerian manufacturing Industry Mojiekwu & Iwuji (2012), etc focused on the analysis of capacity utilization of large scale manufacturing industry, and very negligible attention was given to capacity utilization of small and medium enterprise

For developing countries like Ethiopia which have a lot of crises by a shortage of capital, raw material, and skilled labor, analyzing factors affecting capacity utilization has special implication

for better utilization of existing capacity that makes evolution possible without the need for an additional investment of capital or labor.

The basic metal and engineering industry (BMEI) is often considered as a backbone of an economy (Gebreeyesus, 2014). According to the study of Development of Sustainable and Inclusive Basic Metal and Engineering Industry, the existing metal and engineering industries account in 2014-15 for around 0.8 percent of GDP in Ethiopia, equivalent to $US0.5 billion of value-added. But similar to the most underdeveloped countries the BMEI in Ethiopia is found at a very low stage of development (Gebreeyesus, 2014). They are characterized as capital intensive, largely import-dependent for raw materials, weak in contribution to import substitution, low in capacity utilization, and slow in growth (Beyene, 2018).

In Arada sub city there are over all 101 SME enterprises that produce metal and metal products. This sub-city has a relatively high number of SMEs in Addis than other sub-cities (AAAJCAEDB, 2019). Enterprises in Arada sub-city contributions to employment creation, productivity improvement, technological capability development, and income generation are underutilized. The country has benefited little from this sector due to low productivity, high labor turnover, and an inability to bring the intended structural change (Tigabu et al, 2018).

This study intended to identify the factors affecting capacity utilization of metal and engineering work (MEW) in a small and medium enterprise (SME) in the case of Arada sub-city administration (ASCA) by referring to different researches conducted on different manufacturing industry regarding the factor affecting the capacity utilization of this manufacturing industry. Also, their effect on CU, and finally, which aspect this sector should pay special attention to boost capacity utilization.

1.2 Research background

1.2.1 Overview on small and medium enterprises

There is a worldwide consensus that high rates of economic growth contribute to economic and social development and poverty reduction. At the same time, there is growing recognition that poverty-reducing growth depends on the quality of growth: its composition, distribution, and sustainability (OECD, 2004).

The study called "The importance of SMEs in Developing Economies" asserts that small enterprises are essential to all economies in the world especially to those in developing countries. The belief that small enterprise development is one of the building blocks of innovation and sustainable growth which leads to prove an effective anti-poverty program is a reason for the considerable interest of small enterprises in developing countries. Using the observations of this study, the small enterprises have ensured economic growth, productivity, and employment in any country even during the years of economic crisis and recession. (Hidayet et al, 2010).

In Africa a colossal sum of 90% of all private businesses fall within the bracket of SMEs; by this same estimate, their chip of the employment strata also stands at 5 % with a correspondingly high contribution to the overall productivity output of most African economies. In contrast to the classical gains of multinational corporations, SMEs are better suited to serve the developmental needs of poor countries than the former (UNIDO, 1999).

Based on Gebre-egiziabher and Demeke research, the importance of SMEs is growing in Sub-Saharan Africa (SSA) having increased urban population dynamics. SMEs have become important urban economic activities particularly in providing urban employment because of rapid rural-urban migration and deficiency to absorb this migration in SSA. Since Ethiopia is one of the sub-Saharan countries; SMEs and the informal sector are the predominant income generating activities in cities and towns of Ethiopia which have a significant contribution to local economic development (Gebre-egiziabher and Demeke, 2004).

The governments of Ethiopia developed micro and small enterprises strategy in 1996/1997. However, the program was given high attention by the government in 2004/2005. In line with this, it is implemented by a federal SMSs development agency only at the national level this makes difficult the strategy practical for SMs operators and the government to decide to establish SMSs coordinating body at the regional and zone/district level (Debela, 2011). These sectors contribute about 3.4% to GDP, 3.5% of the industrial sector, and 52% of the manufacturing sector by using effectively the skill and talent of people especially women and youth without resuming high-level training much capital, and high technology(Gebrehiwot,2006).

1.2.2 Classifications of Small and Medium Enterprises

Small and Medium Enterprises (SMEs) are not uniform across the globe. In most literature, the way they are defined depends on the stage of economic development and the broad policy purposes for which the definition is used. The most commonly used definitions relate to either size of employment and or quantum of capital investments or fixed assets.

According to Buculescu M.M, (2013) small enterprises could be defined and classified by considering quantitative, qualitative, and both quantitative and qualitative aspects. The paper states that, because quantitative criteria allow a clear delimitation between different categories of small enterprises like micro-entities, small and medium-sized entities, they are more often used for defining small enterprises. And, some quantitative criteria are the number of employees, turnover, total balance sheet or a combination of the last two, net assets, initial capital, return invested capital, industrial classification combined with a number of employees, totally produced quantity, and their value, added value, etc. The author indicates the number of employees, turnover, and total balance sheet as the most common quantitative criteria used.

1.2.3 Definition of Micro and Small Enterprises in Ethiopia

Federal Negarit Gazette of the Federal Democratic Republic of Ethiopia, February, (2016) edition, states the definitions of both Small and medium enterprises in Ethiopia. Therefore,

"Small manufacturing industry" means an industry having a total capital, excluding building, from Birr 100,001 to Birr 1,500,000 (One Hundred Thousand One Birr to One Million Five Hundred Thousand Birr) in the manufacturing sector and engages from 6 to 30 workers including the owner, his family members, and other employees and;

"Medium manufacturing industry" means an industry having a total capital, excluding the building. from Birr 1,500,001 to Birr 20,000,000 (One Million Five Hundred Thousand One Birr to Twenty Million Birr) in the manufacturing sector and engages from 31 to 100 workers including the owner, his family members, and other employees.

In the Arada sub-city administration, there are different small and medium enterprises in different sectors. And, Metal and engineering work (MEW) is one of these enterprises in the manufacturing sector.

1.2.4 Basic Metal and Engineering sector

The Basic Metal and Engineering Industries (BMEIs) are identified as one of the priority sub-sectors for medium and large industries development in the Growth and Transformation Plan (GTP). The BMEIs are considered as the primary industries to contribute to import substitution-based industrial development (Homma, 2010).

According to Study of Development of Sustainable and Inclusive Basic Metal and Engineering Industry in Ethiopia Metal and engineering industries build capacity and upgrade performance in terms of utilization of capacity. The Ethiopian metal industry sector is classified into two categories, which are basic metal and engineering industries. Basic metal industries involved in the production of metal from ore, scrap, and conversion of billet, slabs, etc. into primary metal products such as hot rolled ribbed and plain reinforcement bars, wire rod, angles, cold-rolled tubes of various profiles, cold rolled sheets, galvanized sheets, and tubes whereas engineering industries convert primary metal products into secondary products such as metallic structures, tanks, pressure vessels, machine parts, components, types of machinery, transport equipment, electrical and electronic equipment, measuring and control instruments and others. The primary metal products produced by basic metal industries are subsequently raw materials (inputs) for the downstream engineering industries (Dametew et.al, 2017).

According to Asmamaw creating backward and forward linkage, enhances foreign exchange earnings by promoting standard quality export products, creates jobs and increases income, and gives an opportunity to technology transfer are the value of metal and metal products industry (Asmamaw, 2010).The Manufacture of metal products of SMEs are an enterprises sector engaged in the manufacture of fabricated metal products, except machinery and equipment; manufacture of parts and accessories for motor vehicles and their engines (Workineh, 2016).

1.3 Problem statement

Capacity utilization is very important in industries because it shows the extent to which factors of production are actually being utilized (Madueme, 2009). Despite the enormous importance of the SME sector to the Ethiopian economy in terms of job creation and alleviating extreme poverty, many SMEs are unable to reach their full potential (Nega & Hussein, 2016). According to Belyh (2015), the majority of businesses today do not run at full capacity. This is because they often encounter numerous roadblocks in the manufacturing process as a result of malfunctioning machinery, reduced demand, employee disruption, and other factors. As a result, a rate of 85% is consistently thought to be the best rate for most companies. And according to the report of Ethiopian development research institute in 2018 (EDRI), SMEs are not operating at their full capacity. The capacity utilization rate for small and medium enterprises in Addis Ababa is 57.4 % for small enterprise and 67.1% for medium enterprise and SMEs in Arada sub- city is one of the Addis Ababa sub-city, they also share this underutilization of installed capacity.

Low values of capacity utilization indicate insufficient utilization of factors of production and the presence of idle factors such as machinery, manpower, and resources, which have negative consequences such as increasing levels of unemployment, poverty, reduction of the size of firms, low levels of gross domestic product. Because idle capacity is a waste resource, it results in a decline in the rate of development for developing countries (Madueme, 2009).

Subramanya and Reddy (2013) also state that low utilization of the production capacity results in an increase in the cost of production per unit. However, if the necessary raw materials are available and maximum utilization of machinery and labor results in higher production, it leads to considerable reduction to the average cost per unit and the marginal cost. The enterprise has to plan in detail to use its productive capacity effectively to reduce overhead costs. Thus, the aim of the enterprises should always be to utilize production capacity fully.

And from the two papers, it can be concluded that low utilization of installed capacity results in low production capacity, and to improve its utilization, main factors affecting CU in the specific industry need to be identified. Additionally, critically analyzing this factor and their impact on CU also helps to manage the factors that lead to high utilization of installed CU.

Most of the studies conducted on capacity utilization focus on specific factors such as factors affected by fiscal incentive, market, technology, and factors within the economics model (Mapetere & Thelma, 2018; Ndemezo et al, 2018; Bansak et al, 2007 Cristian, 2012). Therefore, this paper intends to study the factor affecting capacity utilization, analyze the factor and their impact on capacity utilization and finally recommend a conceptual mapping model that will help SME of metal and engineering works in the case of Arada sub-city to improve their capacity utilization.

1.4 Research questions

The general research question of this research paper focuses on identifying the factors affecting capacity utilization in MEW in SMEs in ASCA.

The specific questions are:

1. What are the main factors that affect the capacity utilization of MEW in SMEs of ASCA?
2. How to analyze the factor and their impact on the capacity utilization of MEW in SMEs of ASCA?
3. How to improve the CU of MEW in SME in ASCA?

1.5 Objectives of Study

1.5.1 General objective

The general objective of this study is to identify the factors affecting capacity utilization of metal and engineering work in SME of Arada sub-city administration.

1.5.2 Specific Objectives

The specific objectives of this research:

1. To assess and identify the factors affecting the capacity utilization of MEW in SMEs in ASCA.
2. To analysis the factor impact on the capacity utilization of MEW in SME in ASCA.
3. To propose a conceptual map model for capacity utilization improvement of MEW in SME in ASCA.

1.6 Scope and limitation of the Research

This research emphasis analyzing factors that affect the capacity utilization of MEW in SMEs in ASCA and proposes its recommendation for improving capacity utilization based on its installed capacity. This study focuses only on MEW in SME of ASCA from all SME in ASCA which has

a relatively high number of SME's in Addis than other sub-cities due to time constraint, resources limitation and difficulty to get information that needs direct contact with the worker because of their behaviors. The result may not necessarily represent the reality for the entire city of Addis Ababa SME factor affect capacity utilization; but within the target sub-city, Arada, the study tried to make representative samples in dealing with the research population. Extensive literature search related to the topic which also includes theoretical foundation, other works on the topic, and real-world application of the topic will be explored to build a general insight about the topic under study.

1.7 Significance of the Study

This research helps the case sector to maintain the critical factors that affect effective capacity utilization to properly utilize its installed capacity and improve its capacity utilization by applying the recommended directions to investigate the way of capacity utilization improvement. This study worth doing because it helps the company to look at its problems in capacity utilization, to take alternative considerations, and to give basic knowledge about factors affecting capacity utilization in manufacturing industries to effectively utilize its capital. The Knowledge from the topic is also used to identify an area that needs further research related to the concept. Moreover, the study can be applied to other SMEs to measure and improve their capacity utilization. On the other hand, this study can be a source of information for other researchers to conduct further work in this sector.

1.8 Organization of the Study

This paper is organized into five chapters; chapter one contained the introduction part dealing with research problems, objectives, and an overview of the case sector, significance, scope, and limitations. The second chapter discussed the review of related literature about the subject matter which is capacity utilization and the factor that influence it. The third chapter contains the methodology of the study that includes research design, method of data collection, and data analysis. And next chapter deals with the result of data analysis and the proposed conceptual model. Finally, chapter five has covered the conclusion of the findings and forwards recommendations.

2. LITERATURE REVIEW

2.1 Introduction

In this chapter different literature have been reviewed concerning capacity utilization related to this study to provide insight into information from previous researches. These include capacity, capacity utilization, and factor affecting capacity utilization from both theoretical and empirical studies will be discussed from different researcher views aspect.

The conceptual framework for the literature review mainly focuses on investing different theoretical and empirical studies on factor affect capacity utilization in the manufacturing industry. And this investigation helps to identify the critical factor that can affect the CU of the case sector that used to improve the capacity utilization of the sector by giving appropriate solutions for those critical factors.

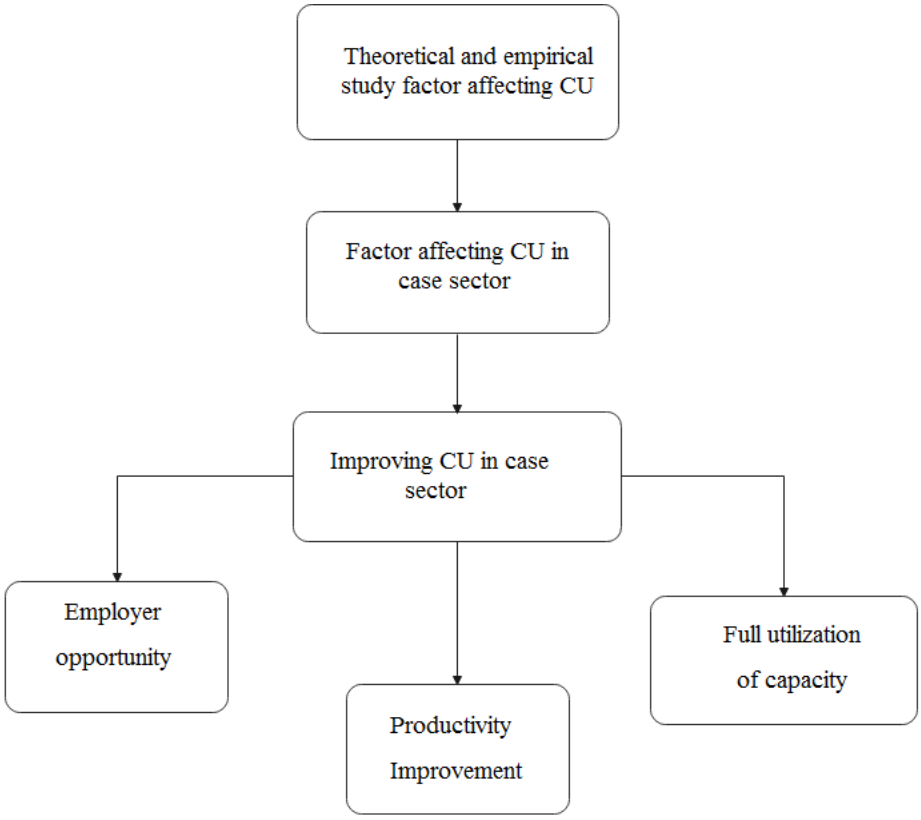


Figure2. 1 conceptual framework

2.2 Conceptual Definitions of Terms

Capacity: an actual output of an enterprise in a given period of time under normal working conditions (Tursunov, 2017).

Capacity utilization: is how an enterprise uses its installed productive capacity.

Factor: is influencing aspects such as financial source (working capital), Infrastructure facility, market demand, Skilled man power, raw material and Tax administration factors on job training, good governance, and innovation that affect capacity utilization of SMEs.

Small Enterprises: enterprise which has 6-30 employees and total asset 100,001—1,500,000 ETB for industrial sector and 50, 0001—500,000 ETB for service sectors.

Medium Enterprise: enterprise which has more than 31-100 employees and total asset above 500,000 ETB for service sector and 1.5million-20million ETB for industrial sector.

Metal and engineering sector in SME are an enterprises sector engaged in manufacture of fabricated metal products, except machinery and equipment; manufacture of parts and accessories for motor vehicles and their engines (Workineh, 2016).

2.3 Capacity and Capacity utilization

Capacity is about the ability to do something, an emergent combination of attributes that enables a human system to create developmental value, and finally, 'capacity' refers to the overall ability of a system to create value (Morgan, 2006). The United Nations Development Programmed defined capacity as: 'the ability of individuals, institutions, and societies to perform functions, solve problems, and set and achieve objectives in a sustainable manner' (UNDP, 2006). According to European Commission (2008) capacity defines as the ability to perform tasks and produce outputs, to define and solve problems, and make informed choices. On the other hand, Lawal defined capacity as the maximum amount that can be produced per unit of time with existing resources, provided that the availability of variable factors of production is not restricted. Technologically capacity refers to Potential output that may be equated to a maximal output given the stock of capital, stock of resource, full utilization of the variable factors of production such as energy, labor, materials, and the state of technology. And economically it refers to optimum potential output which could be produced give the capital stock, the

technology, input prices, output prices when outputs are not fixed, and technically efficient and fully utilized factors of production as appropriate to achieve maximum profit or minimum cost (Lawal,2008).

According to Morrison, capacity utilization is how an enterprise uses its installed productive capacity. A metric used to measure the rate at which potential output levels are being met or used. Capacity utilization levels give insight into the overall slack that is in the firm at a given time. If a company is running at a 70% capacity utilization rate, it has room to increase production up to 100% without increasing costs (Morrison, 2012). Angus classifies capacity as design capacity and effective capacity. The Design capacity is the maximum rate of output achieved under ideal conditions. Effective capacity is based on realities of changing product mix, the need for periodic maintenance of equipment which is usually less than design capacity lunch breaks, coffee breaks, problems in scheduling and balancing operations, and other similar circumstances (Angus, 1995).

The output that a workstation or process can produce in a given period by using its installed capacity under normal operating conditions is called effective capacity (Barnes, 2008). Macroeconomic perspective, CU of manufacturing industries falls during an economic recession because of falling aggregate demand for goods. Practice proves that when CU is falling; the industry is likely to operate with a negative output gap which contributed to an increase in the unit cost of production. It is because the negative output gap acts as non-value-added inputs. Likewise, if CU increases; then industries are likely to operate with a positive output gap which contributed to reducing the unit cost of a product (Richard et al., 2002). Capacity utilization determinants are Product processing time and set-up time of machinery, product defective rate, and maintenance downtime.

On the other hand, capacity utilization depends on production operating parameters such as the technology level of machinery, facility layout of production levels, production planning, and others. CU also depends on the plant management capability such as designing the shop floor, deploying man and machinery efficiently, smooth workflow, and managing the shop-floor environment (Mesut, 2011).

According to Jean and Peter production planning and inventory control are positively associated with capacity utilization such as product batch sizing, inventory optimizing to meet the demand of products, and reducing bottlenecks in the raw materials supply chain Optimization of production cycle time has a link with maximizing capacity utilization and ultimately it contributes to reducing production cost; in this case, multi-objective capacity planning methodology could be useful (Jean and Peter, 1994). Efficient facility design has the ability to contribute to increasing capacity utilization when an industry operates in a dynamic environment. He added that in order to optimize capacity utilization of available resources the facility layout must be optimized (Pandey et al, 2000).

2.4 Factors affecting capacity utilization

In order to get the maximum amount of output at a given capacity effective utilization of existing capacity is required. Hence effective utilization of existing capacity has a positive effect on the manufacturing industry.so it's needed to search the possible factor that affects capacity utilization in different manufacturing sectors. There are limited articles and empirical studies on factors affecting capacity utilization issues associated with the manufacturing/product industry. For instance, according to Branes Raw materials availability, training, skills, the age and condition of the machine, and flexibility of the workforce influence effective capacity utilization (Barnes, 2008). Corporate governance mechanisms like the quality of leadership and organization of the company, market structure and competition, availability, and quality of inputs, market demand, and prices, public and private infrastructures, business rules and regulations are a factor that influences capacity utilization.

According to Manufacturing Survey Analysis, the main reasons for the observed under capacity utilization rate differ from time to time. Because unavailability of raw materials in the local market Ethiopian manufacturing sector is highly dependent on imported raw. The first major reason for their low capacity utilization is inadequate and poor quality raw materials. The other reasons include lack of demand /market/, increased entry and hence sharing of the existing market, interruption of power and water supply are seeming to be the main and more persistent reasons for under capacity utilization (Manufacturing Survey Analysis 2014).

Technology is also a key enabler for the future of production, as the adoption and diffusion of emerging technologies the crux of the industrial revolution. In order to do this, countries need to

continually upgrade technology infrastructure to ensure their platform is advanced enough to fully operate emerging technologies (WEF, 2018). On the other hand, Facility layout design has a major influence on plant productivity. The purpose of layout design is to find the most effective facility arrangement and minimize the material handling. By well-organized material handling the operation cost during manufacturing can be reduced from 15 to 30%. It is critical that the location of machines/workstations should be arranged in a way that reduces the distance traveled by personnel or material handling (Syed et al 2016). According to Lechuga supply chain is a system of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer (Lechuga et.al, 2015). An organization with a better supply chain can keep the business smooth, efficient, and effective (Basu et.al, 2017). Supply chain collaboration increased performance and capacity utilization (Seo et.al, 2015).

The utilization of installed capacity in the manufacturing sector has been largely attributed to ease to assess credit facilities, and also due to prevalence of high-interest rate, thus affecting the importation of critical raw materials (Mike, 2010). The policies influence the development of different sectors and create a stronger group of national industries (WEF, 2016). Management policy with regard to the number of hours worked each week can affect capacity by allowing or not allowing capacity options such as overtime or second or third shifts (Barnes, 2008).

Another factor which includes any issue that may affect the effective capacity, but which the firm may not be able to control directly like product standards, unions, safety regulations, pollution control, and environmental standards, the stability of the society and the government is an external factor (Donald, 2006). Minimum quality and performance standards can restrict management's options for increasing and using capacity.

And some of the studies that are linked to factors affecting capacity utilization that have previously studied empirically are discussed below.

Table2 1Empirical study on capacity utilization

No	Author	Objective	Factors/Cause
1	Solomon Mulugeta (2018)	To Identify major possible cause of under-capacity challenges a, give the possible remedial solutions for the identified possible causes and determine the major stakeholder which must take the lead in resolving this problem of the Ethiopian Re-bars Manufacturing Industry	Shortage of Electric Power lack of foreign currency, lack of working capital, lack of market, lack of proper management and leadership, lack of appropriate skilled manpower, unfair competition with imported products monopolistic nature of competition among local manufacturers, and reluctance of public procurement offices to buy from local manufacturers.
2	Rukhsana K. Kalim (1998)	To find the major determinants of capacity utilization in the large-scale manufacturing sector of Pakistan.	Lack of domestic demand, Lack of demand for exports, Domestic competition and Import policy/competing imports from demand side and Load-shedding, Shortage of imported raw materials, Shortage of skilled labor, High management cost, High labor cost, Lack of credit facilities and Transport problems from supply side
3	Puli.Subramanyam & B. Ramachadra Reddy (2013)	To study the capacity utilization level in micro and small enterprises of selected Kadapa District of Andhra Pradesh.	Scarcity of raw material, shortage of skilled labor, limited marketing facilities, irregular supply of power, the location of the unit and competition prevailing in the market.
4	Denver Mapetere & Manhiwa Thelma	To Improve capacity utilization of furniture manufacturing SMEs through market based view.	Market.

	E R (2018)		
5	Henrik Egber (2007)	To explain low capacity utilization in the Tanzanian context in the 1990s using theoretical approaches in economics.	Industrial capacity in a socialist-oriented economy, Recessions on market, bottle neck in energy input, Strategic entry deterrence, Lack of markets for secondary capital goods, Absenteeism and Social obligations.
6	Mojiekwu, J.N. &Iwuji, I.I.(2012)	To Evaluate the effect of power supply, Inflation rate, and interest rate on CU of Nigerian manufacturing Industry.	Power supply, Inflation rate, and Interest rate.
7	Mustafa Turhan (2018)	The Effect of Capacity Utilization on Economic Growth in Industrial Enterprises.	Raw material inadequacy, problems with workers, financing problems, energy shortage, lack of tariffs.
8	Cynthia Bansak, Norman Morin and Martha Starr(2007)	To examines relationships between technology, capital spending, and capacity Utilization	Technological change
9	Etienne Ndemezo,B. Ndikubwimana & Angelique Dukunde(2018)	To identify major factor of CU in food and beverage manufacturing industry that affected by fiscal incentives.	Input out ratio, fixed asset, employees, company experience, Raw material cost, share of input sourced in Ruwanda, insufficient demand, shortage of qualified labor, shortage of raw materials, shortage of power electricity, shortage of water, lack of road infrastructure lack of specialized technology, lack of working capital, old equipment, tax rate, tax administration and standards.
10	Okechukwu	To identify the determinants of	skilled production workers, power

	Chima Christian, (2012)	Capacity Utilization in Nigerian manufacturing industries within economic model	shortage, cost of Replacement Investment and dummy industry size

According to Mulugeta (2018) study on analyses of the possible cause for under capacity utilization, shortage of Electric Power lack of foreign currency, lack of working capital, lack of market, lack of proper management and leadership, lack of appropriately skilled manpower, unfair competition with imported products monopolistic nature of competition among local manufacturers, and the reluctance of public procurement offices to buy from local manufacturers are considered as a factor a that cause for under capacity utilization for the sector. The study was conducted on the large manufacturing industry and also it didn't include the factors such as technology, policy, and lack of raw material.

Kalim (1998) examine factors affecting capacity utilization in the manufacturing sector of Pakistan and the factors that affect CU from the demand side are lack of domestic demand, lack of demand for exports, domestic competition and import policy/competing imports and from supply-side load-shedding, shortage of imported raw materials, shortage of skilled labor, high management cost, high labor cost, lack of credit facilities and transport problems are factors that affect CU. The other factor that he takes is political instability. Shortage of power, lack of skilled manpower, and the lack of working capital that was considered in Mulugeta study and also factors that mentioned as not considered in Mulugeta study were also not considered in his study.

The other study is Subramanya and Reddy (2013) study that was conducted on CU of micro and small Enterprises in the Kadapa district. In this study, the reasons for underutilized installed capacity include scarcity of raw material, shortage of skilled labor, limited marketing facilities, irregular supply of power, the location of the unit, and competition prevailing in the market. The study includes more of the factor that affects CU but factor such as technology, finical acsses and policy factors are not included in the study. Improving CU of furniture manufacturing SMEs through the market -based view in the case of Gweru, Zimbabwe is studied to improve the Cu of SMEs by investigating only the market effect on CU and recommends the sector to develop a new market strategy to improve their CU (Mapetere & Thelma, 2018). The other is the study that focuses on the explanation of low CU using the theoretical approach in economics which is

capacity utilization of enterprise in Tanzania by Egber. This study explains factors for low CU within economics which are Industrial capacity in a socialist-oriented economy, Recession, bottleneck in energy input, Strategic entry deterrence, Lack of markets for secondary capital goods, Absenteeism, and Social obligations(Egber,2007). Because this study is focused only on factor within economic literature it doesn't consider another factor that mentioned in the previous study.

The Study of Mojiekwu & Iwuji (2012) evaluates only the effect of power supply, inflation rate, and the interest rate on CU of Nigerian manufacturing industry. The study found that power supply has a positive and significant effect on CU and on the other hand inflation and interest rate have a negative impact on CU. According to Turhan (2018) Factors affecting capacity utilization classify as raw material inadequacy, problems with workers, financing problems, energy shortage, and lack of tariffs. In particular, there is a shortage of domestic and imported raw materials and an inadequacy of imported material in the manufacturing industry. The study by Bansak et al (2007) investigates the relation between capital spending, technology, and capacity utilization and the researchers found the technology change lowered the CU. This study considers only the effect of technology and capital spending on CU. According to Ndemezo et al (2018) shortages of raw material, lack of specialized technology, tax administration, and standards are the main factor which underutilization of installed capacity in food manufacturing and oversize in terms of fixed assets, lack of working capital, standards, and insufficient demands are the main factor that undermines CU in beverage manufacturing. The study found results among this factor which are input out ratio, fixed asset, employees, company experience, input cost, the share of input sourced in Rwanda, insufficient demand shortage of qualified labor, shortage of raw materials, shortage of power electricity, shortage of water, lack of road infrastructure lack of specialized technology, lack of working capital, old equipment, tax rate, tax administration, and standards. In this study, the researchers focus only on the factor that affected by fiscal incentives.

Cristian, (2012) identifies factors affecting capacity utilization by considering skilled production workers, power shortage, cost of Replacement Investment, and dummy industry size as a determinant of capacity utilization for the Nigerian manufacturing industry. This study didn't consider factor raw material, market and tax-related factor that considers in most study

From the investigation of ten papers the following factors are identified

Table2 2summery of empirical investigation

Sn. No.	Factors Identified	Studies	Frequency	Rank
1	Infrastructure facility	Mulugeta (2018), Subramanya and Reddy (2013), Egber,2007), Mojiekwu & Iwuji (2011), Turhan (2018), Ndemezo et al (2018) and Cristian (2012)	7	1st
2	Market related issue	Mulugeta (2018), Rukhsana (1998), Subramanya and Reddy (2013), (Mapetere & Thelma, 2018), and Egber,2007)	5	2nd
3	Raw material issue	Rukhsana (1998), Subramanya and Reddy (2013), Turhan (2018), and Ndemezo et al (2018)	4	3rd
4	Tax related issue	Egber,2007) Mojiekwu, J.N. &Iwuji, I.I.(2012), Turhan (2018), and Ndemezo et al (2018)	4	3rd
5	Man power skill issue	Mulugeta (2018), Rukhsana (1998), Subramanya and Reddy (2013), Ndemezo et al (2018) and Cristian (2012)	5	2nd
6	Finance and cost related issue	Mulugeta (2018), Rukhsana (1998), Turhan (2018), Ndemezo et al (2018) and Cristian (2012)	5	2nd
7	Equipment & technology Issue	Bansak et al (2007) and Ndemezo et al (2018)	2	Excluded
8	Standards issue	Ndemezo et al (2018)	1	Excluded
9	Management and leader ship skill	Mulugeta (2018)	1	Excluded

Therefore, from the analysis of the above research work the following factors are identified as critical to have an impact on the capacity utilization of the case sector.

1. **Market demand**: Market demand is a critical factor in today's business environment. High competition in the market forces firms to have flexible strategies for their products and process (Chang and Chiu, 2007). This factor plays a critical role in a firm's innovation performance. However, listening too closely to the voice of customers may impair firms' innovation performance. (Lin et.al, 2013). The main outputs of a firm are called products which must directly satisfy the demand of the customer (Barnes, 2008). The supply of goods produced is largely influenced by the demand environment. Countries with access to large domestic and foreign markets can expand production and enjoy the advantages of economies of scale (WEF, 2018).

2. Raw material: According to Banton raw materials can be defined as "materials or substances used in the primary production or manufacturing of goods". The importance of raw material to the efficient operation of a manufacturing organization cannot be overemphasized; in that, the availability of the raw material in the right quality and quantity will determine to a reasonable extent; the availability, quality, and quantity of the resultant output (Akindipe, 2014). Inadequate production of one industry output is the inadequacy of raw materials and this also causes inadequacy of raw materials for another sector (Thuran, 2018).

3. Infrastructure Facility: Economic development's success or failure is primarily determined by available capital and an enabling environment. Money, manpower, and technology are all important inputs in the growth phase. The efficiency of these inputs, as well as the sources of economic growth, are, however, heavily reliant on the available enabling environment, which is determined in part by the available infrastructure. Infrastructure refers to public goods and services that are used as complementary inputs to conventional development factors such as capital, labor, and enterprise. They assist in rising Return on investment by lowering production costs and enhancing transfer performance (Bello & Osinubi, 2016).

Physical infrastructure such as telecommunications, paved roads, power supply, and water and sanitation systems are all related to improved efficiency and economic development. It affects productivity not only because it determines access to some key production factors (labor and intermediate inputs), but also because it determines market access (Calderon & Serven, 2014).

The state of an economy's infrastructure has a significant effect on all facets of the economy. Low-quality infrastructure and restricted transportation and trade facilities boost logistical and transaction costs, making otherwise competitive goods uncompetitive, and restricting rural development and people's access to markets, both of which have negative implications for economic activity and poverty reduction (Escribano et. al,2010).

Connectivity is strengthened by strong infrastructure, which enhances dependency and specialization. This not only decreases manufacturing costs and enhances consumer health, but it also expands business opportunities, stimulates market competitiveness, and facilitates creativity. Inadequate infrastructure not only prevents these advantages from being achieved, but it also results in high maintenance costs and other negative effects (Du & Douch, 2018).

4. Human Factors: Human Capital is critical to the transformation of production systems, as production facilities cannot evolve unless employees evolve too. Countries will need an adequate pool of available digital, technical, commercial, and management expertise to propel the immediate adoption and use of emerging technologies (WEF, 2018). If this capital is managed properly, it helps the firm to attain its objectives successfully. Job content, job design, and experience, motivation, compensation, learning rates, absenteeism, and labor turnover, and knowledge are some human factors that affect capacity (Foot, 2008). Low education levels and poor health conditions among the population hinder an individual factory's productivity and its ability to absorb new technologies, creating a negative impact on the diversification of manufactured goods in the whole economy (Signe, 2018).

5. Financial access: Access to finance is related to the capacity of the enterprise to get money-related administrations. It is recognized as an imperative figure in advancing firm sustainability and development through financing both existing and new investments. In practice, firms will contribute a project where the anticipated benefits exceed the costs; in any case, an effective investment is accomplished as it were when the firms don't face credit obstacles unrelated to their own performance (Giang, et. al, 2019). According to Heil Both single-country and cross-country studies agree that by hindering optimal resource allocation, a number of different financial frictions will impede productivity growth. Depending on the country and the type of financial friction considered, the channels by which this outcome occurs differ. These frictions will reduce competition, impede investment in capital, and decrease the adoption of advanced technology and distort incentives to efficient capital allocation. Through many channels, more

financial development can promote higher economic growth, including: \ reducing the need to finance projects from own funds; allocating capital to more productive uses; monitoring investments more professionally; providing more insurance, boosting innovation; facilitating monetary policy transmission; and generating productivity gains in the financial sector (Heli,2017).

In developing countries, the credit market usually is underdeveloped. Low access to credit influences firms' generation choices and controls them from optimizing inputs to attain the most extreme yield. This gives proof of the negative impacts of credit limitations on capacity utilization for fabricating firms. Lower capacity utilization is inferior to both capital efficiency and labor efficiency. Financial friction prevents businesses from optimizing capital and labor efficiently, upgrading new goods, introducing new technology, and developing labor skills. In the manufacturing sector, exogenously removing credit restrictions stimulates upgrading processes and raises capacity utilization rates (Zhang, 2020).

6. Tax: According to Bagalkoti tax can be characterized in exceptionally basic words as the government's income or source of wage. The money collected through the tax assessment framework is put into utilize for the country's improvement through a few ventures and plans (Bagalkoti, 2015). Tax can have an impact on countries' fabric living guidelines by influencing the determinants of GDP per capita – work, capital, and productivity. The investigation of the potential joins between productivity and tax

is based on the thought that tax influence productivity through diverse channels which due to a few notable industry characteristics a few businesses are intrinsically more influenced than others by certain taxes In specific, corporate tax diminish investment by expanding the client cost of capital (Vartia, 2008).

One of the foremost critical determinants of a jurisdiction's capacity to recreate a business venture is the level and structure of tax collection forced by governments. Jurisdictions with high levels of tax collection on businesses viably decrease the after-tax rates of return on capital venture and in this way diminish the motivation for businesses to contribute the capital. In other words, business tax decreases the sum of cash that firms will reinvest in new machinery, equipment, and new technology that make the worker more beneficial (Veldhuis & Clemens,2006).

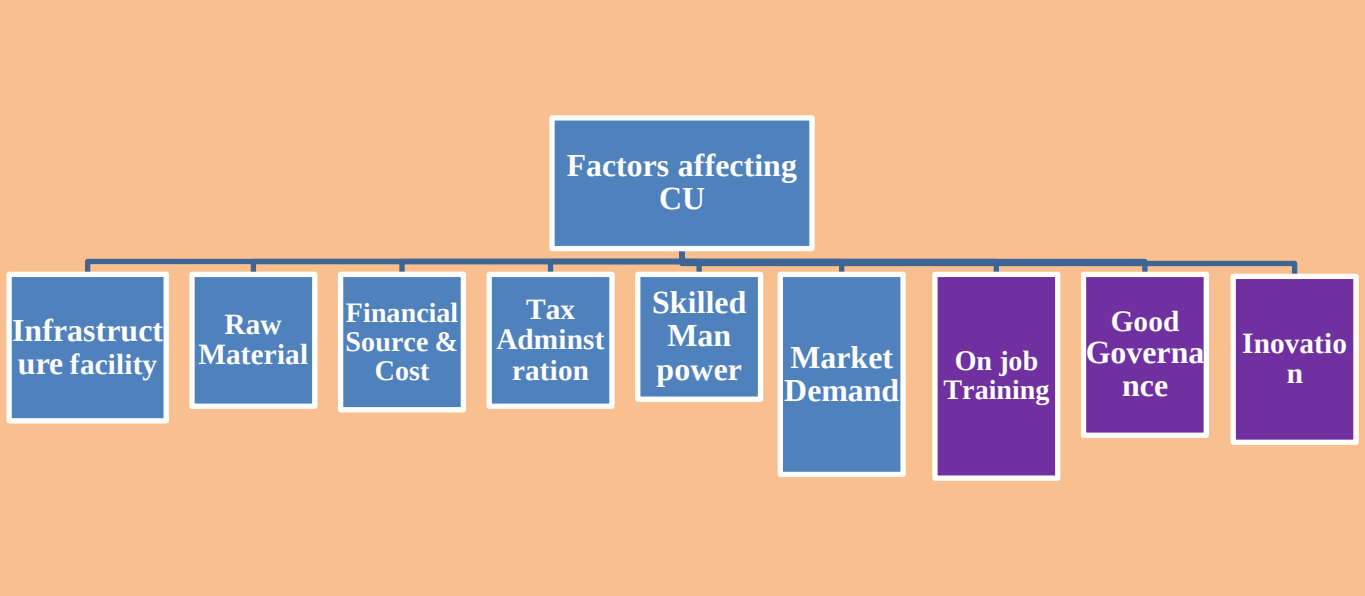


Figure2. 2 Factor affecting capacity utilization

2.4.1 Literature gap

From reviewing different empirical papers it's founded that financial source (working capital), Infrastructure facility, market demand, skilled manpower, raw material, and tax administration are factors covered in most of the paper to affect capacity utilization of the manufacturing industry. On the other hand, from informal observation of the case sector three additional factors that are not included in the investigated paper which are on job training, good governance, and innovation also consider affecting the CU of the case sector. And the justification for these three additional factors discussed below.

1. **On job training:** to aware workers about wise resource utilization and waste elimination through practices such as lean. On-the-job training is where employees are taught during their regular work hours in a real-world environment. It is thought to be the most cost-effective system. This is often referred to as "learning by doing." On-the-job training is a way of improving a worker's abilities through hands-on learning (Vasanthi & Basariyab, 2019). It is well suited to customize training to creating career advancement opportunities for specific needs and strengthen existing partnerships with employers and workers. (Kobes, 2013). Learning and developing the skill of employee training is one of the important activities in the manufacturing and service industry (Timsal.et.al, 2016).

2. **Good Governance:** to avoid corruption and rent-seeking attitude of workers. The management of government in a manner that is fundamentally free of bribery and corruption, with due regard for the rule of law and respect for people's rights to participate in public affairs, is referred to as good governance (WHO,2017). Often the term "good governance" is used to refer to normative questions about what the government can do to alleviate poverty, sustain macroeconomic stability, or provide basic services (Grindle, 2010). In many world agencies, the central aspect of good governance is the ideal of participation, rule of law, effectiveness, efficiency, accountability, transparency, openness, predictability, responsiveness, equity, and inclusiveness (Madhu, 2005).
3. **Innovation:** to use installed capacity effectively to create a new product that can attract the market. According to Lawson and Samson, (2001) an innovation capability is defined as "the ability to continuously transform knowledge and ideas into new products, processes, and systems for the benefit of the firm and its stakeholders". Innovation may also be described as a process and technology for identifying new consumer groups, new markets, and new production methods. Companies solve challenges by incorporating information in the form of innovation (Fri et.al, 2013).

This study seeks to identify factor affecting capacity utilization which are the financial source (working capital), Infrastructure facility, market demand, Skilled manpower, raw material, and Tax administration factors from mostly covered in a previous study and additional factors such as on job training, good governance, and innovation that not include in the previous study.

The study also analyzes their impact that is used to determine the effort needed to reduce their impact. It is also used to determine their rank in their relative importance. There are limited sources of information related to with factor affecting capacity utilization of manufacturing industry and also this limited literature review on this concept focus on large manufacturing industry, and therefore it's needed for research on this concept regarding SMEs. Therefore, this research focused on factors affecting the CU issue of SMEs with possible linkages to SMEs in the Arada sub-city metal and engineering sector.

SME play a significant role in the economic and social development process all over the regions of the world, especially in developing countries. They play a vital role in creating job

opportunities for youth employment, development of entrepreneur skills, technological transfer, and getting more foreign exchange. There is a need therefore to analyze the factors that affect the capacity utilization of the SMEs intending to improve their capacity utilization. This will bring a lasting solution for better utilization of local resources and installed capacity without the need for an additional investment of capital or labor.

3. RESEARCH METHODOLOGY

In the previous chapter, we have discussed definitions of small and medium enterprise, concept about capacity utilization and different factors affecting capacity utilization gap reviewed. This chapter presents how data for this study was obtained and the research design was taken. The topic includes in this chapter the detail methodology, data collection methods, sampling technique and the data analysis techniques.

3.1 Background of the Study Area

The capital city of Ethiopia which is Addis Ababa is established in 1887 E.C with overwhelming dominance in the country's economic, socio-cultural and political affairs. In terms of the high concentration of population and growth, the city shares most of the characteristics of primate cities of the developing world into the capital cities (Megento, 2013). Following the establishment of the FDRE in 1995 Addis Ababa has served as the seat of government for different regimes. Due to mostly its broad manufacturing and commercial sectors, it contributes about a quarter of the country's GDP. The concentration of financial institutions, transport, storage, communication, construction, and real estate is higher in Addis Ababa than in other urban centers (TRANSIP, 2016). There are 118 Wereda in Addis Ababa that divides into 10 sub-city which are Yeka, Akaki Kality, Arada, Keranyo, Lideta Bole, Gullele, Kirkos, Kolfe, Nifas Silk Lafto, and Addis Ketema(AACA, 2019).

Arada sub city its name with the name of Addis Ababa regarding the historical foundation. The regime of emperor MinilikII and Emperor Taitu Butil in 1886 E.C decided this place to be the seat of their government. Arada is one of the ancient parts of Addis Ababa and also one of the areas where the early history of the city most apparent and currently (Hilfu, 2018). As of AACA, 2011, its population was 225,999. Arada is known as the center of the old and the new generation artistic, social and urban lifestyle.

Arada sub-city is the seat of the national palace of the Federal Democratic Republic of Ethiopia government which is the office of Prime Minister, Parliament, Addis Ababa city administration, and other high government and non-governmental institutions (Arada sub-city culture and tourism office, 2017).

Figure3. 1 Map of Arada sub-cities Source: Addis Ababa City Government, (2017)

In Arada sub city, there are over all 101 SME (ASCIDO 2011E.C report) that are engaged in metal and metal products.

Table 3. 1 Number of SME engaged in metal and metal product in Arada sub city Source: ASCIDO, (2011E.C)

Wereda	No of SME
1	1
2	78
3	1
4	1
5	6
6	11
9	1
10	2

3.2 Research Design

The design of the research is a descriptive as well as an exploratory one. The research started with a description of the things that can be easily observed to get the actual picture of the state of things. Then the study veer into a fact-finding to the research sought, collected, and studied to get the true picture of what is sought after. The study is concerned with specific predictions, a narration of facts and characteristics of the sectors regarding relative capacity utilization, and factors affecting the capacity utilization in MEW in SME in ASCA. The Correlation study approach to study the relationship between factors affecting capacity utilization is used in the study.

The research started with a broad literature review to understand the subject matter on one hand and to answer some of the research questions on the other hand. Then after, the exploration of the existing problem, which is under capacity utilization, the main factors (cause) of the under-capacity utilization of the MEW in SME in ASCA identified through a survey questionnaire.

3.3 Source of Data

The source of data for the research was more on primary data, which are Physical observation and survey questionnaires. However, the necessary information and data also collected through a secondary source, which are a Literature survey, journal, report, government publication, sector documentary, the internet, and other texts.

3.4 Sampling Technique and Target Populations

The study was conducted on Metal and Engineering Works of Small and Medium Enterprises in Arada sub city Administration which is one of the manufacturing sectors that comprise 103 small and medium enterprises in metal and engineering work. Since the assessment of factor, affecting capacity utilization of the selected sector encompasses employees and owner who have been experienced in metal and engineering works in SME in ASCA. An employee with long experience in MEW in SME in ASCA relative to others and those have the concept of capacity utilization are chosen because they are well informed and know much about the factors affecting the capacity utilization of MEW in SME in ASCA in detail, so they are selected for this study for convenience of the study.

For the calculation of the sample size, from a population Yamane (1967) formula was used. Which uses 95% confidence level and p =0.5, Hence size of the sample should be

$$\mathbf{n=\ \frac{N}{[1+N(e)^2]}}$$

Where:

n- The sample size

N- The population size

e- The level of precision

Inserting the population size and the other in the other information in the formula I get

$$\mathbf{n=\ \frac{N}{[1+N(e)^2]}}$$

$$\mathbf{n=\frac{101}{[1+101(0.05)^2]}}$$

n=81

3.5 Methods of Data Collection

In order to gather data from relevant sources, both primary and secondary data collection instruments were used. The primary data conducted in the form of physical observation of the general working area and way of doing the work on the enterprise and survey questionnaire which is a questionnaire to each individual owner, supporting expert's office, governmental coordinator, and workers to respond to the questionnaire prepared elated to factor affecting the capacity utilization of the enterprise. The questionnaire consisted of two elements. The first elements incorporate demographic, characteristic, and profile records of the respondent while the second part consist of questions related to measure factors affecting capacity utilization of the enterprise using likert scale anchored by strongly disagree to strongly agree. Both in English and Amharic languages are used for the questionnaire to create right rapport and benefit, and higher responses from people that cannot truly apprehend the English language. The secondary data includes written documents on capacity utilization and factors affecting it by referring different reference books, journal articles, Internet websites, and compiled written references from the case sector. The data set that intends to collect was planned in such a way that enables to meet the proposed research objectives.

3.6 Method of data analysis

In order to analyze the collected data by using primary and secondary methods of data collection Statistical package for social science (SPSS) version 24 was used for correlation and regression

analysis. Statistical analysis such as mean and standard deviation was also used. In regression analysis multiple linear regression analysis was used to predict the outcome of a response dependent variable using one or more independent variables. This helps also to understand the linear relation between dependent and independent variables. The model was used to identify the determinants of capacity utilization. Here, the dependent variable, capacity utilization, is a continuous variable, and hence, the study used a multiple regression model, which is given as follows:

$$Y = \beta_0 + \beta_1\, INF + \beta_2\, RM + \beta_3 FIN + \beta_4\, Tax + \beta_5 HR + \beta_6 MA + \beta_7 TR + \beta_8 GG + \beta_9 IN + \varepsilon$$

Where: Y is capacity utilization,

INF infrastructure, RM is raw material, FIN is finance, HR is human resource, MA is market access, TR is training, GG is good governance and IN referring innovation

β_0 Is the intercept term

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$ and β_9, are coefficients to each independent variable.

Table3. 2 Description of variables Source: organized by the researcher, (2020)

Variable name	**The variable is**	**Expected sign**
Capacity Utilization	Dependent	
Infrastructure	Independent	+
Raw material	Independent	+
Finance	Independent	+
Tax	Independent	-
Human Resource	Independent	+
Market access	Independent	+
Training	Independent	+
Good Governance	Independent	+
Innovation	Independent	+

The analyzed data presented in the form of diagrams, charts, and tables by using Statistical package for social science (SPSS) software. Statistical tools such as descriptive arithmetic mean, standard deviation of the factor and correlation used to show the relation and impact of the factors affecting capacity utilization in the case sector.

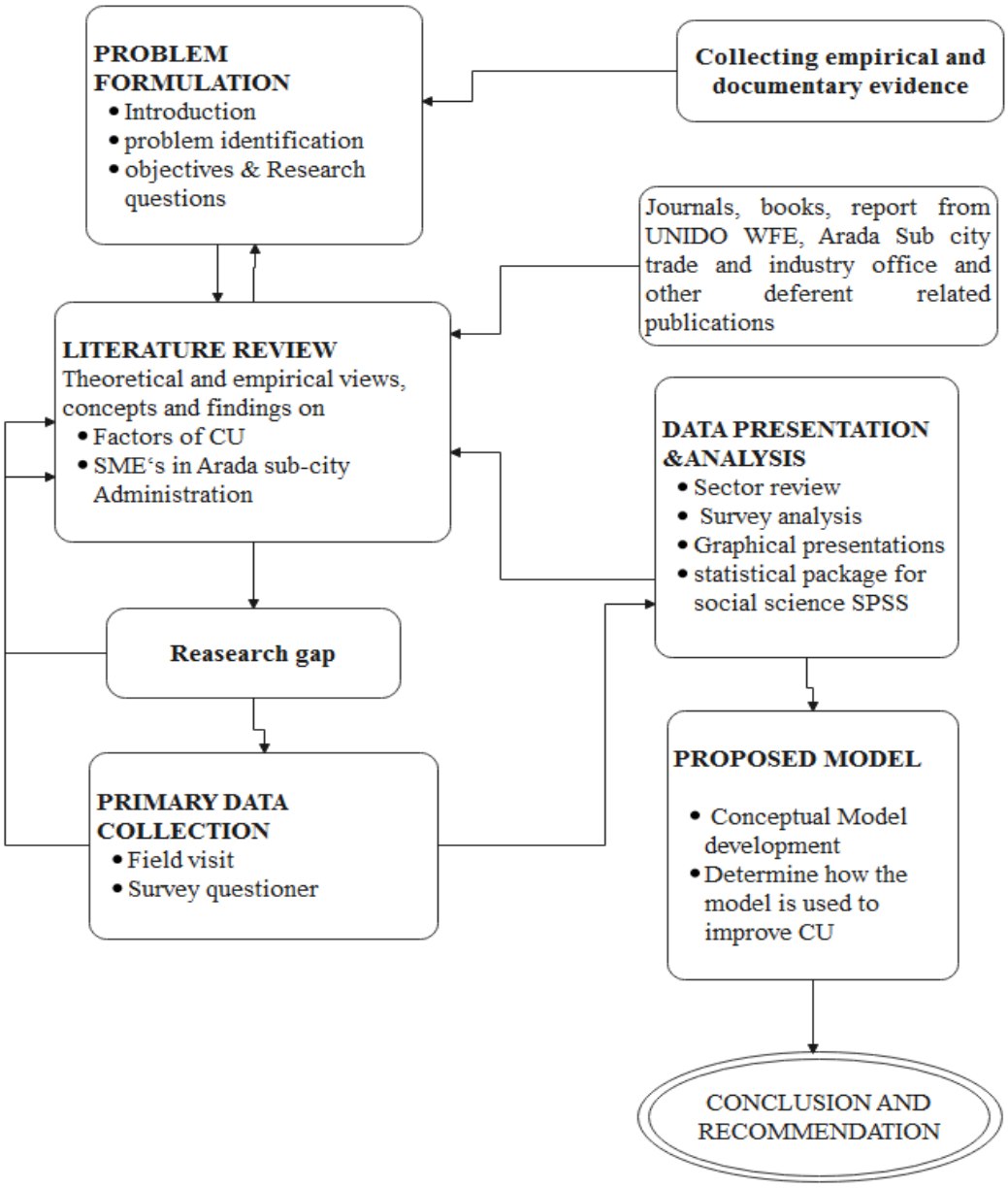


Figure3. 2 Research Framework

4. DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This study aimed at identifying factors affecting Capacity Utilization of Metal and Engineering works in small and medium enterprises in Arada sub city. Accordingly, this chapter presents the analysis and discussion of the data obtained from a survey conducted to answer the research questions raised in chapter one and supports the objectives of the study. The questionnaires were coded in the Statistical Package for Social Sciences (SPSS) software for analysis. Research findings based on survey questioner was summarized and presented in the form of frequencies, percentages, tables and graphs. The presentation of the finding is organized in line with research questions and objectives. It documents the factors affecting the capacity utilization of small and medium enterprise in metal and engineering sectors of Arada sub city.

4.2 General background of the respondent

The survey instrument included seven demographic questions to characterize the participants' profile. The questions include age, gender, education, experience, responsibility, their duration in the work, and their level of capital. Table 4.1 summarizes the participants' profile.

Table4. 1 Participant's Demographic Profile

		Frequency	Percent	Cumulative Percentage
Age	20-25	1	1.23	1.23
	25-30	11	13.58	14.81
	30-35	32	39.51	54.32
	35-40	29	35.80	90.12
	40-50	8	9.88	100
	50-60	0	0	
	Total	81	100	
Gender				
	Male	81	81	100
	Female	0	0	100
	Total	81	100	
Education	Primary school	0	0	0

	Secondary school	31	38.27	38.27
	Certificate	33	40.74	79.01
	Diploma	12	14.81	93.82
	Degree	5	6.18	100
	Masters	0	0	
	Total	81	100	
	1-5 years	24	29.63	29.63
	6-10 years	35	43.21	72.84
	11-15 years	13	16.05	88.89
	>15 years	9	11.12	100
Experience	Total	81	100	
	Manager	67	82.72	82.72
	Supporting office of the enterprise	8	9.88	92.6
	Employee of the enterprise	6	7.41	100
Responsibility	Total	81	100	
	1-3 years	7	8.64	8.64
	4 - 6 years	34	41.98	50.62
	7 - 9 years	33	40.74	91.36
	10 - 13 years	7	8.64	100
Duration	Total	81	100	
	Less than 100000	0	0	0
	Between 100000 and 1500000	54	66.67	66.66
	Between 1500000 up to 20000000	27	33.33	100
	Greater than 20000000	0	10	0
Capital	Total	81	100	

Source: organized by the researcher, (2020)

From table 4.1, 32 (39.51%) majority of the participants are with age between 30 - 35 years old. The other are 1 (1.23%) participant with age between 20 – 25 years old, 11(13.58%) participants with age between 25 - 30 years old, 29 (35.80%) aged between 35-40, 8(9.88%) aged between 40-50 and no respondents in the age category of 50-60. The general information of the respondents includes both personal and professional characteristics. Behind their age the gender of the respondent also sought. Both females and males are participating in SMEs in different sector but, in metal and engineering sector of Arada sub city small and medium enterprise all the 81 respondents were females.

As it can be seen from table 4.1 educational background of metal and engineering enterprise respondent, secondary education educational level was 31(38.27%), certificate holders were 33(40.74%), diploma holders were 12 (14.81) and the remaining 5(6.18) % were degree holders. So, it is noticed that most respondents have educational level of diploma and below. Moreover, experience refers to the numberof years as metal and engineering enterprise 24(29.63%) were between 1-5 years, 35(43.21%) were 6-10, 13(16.05%) were between 11-15 years and 9(11.2%) above 15 years. Therefore, it is possible to generalize that 72.84% of respondents are between 1-5 and 6-10 years.

On the responsibility they assume on the enterprise 67(82.72%) replied that they assume managerial position in the enterprise, 8 (9.88%) were employer of the enterprise and the remaining 6 (7.41%) are supporting role in the enterprise inferring that most respondents are managerial position.

For duration in the business 7(8.64%) had experience of 1-3 years, 34(41.98%) stayed between 4-6 years, 33 (40.74%) had duration of 7-9 years and the remaining 7 (8.64%) having duration of 10-13 years. Regarding capital employed in their enterprise 54(66.67%) has a capital between 100000 and 1500000 and 27 (33.33%) has a capital of 1500000 up to 20000000, this shows that most enterprises have a capital between 100000 and 1500000.

4.3 Capacity Utilization

In this section respondents were asked about their opinion on the existing practice of capacity utilization in metal and engineering enterprises in the sub city and the result is discussed as below.

Table4. 2 Descriptive statistics of capacity utilization

Item		Frequency	Percent	Cumulative Percent
There is low capacity Utilization	Strongly Disagree	1	1.23	1.23
	Disagree	1	1.23	2.47
	Neutral	8	9.88	12.35
	Agree	46	56.79	69.14
	strongly agree	25	30.86	100.00
	Total	81	100	100

Source: Organized by the researcher, (2020)

Table4. 3 Capacity Utilization

Mean	4.19
Std. Deviation	.654

Source: Organized by the researcher, (2020)

Table 4.2, participants' response regarding their capacity utilization of metal and engineering enterprise showed that a majority, 46 (56.79%) agreed to think about low capacity utilization while 25 (30.86%) strongly agreed to thinking about low capacity utilization. This means that a combined 87.65% think about low capacity utilization of their metal and engineering enterprise. It was only 2.26% who disagreed or strongly disagreed to thinking there is no low capacity utilization. The mean response of 4.19 also shows that they agree there is low capacity utilization.

4.3.1 Determinant Factors of Capacity Utilization

In this section, the perception of respondents on each of determinant factors of capacity utilization was described in view of infrastructure, raw material, finance, tax, qualified human resource, market access, on the job training, good governance, and innovation variables.

1. Infrastructure (INFR)

The respondents were asked about availability of infrastructure in three items. These items indicate the availability of infrastructure for metal and engineering enterprises to utilize their

capacity in terms of power disruption, water shortage and transportation problem and the result is displayed below.

Table4. 4Extent of availability of infrastructure

Items	Mean	Std. Deviation
Power disruption	3.58	.772
Water shortage	3.14	.818
Transportation problem	3.00	.570

Source: Organized by the researcher, (2020)

As presented in the table 4.4 the mean scores of the respondents for most items of extent of availability of infrastructure ranges between 3.00 and 3.58, which is between "neutral" to agree.

2. Raw Material (RM)

The respondents were asked about availability of raw material in three items. These items indicate the extent of metal and engineering enterprises raw material availability in terms of shortage of raw material, poor standard of raw material, and higher prices to obtaining raw materials as shown in the table 4.5.

Table4. 5 Extent of Raw Material Availability

Items	Mean	Std. Deviation
Shortage of Raw material	4.05	.805
Poor standard of raw material	4.05	.820
Higher raw material price	3.98	.935

Source: Organized by the researcher, (2020)

As presented in Table 4.5 the mean values of all raw material items were between 3.98 and 4.05, which are agreeing lack of raw material affecting their capacity utilization.

3. Finance (FINC)

The respondents were asked about their practice of finance in three items. These items indicate the extent of metal and engineering enterprises financial practice with regard to capacity utilization in terms of lack of finance, bureaucratic procedures to obtain finance, and poor financial management knowledge.

Table4. 6 Extent of Availability of Finance

Items	Mean	Std. Deviation
Lack of finance	4.40	.683
Bureaucratic procedure to obtain finance	4.33	.791
Poor financial management knowledge	4.10	.768

Source: Organized by the researcher, (2020)

As presented in Table 6 above the mean scores of the respondents for items of finance dimension of capacity utilization ranges from 4.10 to 4.40, which is between "agree" to strongly agree meaning that there is lack of availability of finance and poor financial management knowledge.

4. Tax

Two measures the existing tax system two items were used and these are: high taxation practices and bureaucratic procedure of the tax system as described below by mean and standard deviation.

Table4. 7 Response about the existing tax system

Items	Mean	Std. Deviation
High taxation	2.53	.923
Bureaucratic procedure of taxation	2.22	1.107

Source: Organized by the researcher, (2020)

As presented in Table 4.7 above the mean values for high taxation levied by government on metal and engineering enterprises and bureaucratic procedure of the tax system was 2.53 and 2.22 respectively showing their neutral position,

5. Human Resource (HR)

The variable rated by participants was existence of qualified human resource in the sampled metal and engineering enterprises. This variable was measured using two related questions (Table 4.8).

Table4. 8 Existence of Qualified Human resource in Metal and Engineering Enterprises

Items	Mean	Std. Deviation
lack of educated man power	4.25	.582
lack of experienced worker	3.81	.792

Source: Organized by the researcher, (2020)

The first asked is there lack of educated man power. Respondents mean rating showed they agree to the statement (M=4.25 and sd=0.582933). Participants also agreed to the statement that is there lack of experience for man power in the market with their mean rating of M=3.81 (sd=0.792).

6. Market Demand (MD)

Three questions pertaining to the availability of market were included in this section. This identified three different mechanisms or tools whose result is showed in Table 4.9 below.

Table4. 9 Availability of market

Items	Mean	Std. Deviation
Low Market opportunity	4.41	.787
Knowledge gap in Formulating market Strategy	4.52	.635
Not doing promotion	4.21	.896

Source: Organized by the researcher, (2020)

It can be observed from Table 9 above that participants agreed and strongly agreed in availability of market on products of metal and engineering enterprises. All three items received a mean ranging from M=4.21 to M=4.52 with standard deviations of 0.635 to 0.896. This indicated, creating access to market is an area that needs to improve a lot.

7. On Job Training (OJT)

The respondents were asked about whether they obtain an opportunity to receive on the job training for improvement of capacity utilization in doing their work and they responded as below in Table 4.10.

Table4. 10 Opportunity to Obtain on the Job Training

Variables	Mean	Std. Deviation
Inadequacy of training	4.19	.808
Lack of experience sharing program	4.35	.809

Source: Organized by the researcher, (2020)

The overall mean of Opportunity of obtaining on the job training for metal and engineering practices to utilize their capacity among sampled respondents which received a mean ranging from M= 4.19 to M= 4.35 and sd=0.808 to sd=0.809. This shows that there is lack of obtaining on the job training opportunity.

8. Good Governance (GG)

Good Governance was also assessed in the questionnaire. Three questions were given to the participants (Table 4.11).

Table4. 11 Existence of Good Governance

Items	Mean	Std. Deviation
Corruption in bidding procedure	4.37	.679
Inappropriateness of procedures in government bidding	4.06	.747

unable to revise policies regularly	3.73	.806

Source: Organized by the researcher, (2020)

The first statement stated that 'Corruption in bidding procedure' received a mean of M=4.37 (sd=0.679) while 'Inappropriateness of procedures in Bidding' and 'unable to revise bidding policies regularly' were given an approximate mean of M=4.06 and M=3.73 with (sd=0.747 and sd=0.806) respectively. Participants tend to agree that problem of good governance exists on part of the government on the enterprises sampled.

9. Innovation (INOV)

Finally, the participants were asked the extent to which they agree they are innovative in utilizing their capacity and the result was discussed in Table 4.12 below.

Table4. 12 Innovation Capacity of Metal and Engineering Enterprises

Items	Mean	Std. Deviation
Inexistence of product modification and innovation	3.52	.896
Inexistence of competition	4.04	.558

Source: Organized by the researcher, (2020)

The mean given by the participants on the two items was M=3.52 (sd=0.896) and M= 4.04 (sd=0.558) respectively which means they agree existence of lack of innovative capacity of metal and engineering enterprises in introducing new innovation. This suggests that all the participants agree to their lack of innovative capacity.

4.4 Correlation Analysis of Factors

The following table presents correlation result of independent variables with the dependent variable capacity utilization.

Table4. 13 Correlations

		CU	INFR	RM	FINC	Tax	HR	MA	OJT	GG	INOV
CU	Pearson Correlation	1									
	Sig. (2-tailed)										
INFR	Pearson Correlation	.625**	1								
	Sig. (2-tailed)	.000									
RM	Pearson Correlation	.585**	.027**	1							
	Sig. (2-tailed)	.000	.000								
FINC	Pearson Correlation	.685**	.547**	.297**	1						
	Sig. (2-tailed)	.000	.000	.000							
TAX	Pearson Correlation	-.039	-.144	.120	-.108	1					
	Sig. (2-tailed)	.727	.200	.837	.339						
HR	Pearson Correlation	.652**	.500**	.289**	.253**	-.253	1				
	Sig. (2-tailed)	.000	.000	.000	.000	.184					
MA	Pearson Correlation	.640**	.277**	.472**	.319**	.291**	.270**	1			
	Sig. (2-tailed)	.000	.012	.000	.004	.008	.000				

OJT	Pearson Correlation	.391**	.217	.088**	.501**	-.096	.221**	.237*	1		
	Sig. (2-tailed)	.000	.051	.000	.000	.395	.000	.033			
GG	Pearson Correlation	.303**	.350**	-.005**	.321**	.005	.024**	.229**	.091	1	
	Sig. (2-tailed)	.006	.001	.012	.003	.962	.010	.040	.419		
INOV	Pearson Correlation	.621**	.488**	.354**	.476**	-.009	.331**	.285**	.170	.243**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.936	.000	.010	.130	.029	
**. Correlation is significant at the 0.05 level (2-tailed).											

Source: Organized by the researcher, (2020)

Pearson correlation was calculated to see the relationship between the dependent variable Improving Capacity Utilization and the independent variables Infrastructure, Raw material, Finance, Tax, Human resource, Market access, Training, Good governance, and Innovation. As can be seen from Table 4.13, all the independent variables showed positive correlation with the dependent variable with the exception of tax. In their order of strength of relationship 'Finance' was strongly correlated to Enhancing capacity utilization with Pearson correlation coefficient r (81) = 0.685s, p< .01, followed by 'Human Resource' with r (81) = 0.652, p< .01. Third was 'Market Access' with r (81) = 0.640, p< .01, fourth was 'Infrastructure' with Pearson correlation coefficient r (81) = 0.625, , fifth was 'Innovation' with Pearson correlation coefficient r (81) = 0.621, p< .01, sixth was 'Raw Material' with r (81) = 0.585, p< .01, seventh was 'Training' with Pearson correlation coefficient r (81) = 0.391, p< .01, eighth was 'Good Governance' with Pearson correlation coefficient r (81) = 0.303, p< .01, and 'Tax' with a negative Pearson correlation coefficient r (81) = -0.039, p< .01 .

4.5 Regression Analysis

A standard multiple regression analysis was conducted to evaluate how well the different elements of Infrastructure, Raw material, Finance, Tax, Human resource, Market access,

Training, Good governance, and Innovation determines Capacity Utilization in metal and engineering sector of Arada sub city small and medium enterprise.

Table4. 14 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.895[a]	.801	.776	.309
a. Predictors: (Constant), Innovation, Tax, Training, Good Governance, Market2ccess, Infrastructure, Finance, HR, Raw Material				
b. Dependent Variable: capacity utilization in Arada sub city				

Source: Organized by the researcher, (2020)

Table4. 15 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	27.427	9	3.047	31.839	.000[a]
	Residual	6.796	71	.096		
	Total	34.222	80			
a. Predictors: (Constant), Innovation, Tax, Training, Good Governance, Market access, Infrastructure, Finance, HR, Raw Material						
b. Dependent Variable: capacity utilization in Arada sub city						

Source: Organized by the researcher

The multiple regression of the dependent variable capacity utilization and the independent variables infrastructure, raw material , finance, tax, human resource, market access, training good, governance, and innovation resulted in a significantly related equation with F of ((9,71) = 31.839, $p < .001$ The adjusted R square was 0.776, indicating that approximately 77.6% of the variance in improving capacity utilization of metal and engineering enterprises rated by participants can be accounted for by the linear combination of factors infrastructure, raw material

, finance, tax, human resource, market access, training good, governance, and innovation. Thus, the **ANOVA** result shows that the model is fitted (.000 < .05).

Table4. 16 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-1.722	.389		-4.423	.000		
	Infrastructure	.187	.083	.140	2.244	.068	.547	1.829
	Raw Material	.213	.063	.224	3.391	.001	.314	3.189
	Finance	.153	.063	.164	2.435	.017	.379	2.636
	Tax	.063	.048	.074	1.305	.196	.768	1.302
	Human Resource	.064	.070	.063	.916	.013	.323	3.100
	Market Access	.144	.053	.156	2.719	.004	.496	2.018
	Training	.141	.063	.140	2	.029	.692	1.445
	Good Governance	.247	.074	.221	3.327	.001	.835	1.198
	Innovation	.351	.082	.306	4.293	.000	.633	1.580

Table 4.16 shows the results of coefficients of multiple linear regression analysis for the effect of independent variables of (Infrastructure, raw material, finance, tax, human resource, market access, training, good governance and innovation) on capacity utilization of metal and engineering firms thus raw material, finance, human resource, market access, innovation, training and good governance variables are significant but, two variables of tax, and Infrastructure was not significant.

Table4. 17 Reliability Analysis

Cronbach's Alpha	N of Items
.794	10

AS table 4.17 shows Cronbach alpha of instruments used in the study for dependent and independent variables is 0.794 meaning that items used in the study has good relationship.

Table4. 18 Residuals Statistics

Residuals Statistics					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.31	5.18	4.19	.618	81
Residual	-.566	.638	.000	.215	81
Std. Predicted Value	-3.040	1.604	.000	1.000	81
Std. Residual	-2.483	2.799	.000	.942	81
a. Dependent Variable: Category two-less capacity utilization in Arada sub city					

Source: Organized by the researcher, (2020)

Table4. 19 Collinearity Diagnostics

Model	Dimension	Eigen value	Condition Index	Variance Proportions									
				(Const)	Infrast ructure	RM	Financ e	Tax	HR	Market access	Training	GG	Innovation
1	1	9.801	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	2	.058	13.036	.00	.00	.01	.00	.76	.01	.01	.00	.00	.01
	3	.033	17.200	.00	.02	.01	.05	.00	.04	.45	.01	.05	.03
	4	.026	19.319	.01	.03	.30	.17	.01	.00	.20	.03	.01	.00
	5	.021	21.514	.01	.12	.00	.04	.01	.32	.00	.20	.11	.00
	6	.021	21.789	.00	.01	.16	.26	.03	.12	.03	.26	.02	.03
	7	.014	26.635	.00	.09	.24	.16	.01	.27	.00	.28	.21	.02
	8	.011	30.145	.19	.02	.12	.20	.00	.10	.03	.00	.48	.14
	9	.010	31.693	.00	.47	.07	.02	.10	.00	.07	.20	.09	.45
	10	.006	41.630	.79	.23	.09	.11	.07	.12	.20	.02	.04	.32

a. Dependent Variable: capacity utilization in Arada sub city

Source: Organized by the researcher, (2020)

Results of Tests for Assumptions of Multiple Linear Regression Analysis

The variables are approximately normally distributed (Appendix -2). The scatter plots of the data of the study confirm for the existence of linearity (Appendix - 3). The data also shows homoscedasticity, which is where the variances along the line of best fit remain similar as you move along the line (Appendix -4). While putting guidelines to be applied while assessing the assumptions of no multicollinearity, (Hair et al., 1995) has argued that if the largest VIF is greater than 10 then there is a cause for concern and also argued tolerance below 0.1 indicates a serious problem. In light of this perspective, the VIF values are all well below 10 and the tolerance statistics are all well above 0.4 for the multiple linear regression model of the study. Therefore, it is safely concluded that there is no co linearity within the data of the study.

4.6 Proposed conceptual map for Capacity Utilization Improvement

A concept map is a visual organization and representation of knowledge. It shows concepts and the relationships among them (Embley, D.W. et al, 2011). It is created by writing keywords, which are enclosed in shapes and drawing arrows between the ideas that are related. It also consists of a short explanation by the arrow to explain how the concepts are related.

For this thesis, Capacity Utilization is identified as the dependent variable whereas Infrastructure, Raw material, Finance, Tax, Human Resource, Market Demand, Training, Good Governance and Innovation are considered to be the independent variables.

The conceptual mapping model was constructed in such a way that, by listing the detailed plan of actions for improving the performance of the above independent variables that will enhance the capacity utilization of SMEs in particular to the study area. In doing so, the two independent variables namely infrastructure and Tax were withdrawn since their effect on the overall capacity utilization is found to be insignificant in comparison to other variables.

Job Training of production and marketing highly influence the capacity utilization of MEW in SME since they are vital for enhancing the production and overall profile of the enterprise. The job training presents a prime opportunity to expand the knowledge base of all employees, staff of SMEs and provides both the individual and the enterprise as a whole with benefits that make the cost and time a worthwhile investment. The return on investment from training and development of employees is not questionable. This is because the employees or members of those SME's who receive the necessary training are more able to perform in their job. The training will give the staff a greater understanding of their responsibilities within their role, and in turn, build their confidence. This confidence will enhance their innovation capacity that leads to develop better designed product that gives more market opportunity and this improves overall performance and the overall capacity utilization of the enterprise. In addition to training, good recruitment of staff and improving the educational background of workers helps to ensure that employees or staffs of SMEs have a consistent experience and background knowledge on their work. The extent to which the motivation of workers adds to the efficiency of production is also significant. The trained-workers have a paramount contribution for the enterprise to improve process efficiency which in turn to financial gain. Productivity usually increases when a company implements production and marketing training courses. This in return allows the company to identify and address the marketing gap that exists with the increasing unit price of materials (McKenzie.D & Woodruff.C, 2014). Good connection with raw material suppliers needs to be established so that the enterprise gets the inputs of production without difficulty which in return allows linkage with possible consumers of their products and the industry as a whole.

Increased innovation in new strategies and products also results from on-going training and up skilling of the workforce can encourage creativity. New ideas such as using of locally available materials as well as technological tools can be formed as a direct result of training and government supports. This will directly enhance the marketing opportunity of the SMEs. Indirectly, the staff of SMEs will be well equipped with the necessary academic and material techniques to perform promotion of their products so that the enterprise's market opportunity will grow further. Identification of different financial sources is mandatory for the enterprise since it is impossible to mobilize resources and produce a certain output. Establishing a healthy saving culture is essential so that the enterprise rests in a good financial foundation and sustains its growth without difficulty. Thus to improve the capacity utilization of MEW in SME, the following conceptual mapping model is adopted as follows.

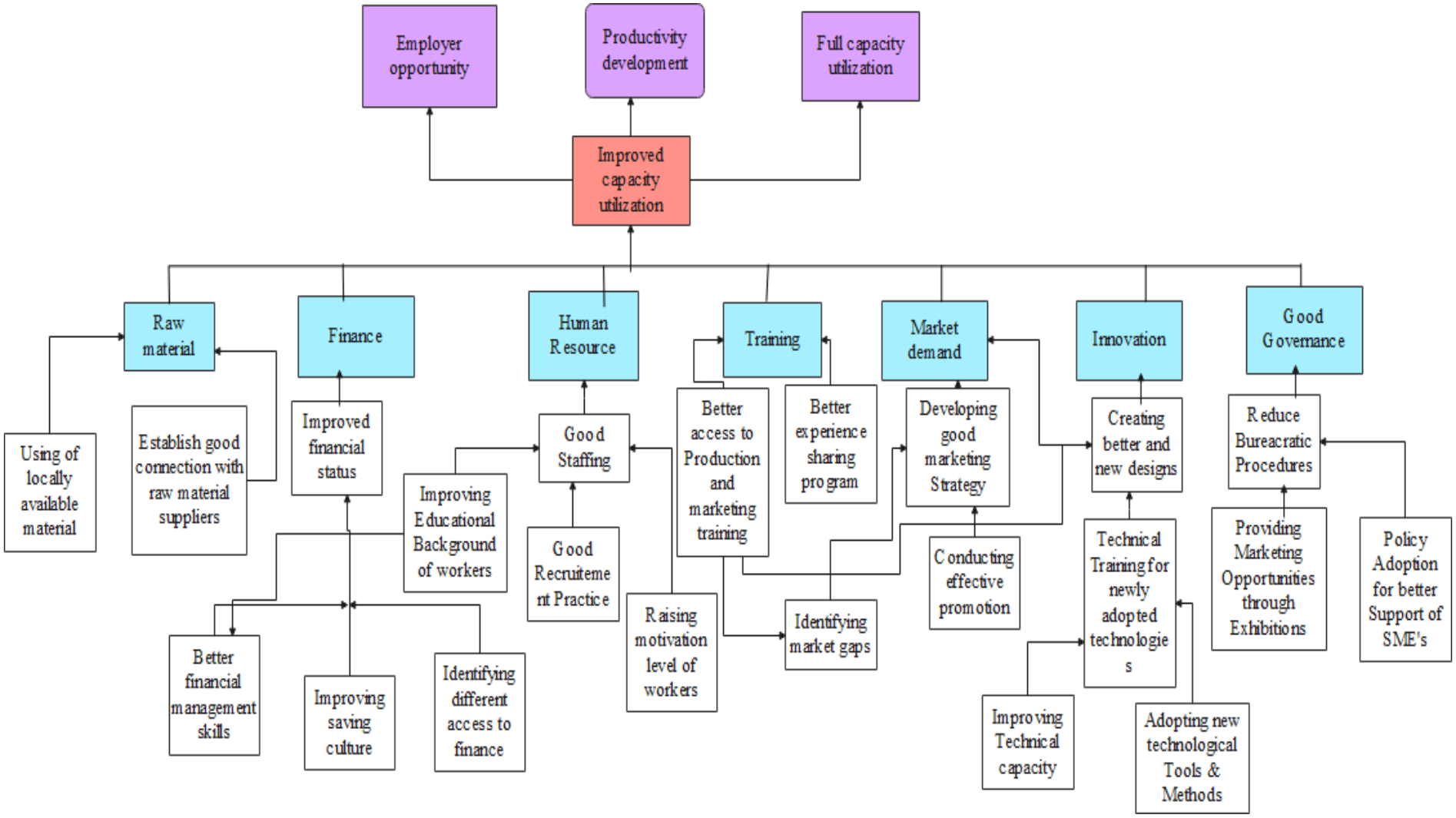


Figure4. 1 Proposed conceptual map for Capacity utilization Improvement

Improved utilization of capacity will significantly contribute to the increase of employment opportunities since enterprises will be able to produce more goods and render additional services. This additional output paves the way for the enterprises to hire more employees to cope up with the increased demand for their product and service. The above constructed conceptual model for MEW in SME is a continuous process in which the enterprises need to regularly follow-up and monitor the effect of the model on their capacity utilization level and make the necessary changes to sustain its positive impact. This helps to assess the overall performance of the enterprise after the adoption of this model and determine its impact or relevance in addition to examining its potential contributions to the enterprises.

4.7 Verification of the proposed conceptual map

A proposed conceptual map for a certain manufacturing enterprise should be evaluated for its effectiveness. In order to assess the proposed conceptual map, the researcher randomly selected twelve (12) owners of enterprises from the target samples, organized them into two equal numbered groups, and make discussions that could verify whether the conditions stated in the map will pose a positive change to the existing capacity utilization of those selected enterprises or not. The result of the survey is presented as follows.

In the previous chapter, it was stated that inadequacy of training and lack of experience sharing program were the major problems regarding on job training. Selected owners of enterprises agreed that productivity training in general will help them to extract more of their capacity by strengthening the skills that each employee needs to improve. It helps to bring the skills and knowledge of workers to a higher level by making new and better designs that are capable of dominating the existing market. Therefore, based on the suggestion from the selected owners of enterprises, the adoption of training will be able to extract the best available work methodology. This will bring about the performance of the workers to a high level and enhance the capacity utilization of the enterprises as a result.

From a financial perspective, lack of adequate finance, bureaucracy issues to obtain finance, and defective financial management knowledge were mentioned as the key problems of the enterprises. Owners of selected enterprises in this case also unanimously agreed that training helps to be economical in operations so trained employees are able to make better and

economical in operations since trained employees are able to make better and economical use of materials and equipment. These conditions demonstrate that the conceptual model developed by the researcher indeed improves the capacity utilization of the enterprises by enhancing their financial status.

It is known that enterprises including those who engage in engineering and metal works capacity utilization rely heavily on access to markets for their goods and services. Earlier on, it was explained that enterprises were suffering from shallow market opportunities, knowledge gap in formulating marketing strategy, and not doing promotion. Owners of the selected enterprises emphasized the need for improved market access as the main driving factor for capacity utilization. In doing so, they agreed to the need for marketing and promotion training to raise their market access. The owners suspected that this training will provide a solution to identify the existing market gap and conduct effective promotion techniques. In addition, they come along with the launching of new designs and methods as one means of developing a better marketing strategy. The above conditions will result in revamping the market access of the enterprises and bring improved capacity utilization.

Concerning human resources, the absence of adequate educated manpower and experienced workers were identified as the main barriers that degrade the capacity utilization of the enterprises in the study area. Owners of the selected enterprises admitted the need for efficient human resources since maximum productivity level cannot be achieved without skilled manpower. They acknowledged the derived conceptual map in particular to the human resource which outlined the need for better recruitment practice of enterprises as the key to construct good staffing in terms of personnel. They also agreed that these have to be supplemented with improving the educational background of workers and raising the motivation of workers. With the implementation of those practices regarding human resources, the owners concluded that the capacity utilization of the enterprise will be improved.

In addition to the above factors, owners of the selected enterprises acknowledged that innovative skill continues to have a positive impact on the capacity utilization of their enterprises. Adoption of new and better designs that were outlined as the key for the development of innovation capacity is regarded as decisive action by the owners of the enterprise as well. This requires the

need for the adoption of new technologies and improving the technical capacity of workers through training so as to boost the innovation skill of the enterprise. These conditions create a healthier environment for the enterprises to emerging as a competitive firm. The above condition helps to minimize the inexistence of product modification, innovation, and competition that were postulated as problems that adversely affect the capacity utilization of enterprises.

As shown in the conceptual map, good governance was identified as one of the key factors affecting the capacity utilization of MEW in SMEs. Deception in bidding procedures, ill-suited procedures in government bidding, and lack of government's initiative to revise policies regularly were the main hurdles that enterprises are facing with reference to the above factor. Owners of the selected enterprises confirm the necessity of policy adoptions for better support of SMEs and provision of marketing opportunities in order to build on the existing capacity utilization level of the enterprises from a good governance perspective.

Raw material plays an important role in the production process to a great extent and the overall capacity utilization of enterprises. In the previous chapter, shortage of raw material supply, poor standard, and expensiveness of raw materials were outlined as problems related to the above factor. The constructed conceptual map recognized the need for the use of locally available raw materials to improve the capacity utilization of enterprises. Owners of the selected enterprises verified the above statement by stating that, the use of locally available materials enhances their financial status as well as increases their market access. They also substantiated the need for the existence of a strong linkage between enterprises and suppliers so that the provision of raw materials will be performed effectively. By applying this model, owners of the enterprises admitted that raw materials can be managed and optimized at a professional level while contributing to the overall capacity utilization of MEW in SMEs.

In conclusion, owners of the selected enterprises from both groups have the same opinion with the proposed conceptual map in order to maximize the enterprise capacity utilization. Improving one factor by changing the existing practice of entity will have an immense effect on the remaining variables since they are very inter-dependent on one another.

5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Introduction

The purpose of this research was to identify factors affecting capacity utilization of metal and engineering work (MEW) in small and medium enterprises (SME) in particular to Arada Sub-city.In this study, Capacity Utilization was the variable of interest using descriptive and exploratory research approaches. Furthermore, this chapter presented conclusion and recommendations in line with the objectives of the study, the key findings of the three research questions were summarized below.

5.2 Major findings

The main findings in relation to the research question number one which is to assess and identify the factors affecting the capacity utilization of MEW in SMEs in Arada Sub City Administration are

1. Majority of respondents consider that there is low capacity utilization of metal and engineering work in SME
2. Nine different distinct factors affecting capacity utilization of MEW in SME of ACSA were identified namely infrastructure, raw material, finance, tax, human resource, market demand, on job training, good governance, and Innovation.
3. Market demand were identified as the most and the least key fundamental factors that greatly affect capacity utilization of MEW in SMEs in a positive manner and tax were identified as the least key fundamental factors that affect capacity utilization of MEW in SMEs in a negatively manner.
4. Tax criterion which includes high tax allocation and Bureaucratic procedure of taxation poses a moderate effect on improving capacity utilization of MEW in SME negatively.

The main findings of the study in relation to research question number two which is analyzing the factor impact on the capacity utilization of MEW in SME in ASCA include

1. Respondents were dissatisfied with the price, availability and standard of raw materials while tax system has been identified as the least factor affecting their capacity utilization.

2. Lack of alternative financial resources and poor knowledge of financial management was proved to be the major setbacks contributing to the low capacity utilization of MEW in SME in the study area
3. Lack of educated manpower, inadequacy of job knowledge to formulate a marketing strategy, lack of job training opportunity and innovative skill were also identified as one of the key factors of improving capacity utilization.
4. Concerning the significance of the variables, all except tax, and infrastructure were found to be very significant on the capacity utilization of metal and engineering firms.

The main findings in relation to research question number three was to propose a conceptual mapping model for capacity utilization improvement of MEW in SME in ASCA.

1. The importance of on job training staffs or employees of MEW in SME of both new and experienced – really cannot be overemphasized.
2. Government support is a key to intensify the capacity of MEW of SMEs by providing not only training opportunities but also by arranging marketing opportunities like exhibitions since it was effective for other sector enterprises.
3. Enterprises need to develop a good saving culture to boost working capital and also seek alternative financing sources in the form of loans and credit from governmental as well as from non-governmental micro-finance institutions to boost their financial status.

5.3 Conclusion

This study revealed that small and medium of metal and engineering enterprises in Addis Ababa and Arada sub-city, in particular, have been utilizing their capacity below the required level to sustain their business without difficulty. This was down to the existence of inadequate raw material supply at a reasonable price, backward financial management strategy, less exposure to training sessions, poor market access, and absence of innovative skills of the enterprises. Poor provision of infrastructures, the prevalence of bureaucratic procedures in government offices, and lack of adequate tax related incentives are also considered as some of the causes that negatively affect the capacity utilization of Arada sub city small and medium enterprises.

Due to the above stated causes, enterprises are forced to produce a limited number of outputs and reduced financial muscle in subsequent. And to mitigate the aforementioned problems, the researcher comes up with a conceptual map that can improve the capacity utilization of

enterprises. The research provides the enterprises to have a clear idea of where to focus and make a change s to utilize more of their capacity by adopting the detailed activities of the proposed conceptual map.

The result of the findings of the first research question (that is, assess and identify the factors affecting the capacity utilization of MEW in SME in ASCA) implied that the majority of the respondents in the study area, regarding their perception on the capacity utilization level of the MEW of SME found to be low. Besides infrastructure, raw material, finance, tax, human resource, market demand, on job training, good governance, and innovation were identified as the factors affecting the capacity utilization of MEW in SMEs in ASCA. From the above factors, job training, good governance, and innovation were identified as literature gaps that are not explored under previous studies. The second research question of the study was concerning on analysis of the factor impact on the capacity utilization of MEW in SME in ASCA. The researcher revealed that limited marketing opportunity is the most significant factor that poses the most significant factor from other variables while tax has been identified as the least independent factor for improving capacity utilization of MEW of SME in ASCA. The financial aspect factor which includes inadequate working capital as well as poor knowledge of financial management and the human resource factor which contains lack of educated manpower and job training opportunity were also found to exert a significant effect on capacity utilization of those enterprises in comparison to other factors.

The final research question of the study was to propose conceptual mapping model for capacity utilization improvement of MEW in SME in ASCA. Accordingly, this study identified in its model to have job training opportunities for MEW of SME and bring good governance by avoiding bureaucratic procedures to

- Giving relevant on job training that results in more skilled and educated manpower that contributes to more quality and quantity outputs through the implementation of new designs and using of technologies. And this will give a high market opportunity.
- Ease the financial burden that most MEW in SME are facing by using locally available material including recycled materials and reduce wastage as much as possible.
- Widen the marketing opportunity of enterprises through promotion and performing of new marketing strategies through conducting of business plans.

- Support the overall production and marketing strategies of MEW in SME.

This study also revealed that more responsibility lies on the shoulders of the enterprises despite the need for government body intervention to facilitate marketing opportunities and support by reducing the bureaucratic procedures during tendering and licensing stages. In conclusion, unless all the enterprises, the sub-city and woreda level SME's and other stakeholders give due attention towards these bottlenecks on the time, the enterprises continue to suffer from under capacity utilization related problems.

5.4 Recommendation

The researcher draws the following recommendations based on the findings of the study, interpretation and conclusion

5.4.1 Recommendation for MEW in SME of ASCA

The research findings revealed that respondents thought the capacity utilization level of MEW in SMEs in particular to ASCA low. Therefore, it was recommended that enterprises should

- Work closely with the government body to get on job training opportunities to develop the skill and technical capacity in both productions as well as marketing departments to address the knowledge gap.
- Improve leadership capacity of their personnel by engaging themselves regularly market consultation with different associations, and other concerned authorities and also establish relationships with similar international manufacturing industries to share their experience in the industry.
- Create awareness to workers about wise resource handling, resource utilization, and waste elimination through practices such as lean.
- Enterprises need to use their installed capacity effectively by blending the required academic knowledge and work experience to create new products that can attract the rapidly changing market.
- Establish a business network with technology oriented intervention such as social media promotions to address customers regarding the services of the enterprise.
- Conduct a regular business plan to cope with the ever changing marketing conditions of the world.

- Form a suitable workshop area since metal & engineering require a high level of technical & engineering knowledge/skill which involves the deployment of equipment, materials as well as human resources.

5.4.2 Recommendation for Woreda and sub-city level SME Bureau and policy practitioners (Makers)

Policy practitioners and other stakeholders who are responsible in decision making activities concerning the existing as well as the future improvements regarding capacity utilization of MEW in SME should consider the following recommendations

- Supplier credit facility or any other financial source must be well assessed regularly for strengthening the financial status of the enterprises.
- The government body should support the MEW in SME by providing supports of foreign currency availability and supply of adequate import of raw materials.
- The government body should also formulate and implement non-bureaucratic procedures and laws so that enterprises should participate in bidding and other public procurement practices without bias.
- Since good governance is one of the keys to enhance the capacity utilization of SMEs, the government needs to apply string control to avoid corruption and rent-seeking attitude of civil servants in bidding and job opportunity creation programs.
- Finally, the government stakeholder should pass rules and regulations in favor of local manufacturers, so that the metal engineering industries can be more competitive on the international and national markets.

5.4.3 Recommendation for further research

This study took a sample size of 81 respondents and employed descriptive and exploratory research approaches. The study was limited to the Arada Sub city only. Therefore, the researcher recommends further researchers who wish to conduct a study on this topic to

1. Expand these researches by increasing the sample size and scope of thematic area that could enhance a variety of perceptions.

2. Carryout a comparable type of research in another occupation.

Reference

Addis Ababa Administration Job Creation and Enterprise Development Bureau (2019) data

Addis Ababa City Administration culture and Tourism Bureau (2011). Heritage inventory report.

Arada sub-city Industrial development office 2011 EC fiscal year report.

Arada Sub-City Administration, (2017).

Akindipe. O, 2014 The role of raw material management in production operations International Journal of Managing Value and Supply Chains (IJMVSC) Vol.5, No. 3

Asmamaw (2010), "Ethiopian Basic Metals and Engineering and technology challenges".

Angus W.L (1995) Managing Capacity and Demand in A Resource Constrained Environment; Lessons for the NHS. Journal of Management in Medicine vol9 no, 5

Augustine C. Osigwel,(2015) Kenneth Obi Does Capacity Utilization Rate Affect Imports of Raw Materials in Nigeria

Bagalkoti, Indira N. "Mobilization of Revenue Reforms and Development–An overview." *IJRAR-International Journal of Research and Analytical Reviews (IJRAR)* 2, no. 2 (2015): 813-822.

Bansak.C, Morin.n and Starr.M technology,(2007) capital spending, and capacity utilization (ISSN 0095-2583) Online Early publication February 2, 2007 Vol. 45, No. 3, Western Economic Association International

Barn Basu, G., Jeyasingam, J., Habib, M., Letchmana, U., & Ravindran, R. (2017). The Impact of Supply Chain Management Practices on the Performance of Private Universities in Malaysia. International Journal of Supply Chain Management, 6(3), 22-35.

Belyh.A, (2015) Capacity Utilization.

Bello, A. A., & Osinubi, T. S. (2016). Infrastructure development and economic growth in sub-Saharan Africa.

Beyene .T (2018). Analysis of Achievements and Challenges of Metal, Engineering, Chemicals and Construction Inputs Industries

Buculescu, M. M. (2013) Harmonization process in de fining s mall and medium – sized enterprises, arguments for a quantitative definition versus a qualitative one, Theoretical and Applied Economics, Vol. 20, No.9

Calderon Ccsar, and Luis Serven. 2014. “Infrastructure, Growth, and Inequality: An Overview.” 7034. World Bank Policy Research Working Paper. doi:10.1596/1813-9450-7034.

Commission on Legal Empowerment of the Poor (2006). Background issue paper onLegal Empowerment of the Poor, Addis Ababa

Chang, M.C., Chiu, Y.H., 2007. The analysis of a price war strategy under market demand growth. Economic Modelling 25, 868e875.

Christian O.C. 2012 Capacity Utilization in Manufacturing Industries: Evidence from Nigerian Firm Level Data.

Dametew.A.W , Kitaw.D and Ebinger.F (2017)The Roles of TQM and JIT For Basic Metal Industries Global Competitiveness

Debela. K (2011) Women in the development of micro and small enterprise to ensure sustainable development food security.

Donald Waters. (2006) Operations Strategy, Thomson Learning

Du, J, & Douch, M. (2018). Infrastructure and Productivity: A Review.

Egber.H, (2007) Capacity Utilization of Enterprises in Tanzania Tanzania Journal of Development Studies, Vol. 7, No. 1: 16-26

Embley, D. W., Liddle, S. W., & Pastor, O. (2011). Conceptual-model programming: a manifesto. In *Handbook of Conceptual Modeling* (pp. 3-16). Springer, Berlin, Heidelberg.

Ethiopian Development Research Institute (EDRI) (2018) Main Features of Micro and Small Manufacturing Enterprises in Ethiopia Baseline Survey Report

Escribano, A., Guasch, J. L., & Pena, J. (2010). Assessing the impact of infrastructure quality on firm productivity in Africa: cross-country comparisons based on investment climate surveys from 1999 to 2005. The World Bank

Federal Democratic Republic of Ethiopia Addis Ababa City Administration Ethiopia Transportation System Improvement Project (TRANSIP), 2016 Social Impact Assessment (SIA) January

Fri, W., Pehrsson, T. & Søilen, K. S (2013) How Phases of Cluster Development are Associated with Innovation - the Case of China, *International journal of innovation science,* 5:1, 31-44

Federal Negarit Gazette of the Federal Democratic Republic of Ethiopia Addis Ababa February, 2016

Foot Margaret and Caroline Hook (2008), Introducing Human Resource Management, 5th Edition, Prentice Hall

Gebrehiwot A, Business development service (BDS) In Ethiopia :(2006) status, prospect, and challenge in the Micro and Small enterprise sector. Awassa, Ethiopia,

Gebre-egziabher T., Demeke, M, (2004). Small Businesses in Small Towns of the Eastern Amhara Region: Nature and Economic Performance. A Research Report on IDR, Addis Ababa University

Gebreeyesus. M (2014) A natural experiment of industrial policy Floriculture and the metal and engineering industries in Ethiopia.

Giang, M. H., Trung, B. H., Yoshida, Y., Xuan, T. D., & Que, M. T. (2019). The causal effect of access to finance on productivity of small and medium enterprises in Vietnam. *Sustainability*, *11*(19), 5451.

Government of the federal democratic republic of Ethiopia ministry of urban development and housing micro and small enterprise development policy and strategy April 2016

Grindle, M. S. (2010). Constructing, deconstructing, and reconstructing career civil service systems in Latin America. *HKS Faculty Research Working Paper Series*.

Hair, J. F. Jr., Anderson, R. E., Tatham, R. L. & Black, W. C. (1995). *Multivariate Data Analysis (3rd edition)*. New York: Macmillan.

Hiluf. N. (2018) Socio-Economic Roles and Challenges of Micro and Small Enterprises in Addis Ababa: The Case of Arada Sub-City.

Heil, M. (2017). Finance and productivity: A literature review.

Hidayet, K. et al. (2010) The importance of SMEs in Developing Economies, 2nd international symposium on sustainable development, Turkey

Homma. T (2010) Basic Metal and Engineering Industries (BMEIs): International Comparison of Polliicy Framework and Ethiiopiia''s Approach

Jean, N, E. and Peter,R,(1994)"Spreadsheet simulation to aid capacity management of batch chemical processing using JIT pull control", International journal of Operations & production management,Vol. 15 No.10, pp 82-88.

Kalim, R. K. (1998). Factors Affecting Capacity Utilization in Manufacturing Sector of Pakistan: A Survey Analysis. Pakistan Economic and Social Review, 171-182.

Kobes. D, 2013 (Making On-the-Job Training Work Lessons from the Boeing Manufacturing On-the-Job Training Project November)

Kumar Sah. S 2014 Corruption and Good Governance: The Case of Bangladesh SUST Journal of Social Sciences, Vol. 22, No.2, 2014; P: 45-52)

Lane and Rosewall. T (2015) Firm-level Capacity Utilization and the Implications for Investment, Labor and Prices Kevin

Lawson, B. and Samson, D. (2001). Developing innovation capability in organizations: a dynamic capabilities approach. International journal of innovation management, 5(3), 377-400

Lawal.P olayemi June, (2008) capacity utilization of construction craftsmen in public sector in north central zone of Nigeria

Lin, R.-J., Tan, K.-H., & Geng, Y. (2013). Market demand, green product innovation, and firm performance: evidence from Vietnam motorcycle industry. Journal of Cleaner Production, 40, 101–107. doi: 10.1016/j.jclepro.2012.01.001

Madueme S. I. (2009) capacity utilization rates in Nigerian economic sectors: an analysis article february 2009

Mapetere. D and Thelmaer. M (2018) improving capacity utilization of furniture manufacturing smes through market based view: a case of gweru, zimbabwe international journal of economics, commerce and management United Kingdom vol. vi, issue 10,

McKenzie, D., & Woodruff, C. (2014). What are we learning from business training and entrepreneurship evaluations around the developing world? The World Bank Research Observer, 29(1), 48-82.

Megento. T, (2013) inner city housing and urban development- induced displacement: impact on poor female-headed households in Arada sub city of Addis Ababa, Ethiopia Addis Ababa University

Madhu, P. (2005). What is good governance *Trade Union*, *1*(1), 1-6.

Mesut, K., (2011), "Determining the capacity and its level of utilization in make-to-order manufacturing: A simple deterministic model for single-machine multiple-product case", Journal of Manufacturing Systems, Volume 30, No 2, pp 63-69.

Mike, J.A. (2010). Banking sector reforms and the manufacturing sector: The Manufacturers' Association of Nigeria Perspective. CBN Economics and Financial Review, 4, 57-65

Mojekwu, J. N. Iwuji, I. I (2012) Factors Affecting Capacity Utilization Decisions in Nigeria: A Time Series Analysis.

Morrison, C. J. (2012). A microeconomic approach to the measurement of economic performance: Productivity growth, capacity utilization, and related performance indicators. Springer Science & Business Media.

Mulugeta. S (2018) Analysis of Causes for under-capacity production of the Ethiopian re-bars Manufacturing Industry Doctoral dissertation, Addis Ababa science and technology university).

Ndemezo. E, J.B. Ndikubwimana & Dukunde. A, (2018) Determinants of Capacity Utilization of Food and Beverage Manufacturing Firms in Rwanda: Do Tax Incentives Matter?

Nega.F and Hussein. E (2016) Small and medium enterprise access to finance in Ethiopia synthesis of demand and supply the horn economic and social police institute

N. Jayanth1, S. Vidyashankar (2014) A Case Study Optimization of Capacity Utilization in a Manufacturing Industry

OECD (2004) promoting entrepreneurship and innovative SMEs in a global economy: towards a more responsible and inclusive globalization, second OECD conference ministries report, OECD publications, France

Pandey P.C, Janewithayapun, S., Hasin, M.A.A. (2000), "An Integrated System for Capacity Planning and Facility Layout", Journal of Production planning & Control: The Management of Operations, Vol.11 No.8, pp 742-773

Peter Morgan May (2006) the Concept of Capacity

P´erez Lechuga, C.A. Mu˜n´oz Ib´a˜nez, F. Venegas Mart´ınez 2015, International Journal of Pure and Applied Mathematics Volume 105 No. 3, 477-496

Richard B, Nicholas J.A. and Robert F.J. (2002), Operations Management for Competitive Advantage, the McGraw Hill Publication, 9th ed., pp. 356-367

Seo, Y.J., Dinwoodie, J., & Roe, M. (2015). Measures of supply chain collaboration in container logistics. Maritime Economics & Logistics, 17(3), 292-314. https://doi.org/10.1057/mel.2014.26

Signe. L (2018) the potential of manufacturing and industrialization in Africa

Study of Development of Sustainable and Inclusive Basic Metal and Engineering Industry in Ethiopia, 2015

Subramanyam, P., & Reddy, B. R. (2013). Capacity Utilization of Micro and Small Enterprises in Kadapa District. Indian Journal of Commerce and Management Studies, 4(1), 68.

Syed Asad Ali Naqvi, Muhammad Fahad, Muhammad Atir, Muhammad Zubair & Muhammad Musharaf Shehzad | Wenjun Xu (Reviewing Editor) (2016) Productivity improvement of a

manufacturing facility using systematic layout planning, Cogent Engineering, 3:1, DOI: 10.1080/23311916.2016.1207296

Tigabu D. Getahun, Gebrehiwot A. Kebedew, Balineau Gaëlle and Fikru D. Sima, (2018) Manufacturing Competitiveness in Ethiopia:Developments, Challenges and Prospects, Ethiopian Development Research Institute,

Timsal.A Awais.M, and Shoaib.O (2016) On job Training and Its Effectiveness: An Employee Perspective South Asian Journal of Banking and Social Sciences, Vol. 02, No.01, ISSN: 2410-2067 © Institute of Banking & Finance, BZU Multa

Turhan. M (2018) The Effect of Capacity Utilization on Economic Growth in Industrial Enterprises

Tursunov, B. (2017). Ways of increasing the efficiency of usage the production capacity of textile enterprises. *Бюллетень науки и практики*, (8), 232-242.

UNDP (2006) Capacity Development Practice Note, United Nations Development Program

UNIDO, Stemming Irregular Migration In Northern And Central Ethiopia, UNIDO INCEPTION PHASE REPORT Volume II

Vartia, L. (2008). How do taxes affect investment and productivity? An industry-level analysis of OECD countries. Economics Department Working Papers No. 656

Vasanthi.S & Basariyab.R, (2019) Pros and Cons of On the Job training versus Off the Job training international journal of scientific & technology research volume 8, issue 10, issn 2277-8616

Veldhuis,N., & Clemens, J. (2006). *Productivity, Prosperity and Business Taxes* Fraser Institute.

Workineh. M (2016), Factors Affecting the Development of Micro and Small Scale Manufacturing Enterprises in Addis Ababa: The Case of Kirkos Sub-city.

World economic forum, (2018) Readiness for the Future of Production Report

World economic forum, (2016) New Industrial Policy and Manufacturing: Options for International Trade Policy

World Health Organization(WHO). (2017). Global action plan on HIV drug resistance 2017–2021.

Yamane, Taro. (1967): Statistics: An Introductory Analysis, 2nd Ed., New York: Harper and Row

Zhang, D. (2020). Capacity utilization under credit constraints: A firm-level study of Latin American manufacturing. *International Journal of Finance & Economics*.

Appendix-I survey questions

ADDIS ABABA INSTITUTE OF TECHNOLOGY

Improving Capacity Utilization of Metal and Engineering Works In Small and Medium Enterprises (Case of Arada sub city Administration)

My name is Yodit Tolosa, M.Sc. Student at Addis Ababa Institute of Technology, in the school of Mechanical and Industrial Engineering in Industrial Engineering. I am conducting a research on identifying the factors affecting Capacity Utilization of Metal and Engineering Works in Small and Medium Enterprises in the Case of Arada sub city. The aim of this questionnaire is to identify critical factors affecting the capacity utilization of Metal and Engineering Works in Small and Medium Enterprises in Arada sub city Administration.

Your voluntary participation and accurately responding survey questions has an added value to the successful completion of this research. The information you will give will enable me to critically analyze the subject matter. Therefore, please answer all questions. Your response will be used for academic purpose only and will be kept confidential.

Thank you in advance for your kind cooperation and sparing your precious time to respond to the questions.

Best Regards,

Yodit Tolosa

Instruction Please indicate the following by ticking (√) on the spaces in front of the response options:

Section I: General background of respondents

1.

1.1 Age:

20-25 ☐ 30-35 ☐ 40-50 ☐

25-30 ☐ 35-39 ☐ 50-60 ☐

1.2 Sex:

Male ☐ Female ☐

1.3 Education:

Certificate/Diploma ☐

Bachelor degree ☐ Master's degree ☐

2, Work experience in Enterprise:

1-5 years ☐ 6-10 years ☐ 11-15 years ☐ above 15 years ☐

3. What is your major role in the enterprise?

- ✓ Individual owner of the enterprise ☐
- ✓ Supporting expert's office worker ☐
- ✓ Governmental coordinator/supporter ☐
- ✓ Formal workers of the enterprise ☐
- ✓ Other _____

4. How many years has been the enterprise in the business?

1-3 years ☐ 4-6 years ☐ 7-9 years ☐ 10-13years ☐ above 13 years ☐

5. Capital investment

Less than 100,000 ☐

100,000-1,500,000 ☐

1,500,000-20,000,000 ☐

More than 20,000,000 ☐

Section II: Questionnaires related with factors influencing capacity utilization.

The followings are lists of statements that pertaining to factors affecting capacity utilization of Metal and Engineering Works in Small and Medium Enterprises in Arada sub city Administration. For each question give your answer by ticking (√) on the spaces provide only on one place.

S. No	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	There is low capacity utilization problem in Metal and Engineering Works of Small and Medium Enterprises in Arada sub city Administration?					
	The followings are factors from literature review to affect capacity utilization in MEW in SME in ASCA.					
2	Infrastructures facility					
2.1	Power shortage					
2.2	Water shortage					
2.3	Lack of transportation					
3	Raw materials					
3.1	Shortage of raw material					
3.2	Low quality of raw material					
3.3	High cost of raw material					
4	Finical source and cost					
4.1	Lack of working capital					
4.2	Bureaucracy in getting finance					
4.3	Low financial management skill					
5	Tax administration					

5.1	Unfair tax/high level of tax rate					
5.2	Bureaucracy in taxation process					
6	Skilled man power					
6.1	Shortage of skilled man power					
6.2	Shortage of experienced worker					
7	Market demand					
7.1	Low market opportunity					
7.2	Shortage of market strategy development skill					
7.3	Low promotion work					
8	On job training					
8.1	Shortage of relevant training					
8.2	Lack of experience sharing programs					
9	Good governance					
9.1	Corruption in bidding system					
9.2	Lack of developed strategy To reduce bureaucracy					
9.3	Lack of policy review periodically					
10	Innovation					
10.1	Lack of product modification and innovation					
10.2	Low level of competence and highly dependent behavior					

Mention if there is other_____

አዲስ አበባ ዩኒቨርሲቲ ቴክኖሎጂ ተቋም

መካኒካል እና ኢነደስትሪአል ትምህርት ክፍል

እኔ ዱዲት ቶሎሳ የአዲስ አበባ ዩኒቨርስቲ መካኒካል እና ኢንደስትሪያል ትምህርት ክፋል የድህረ ምረቃ ተመራቂ ተማሪ ስሆን በአሁን ሰዓት በአራዳ ክፍለ ከተማ የሚገኙ በብረታ ብረት እና ኢንጅነሪንግ ስራ የተሰማሩ የአነስተኛና መካከለኛ ኢንተርፕራይዞች አቅም/ችሎታ አጠቃቀም ላይ ተፅህኖ የሚፈጥሩ ጉዳዮችን መለየት በሚል ርዕስ የመመረቂያ ፅሁፌን በማዘጋጀት ላይ እገኛለው። የዚህ ጥያቄ አላማም በአራዳ ክፍለ ከተማ የሚገኙ በብረታ ብረት አና ኢንጅነሪንግ ስራ የተሰማሩ የአነስተኛና መካከለኛ ኢንተርፕራይዞችን አቅማቸውን እንዳይጠቀሙ ተጽእኖ የሚያደርጉ ምክንያቶችን ለመለየት ነው።

የእርስዎ በጎ ፈቃድኝነት ተሳትፎ እና ጥያቄዎቹን በትክክል መመለስ ለጥናት ፅሁፌ ውጤታማ አጨ ራረስ አስተዋፆ አለው። የሚሰጡትም መረጃ ለትምህርት ዓላማ ብቻ የሚውልና ሚስጥራዊነቱ የተጠበቀ መሆኑን በመገንዘብ መጠይቁን በጥንቃቄ እንደሞሉ እጠይቃለው። በመጨረሻም ጊዜዎን ሰውተው ላደረጉልኝ ትብብርም ከልብ አመሰግናለው።

ከ ትህትና ጋር

ዱዲት ቶሎሳ

መመሪያ፤ ከዚህ በታች ላሉት ጥያቄዎች መላስዎትን በሳጥኑ ውስጥ የእርማት ምልክት " √ "ያስቀምጡ::

ክፍል 1: የጥናቱ ተሳታፈዎች ጠቅላላ ሁኔታ

1.

1.1 ዕድሜ:

20-25 ☐ 30-35 ☐ 40-50 ☐

25-30 ☐ 35-39 ☐ 50-60 ☐

1.2 ፆታ:

ወንድ ☐ ሴት ☐

1.3 የት/ት ደረጃ:

የመጀመሪያ ደረጃ ☐ ድግሪ ☐

ሁለተኛ ደረጃ ☐ ማስተርስ ☐

ዲፕሎማ ☐ ሰርተክፌት ☐

2. በኢንተርፕራይዙ ያሎት የስራ ልምድ ፡

1-5 ዓመት ☐ 6-10 ዓመት ☐ 11-15 ዓመት ☐ ከ15 ዓመት በላይ ☐

3. በኢንተርፕራይዙ ያሎት የሥራ ድርሻ?

- ✓ የኢንተርፕራይዙ አላፊ ☐
- ✓ ኢንተርፕራይዙን ከሚደግፉ ቢሮዎች ☐
- ✓ የ ኢንተርፕራይዙ መደበኛ ሰራተኛ ☐

4. ኢንተርፕራይዙ ከተከፈተ ስንት አመት ሆነው?

1-3 ዓመት ☐ 4-6 ዓመት ☐ 7-9 ዓመት ☐ 10-13 ዓመት ☐

ከ13 ዓመት በላይ ☐

5. ካፒታል

ከ100,000 ብር በታች ☐
ከ100,000-1,500,000 ☐
ከ 1,500,000-20,000,000 ☐
ከ20,000,000 ብር በላይ ☐

ክፍል 2፡ የአቅም/ችሎታ አጠቃቀም ላይ ተፅእኖ የሚያሳዳሩ ምክንያቶችን ጋር የተያያዙ ጥያቄዎች።

1) ከዚህ በታች በበአራዳ ክፍለ ከተማ የሚገኙ በብረታ ብረት እና ኢንጅነሪንግ ስራ የተሰማሩ የአንስተኛና መካከለኛ እንተርፕራይዞችን የአቅም/ችሎታ አጠቃቀም ላይ ተፅእኖ የሚያሳዳሩ ምክንያቶችን ለሆኑ የሚችሆ ነገሮች ተዘርዝረዋል። ከተዘረዘሩት ችግሮች በያእያንዳንዱ ጥያቄ ከአማራጮቹ አንዳ ጊዜ ብቻ የ " √ " ምላክት በማዳረግ ምላሽ ይስጡ።

ተ.ቁ	ጥያቄዎች	በጣም አልስማማም	አልስማማም	ለመወሰን እቸገራለው	እስማማለው	በጣም እስማማለው
	ዝቅተኛ የሆነ የአቅም/ችሎታ አጠቃቀም በበአራዳ ክፍለ ከተማ የሚገኙ በብረታ					

	ብረትአና ኢንጅነሪንግ ስራ የተሰማሩ የአነስተኛና መካከለኛ ኢንተርፕራይዞችን ላይ አለ።					
	በበአራዳ ክፍለ ከተማ የሚገኙ በብረታ ብረት እና ኢንጅነሪንግ ስራ የተሰማሩ የአነስተኛና መካከለኛ ኢንተርፕራይዞችን የአቅም/ችሎታ አጠቃቀም ላይ ተፅእኖ የሚያሳዳሩ ምክንያቶች					
2	መሰረተ ልማት					
2.1	የታይል/መበራት መቆራረጥ					
2.2	የውሃ እጥረት					
2.3	የማጓጓዣ ችግር					
3	ጥሬ እቃ					
3.1	የጥሬ እቃ አቅርቦት እጥረት					
3.2	የጥራት ደረጃቸው የወረደ የጥሬ እቃ አቅርቦት					
3.3	ከፍተኛ የሆነ የጥሬ እቃ ዋጋ					
4	ፉይናንስ					
4.1	የመስሪያ ገንዘብ የሚሆን ካፒታል እጥረት					
4.2	ፉይናንስ/የገንዘብ ለማግኘት ያለው ቢሮክራሲ					

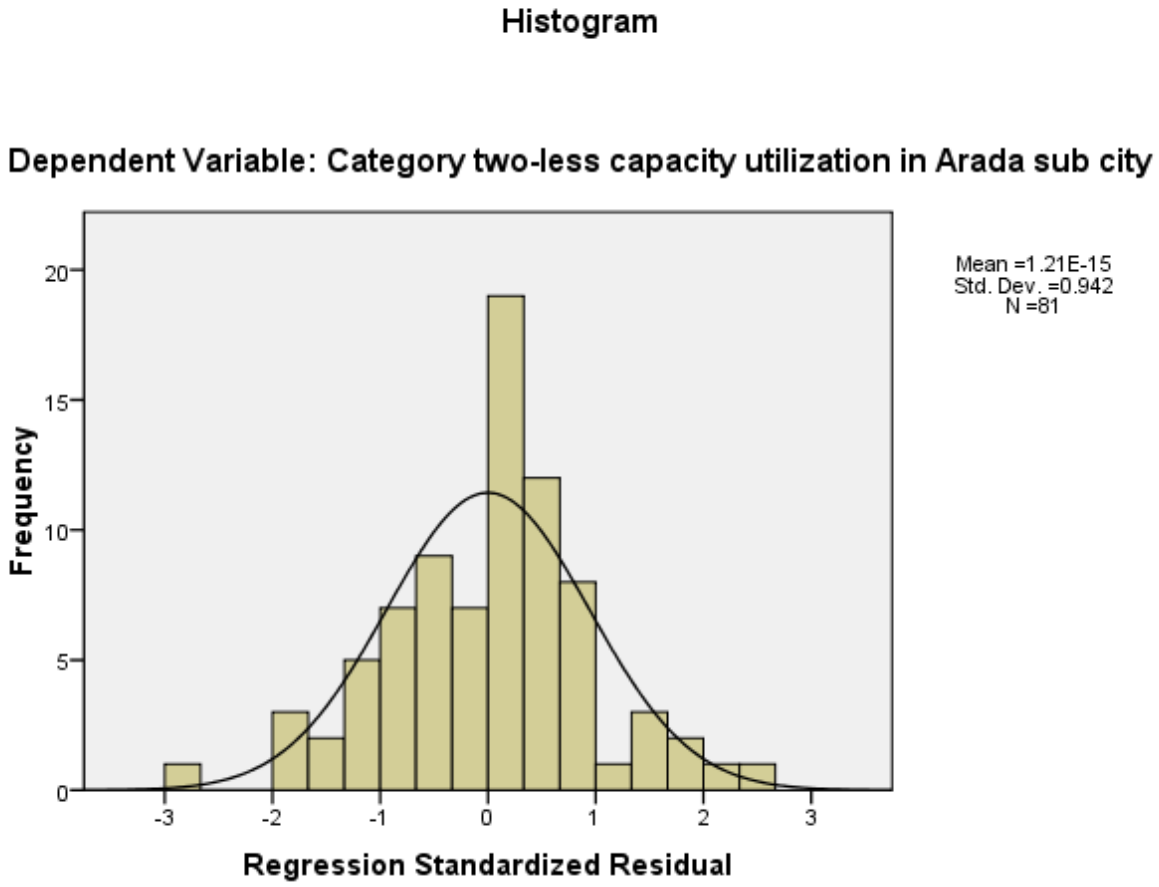
4.3	ፉይናንስ/የገንዘብ አያያዝ ክሎት ክፍተት					
5	ቀረጥ					
5.1	ከፍተኛ የሆነ ቀረጥ					
5.2	ቀረጥ አከፋፈል ላይ ያለ ቢሮክራሲ					
6	የተማረ የሰው ኃይል					
6.1	የተማረ የሰው ኃይል እጥረት					
6.2	በቂ የሆነ የስራ ልምድ ያለመኖር					
7	የገበያ ችግር					
7.1	የገበያ ዕድል አለመኖር					
7.2	በቂ የሆነ የገበያ ስትራቴጂ የመፍጠር የእውቀት ክሎት አለመኖር					
7.3	የማስታወቂያ ስራ አለመስራት					
8	የስራ ላይ ስልጠና					
8.1	በቂ የሆነ ስልጠና አለመኖር					
8.2	የልምድ ልውውጥ መርሃ ግብሮች አለመኖር					
9	መልካም አስተዳደር					
9.1	የጨረታ ስነ ስርዓት ላይ ያለ ሙስና					

9.2	ቢሮክራሲ ለመቀነስ የሚያስችል ስትራቴጂ አለማዘጋጀት					
9.3	ፖሊሲዎችን በየጊዜው የለማሻሻል					
10	ፈጠራ					
10.1	የማሻሻያ እና የፈጠራ ስራ አለመኖር					
10.2	ውድድር አለመኖር እና የጥገኝነት ባህሪ					

ሌላ ምክንያት ካለ ይጥቀሱ_____

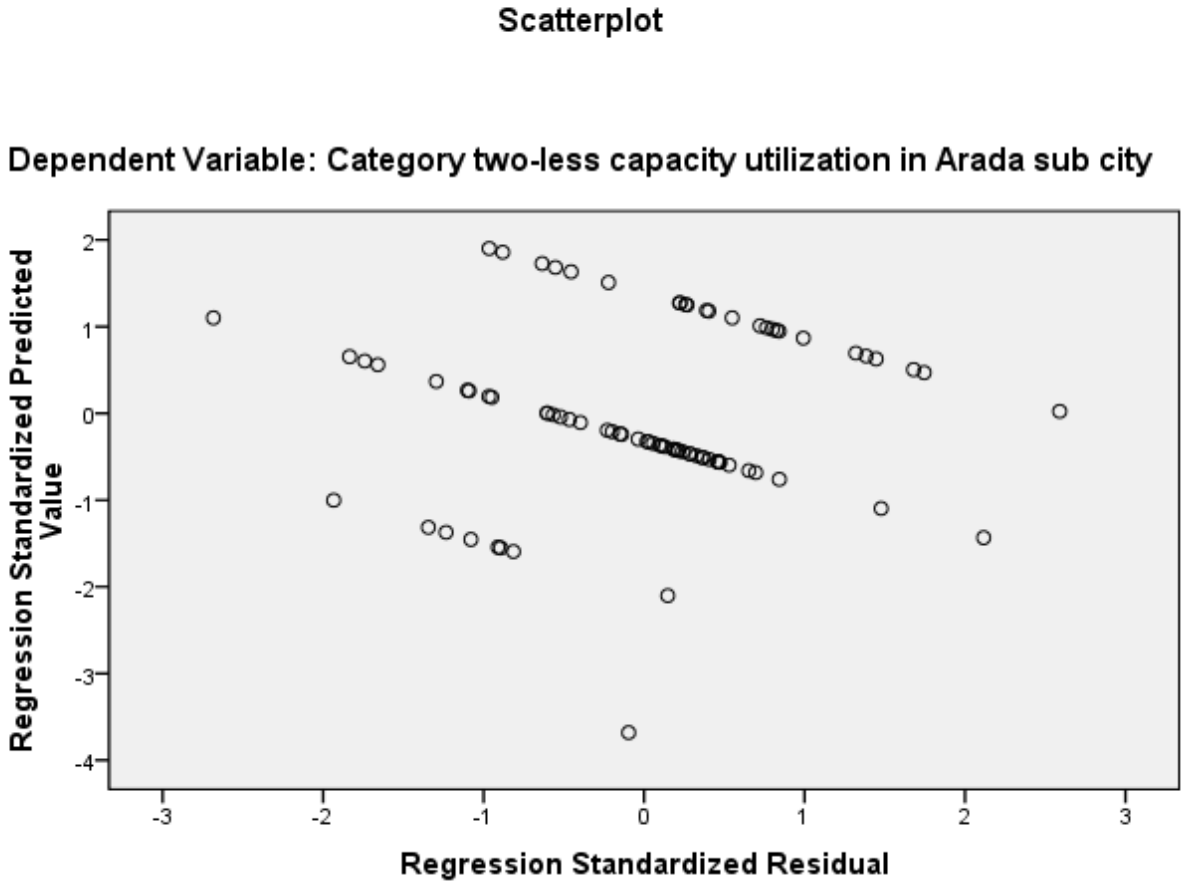
_____

Appendix- Ⅱ



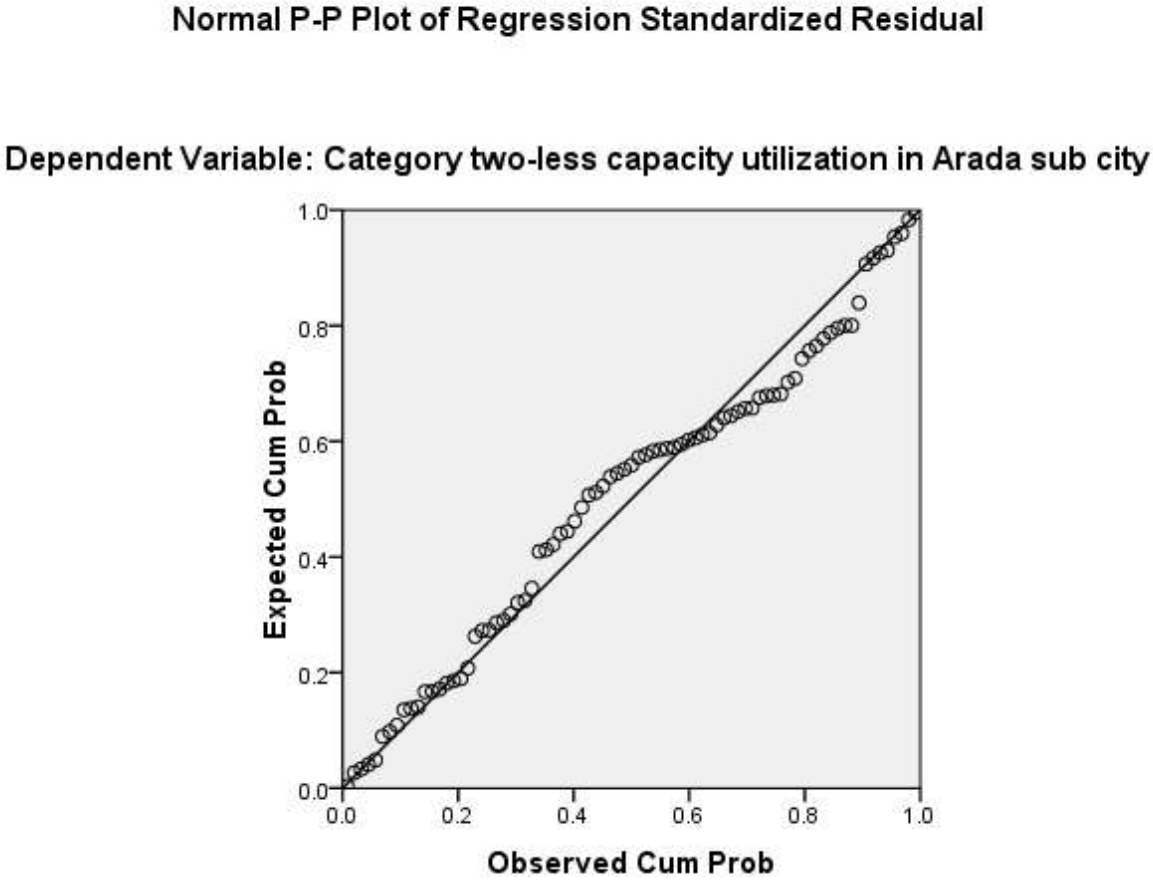
Source: Own Competition 2020

Appendix-Ⅲ



Source: Own competition 2020

Appendix-Ⅳ



Source: Own competition 2020

.