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CLUSTER DEVELOPMENT FOR METAL WORK INDUSTRIES: Case Study on Addis Ababa Micro and Small Scale Metal Work Industries

By

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LIST OF ABBREVIATIONS

BDS- Business Development Service

C&ND- Cluster and Network Development

CDA- Cluster Development Agent

CDP- Cluster Development Program

E.F.Y- Ethiopian Fiscal Year

FDI- Foreign Direct Investment

FeMSEDA- Federal Micro and Small Enterprise Development Agency

GDP- Growth Domestic Product

GIS-Geographical Information System

GNP-Gross National Product

GPS- Global Positioning System

GVP- Gross Value of Production

ISIC- International Standard Industrial Classification

LE- Large Enterprise

MoI- Ministry of Industry

MoT- Ministry of Trade

MSEs- Micro and Small Enterprises

MSMEs- Micro, Small and Medium Enterprises

NGO- Nongovernmental Organization

ReMSEDA- Regional Micro and Small Enterprise Development Agency

SICDP- Small Industry Cluster Development Program

SMEs- Small and Medium Enterprises

SSE- Small Scale Enterprise

SSI- Small Scale Industry

TVET- Technical and Vocational Education Training

UNIDO- United Nation Industrial Development Organizations

UPTECH- Technology Up-Gradation and Management Program

ABSTRACT

The contribution of micro, small and medium Scale industries towards employment generation, alleviation of poverty and inequalities and development of backward areas is recognized worldwide. Although, these industries have great role in economic development of our country, they doesn't benefit as their potential due to their problems related to their size. Most of the problems are lack of: market, skilled manpower, working capitals, information and low level of competitiveness. In addition there is lack of cooperation among themselves, which limits sharing of resources between them.

Micro and small industries clustering is a group of these industries, producing similar products, located in a geographical proximity, sharing resources (like knowledge, technology etc) among themselves in order to overcome their internal and/or external challenges, and that compete each other but also cooperate with one another.

The study is concerned on cluster development of micro and small metal work industries in Addis Ababa city. It covers 32 micro and small scale metal work industries selected from all sub cities with the objectives of developing micro and small metal work industry cluster to create a conducive environment for the development of inter-firm cooperation, improve the competitiveness of the industries, to solve marketing problems of the industries, and to facilitate metal work technology transfer to the country.

For the accomplishment of the objectives of the study the selected industries were assessed through questionnaires, interviews and observation. The results obtained from the survey shows that Addis Ababa micro and small metal work industries faced with the following problems. These were:- lack of: market, product displaying area (marketing area), working capital, technical training, trust among the metal working industries; and flexibility of price and quality of raw materials. In order to solve the observed problems with the support of published and unpublished literatures the study proposed the development of micro and small metal work industry cluster and identifies suitable cluster location in the city. Taking into consideration of other countries experiences, for realization of the benefits of developed metal work industry cluster it should be suggested that to properly cooperate all collaborators of the cluster.

CHAPTER ONE

PROBLEMS AND ITS APPROACH

1.1. Background and Justification

Micro, small and medium enterprises (MSMEs) in manufacturing industry have a significant role to play in economic development in general and in industrial development in particular at all levels of development *(Ceglie & Dini, 1999).* SMEs form the backbone of the private sector, make up over 90 percent enterprises in the world and account for 50 to 60 percent of employment. SMEs engaged in manufacturing account for between 40 and 80 percent of manufacturing employment.

In Ethiopia, the presence of Micro, Small and medium enterprises (MSMEs) are very important for several reason, such as their potential to create employment; their contribution to a more efficient allocation of resources (i.e. MSME's tend to adopt labor-intensive production methods and thus more accurately reflect the resource endowments in developing countries like Ethiopia where labor is plentiful and capital is scarce); and their support on the building of systematic productive capacities (i.e. they help to absorb productive resources at all levels of the economy and contribute to the establishment of dynamic and resilient economic systems in which small and large firms are interlinked).

Currently, in Ethiopia the establishments of metal industries under small, medium and large scale are growing. The general condition of metal and engineering industry in the country is clearly a function of economic policies and strategies as well as the macro-economic situation of the country. The metals and engineering industry is one of the vital sectors as it contributes substantially to the country's Gross National Product (GNP) and Employment. With the presence evidence and in the future in Ethiopia well performing micro and small metal work industries will be expected to use sub contracting opportunities obtained from metal and engineering corporation. Even though, now a day's establishment of micro and small metal work industries are increasing and the metal and engineering corporation generates a vast market opportunities for them, Problems related with the size of micro and small metal work industries limits their contribution to the development of country and industries.

The problems of MSE's related with their size leads them to inability of capturing the market opportunities which require large production quantities, makes difficulties in achieving economies of scale in the purchase of inputs (such as equipment, raw materials, finance, consulting services, etc.) ,barrier to the internalization of functions such as training, market intelligence, logistics and technology innovation ,and prevent the achievement of specialized and effective internal division of labor which, according to classical economic theory, fosters cumulative improvements in productive capabilities and innovation *(Ceglie, & M. Dini, 1999).*

Now a day's Ethiopian government is concerned with identifying strategies and programs that enhance productivity, competitiveness and how to collaborate micro and small scale industries within the country. The above problems facing micro and small metal industries will be solved through different techniques like, supply chain integration, development of industry cluster, etc.

This thesis is concerned with solving the problems of micro and small scale metal industries in Ethiopia through industry cluster development.

Industry cluster is "geographically proximate group of companies and associated institutions (such as universities, government agencies, and related association) in a particular field, linked by commonalities and complementarities. In another saying a cluster is a sectoral and geographical concentration of MSEs, faced with common opportunities and threats. Such a configuration can: Give rise to collective benefits, for example through the spontaneous inflow of suppliers of raw materials, components and machinery or the availability of workers with sector specific skills; Favors the creation of providers of specialized technical, administrative and financial services; and Create a conductive environment for the development of inter-firm co-operation as well as of co-operation among public and private institutions to promote local production, innovation and collective learning *(Bhushan, 2006).*

Industry cluster can also be in the macro-economic level which focuses on collaboration between partners in the same industry *(Sureephong, et al., 2006)*. Thus industry clusters enhance the division and specialization of labor among enterprises, the development of the market for skilled workers, and the dissemination of technical and managerial knowledge.

1.2. Statement of the Problems

As different exploratory surveys describe, there are a set of problems characterizing individually working micro, small and medium-scale manufacturing enterprise (MSME's) in developing countries**.** These constraints include: lack of access to market; difficulties in achieving economies of scale in purchase of inputs (such as equipment, raw materials, finance, consulting services, etc.); significant obstacle to the internalization of functions such as training, market intelligence, logistics, and technology; lack of the achievement of specialized and effective internal division of labour and lack of marketing area *(Ceglie, & M. Dini, 1999)*. Since most of Ethiopian MSME's are operating individually, they have been challenged by many of the above problems.

Through clustering, individual MSME's can address the listed problems and improve their competitive position. The reason is that clustering creates cooperation and linkages among MSME's and others (i.e. suppliers and customers). This feature of clustering also shares resources among the MSME's, provides an opportunities for bulk purchase of inputs, can specialize on their core business and give them the way to external division of labour.

Therefore, to solve the problems of individually working Ethiopian micro and small metal work industries, the study develops metal work cluster considering selected micro and small metal work industries in Addis Ababa.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of the study is to develop industry cluster model for micro and small-scale metal work industries so as to create a conducive environment for the development of inter-firm co-operation and to improve the competitiveness, productivity of those industries within the cluster and to facilitate technology transfer to the country.

1.3.2. Specific Objectives

To achieve the general objective of this research, the following specific objectives are accomplished throughout the study:

- Investigate the problems of the isolated (individually working) micro and small-scale metal work industries;
- Identify possible cluster development model for micro and small-scale metal work industries;
- Identify suitable location for metal work cluster in Addis Ababa for selected industries;
- Develop model of clustering for selected micro and small metal work industries; and
- Study the role of metal work industry cluster in metal work technology transfer to the country.

1.4. Significance of the Study

The research paper provides the way to strengthen micro and small-scale metal work industries in the country by developing industry cluster. By doing this, the industries competitiveness, productivity, ability to facilitate technology transfer to the country and innovation capability of industries is improved; the continuity of these improvements in the future assists the import substitution policy of the country.

Therefore, the micro and small-scale metal work industries, the government, the society and the researcher are benefited from the study. In addition the research paper can be used as a reference for other researcher who wants to work on the area of industry cluster development.

1.5.Scope of the Study

Although the problems of micro and small industries related with their size, which makes the industries less competitive and less productive is observed in most of MSE's sectors of investment like construction, metal and wood work industry, textile and garment industry, etc, this study is limited to strengthening the selected metal work industry through clustering because of economic, time, and other unforeseen constraints.

In addition, solving the above problems observed in those sectors can be solved through different techniques, but in this study industry clustering is applied to solve the problems.

1.6. Organization of the Study

This thesis contains a total of seven chapters. The organization of the chapters is arranged in such a way that it follows a logical sequence. The first chapter, problems and its approach, includes: background and its justification, statements of the problems, objectives, limitations, significances, and organization of the study.

The second chapter, related literature review, provides: theoretical background of the cluster, approaches of cluster development, small-scale manufacturing industries, historical development and production process of metal work, best practices of clustering in developing countries, and Practices of clustering and problems of existing cluster in Ethiopia.

Chapter 3, methodology of the study, introduces sample size determination, sampling methods and methods of data collection in which the study is carried out.

Chapter 4, data collection and analysis, is about presenting the data collected and identifying the problems of micro and small metal work industries in Addis Ababa.

Chapter 5, metal work cluster identification and analysis in Addis Ababa, is about analyzing necessity of clustering for metal work industries and identifies suitable cluster location in the city.

Chapter 6 provides the readers with model of developing metal work industry cluster in Addis Ababa and introduces the effects of metal work industry cluster in facilitating the metal work technology transfer to the country.

Finally, the study provides conclusions, recommendations and future research directions in chapter seven.

CHAPTER TWO

LITERATURE REVIEW

2.1.Introduction

Globalization of trade is increasing the world competition and this has resulted in a growing number of countries and individual businesses seeking survival beyond their internal resources. Thus, the role of business clusters has become increasingly important and has gained more attention from both policy makers and academia, particularly in developed countries *(Catherine*, *2008).*Today's economic map of the world is dominated by what Porter call clusters *(M. E. Porter., 1998).* The cluster approach to development aims to stimulate economic growth by increasing the benefits to firms of being located in a certain region *(Amy Cogan, & Stephen, 2008).* Clusters are a striking feature of virtually every national, regional, state, and even metropolitan economy. It affects competitiveness within countries as well as across national borders. Therefore, they lead to new agendas for all business executives, not just who compete globally. More broadly clusters represent a new way of thinking about location, challenging much of the conventional wisdom about how companies should be configured, how institutions such as universities can contribute to competitive success and how governments can promote economic development and prosperity *(M. E. Porter., 1998).*

Recently, the concept of industrial cluster has become the focal point of analyzing regional economic development. National and regional economies tend to develop, not in isolated industries, but in clusters of industries related by buyer and supplier relationship, common technologies, common inputs or common customers. The concentration of enterprises facilitates linkages with suppliers and buyers, as well as fosters a mixture of cooperation and competition that can give rise to vibrant local economies. The cluster concept plays a double role in helping firms and regions, first, as target: shaping related business activities in certain sectors, and second as method: to facilitate inter-firm learning and tailoring of support *(Arnoud, 1999).*

Small-scale manufacturing enterprises can play a key role in triggering and sustaining economic growth and equitable development in developing countries. However, this potential role is often not fulfilled because of a particular set of problems characterizing them. These problems are unable to capture market opportunities which require large production quantities, homogenous standards, and regular supply; difficulties in achieving economies of scale in the purchase of inputs (such as equipment, raw materials, finance, consulting services, etc.); a significant hindrance to the internalization of functions such as training, market intelligence, logistics and technology innovation; preventing the achievement of specialized and effective internal division of labor which, according to classical economic theory, fosters cumulative improvements in productive capabilities and innovation *(Giovanna, & Marco , 1999)*

In order to overcome the above mentioned problems of small scale manufacturing enterprise, the enterprise should collaborate together through clustering.

2.1.1. Definitions and Types of Cluster

Definitions of cluster

In different economic literatures clusters can be defined in various forms. Porter in 1990 defined cluster as a group of firms engaged in similar or related activities within a national economy. Schmitz in 1992 on the other hand defined cluster as a group of enterprises belonging to the same sector and operating in close proximity to each other. Further in 1998 Porter defines cluster as a geographical concentration of interconnected companies, specialized suppliers, service providers, firms in related industries and associated institutions (e.g. universities, standards agencies, trade associations) in a particular field that compute but also cooperate *(Charlie , 2008).* Swann and Prevezer in 1996 defined cluster as the presence of firms from the same industry or the same group of enterprises within the same geographical space. From here one can notice that while a 'specific region' provides a geographical dimension to the definition of cluster 'related industries' adds a technological dimension. It implies that the groups of firms are similar in product or process and are linked through the technology supply chain *(Rakash, 2002)*.

According to the economic literature, industrial clusters are groups of firms on the same location composing production system with spillovers that can be vertical and/or horizontal. The United Nation Industrial Development Organization (UNIDO) also defines a cluster as a local agglomeration of enterprises producing and selling a range of related or complementary products within a particular industrial sector or subsector *(Richard, 1996).*

As mentioned above cluster can be defined in various ways by different persons, but Adoption of cluster definition depends on the environmental context in which the subject is applied. This study adopts Schmitz's definition because geographical proximity appears to be important for Ethiopian MSE clusters. This is because of geographic proximity of stake holders of clusters appears to be particularly important in developing countries like Ethiopia where poor infrastructure, weak information systems, and cultures that place high value on face-to-face communication are the norms.

Therefore, depending on the way Schmitz's defined cluster, under this study: cluster is defined as a group of micro and small metal work Enterprises/industries, producing similar products, located in geographical proximity, sharing knowledge and technology among themselves in order to overcome their internal and/or external challenges, and that compete each other but also co-operate with one another.

Types of clusters

Clusters can be classified in different dimension. These are:

- *Based on cluster development*, cluster can be classified as Natural clusters and innovative clusters. *Natural clusters*: is characterized by traditional local in nature, age long, simple in outlook, low skill, very small of operation, and none sharing. *Innovative clusters*: its characteristics includes modern and global in outlook, knowledge based, competitive, scientific in approach, improved scale of production and requires all levels of skills.

- *Based on the cluster integration*, cluster can be classified as horizontal clusters and vertical clusters. *Horizontal clusters***:** are clusters of organizations which have the same or similar functions and/or operation. *Vertical clusters***:** it is when organization in the value chain cooperates towards common goals.
- *Based on the type of product or services they provides***,** cluster classified as Clusters in automotives industries, Clusters in metal industries, Clusters in tourism, etc
- *Based on the type of location dynamics their constituent industries are subjected to***:** Many industries are tied to their location by the need to be close to their customers. Other industries are tied to their location by the need to be close to natural resources. Finally, there are many industries that are essentially free to choose their location according to the quality of cluster specific business environment.
- Cluster classified *based the stages of development they have reached***.** Stages of development on quality of the external business environment the cluster operate in, Stages of development on the progress of the cluster has made in mobilizing of its business environment through active cooperation and other internal activities.

2.1.2. Benefits of Cluster Development

Industry cluster development benefits both the industry within the cluster and has a positive effect in the country's economic development. The following are some of the benefits of industry clusters:

- Cluster strengthens industries in the value chain includes core industries, related industries, and supporting industries by location advantages, which may stimulate comparative advantages to be a competitive advantage.
- Cluster makes industries within the cluster more competitive than those industries outside the cluster by increasing the productivity of companies based in the area, by driving the direction and pace of innovation (which underpins future productivity growth), and by stimulating the formation of new business. *(M. E. Porter. 1998).*
- Cluster stimulates the growth of related industries which need supplies of the same raw material and supporting material, therefore it can strengthen partnership between/among prioritized, related, or supporting industries.

- ❖ Clustering creates external economies and joint actions and increases scope. In effect individual enterprises in a cluster can gain collective efficiency. Close proximity facilitates the establishment of business networks by enterprises in the locality of industrial links without substantial transaction costs or difficulties *(Ceglie, & M. Dini, 1999).*
- ❖ Cluster development is important for both development of SMEs and development of economy.
- ❖ Through clustering, individual enterprises can address their current problems related to their size, production process, marketing, procurement of inputs; risks associated with demand fluctuations, and market information *(Tambunan, 2005).*
- ❖ A cluster will also attract many traders to buy the products and sell them to distant markets. Also, with clustering of enterprises, it becomes easier for government, universities, and other development supporting agencies to provide services.

2.1.3. Cluster Development Pattern

There are three patterns of cluster development. These are:

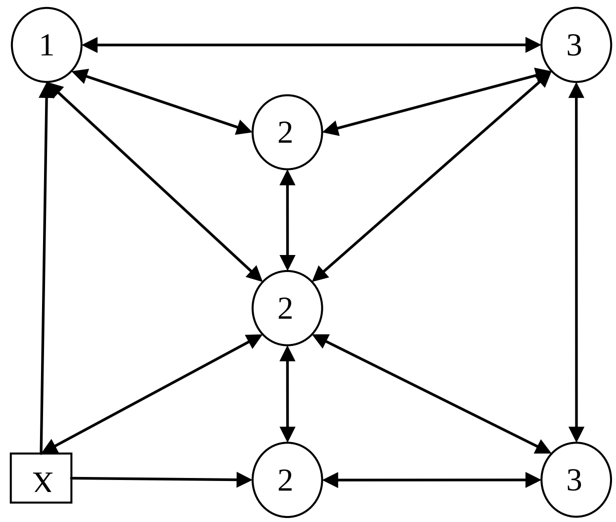
A. *Pattern of cluster development which relies on spatial proximity*, as it is the physical proximity of the firms that generates the advantages in these clusters. Increasing advantages in terms of reduced transactions costs and agglomeration economies are generated as the number of firms in a location increases. As densities of firms increase, agglomeration effects will be greater, creating a greater incentive for firms to locate within the cluster and attracting a greater number of firms into the area *(Charlie, 2008)*. Spatial proximity pattern of cluster development: generates agglomeration economies, Facilitates face-to-face interaction which allows for a smoother transaction process between firms, reducing the costs and uncertainty associated with markets and allows the spillover of knowledge to occur. Although spatial proximity is an important factor in the development of clusters, it is not necessarily a prerequisite.

B. Pattern of cluster development on relational as well as physical proximity; the formation of trust between firms, in other words, is likely to reduce the importance of physical proximity. Shared cultural values and norms are crucial to the development of trust. As trust develops, the importance of spatial proximity declines and relational proximity becomes the predominant logic underpinning inter-firm collaboration. Under these circumstances, relational proximity begins to increase in importance, enhancing shared values and stimulating a more trusting relationship between collaborating firms *(Charlie, 2008).*

C. *Pattern of clusters development on relational proximity*: this pattern of cluster development is not reliant on spatial proximity. Instead, it is relational proximity that brings firms together. As it is stated on the handbook, Lissoni found evidence of knowledge flows within an epistemic community comprising of engineers and technicians created through trading relationships, but found no evidence that these knowledge flows were the result of geographic proximity. Morgan, however, suggested that geography is still important, despite an increased interest in the relational aspects of clusters formation. ***(****Charlie, 2008).*

As it can be seen from the cluster development path below, there are multiple paths and multiple outcomes in this process, the process is dynamic and a cluster may not necessarily stay static over time as the importance of spatial and relational proximity varies. Thus, cluster development may not be uniform across space.

Importance of spatial proximity



Importance of Relational Proximity

Figure 2.1: Patterns of Cluster Development

In the literature above it is described that, there are three patterns of cluster development. For the development of MSE clusters in developing countries like Ethiopia, it is advisable or recommended to follow pattern of cluster development which relies on geographical/ spatial proximity. This is because of poor infrastructure, weak information systems and cultures that place high value on face-to-face communication are the norm in the developing countries. Therefore, under this study for the cluster development of micro and small scale metal work industries found in Addis Ababa, I adopt pattern of cluster development which relies on the geographical/spatial proximity because of the advantages of this pattern over the other patterns in the developing countries.

2.1.4. Cluster Formation Process

Clusters form as a result of direct interactions and ongoing collaboration between businesses. These interactions create relationships and transactional as well as relational proximity that in turn generate greater opportunities for substantive and ongoing cooperation.

Clusters formation encompasses a transition from no collaboration between firms to cooperation and the reformulation of competitive activity around the wider economies of scale that become available to firms within an emerging cluster *(Charlie, 2008).*

As described under hand book of research on cluster theory, Atherton, identify five stages in the process of clusters formation. The stages are broadly sequential, in that transition from one to the next signifies movements towards formation of a cluster and recognition by the businesses involved that this is increasingly intrinsic to their competitive advantage. Movement from stage to stage is dependent upon the emergence of greater levels of mutual commitment to cooperation, and hence to increased levels of group interaction *(Charlie, 2008).*

Stage 1 Identification of a common issue or problem

The first step is the acceptance or recognition that individual firms face issues and developmental constraints that they cannot address themselves.

An initial condition for clusters emergence, therefore, is that firms experience or face a shared issue that they could resolve through collaboration. At this first stage of clusters development, businesses have not agreed to work together and in most circumstances do not recognize or appreciate the potential of cooperation and group activities in helping to address shared issues or problems. The dynamics underpinning clusters formation start before actual collaboration occurs, and are predicated on the latent potential for cooperation on shared issues *(Charlie, 2008).*

Stage 2 Recognition of a need or opportunity to cooperate

Clusters start to form when the potential to work together transforms into active interaction and cooperation, in order to address shared concerns. The second stage of clusters formation occurs, therefore, when firms are stimulated or pushed to collaborate with like-minded businesses.

The second stage of clusters formation encompasses a shift to recognition of the opportunities arising from group collaboration, and the need to do so in certain circumstances in order to enable business development and mitigate threats or constraints to firms.

Recognition of the need or opportunity to co-operate moves firms closer to direct collaboration, and so involves engagement amongst the firms as well as mutual recognition that co-operation may be of benefit to all involved *(Charlie, 2008).*

Stage 3 Development of an initial collaborative project

Once a group or network of firms that have a common issue has accepted, and then agreed, that there is scope for collaboration, the next step is to determine the form, scale and nature of cooperation. This stage of clusters formation entails a shift from exploration of the opportunities for collaboration to actual cooperation via group engagement in shared activities. Projects typically were based on agreed parameters, and means of working together, which provided explicit limits to individual firm commitment to collaboration *(Charlie, 2008).*

Engagement in an initial 'test' project,

- ❖ manage the potential risk arising from breakdown in relations or failure of the collaborative project
- ❖ Allowed firms to learn about the partner firms that they are cooperating with, so increasing awareness of the activities and capabilities of other firms in the grouping. It also provided opportunities for the development of trust and familiarity amongst the collaborating firms.
- ❖ Helped collaborating firms to develop protocols and shared 'rules' for engagement and cooperation.

Stage 4 Emergence of ongoing group collaboration through multiple projects

Following on from an initial project, participants that can see further benefits from group collaboration explored additional opportunities to develop new projects and group activities. As multiple projects were agreed upon, and activated, participating firms became more aware of and familiar with each other, and their individual and organizational capabilities. Through ongoing collaboration via projects, the participating firms are able to develop higher levels of trust and, as a result, become more mutually dependent *(Charlie, 2008).*

Stage 5 Formalization of the group and its collaborative activities

The formalization of group collaboration represents a final stage in the clusters formation process, in that the importance of cooperation and the growth of interdependence were explicitly recognized by participating firms as the basis for their own activities and responses to external stimuli. Through exchanges of agreements to cooperate, and contracts, collaborating firms made more explicit and more tangible the extent and importance of cooperation to their operation and future potential for survival and growth. Over time, such agreements were likely to develop into more substantive forms of cross-investment and cross-ownership that publicly stated the extent to which firms were collaborating. The move to formalization of previously informal ties and interdependencies represents, therefore, a shift to more explicit investment in and commitment to the group as the basis for seeking out competitive advantage and competing against other firms *(Charlie, 2008)*.

Under this study, the framework of cluster formation for micro and small scale metal work industries in Addis Ababa is done based on the above listed five stages of cluster formation process.

2.1.5. Cluster Identification Methods

The industrial clusters fall into the group of modern tools of economical development for regional economy and competitiveness increasing.

When the creator or regional authorities think about the cluster birth, they must have some method how to obtain information about suitability of region for cluster birth, and potential of regional economy. There are several methods for industrial clusters identification in regions in contemporary literature. But no more methods are applicable in practice because of the data are not available *(Stejskal, 2010)*.

There are many lists of tools for cluster identification in literature and other sources. These lists of tools will be classified into two groups as qualitative and quantitative based on their similarity *(Stejskal, 2009)*.

Methodologies of cluster identification/mapping

Following methods were used for cluster identification or cluster mapping in various studies:

Localization quotient (LQ) is "a measure of the relative significance of a phenomenon (e.g. employment) in a region compared with its significance in a larger region" *(Muhendislik, 2007).* In another saying localization quotient compares the characteristics of branches (number of employees, sales and added value) at the regional and national level. In industry cluster analysis, the location quotient measures the employment in a cluster as a ratio of total regional employment when compared to the national cluster. An advantage of localization quotient methods of cluster mapping is its ability to benchmark clusters in a wide region. Whereas its disadvantage is it may not be able to capture local realities and the accuracy of results depends heavily on the availability and reliability of data *(Muhendislik, 2007).*

Export Data and Input-output analysis of business relationships (IOA): can identify the relationships among firms which are necessary for cluster initiatives (program). "This can be done by identifying the most interesting global industries based on export criteria or simply by focusing the analysis on all the relatively largest transactions between industries in the input-output table". An advantage of input-output analysis of cluster mapping is it demonstrates the amount of commercial interaction between industries. Where as its disadvantages is it does not focus on co-localization *(Muhendislik, 2007).*

The Snowball Method: is a qualitative cluster mapping approach and is suitable for mapping "emerging" clusters (which supposedly hosts a reasonable number of companies), mapping clusters in a small area (i.e. a small city or province), and when the available data is not reliable and/or specific enough for mapping purposes *(Muhendislik, 2007)*. The advantages of snowball cluster mapping methods are its ability to captures relations & networks and can identify emerging clusters. Whereas its disadvantage is it might be time (and resource) consuming for mapping practices in large areas/ regions.

New geographical method called the Ripley’s K method has its roots in complex mathematical formulae and statistical models. Even though, this method solves one of the key problems of localization quotient method, it is hard to understand and apply because of its complexity. An advantage of the new geographic method of cluster mapping is that it does not rely on geographical borders to identify cluster. Whereas its disadvantages are its application is still being tested, dependency on detailed location data for each company, and computational demands *(Muhendislik, 2007).*
Data constraints, geographical scope of analysis, and purpose of the mapping exercise are factors affecting cluster mapping.

Even though we have different methods of cluster identification as described in the literature above for the selection of sectors to be clustered and the region under which the sector to be clustered, but under this study, the identification of micro and small scale metal work industry sector for clustering in the region of Addis Ababa is selected based on the justification below.

As compared to other sectors, solving the problems of individual MSE’s metal work through clustering benefits the country in both the agricultural activities and large industries including metal and engineering industries, this is because MSE’s metal works produce equipments that support agricultural activities and different spare parts for large firms in the country.

2.1.6. Cluster and Supply Chain

Industry cluster and supply chain are in focus of every countries which rely on knowledge-based economy. Both focus on improving the competitiveness of firm in the industry in the different aspect. In addition both industry cluster and supply chain are in the different level of management but focus on the common objectives *(Sureephong, P. et al., 2006).*

The supply chain is integrated in the core business of the industry cluster. The cluster support the supply chain by integrating academic institutes, government agencies, association and supporting industry in order to create the innovation and enhance the knowledge in the supply chain.

Figure below illustrates the general overview of the integration of industry cluster and supply chain *(Sureephong, P. et al., 2006).*

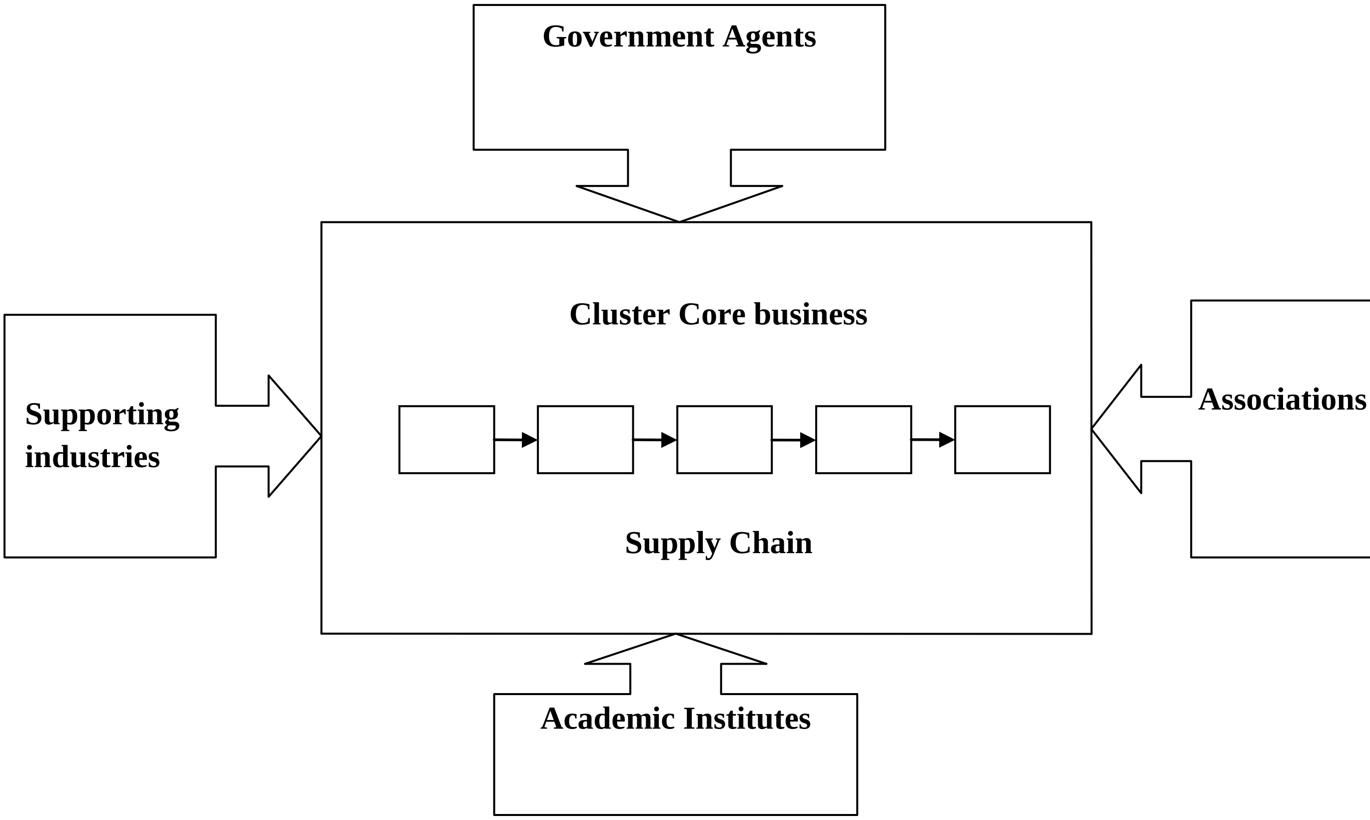


Figure 2.2: Integration of Industry Cluster and Supply Chain

The following are some of the benefits of cluster to supply chain:

- ❖ Clustering can improve the capability of companies to select their supply chain partner.
- ❖ Collaboration in the cluster will improve knowledge and information sharing between partners in the supply chain.
- ❖ Cluster development agent (i.e. a person who conceptualizes the overall developmental strategy for a cluster and initiates implementation) in the cluster can be supply chain facilitator which will assists the information sharing in the supply chain.

2.2.UNIDO Approaches of Cluster Development

UNIDO's activities in the SME cluster and network development field started in the mid 90s and have so far included technical cooperation projects in 12 countries. Its main objectives are: fostering collaborative attitude and joint action among cluster actors and developing entrepreneurship skills and SME support services that underpin collective efficiency *(Ceglie, 2003).*

Some of the countries in which UNIDO designed/implement cluster and network development (C&ND) projects are: Colombia, Ecuador, El Salvador, Ethiopia, India, Honduras, Morocco, Nicaragua, Nigeria, Pakistan, Senegal, Thailand, Tunisia, and Zimbabwe *(Ceglie, 2003).*The United Nation Industrial Development Organization (UNIDO) defines a cluster as a local agglomeration of enterprises producing and selling a range of related or complementary products within a particular industrial sector or subsector *(Richard, F., 1996)*. Challenges are for example, product obsolescence or lack of markets, where as opportunities examples are, scope for increasing turnover through quality up-gradation or the introduction of new products or increasing exports through targeted marketing. UNIDO can also defines Networks as: a groups of firms that cooperate on a joint business project complementing each other and specializing in order to overcome common problems, achieve collective efficiency and penetrate markets beyond their individual reach *(Ceglie & M. Dini 1999).*

During supporting SME's in developing countries, UNIDO's follow one of the following approaches. In some projects the overall cluster aspect prevails and the promotion of networks is pursued as part of the cluster development strategy. In other cases, activities start with the development of horizontal or vertical networks and then, as networking intensifies and more and more enterprises are involved, the territorial, or cluster dimension starts to emerge with the involvement of business development service providers, associations of enterprises and governmental institutions. Flexibility, a need–based approach, and intermediary driven support are the key characteristics of cluster development approach.

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UNIDO designed a methodology for the formulation and implementation of cluster development projects. They adopt the following steps for the cluster development approaches *(Bhushan, 2006).*

- *Selection of clusters:* it ensures that the available resources are concentrated on clusters where the approach can have significant impact by contributing towards business gains of the SMEs, revitalization of systemic interactions among stakeholders, dissemination of best practices, etc. Selection of clusters generally includes the following steps: Identification of clusters in a country; Creation of country cluster table and map; Preliminary selection and shortlist of clusters; Formulation of final selection criteria; Collection of primary data; and Final selection of cluster(s).
- *Diagnostic study:* helps to identify cluster(s) strength and weaknesses, the environment in which it or they operate and the steps to be undertaken for sustainable development of the stake holders.
- *Trust building:* Establishing an atmosphere of trust within a cluster is an essential prerequisite to earn the support from those involved in the cluster. Here the Cluster Development Agent (CDA) must first develop "bilateral" trust with individual stakeholders and then use it to create/enhance trust among the other stakeholders. The process starts with informal/formal interactions and later takes the route of trust building through participation in activities.
- *Action plan:* This list of activities (generally for a year) which is more than the sum total of demand from the different cluster stakeholders; starts with inputs from the diagnostic study. It is a roadmap that will help foster relationships among the stakeholders while delivering visible results. It is also an attempt to embody the vision for the cluster as a whole in a set of activities that can be implemented through stakeholder collaboration.
- *Implementation:* refers to the range of activities that lead to the realization of the long-term objectives enshrined in the "vision statement" of a cluster. It involves a radical change in the way the cluster stakeholders interact and conduct activities. In the implementation of the action plan the stakeholders discover the advantages of closer cooperation. The last phase of implementation consists of execution of an exit plan.

- *Monitoring and evaluation:* Monitoring of the quantifiable and qualitative outcomes of implementation helps to disseminate best practices and strengthen trust among stakeholders. It also allows the identification of emerging changes in the relationships among cluster stakeholders and the adaptation of cluster activities and governance structures to these.

The various stages of cluster development are not mutually exclusive. They often overlap. In particular, the trust building phase is a continuous one. UNIDO's cluster development is a loop approach as shown in figure below *(Bhushan, 2006):*

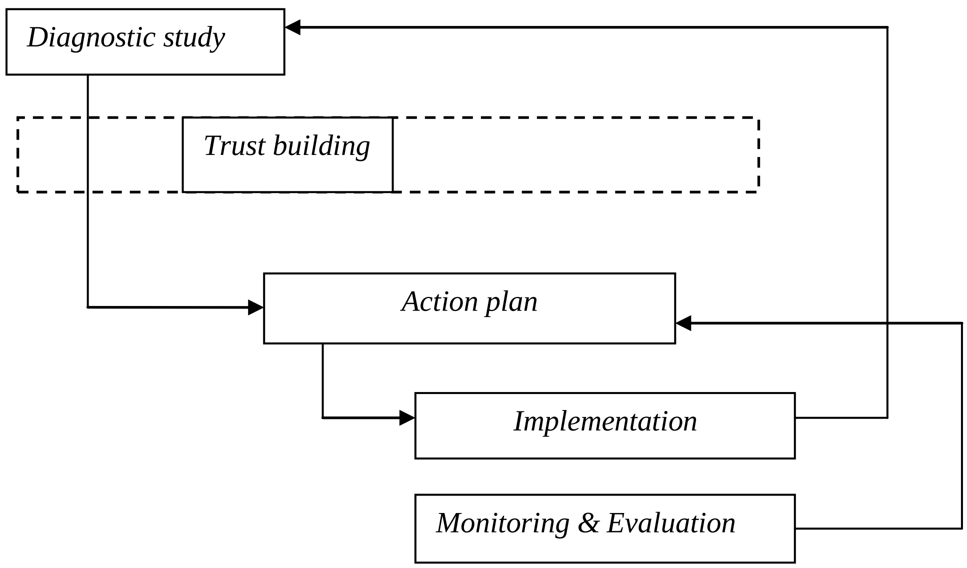

Figure 2.3: UNIDO's Cluster Development Approach

2.3. Small-Scale Manufacturing Industries

2.3.1. Introduction

The contribution of Small Scale enterprises (SSE) towards employment generation, alleviation of poverty and inequalities and development of backward areas is recognized worldwide. In overall economic development, a critically important role is played by micro, small and medium enterprises in the developing world. The vast majority of countries rely on the dynamism, resourcefulness and risk-taking of private enterprises (to which most small scale manufacturing enterprises belong) to trigger, sustain the process, and form the base for private sector led of economic growth.

In this regard, small scale manufacturing industries are playing an ever-increasing role in the manufacturing industrial structure of the country. Expansion and development of the sector increases agricultural productivity through providing agricultural inputs and creating demand for agricultural outputs. Furthermore, small scale manufacturing industries play a key role in stimulating other sectors of the economy such as trade, construction and services and in reducing unemployment *(FDRE CSA, 2010).*

Manufacturing is defined here according to International Standard Industrial Classification as "the physical or chemical transformation of materials or components into new products, whether the work is performed by power - driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail. The assembly of the component parts of manufactured products is also considered as manufacturing activities."

2.3.2. Small- Scale Manufacturing Industries in Ethiopia

In Ethiopia, small-Scale Enterprises (MSE's) have been neglected for a long. However, especially following the country's shift to a market economy, the government as well as Non-governmental Organizations (NGOs) and donors have shown interest in the area. This shift to a market-led economic system would mean the strengthening of the private sector, which would then foster the development of Small-Scale Enterprises (SSE) in Ethiopia as they constitute the majority of the sector.

There were 43,338 small scale manufacturing establishments in Ethiopian fiscal year (E.F.Y) 2000 (2007/08). Out of the total, the largest in number, or slightly more than 23 thousand or 53.2 %, were grain mills, 8.6 thousand (19.8 %) furniture manufacturers and metal manufacturing establishments numbered 4.4 thousand or 10.1 % of the total, respectively. On the other end, very few small scale establishments were engaged in chemical, leather and footwear manufacturing, while there were none in the machinery and parts manufacturing. During the stated year all the establishments combined engaged 138,951 people, which are roughly a ratio of 1 to 3.2, i.e., on average 10 small scale manufacturing establishments engaged 32 people.

A further look reveals that in absolute terms, grain mills employed the most: 70,023 (50.4 %), followed by furniture manufacturers, 34,718 (25.0 %) and metal manufacturers, 15, 031 (11.0 %), in that order *(FDRE CSA. 2010).*

Gross value of production (GVP) in the stated period amounted to birr 2.79 billion, out of which grain mills contributed 1.1 billion, which is 40.0 % of the total. Furniture manufacturers' GVP reached 635.9 million, which is ahead of metal manufacturers' GVP (419.6 million). The other notable GVP was, that of food manufacturers amounting to 308.3 million birr or 11.0 %, trailed by non-metallic mineral products manufacturing 116.9 million birr (4.2 %) and wearing apparel manufacturing 115.7 million or 4.1 % of total gross value of production by small scale manufacturing establishments during the year *(FDRE CSA. 2010).*

2.3.3. Social and Economic Significances of Micro and Small Scale Enterprises

Micro and Small scale Enterprises (MSEs) have important roles by creating jobs and means of incomes, and as an "engine of economic growth". But, scholars argue that the contribution of these enterprises may vary according to the level of enterprises.

The definition of and criteria for MSE vary from country to country. For example, in Ethiopia, country wide used definition of MES's is on the bases of three criteria. These are: level of paid-up capital/fixed asset, using high tech establishment and consultancy services. Accordingly, in Ethiopia micro enterprise refers to small business with paid up capital not exceeding birr 20,000 and excluding high tech consultancy firms and high tech establishments. And, small enterprise refers to enterprise with paid up capital from birr 20,000 to 500,000 and excluding high tech consultancy firms and high tech establishments. However, in most countries MSE is defined based on number of employees. Accordingly, most commonly, micro enterprise is enterprises with ten and less employees, while small enterprise is enterprises with 10 to 50 employees.

Even though Micro and Small Scale Enterprises is defined in different ways in different countries, the development of Micro and Small Scale Enterprises both in developing and developed countries provides the following advantages.

- ❖ Reducing unemployment**:** All small enterprises, display a remarkable capacity to absorb labor thus contributing to easing the pressure of unemployment.
- ❖ Consequently, they provide income earning opportunities for a large proportion of the population. They generally tend to contribute to a more equitable distribution of income.
- ❖ They produce relatively cheaper goods and services locally using labor intensive methods satisfying the needs of (particularly the poor) people-hence contributing to the variety of consumer goods.
- ❖ Promote subcontracting arrangements and act as ancillaries to large scale enterprises. They facilitate effective technology transfer as a result. In addition, they provide significant inter-sectoral linkage, integrating economic sectors through the backward and forward linkages.

In current Ethiopian situation, where population is growing at an increasing rate and substantial increase in urban population is taking place, accompanied by high unemployment rates resulting from educational attrition/ dropouts, retrenchments, dislocations, unavailability of formal sector employment opportunities, and a host of other factors, the Small scale enterprises sectors need to be given urgent and due attention to foster development. Since in the country MSE's play a significant role in terms of accommodating a number of operators and generating gainful employments to the labour force. They also provide livelihood to the vast majority of the population next to agriculture *(Worku & Daniel, 2004).*

2.4. Historical Development and Production Process of Metal Works

Historical development of metal working

No one knows with any certainty where and when metal working began. The connection of fire and metal brought metal into focus. Egyptians are taught to have been one of the first civilizations to work gold. As Isaac Asimov speculated, gold was the first metal. Almost all other metals are found in ores, a mineral bearing rock that requires heat or some other process to liberate the metal. After the invention of metal, metal working was being carried out by the south Asian inhabitants of Mehrgarh between 7000-3300 BCE. Then the Middle East was started metal working, to produce jewelry and simple tools by using copper ore.

Looking beyond the Middle East, china and Britain started metal working by using bronze. United States is also using metals for different jeweler and arts.

In Ethiopia, different writers argued that metal working had been started during the Axumite civilization by local experts (black smiths and artisans) and this beginning of metal working in the northern part of Ethiopia had passed through evolutionary process significantly in making traditional agricultural implements, household equipment and defense tools. This evolutionary process has contributed to the creation and development of modern metal and wood works through the country.

General metal working production process

Metalworking is the process of working with metals to create individual parts, assemblies, or large scale structures. The term covers a wide range of work from large ships and bridges to precise engine parts and delicate jewelry. It is therefore includes a correspondingly wide range of skills, processes, and tools.

Modern metalworking processes, can be categorized as forming, cutting or joining processes. *Forming process*:is the process of modifying metal or work piece by deforming the object without removing any material. Forming is done with heat and pressure, or with mechanical force, or both. Examples of forming process are metal casting. *Cutting process* is a collection of processes where in material is brought to a specified geometry by removing excess material using various kinds of tooling to leave a finished part that meets specifications. The net result of cutting is two products, the waste or excess material, and the finished. *Joining process:* includes welding, brazing, soldering, and riveting

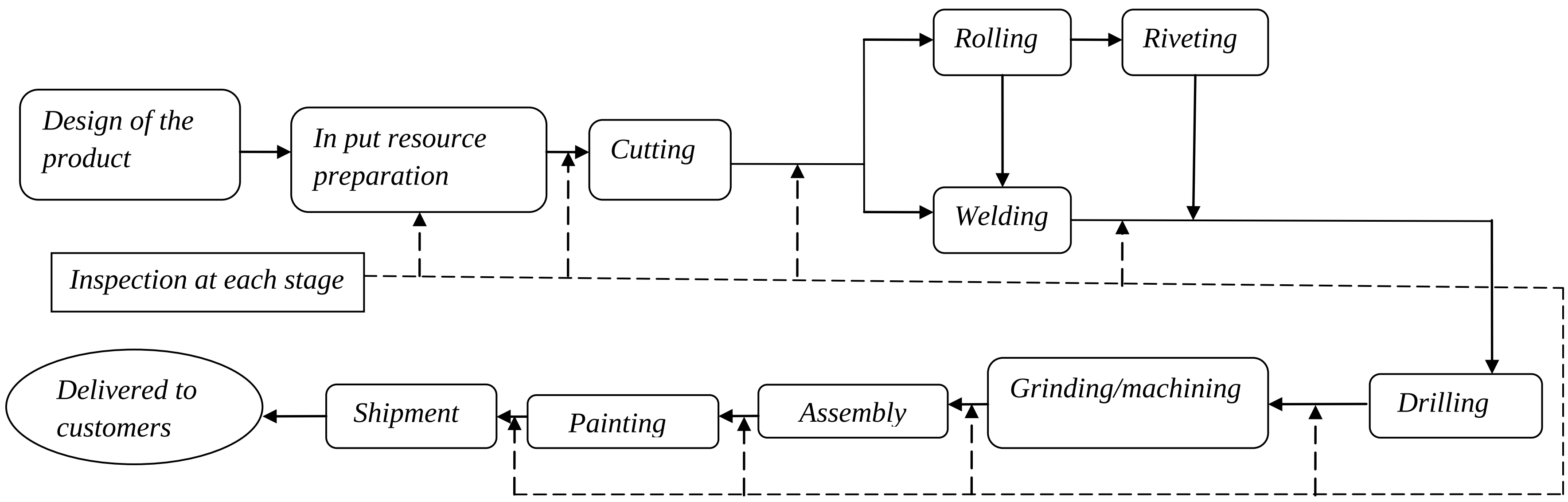

Figure 2.4: General metal work production process flow chart

Note: The above production process applies for any metal work product manufacturing industries, which is obtained during the observation of selected micro and small metal work industries in Addis Ababa.

2.5. Developing Countries Experiences in Industry Cluster Development

Even though currently every developed and developing nation is taking cluster as a strategy for regional economic development, the ideas of cluster implementation for economic development vary between country to country and region to region. The more developed country like Italy, Japan , China, etc. as they are more advanced in technology, so their ideas for cluster approach is to go for international market penetration and enhancement of competitiveness etc. But the developing country like India, Indonesia, and etc cluster approach is for economic development, community development, pro-poor growth, market development etc *(Rinku, & Ashim, 2011).*

Under this study, micro and small scale metal work industry clustering approach is for market development, pro-poor growth and economic development. Since cluster implementation varies from developed to developing countries, for Ethiopian MSE's cluster approach the following best cluster implementation in developing countries is used as bench mark.

2.5.1. African Experience in Cluster Development

Clustering appears to have the potential to enable African countries to overcome or ease some of the barriers to industrial development. By increasing market access, fostering communication and information sharing, facilitating technological upgrading, increasing efficiency, and contributing to the development of supportive institutions, clusters can build industrial capacity *(McCormick, 1998).*

Preliminary analysis suggests that African clusters fall broadly into three groups. The first group makes its contribution by building a productive environment that, in some respects at least, prepares the ground for industrialization. The second group of clusters already has much clearer signs of emerging collective efficiency. These clusters are already industrializing, but remain limited by the weak technology of most of the firms and the frequent sidetracking of associational activity. The third group of cluster includes large as well as small and medium-size firms. They aim for wider markets, national and/or foreign, and are generally able to produce competitively *(McCormick, 1998).*

Most African clusters are hardly more than basic sectoral agglomerations consisting of hundreds, or sometimes thousands, of tiny firms, that operate at much lower levels of technology. They have few linkages within or outside the cluster, and their capacity for joint action is weak.

Clusters in Africa in general are said to be plodding along and unless public policy interventions are made the clusters will remain undynamic *(McCormick, 1999).*

Metal work clusters in Kamukunji, Nairobi

Kamukunji is a large, busy cluster of tinsmiths, where nearly two thousand artisans fashion a variety of metal products, including tin trunks, charcoal stoves, security bolts, cooking pots, griddles, bicycle carriers, and wheelbarrows. The cluster's location between the industrial area and the country bus station make it accessible to both supply and product markets.

Most firms in the cluster use craft-based production methods and very simple technology. Fewer than 10% have the electricity connections that are essential to higher technology production. The majority use hand tools or simple hand-operated machines to make products of new and/or used sheet metal. Production processes are slow and products poor in quality. Workshops with electricity undertake welding, engineering, and fabrication work, frequently making to order rather than for the market. Their products include door and window grills, metal brackets, hinges, door bolts and latches, bicycle parts and simple machines.

Joint action in Kamukunji emanates from three different sets of inter-firm linkages. These are Kamukunji Association, informal groupings of firms making similar products and usual bilateral exchanges of tools and equipment and occasional subcontracting arrangements *(McCormick, 1998).*

The firms within the cluster are benefited from their concentration in defined location, since the concentration of the metal workers in Kamukunji (clustering of metal workers in Kamukunji) is well known in Nairobi and beyond which will serve as a magnet for the customers of Kamukunji producers.

In addition to above mentioned benefits of Kamukunji cluster, collective learning experience in Kamukunji metal work cluster, helps the firms within the cluster to produce75% of metal boxes and 80% of wheelbarrows made in the country.

Suame metal work cluster, in Ghana

Suame metal work cluster is originated as spontaneous agglomerations of enterprises, containing greater than 9000 firms with 5-10 average numbers of employees. Firms within the cluster are involved in two activities: metal work and repair. Dawson grouped the metal work manufacturing in the cluster in to three groups: black smiths who used clay and brick forges and hand tools; a middle group who had achieved a modest level of technological enhancement, mostly with the use of locally made machines; and a group using machine tools including at least one lathe.

Suame metal work clustering produces bolts and nuts, brackets, springs, agricultural implements, and other engineering products for the domestic and limited export (West Africa) markets. Even though, the products of the cluster can compete with the similar imported products, the Suame metal work firms have probably not captured all available scale of economies. The firms in the Suame manufacturing cluster benefited by expanding or by creating inter-firm division of labour through specialization *(McCormick, 1998).*

2.5.2. Other Developing Countries Experience in Cluster Development

The Brazilian Shoe cluster of Sino's Valley

The Sinos Valley region in Brazil is almost wholly geared to various aspects of shoe making and leather related activities *(Nadvi, 1995).* The Sinos Valley shoe cluster comprises 1673 firms (footwear and related industries) and 170,500 workers *(Thompson Chaudhry, 2005).* Approximately 70% of the Sinos Valley cluster production is exported largely to the United States. Within this cluster alongside approximately there are 500 shoe producers, over 700 stage units and 700 ancillary agents.

Even though the cluster contains in a large parentages large shoe manufacturing firms, SME producers and exporters are also the components of the Sinos Valley shoe cluster *(Nadvi, 1995)*. In general, the Sinos Valley is an example of an industrial cluster from the south of Brazil which has grown rapidly in short period of time. It is now a recognized global player in the shoe industry with exports of close to $ 1 billion a year. The cluster benefited from the import substitution policies that prevailed through to the late1960's and the subsequent export incentive programs.

The Mexican shoe cluster of Leon and Guadalajara

Shoe making in Mexico are locationally concentrated. There are three specialized clusters each producing distinct type of shoes. These are: Leon, with 51% of all Mexican shoe firms, manufacturing mainly men's and children's shoes; Guadalajara, with 22% and producing largely women's shoes; and Mexico City, with 12% of registered shoe producers.

There are an estimated 2,700 shoe firms employing 70,000 person's in Leon and 1,100 shoe producers with a total work force of 25,000 in Guadalajara. Both shoe clusters contains small firms (which employs less than 100) in a large percentage and with small percentage large firms (which employs over 250 people). The Mexican shoe industry is largely inward oriented, operating under protected market conditions and creating primarily to domestic demand. Exports of shoes from Mexico in 1991 accounted for only 7% of total production *(Nadvi, 1995).*

The knitwear cluster of Tiruppur, India

The knitwear cluster of Tiruppur composed of 2,500 knitting and garment making units, 600 processing units, 300 printing units, and over 100 embroidery units in 1993. The Tiruppur producers are benefited from spatial and sectoral clustering, which hinges on specialized and flexible inter-firm production arrangements *(Nadvi, 1995)*. The Tiruppur knitwear exports 70% of India's cotton knitwear exports *(Thompson Chaudhry, 2005).*

Tegal metal working industry cluster in Indonesia

The Tegal metal working industry cluster has about 30,029 workers out of 118,820 workers, or approximately 25% of total workers employed in the districts industrial sector. There are around 2,811 metal workshops in the cluster, or about 10% of the total number of local enterprises in non-farm sectors. The majority of the metal workshops are small, employing less than 20 workers.

Although metal working involves a range of processes, the sector is dominated by the plate forming business. Their comparative advantage has been in filling small orders for simple metal products or components, mostly for household appliances and handicrafts, but also for furniture, and, to a lesser extent, for parts and components for the general machinery and automotive industries *(Tambunan, 2006)*.

The development of Tegal metal working industry cluster provides the following benefits for the SMEs in the cluster: *(Tambunan, 2006)*.

- The development of Tegal metal working cluster creates external linkages between SMEs in the cluster and urban large enterprises (LEs) and it also creates internal linkages between the firms in the cluster. This will realizes the achievements of benefits of cluster described in the literature.
- The Tegal metal working industry cluster establishes the long term stable linkages of SME's in the cluster with urban based firms; this linkage keeps them in operation. With this ways, the Tegal metal working industry clusters have access to wider markets.
- Through subcontracting with firms in the clusters they generate not only the wider market opportunities for rural SME clusters but also helps rural SMEs to upgrades their technological capabilities and hence improve their performance.

Economic importance of cluster in developing countries

Cluster produce a significant amount of output, with a great deal of this output bound for the export market. Below table indicates the economic importance of cluster in developing countries like in Brazil, Mexico, India, and Pakistan.

Table 2.1: Economic Importance of Cluster in Developing Countries

Cluster	**Exports**	**Production**
Footwear in Sinos Valley, Brazil	$1.5 billion in exports in 1997 (2005 current prices), from Sinos Valley in 1990 Brazil accounted for 12.3% world shoe exports; Sinos valley exports 70% of the output in 1991	Approximately 142 million pairs of shoes produced in 1991
Footwear in Guadalajara, Mexico	-	Accounted for 27% of the 172.4 million (about 46.5 million) pairs of shoes produced in Mexico
Cotton Knitwear in Tiruppur, India	70% of India's cotton Knitwear exports	2.5 billion Rupees turn over in 1985
Woolen Knitwear in Ludhiana, India	$ 121 million in exports in 1996-1997	Produced 90% of India's woolen and acrylic knitwear
Surgical instruments in Sialkot, Pakistan	$ 125 million of exports in 1995-1996	Most of the production exported

Source: (Thompson Chaudhry, 2005)

2.5.3. Lessons Learned From Experiences of Industry Cluster in Developing Countries

From the above developing countries experiences of clustering, the following points are learned.

Location of the cluster: the cluster should be located so that it is accessible to both supply and product markets. For instance, metal work cluster in Kamukunji is located between industrial area and the country bus station. In addition the Brazilian shoe cluster is benefited from its location, in which the raw material suppliers and input manufacturer are present.

Presence of strong joint action within the cluster realizes the benefits of cluster. This joint action achieved through inter-firm linkages (i.e. inter-firm linkages can be created by formation of industry association, informal grouping of firms (informal cooperation), bilateral exchanges of tools and equipments, and occasional subcontracting arrangements between firms in the cluster).

Exercising collective learning experiences among the cluster stakeholders and inter-firm division of labour through specialization helps the firms in the cluster by increasing their productivity.

Intervention by support institutions and government: the role of institutions and government in facilitating cluster program based on the above countries experiences includes: promoting inter-firm collaboration within the clusters; improving the linkages with backward suppliers; facilitating the development of local financial , technical and producer services facilities; influences in facilitating cluster entry into export market and making firms associations that helps in initiation of collaboration. For example, the Mexican and Brazilian shoe cluster experiences indicate that local institutions, especially representative trade bodies, can play a key role in encouraging local producers to make the necessary switch–in-gear and in providing collective technical and information services which serve to enhance local competitiveness.

2.6. Practice of Cluster Development in Ethiopia

For overall economic development of developing countries micro, small and medium enterprises (MSMEs) have a great contribution *(FDRE CSA. 2010).*By understanding the critical importance of micro, small and medium enterprises (MSMEs) in economic development, the industrial development strategy of Ethiopia gives highest priority for the development of them in the country. In the country, the sectors like leather and leather product, textile and garment, metal and wood work enterprises are dominating in forming the MSME's, the reason for this sector to dominate is that they have a potential to generate employments, poverty reduction and wider distribution of wealth and opportunities.

As it is described in the problems of the statement the MSME's will faces a number of difficulties while achieving their objectives. In order to overcame the problems of MSMEs in the country, the government and the United Nations and Industrial development Organization (UNIDO) develops MSMEs networking and clustering. In Ethiopia clustering of different MSMEs was done in the sector of readymade garment, hand loom weaving, and leather footwear in Addis Ababa and metal and wood works in Mekelle.

Mekelle Metal and Wood Enterprises Cluster

Mekelle (headquarters city of Tigray region) metal and wood enterprises cluster, with at least 600 micro and small enterprises, accounts for 50 percent of all metal and wood enterprises in the Tigray region. The major products include a wide range of metal and wooden products: household utensils, office and household furniture, construction materials like window grills and agriculture equipment *(Tsegabu, 2006).*

The cluster embodies three types. These are: category I individual metal and wood manufacturers containing more than 250 metal and wood workshops; category II cooperative associations and category III scrap material recycling producers.

Addis Ababa Ready-Made Garments Cluster

The garment industry of Ethiopia is concentrated in Addis Ababa and its vicinities particularly Akaki and Dibrezeit. New garment production facilities are being set up or are becoming operational in Akaki, Dukem and Dibrezeit. The concentration of these production facilities in and around Addis Ababa and has created favorable opportunities for the promotion of a natural garment cluster.

Addis Ababa ready-made garments cluster, with 43 small and medium scale enterprises and an estimated sewing capacity of 5000 machines, is the only such cluster in Ethiopia. The major products include basic T-shirts, sportswear, uniforms, gents' suits etc largely for domestic market. Private sector enterprises, which account for 38 out of 43, have come up only during the last decade. This cluster has been an important source of employment for women *(Kastro, 2006).*

Addis Ababa (Merkato) Leather Footwear Cluster

The leather footwear sub-sector accounts for 72 percent of all leather and leather products enterprises in Ethiopia, and is dominated by the MSEs. Merkato (Addis Ababa) leather footwear cluster, which has at least 600 registered and un-registered enterprises producing more than 6 million pairs of shoes annually, accounts for over two-thirds of all micro and small-scale footwear manufacturers in the country. The only way to survive this opportunities is through reducing the costs and improving the design, quality and marketing systems *(Addis, 2006).*

Increased business as well as vocational skills, upgrading of technology, better designs, better shop floor practices, bookkeeping, improved working premises, easy access to credit, quality awareness and joint actions on the business operations of common interest will help the enterprises in becoming more competitive and thereby ensuring their survival and growth. It is believed that more than 1000 enterprises are producing leather shoes in Addis Ababa. This cluster is as large as successful shoe clusters in other countries, e.g., Agra in India, the Sinos Valley in Brazil *(Testushi, et al., 2007).*

Gullele Handloom Cluster

Ethiopia has a long and traditional history and competence in production of delicate and intricately designed hand woven fabrics on traditional looms. The estimated number of handlooms in the country is to the tune of 290,000 and more than 60 percent are located in rural areas. There are around 20,000 looms in Addis Ababa city alone and most of them are located in the sub-city of Gullele. This cluster of handlooms (Gullele), the biggest in the country, produces fabrics for traditional Ethiopian dresses, bed sheets and curtains for domestic market. However, some private entrepreneurs working with groups of weavers on sub contracting basis are producing and exporting a variety of high value added home furnishings, although in limited quantity *(Worku, 2006).*

In the country, the Gullele handloom cluster initiative has raised incomes for poor weavers and their households through strengthened marketing initiatives and the co-operative sharing of equipment and facilities.

In summery the following points are concluded from the Ethiopian experiences on cluster development: As it is described in the above literature, practicing of industry cluster in Ethiopia is becoming familiar with hand loom (textile sector), readymade garments (textile sectors), leather footwear (Leather and leather product sector), and Metal and wood working sectors.

Even though currently in Ethiopia the cluster development is ever increasing, the cluster identification is not uniformly distributed throughout the cities of the country, for instance there are so many micro and small metal work industries in Addis Ababa which needs clustering approaches in order to achieve described benefits of cluster development.

From the above it is understood that, now a days the development of MSE's cluster was started in Ethiopia but not strengthened. As different literatures describe individually working MSE's are often unable to capture market opportunities which require large production quantities, homogeneous standards and regular supply. Most of MSE's found in Ethiopia will face the above problem, since they are working individually. Clustering of MSE's leads to high productivity because of the access to specialized in puts and employees, information, complementarities across products in the clusters and across institutions.

For developing country like Ethiopia in which cluster approach is for economic development, the cluster process improves the ability of MSE’s to improve market access through external gains and joint action. This can raise income for those who work in the clusters, raise their assets and capabilities and have a significant impact on lowering levels of poverty and social deprivation.

2.7. Problems of Existing Cluster in Ethiopia

Even though the practice of micro and small enterprises cluster was started in Ethiopia with handloom, readymade garments, leather footwear and metal and wood work sectors, the diagnostic study of these clusters shows the clusters are challenged by a number of problems. These problems are:

The inter-firm and intra-firm linkages in those clusters are under question and too loose. For instance, inter-linkages in Mekelle metal and wood work cluster is limited to only among operators of best friends in purchasing raw materials, working together especially in new product development.

This weak inter-firm linkage in the cluster affects the growth and maturity of the cluster and the firms within the cluster miss the expected opportunity of reducing costs of production through bulk purchasing of inputs, and to take market chance of large production quantities.

In addition to Mekelle’s metal and wood work cluster, Merkato footwear cluster is also faced a problem of low level of trust and inter-firm linkages (i.e. low level of vertical and horizontal linkages) which affects the degree of sub contracting practice that utilize the production capacity of MSE’s in the cluster and their efficiency.

Lack of expected support and cooperation from different governmental institutions to the cluster: this has its own impact on the rate at which the cluster becomes fully performing.

Absence and less contribution of Business Development Services (BDS) in the cluster to assists enterprises in market promotion, linkage formations, product development, technical consultancy and training, and financial managements.

In appropriate location of the enterprises in the cluster, for example most of micro and small metal and wood work enterprises in Mekelle metal and wood work cluster are located outside the main roads and market area, which makes difficulty for the enterprises' products to be known by the users with less efforts of advertising condition.

Non availability of information dissemination center related to market, raw materials, technological issues, finance, training facilities, procedures and formalities required by credit institutions and absence of market place.

Lack of technical skills and managerial know how of the owners of the enterprises in the cluster. For example, most of the owners and workers engaged in Mekelle metal and wood work cluster have lack of technical skills and managerial know how, which lead the productions potential of the cluster underutilized.

Lack of enterprises vision to deal with private customers to expand their market coverage by taking government as a dominant customer, that leads the enterprises to lack of demand in their future life.

CHAPTER THREE

METHODOLOGY OF THE STUDY

3.1. Literature Survey

Literatures are surveyed on relevant materials of basic concepts of cluster, cluster development strategies, economic advantages of cluster development, effect of cluster development on strengthening micro and small-scale industries in both developed and developing countries, relations of cluster and supply chain, and cluster formation process. The literatures are obtained from electronic media (especially websites), books and journals. In addition previous related research studies, statistical data related on the objectives of the study, library of university, library of federal micro and small enterprise development agency, document of Addis Ababa micro and small enterprise development agency, and materials from website of United Nation Industrial Development Organization are used as a source.

3.2. Sample Size Determination

As the data obtained from the report of Addis Ababa micro and small enterprise development agency up to March 2002 E.C, there are about 1041 micro and small enterprise's established in the sector of metal and wood working. During the study the selected metal work sectors of micro and small industries found in all sub-cities of Addis Ababa are assessed.

There are about 1041 micro and small enterprises under wood and metal sector in Addis Ababa city, but this sector includes enterprises producing metal products only, metal and wood products together, and wood products only. Here this study is more focus on general metal work enterprises. As the information obtained from the expertise of Addis Ababa micro and small enterprise development agency, the enterprises included under wood and metal sector and producing only metal products is not greater than 10% of the total enterprises found in Addis Ababa under wood and metal sectors.

As it is described in the above paragraph, the expected number of micro and small scale metal work enterprises are 10% of 1041 (i.e. the total number of enterprise registered in the city under wood and metal sector).

This indicates that the population size of the study area is around 105 metal work enterprises. During this study there are different constraints like time, finance etc, that lead the researcher to study on the samples drawn from the population rather than studying the whole population.

Slovin's formula is used in order to determine the appropriate sample size for the study from the population *(Ariola et al., 2006).*

- Slovin's formula is written as:

  $n = N / (1 + Ne^2)$

  n = Number of samples
  N = Total population
  e = Error tolerance

While using the Slovin's formula, confidence levels and margins of error should be taking into account. For this study 85% confidence level (giving a margin error of 0.15) is used for determining the size of the sample. Therefore, the sample size of the study is calculated as follows:

For this study: N= 105 only metal working small scale enterprise

e= 0.15

$$n = \frac{N}{1+Ne2}\ , \quad n = \frac{105}{1+(105*0.15*0.15)} = 32$$

In the study, the data is collected from 32 selected micro and small scale general metal work enterprises found in all sub-cities of Addis Ababa.

3.3. Sampling Methods

In order to draw the samples from the whole metal sectors of micro and small enterprises found in Addis Ababa, the stratified sampling method is used.

The reason for selecting stratified sampling method is that, this method of sampling eliminates the bias of one area to others during selection of samples from the population.

Firstly the metal sectors of micro and small enterprises found in Addis Ababa (i.e. the sampling frame or study population) divided into mutually exclusive strata or subgroups i.e. the total population will be divided into metal sector micro and small enterprises in sub cities (which means 10 subgroups will be formed) which is based on the geographical proximity of the industries in the sub cities. Secondly, based on the question of the research the quotas are given for each subgroup of metal sectors of micro and small enterprise in Addis Ababa.

Finally, the sample for the study is selected from each subgroups/sub cities using simple random sampling techniques.

3.4. Methods of Data Collection

During the study in order to collect the primary data, questionnaire supported interview and direct observation of the selected micro and small scale metal work industries are used.

Mixed types of questionnaire (i.e. open and closed types of questionnaire) are prepared during the study. Only one questionnaire is distributed for single selected micro and small scale metal work industries found in Addis Ababa, so that only one data is required on behalf of that industry.

The purpose of the questionnaires is to assess the following areas:

- ❖ The average size of the industry in terms of number of workers and capital employed to establish the industry;
- ❖ Educational backgrounds of the owners and workers of micro and small metal work industries;
- ❖ The type of product produced in the industries;
- ❖ The status of the industries in the market and their potential customers.
- ❖ About the industries suppliers of raw materials, machineries, equipments, etc
- ❖ The industries contribution in the reduction of unemployment in the sub-cities and the region (i.e. Addis Ababa); and

- ❖ Weakness and strength of the individual selected micro and small metal work enterprise. (i.e. to find areas which requires support through training).

The questionnaire are structured so that it contains thesis title, acknowledgement letter, general information about the micro and small scale metal work industry, industry product analysis, existing resources in the industry, issues related to marketing, and industry linkages with support institution.

In order to check answers given for the questionnaires developed and to have additional information about the research, the researcher interviews expertise and workers of the selected micro and small metal work industries. In addition, to the observation of the enterprise was employed during the study.

CHAPTER FOUR

DATA COLLECTION AND ANALYSIS

4.1.Development of Micro and Small Scale Enterprise in Addis Ababa

Addis Ababa, the capital city of Ethiopia, is the most populated urban city in the country confronted by Micro and Small Enterprises (MSEs) Sectors. The increasing population size in the absence of adequate capacity to accommodate the associated increasing demand has created pressure and contributed for prevalence of mass poverty, unemployment, and other socioeconomic problems in the city. The above listed problems make development of Micro and Small Enterprises (MSEs) more significant. Metal and wood works is one of Micro and Small Enterprise (MSE) sector which has been contributing important role in this regard.

Since 1996 E.C. in Addis Ababa city different sectors of Micro and Small scale enterprises are established and working in collaboration with government organizations, Nongovernmental organizations, investors, and with different social affairs associations.

Based on the data obtained from the report of Addis Ababa Micro and Small Enterprises development Agency, starting from 1996 E.C to March 30, 2002 E.C 6471 Micro and Small Enterprises (MSEs) are established under six main sectors for development (i.e. Metal and wood works, textile and garment, construction, food preparation, municipality house, city agriculture and others.

Among the six selected sectors for development by Ethiopian government, metal and wood works sectors constitutes 16.08% of the total established Micro and Small Enterprises in the city in specified years. Distribution of Micro and Small Enterprises in Addis Ababa is listed in the table below.

Table 4.1: Distribution of micro and small enterprises in Addis Ababa

No.	**Sub city**	**Sectors**								**Total**
		Textile & garment	Construction	Metal & wood works	Food Preparation	Municipality house	City agriculture	Coble stone	Others & parking	
1	Ledeta	31	152	48	78	36	16	30	118	509
2	Akaki Kaliti	35	236	48	92	30	101	-	161	703
3	Gullele	188	191	24	87	32	25	51	30	628
4	Bole	34	310	174	132	89	107	-	219	1065
5	Nifas Silk Lafto	20	146	237	76	76	42	8	60	665
6	Kolfe	56	118	228	153	44	41	12	226	878
7	Yeka	20	254	77	70	38	52	-	357	868
8	Addis Ketama	33	132	112	56	35	32	-	-	400
9	Arada	94	51	63	77	40	21	14	77	437
10	Kirkos	23	136	30	68	37	24	-	-	318
	Total	**534**	**1726**	**1041**	**889**	**457**	**461**	**115**	**1248**	**6471**
	%	**8.25**	**26.67**	**16.08**	**13.73**	**7.06**	**7.1**	**1.77**	**19.28**	**100**

Source: Report of Addis Ababa Micro and Small enterprises development Agency on established Micro and Small Enterprises from 1996 E.C to March 30, 2002 E.C

As it is observed from the above table metal and wood works sectors of MSEs in Addis Ababa constitute the second largest sectors next to construction. Here in the figure below the distribution of this sector in the sub cities of Addis Ababa is presented.

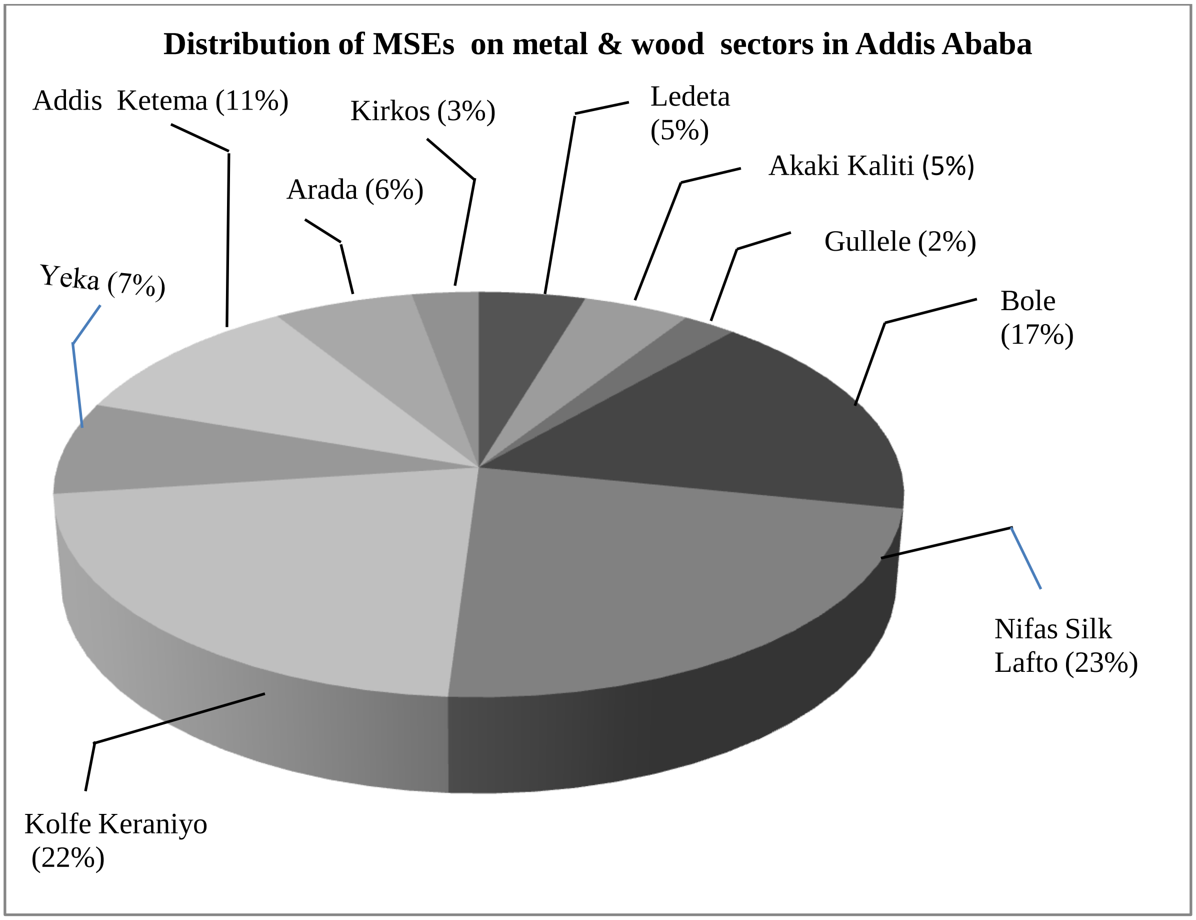

Figure 4.1: Distribution of metal and work sector's of MSE's in Addis Ababa

Source: Report of Addis Ababa Micro and Small enterprises development Agency on established Micro and Small Enterprises from 1996 E.C to March 30, 2002 E.C

4.2.Problems of Micro and Small Scale Enterprises in Addis Ababa

As it is described on the research done on impact assessment of establishment of Micro and Small enterprises in Addis Ababa on social and economic by Addis Ababa Micro and Small enterprise development agency, the following problems are identified for the sectors and ranked based on the criticality to the sectors.

Table 4.2: Level of Problems of MSE's in Addis Ababa on Sectors

Problems observed	Textile and garment	**Metal and wood works**	Food preparation	Construction	Municipality house	City Agriculture
Skilled manpower	-	**2nd**	-	3rd	1st	2nd
Infrastructure	2nd	**-**	-	-	-	3rd
Market	3rd	**1st**	1st	2nd	-	-
Availability of manpower and insufficient raw material supply	1st	**3rd**	2nd	1st	3rd	1st
Training	-	**-**	-	-	2nd	-
Finance	-	**-**	3rd	-	-	-

Source: Research on impact assessment of establishment of Micro and Small enterprises in Addis Ababa (from 1996-2001 E.C) on social and economic development and the assessment of MSE's problem with their possible solution (done by Addis Ababa Micro and Small enterprise development agency)

From the above table it is observed that the main problems of metal and wood works enterprise in the city are lack of market, lack of skilled manpower, and insufficient skilled manpower and supply of raw materials. In addition to the above core problems, the research on impact assessment of establishment of MSE's in Addis Ababa (from 1996-2001 E.C) on social and economic development and the assessment of MSE's problem with their possible solution (done by Addis Ababa Micro and Small enterprise development agency) identifies the following problems of micro and small enterprise in Addis Ababa related to technology.

These are

- Micro and small enterprises are unable to identify the existing technology.
- Expensiveness of advanced technology, materials and spare parts.
- Micro and small enterprises are unfamiliar with different websites.
- Lack of skilled manpower.

However, the establishments of micro and small metal work industries are facilitated now a day in the city and it is believed that they can have a significant contribution to the economic development of the country. Currently, it is clearly shown that the sector doesn't provide as its potential to the economic development of both society and country. This is because of the above problems challenging the operational condition of the industries in the city.

For the realization of achieving the potential benefits of micro and small enterprises, the Ethiopian government starts to support the sector by making the policies that provide market opportunities, finances, training etc. By considering the problems of those industries in the city, the study develops a mechanism called clustering for them to create culture of sharing resources among themselves (i.e. knowledge, technology, human resources, machineries etc) and backward and forward linkages are properly formed so as to overcome the common problems of micro and small metal work industries identified above.

4.3. Survey Results

General Information about the selected Micro and Small Metal Works Industries

During the survey 32 micro and small-scale metal work industries were assessed. Among this, 17 of them are owned by individual; whereas the rest of the industries are under Share Company.

Table 4.3: Educational Background of the Owners of Metal Work MSE's individually

Educational level category	Number under category	Over all %
Less than grade 8	-	-
Grade 9-12	6	35
10+1,10+2	6	35
College diploma	4	24
University level	1	6
Total	**17**	**100%**

65% of the owners of the industries take additional education, in addition to completing grade 12. Whereas the rest 35% of the owners do not take any other additional educational training rather than their educational background ranges between grades 9-12 as described in table 4.3.

Table 4.4: Educational Background of Owners of Share Enterprises

Education level category	Number under the category	Overall %
Less than grade 8	-	-
Grades 9-12	8	12
10+1,10+2	34	52
College Diploma	22	34
University level	1	2
Total	**65**	**100%**

Most of the owners' educational background of selected share micro and small scale metal work industries is between 10+1 to college diploma (that is around 88%) as stated in table 4.4 above.

Educational training is a key tool for knowledge acquisition and it is used for facilitating the growth of any type of industries including metal work industries. As illustrated in the above tables (table 4.3 &4.4) most of the owners (i.e. around three fourth) of selected micro and small metal work industries educational background ranges from 10+1 to college diploma. From this, the author believes that as their educational background assists the cluster growth by providing suitable condition for an organization that give technical training for the metal work industries in the cluster.

From the survey result which is described in Annex-A, the establishment year of those industries are summarized as in the table below:

Table 4.5: Establishment Year of the Selected Metal Work MSE's

Years of establishment	Number of industries	Overall %
Between (1996-1997 E.C)	19	59
Between (1998-1999 E.C)	8	25
Between (2000-2001 E.C)	5	16
Total	**32**	**100%**

Around 59% of the selected small scale metal industries were established in the year between 1996-1997E.C (table 4.5). This indicates that most of the industries assessed have an age of 5-6 years.

From the age of selected metal work industries, it is clearly understood that, the industries are immature. In addition to their size, this immaturity of industries makes difficulties for individual micro and small metal work industries to overcome their problems identified both by the secondary sources of data and survey result.

Industry Product Analysis

In Addis Ababa city, metal and wood sector is one among the six sector selected under micro and small scale enterprise which have a great influence in the reduction of poverty by employment generation. Metal and wood work sector includes three subdivisions of industries.

These are: only metal product producing industry, only wood products producing industries, and both metal and wood products producing industry. Even though metal and wood work sector include three subdivisions the majority of the sector is under producing both metal and wood product.

In the city metal work industries are unevenly distributed in all of the sub cities. Almost all of them are producing similar type of products. At present most of the industries are involved in manufacturing household equipment, office equipment, materials input for construction industries, materials that support agricultural activities, and the like. The major products of the industries assessed during the survey are summarized in the table below.

Table 4.6: Products Manufactured by Metal Work MSE's under the Study

No.	Group of products	Specific type of metal products
1	Household equipment	- Energy saving of different types of injera stoves and for other purpose stoves - Ethanol stove - Beds - Chairs
2	Office equipment	- File cabinet - Cazina - Lateral cabinet - Shelf
3	Materials that support agricultural activities	- Poultry cages
4	Materials input for construction industries	- Grills for apartments - Window, door - Roof rack - Tanker for water storage - Safety material - Lift for transportation of material during construction
5	Modification of simple machineries	- ‘Blocket’ producing machine - Mixer - Coal producing (from different waste woods) machine (Briquetting machine) - Agglomeration machine - Hammer mill
6	Others	- Bull bar - Car chair

Hand Tools and Machineries used in the selected Micro and Small-Scale Metal Industries

The result conducted from survey indicates that almost all micro and small scale metal work industry assessed uses common machineries and hand tools. Below table summarizes the machineries, tools and the core process of the industries.

Table 4.7: Type of machineries available in metal wok enterprises under the study

Machineries available in the industries	Number of industries having specified machine	Core process of the industries	Hand tools available in those industries
- Grinder - Driller - Welding machine - Cutting machine	18	Welding and Assembling	- Hammer - Manual Cutter - Saw - Other manually operated machines used in any general metal work
- Driller - Bench grinder - Welding machine - Lathe machine	2	Machining, Welding, Assembling	
- Grinder - Welding machine - Cutting machine - Compressor - Drilling machine	12	Welding and Assembling	
- Grinder - Driller - Three in one cutting machine - Rolling and bending machine - Oxyacetylene welding	1	Welding and Assembling	

Raw Material and its Supply Source

The major raw material required for the production of the assessed small scale metal industries output includes sheet metals, antirust**,** electrodes, RHS, Almunium sheets, carbon steel, cutting disk, LTZ, spare pipe, round pipe etc. as it understood from the survey, almost all the required raw materials are imported from abroad such as, Turkey, china, Indonesia, etc. these raw materials are imported by local traders mostly found in Merkato and which has a long distribution channels. This long distribution channel of the raw material suppliers of the industry contributes to the inflation of the raw material price.

Among all assessed small scale metal industries only one of them uses scrap materials (these scraps includes wasted Almunium sheets obtained from different large metal industries) as a raw material to manufacture different kinds of household equipment.

Customers of Micro and Small Scale Metal Work Industries

Micro and Small scale metal work industries assessed in this study, manufactures different types of products such as household equipment, modification of simple machineries, input materials for the construction industries, materials that support agricultural activities etc. The customer of these products includes public individuals, governmental organization, nongovernmental organization and private investors.

As it is understood from the survey, the growth of construction industries in the city (especially construction of condominium) creates a big market opportunities for small scale metal industries. In addition the survey describes above 50% of the industries market is obtained from input materials of construction industries.

Below table summarizes the customers of the assessed small scale metal industries found in the city:

Table 4.8: Customers of metal work industries under the study

Customer category	Specific customer	Number under specified customer
Local	Individuals	32
	Government organization	18
	Nongovernmental organization	10
	Private investors	16
Foreign	-	-

Industries Linkage with Support Institutions

One of the most important factors that differentiate the dynamic and vibrant clusters ones from the static and not vibrant ones is the linkage of cluster stakeholders (core industries in the cluster development) with among themselves and the presence of supporting institutions like university and college, major suppliers of raw materials, governmental institutions (like federal and regional micro and small enterprise development agency, ministry of science and technology, ministry of industry, etc), financial institutions (like Addis credit and saving institution S.C, banks, etc.), and nongovernmental organization (like United Nation Industrial Development Organization (UNIDO), United Nation Development Program, (UNDP), etc).

Once the problems of the isolated/separated micro and small scale metal work industries in the city leads us to the development of metal work industry cluster in the city, the main thing that should be assessed is the relation of these industries with different support institutions.

The linkage of the assessed micro and small scale metal work industries found in Addis Ababa with support institutions is analyzed during the survey and presented in the table below:

Table 4.9: Linkages of metal work industries with support institutions

Category	Number of industries under the category	Overall %
Industries having relations with support institutions	26	81.25
Industries doesn't have relations with support institutions	6	18.75
Total	**32**	**100%**

As it is described in the above table, almost above 80% of the industries assessed during the survey has a relations with the support institutions. The industries main linkage is mostly with federal /regional micro and small enterprise development agency and Addis credit and saving institution S.C. The survey also describes as there is no any relations between industries and universities and Colleges. Among all industries selected in the survey around 18% of the industries respondent tells as they don't have any relations with support institutions.

Even though, the above table 4.9 describes more than 80% of the industries have linkages with support institutions, but their linkage are limited only with Federal/Regional micro and small enterprises development agency (policy maker or government). Therefore, the result shows that as there is lack of linkages with other main groups of prospective collaborators like academia (i.e. University, TVET, etc), different business support organizations, and financial organizations. To introduce linkages with all collaborators the metal work industry cluster is developed under this study.

Industry Culture of Working with Other Metal Working Industries

As it is described in the literature, among different advantages of industry clusters, one is developing a culture of working together of the core industries (cluster stakeholders) with themselves by building trust between them. Therefore it is necessary to assess the status of the separated industries regarding working together with other similar industries.

Below table summarizes the survey result on the behavior of selected industries in relation with working with other similar industries.

Table 4.10: Behaviors of metal work enterprises on working with other similar enterprises

Category	**Number of industries under category**	**Overall %**
Industries working with other small scale metal working industries	28	87.5
Industries not working with other small scale metal working industries	4	12.5
Total	**32**	**100%**

The responding metal work industries were asked whether they had the behavior of working with other similar industries and believe on the benefits of working together. The findings shown on table 4.10 illustrates that 87.5% of the respondents affirmed this, whereas the rest of 12.5% of the industries doesn't currently working with other industries.

As it is understood during the survey, the respondents of these industries believes on the benefits of working together with similar industries, but they fear as there is no trust between them which changes their mind as if they are working together with other similar industries taken off their market opportunities by those industries.

Since the majority of industries (i.e. 87.5% of the industries) exercising the culture of working together which initiates the collaboration among these metal work industries, the only thing expected from the metal work cluster facilitator is that building trust within this informal collaboration process. In addition from the result the researcher believes that this habit of selected metal work industries can help the cluster development agent (cluster development facilitator) to create awareness on the benefits of developing metal work cluster to the these metal work industries with short period of time.

Educational Background and Training in the Industry

Education and training of the workers are the key factors for the development of industries in both developed and developing countries. On the other hand, training applies to any transfer of knowledge, skills and attitudes which is organized to prepare people for more productive. Short term training directly or indirectly affects the performance of micro and small scale metal work industries workers. Accordingly, the researcher asked respondents of the industries about short term training opportunity given to them by support institutions (especially by Federal and Regional small and micro enterprise development agency in collaboration with different Nongovernmental Organization like United Nation Industrial Development Organization (UNIDO), United Nation Development program (UNDP), etc).

As described in the table 4.11, out of the total respondents of industries 26 or 81.25% of them said that they have got training program on the area of the industries interest (i.e. training both on support process activities like on market issue and on core process like metal manufacturing technology (such as, welding ,grinding technology, etc)).

Table 4.11: Training for metal work industries by support institutions

Category	Number of industries under the category	Overall %
Industries that takes training from support institutions	26	81.25
Industries that doesn’t takes training from support institutions	6	18.75
Total	**32**	**100%**

In 32 assessed micro and small scale metal work industries found in the city, 253 male and female workers are there including the owners of the enterprise. The educational background of those workers ranges from elementary school to university level. Table 4.12 summarizes the survey result on educational background of the workers on the selected industries.

Table 4.12: Educational Background of the Workers in Metal Work MSE's under the Study

Educational level	Number of workers under the specified education level	Overall%
< grade 8	27	11
Between grade 9-12	95	37
TVET (10+1,10+2)	92	36
College diploma	37	15
University level	2	1
Total	**253**	**100%**

As it can be understood in the above table around 45% of the workers employed in the selected metal working industries doesn’t took education/training rather than taking regular elementary and high school education level. This has its own impact on developing the role of micro and small scale metal industries in technology transfer.

Problems facing micro and small scale metal work industries

As different literatures argues that, micro and small scale enterprises are recognized as a main factor of economic growth and equitable development. Especially for the developing countries, micro and small scale enterprises have a great contribution to the employments generation, poverty reduction and wider distribution of wealth. Even though micro and small scale enterprises have a significant role in the developing process of the countries, their potential role is not fully realized because of a set of problems and limitations they encounter on their growth. Under this study, the main problems of selected micro and small scale metal work industries are assessed and the survey result is summarized in the table 4.13 below.

Table 4.13: Problems facing the metal work enterprises under the study

Problems	Number of industries under specified problem	Overall percentage
Lack of skilled manpower	13	11.6
Lack of market	20	17.9
Lack of working capital	22	19.6
Lack of space/land	27	24.1
Power shortage/breakage	14	12.5
Others	16	14.3
Total	**112**	**100**

As it is described in the table above, 61% of the problems of selected small scale metal industries are lack of markets, lack of working capital and lack of space or land (lack of working area). Other than the listed problems, 14.3% of the problems of the industries are unavailability of the raw materials at the required time, timely variation of raw material cost, absence of area for the product displaying, lack of trust between the suppliers of raw material and the industries etc.

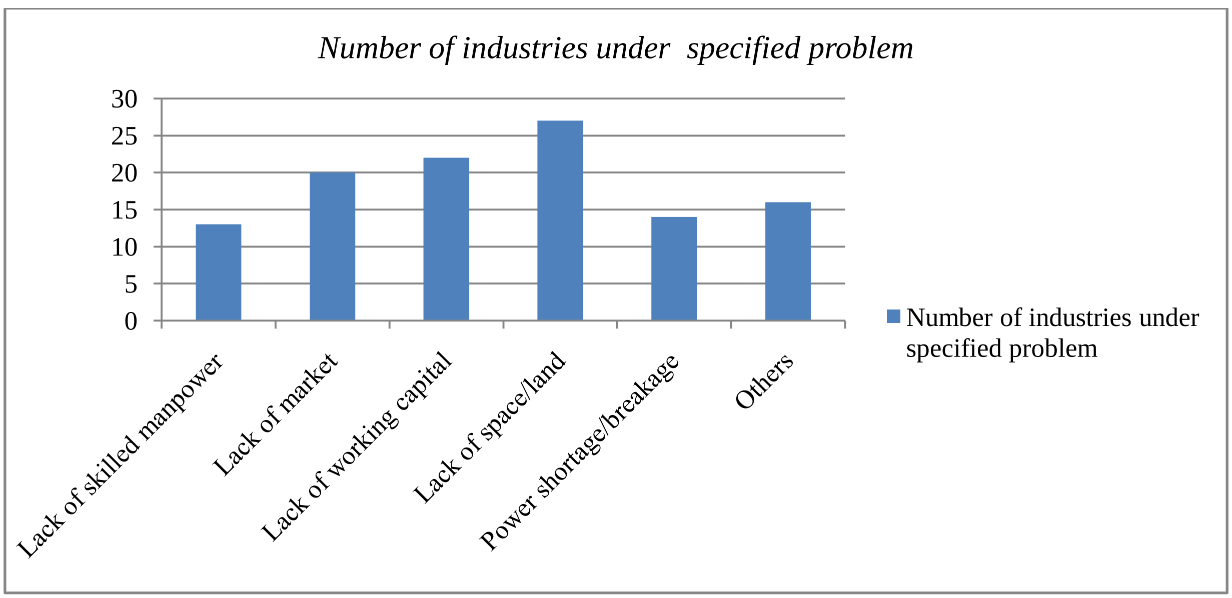

Figure 4.2: Problems of selected micro and small scale metal enterprises in Addis Ababa

4.4. Summary of Major Findings

Micro and small enterprises in metal and wood work sectors constitutes 16.08% (1041 enterprises) of the total established micro and small enterprises in Addis Ababa in the year of 1996E.C-2002E.C. From 1041 metal and wood work industries, 10% (105 industries) are engaged in producing only metal products. Among 32 selected metal work industries 17 of them are owned by individuals with educational level ranging from grade 9 to university level, whereas the rest 15 metal work industries are owned by shares. Above 50% of the metal work industries under the study was established in the year between 1996E.C-2002E.C.There are in average 255 employers including the owners of the industries in 32 micro and small metal work industries under this study.

Even though the metal work industries under the study are not concentrated in a specific location in the region, it is observed that sub cities in the region starts to bring the metal work enterprises in the specific location (for example, in Akaki Kaliti sub city there is a specific area called industrial sector, where micro and small metal and wood work enterprises are concentrated, but there is no resource sharing between them). This activity of sub cities will be used as a turning point for the development of metal work enterprise cluster in the city.

At present the industries purchase the raw materials from the local shops concentrated in Merkato area. The major products manufactured in the industries include: house hold equipment, materials used as input for the construction industries, agricultural implement, office equipment and modification of simple machineries. Most of the manufacturing process of the industries is similar.

About 81% of the individually working industries assessed have an appreciable with the city and sub cites micro and small enterprise development agency office and with Addis credit and saving institution S.C, whereas the rest of industries doesn’t have linkages with the offices. In addition the whole industry under the study doesn’t have linkages with higher institutions in the city and nongovernmental organizations.

According to the respondents and the writer observation during the study, the Addis Ababa micro and small metal work industries faced with the following problems:

- Lack of demand;
- Lack of skilled manpower;
- Lack of product displaying area/ lack of marketing area;
- Flexibility of the price and quality of the raw materials;
- Lack of working capital;
- Lack of technical training; and
- Lack of trust among themselves.

CHAPTER FIVE

MICRO & SMALL METAL WORK INDUSTRY CLUSTER IDENTIFICATION AND ANALYSIS IN ADDIS ABABA

5.1. Introduction

In the previous chapter, it is described that as the practice of cluster was started in Ethiopia with handloom weaving, readymade garments, and leather footwear in Addis Ababa and metal and wood in Mekelle. But their diagnostic study identifies the following problems in the clusters: inappropriate location of the enterprises in the cluster, Absence and less contribution of the business development services, weak inter-firm and intra-firm linkages of the firms in the cluster, lack of expected support and cooperation from different governmental institution to the cluster, lack of technical skills and managerial know-how of the owners of the enterprises in the cluster and non availability of information dissemination center in the area.

Here under this study, the micro and small scale metal work industry cluster in Addis Ababa is developed by taking into consideration of the above listed problems of existing cluster in Ethiopia. This consideration during the metal work cluster development includes:

Selection of suitable cluster location: the metal work industries to be clusters in the organized in a specified single location of the cluster (i.e. the study depends on the geographical proximity of the metal work industries). During the selection of the cluster location, market potential, presence of support institutions and establishment of industries in the area are considered.

The strategies that provide strong inter-firm linkages are included. These are starting awareness creation on the benefits of working together to the industries before the metal work cluster is initiated, and forming an association of the industries in the cluster.

The cluster includes *technical skill development and upgrading center and business management trainers* by the coordination of the cluster development agents.
The process also encompasses the trust building between and among the cluster actors.

5.2. Cluster Analysis of Micro and Small-Scale Metal Work Industries in Addis Ababa

Metal and Wood working is one of the six crucial MSE's sectors selected by the government of Ethiopia as development guide sector. Among totally established MSE's in Addis Ababa from 1996 E.C- 2002 E.C 16.08% (1041 MSE's) are engaged in metal and wood work sectors. From this MSE's, 10% of the enterprises (105 MSE's) are engaged in producing metal works only, based on guide of the expert on the sector in Addis Ababa Micro and Small Enterprise Development Agency .This study focuses on those industries only producing metal products only.

The study is based on 32 metal work MSE's found in the region (i.e. the industries are found in Akaki Kaliti, Arada, Nifas silk Lafto, Bole, Gullele, Kolfe Keraniyo, Addis Ketema, Ledeta, Kirkos and Yeka sub cities of the region). Most of the metal work MSE's under this study was established between 1996 E.C to 2002 E.C. the production process of these industries are similar, comprising of milling/grinding, Assembling, sanding/polishing and painting operations. In addition to the similarity of the production process, the industries work with similar hand tools and machineries. The local shops in the region (Addis Ababa) are the major raw material supply source of the selected metal work MSE's.

The main problems of metal work MSE's in the region that becomes obstacles for them to produce new products, increase their capacity of production, benefits the society as expected from MSE's sectors: are market problem (lack of demand), lack of skilled manpower and insufficient skilled manpower and supply of raw materials.

Under this study most of the industries are taken from different areas of the Addis Ababa (i.e. the industries identified are scattered). Even though the formal clustering of metal works MSE's is not found in the region (Addis Ababa), under the support of Addis Ababa Micro and Small Enterprise Development Agency the trends of bringing the enterprises in a defined location is started in Akaki Kaliti, Nifas silk Lafto, Arada, and Kolfe Keraniyo as industrial zones. The rest of sub-cities also started to follow the experience of these bringing together the enterprises in a defined location.

The industries within the industrial zone are related by only being in the same location. As it can be understood during the observation of the industrial zones, there is no linkages between industries as sharing of resources, knowledge transfer and in general there is no cooperation among industries.

Therefore, the metal works MSE's found in Addis Ababa should be clustered for the following reasons:

Best Practice on Clustering

Best experiences of other countries (i.e. both developed and developing countries) on clustering of metal working MSE's and other sectors like footwear, garment manufacturing etc, indicates both the countries and the stakeholders of the cluster (firms) are benefited from the clustering of MSE's, since the clustering in those countries provides better performance on employments generation, knowledge and technology transfer, access to product market for the stakeholders of the cluster and value addition to GDP.

As it is described in the literature part of the study, access to product market is one of the benefits of clustering. Dawson in 1988 observes that marketing is the metal worker's greatest weakness. For example, the location of the Suame metal work cluster in Ghana helps the firms with few efforts to advertise themselves and depend on informal contacts to spread their reputation. Like metal work cluster in Suame, Kamukunji metal work cluster in Kenya, benefited from its defined location which provides access to local and national markets *(McCormick, 1998).*

In another way clustering can also benefit countries by attracting the Foreign Direct Investment (FDI) and technology transfer. For example, evidence from the garment manufacturing sector in China demonstrates that the geographical clustering of the industry in Hong Kong has been particularly attractive for foreign investors who have sought to access the Chinese market. In this case, the technology transfer in the sector was greater in Hong Kong than in other, more geographically dispersed garment producing centers in China.

Those countries can also increase the capacity of their firms by expanding or by creating inter-firm division of labour through specialization. For instance, firms in Suame metal works produces bolts and nuts, brackets springs, agricultural implements, and others. By the end of mid 1980's these products were competing with the flood imports brought by liberalization. Even though Suame metal work firms not captured all available markets to its products, Suame metal work clustering benefit them by creating inter-firm division of labour through specialization *(McCormick, 1998).*

In addition to the abroad best clustering experience, in Ethiopia practicing of clustering with leather footwear, readymade garments, handlooms and metal and wood work was started. Even though these clusters are immature, based on the report of their diagnostic study, the firms within the cluster become strengthened a culture of working together especially in new product development. Therefore, from this all, clustering of metal work MSE's found in Addis Ababa will also benefits both the society and the country growth.

Marketing Problems Minimized Through Clustering

Marketing problems (lack of demand) and insufficient supply of the raw materials are identified as the major problems of the metal work MSE's in Addis Ababa[1]. These problems will be minimized through clustering, since clustering improves the access of firms within the cluster product to the market by strengthening the market chains through link created in the cluster. In addition to this, when the established Addis Ababa metal work cluster becomes fully performing (i.e. when the cluster becomes mature), the suppliers of the raw materials and machineries attracted to the cluster location area in order to take advantages of market opportunities generated by the firms within the cluster. This in turn minimizes the costs of the raw materials due to the reduced transportation cost and the firms can get the raw materials at the time they need.

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[1] Research done on impact assessment of establishment of Micro and Small enterprises in Addis Ababa on social and economic by Addis Ababa Micro and Small enterprise development agency, 2002 E.C

Cost Saving Through Clustering

As stated by the industrial location theory, the cost savings that occur as a result of spatial concentration are a major cause for creating the industry cluster (*Dayasindhu, 2002)*. This cost savings are usually results from increased market power (this is because of inter-firm linkages among the industries in the cluster makes them more competitive than other industries outside the cluster), availability and use of specialized facilities, shared physical and human infrastructure, reduced risk of budding entrepreneurs and knowledge transfer. In addition to specified advantages of clustering in cost saving, firms within the cluster can purchase raw materials together which will minimizes the transaction costs and provides them to use an opportunities of price discount. Therefore, clustering of metal works MSE's in Addis Ababa will benefits the micro and small-scale enterprises to be clustered.

5.3. Identification of Metal Work Industry Cluster Location in Addis Ababa

In the literature part of the study, it is described that different authors defines cluster in different ways and cluster development pattern can also be relied on the relational proximity, geographical or spatial proximity, or the combination of the relational and geographical proximity. This study adopts cluster development pattern which relies on geographical proximity, because geographic proximity appears to be particularly important in developing country like Ethiopia where poor infrastructure, weak information systems, and cultures that place high value on face-to-face communication are the norms.

Cluster location identification is one among the elements of selecting potential clusters. For the identification of cluster location, the following points should be considered: Presence of support firms and service providers; presence of raw materials suppliers (Nearest to the potential suppliers); and areas that contribute high employment generation.

Since the location (i.e. latitude (horizontal), and longitudinal (vertical)) of the sample metal work MSE's found in Addis Ababa is obtained using Global Positioning System (GPS). The gravity positioning model is assumed to locate industries at an optimum facility cost *(Rosenberg & Frischtak, 2004).*

In addition the gravity positioning model is used to identify the suitable cluster location for metal work MSE's. This is because of gravity positioning model puts micro and small scale industries closer to each other benefited from agglomeration.

The formula's for gravity positioning model is:

$$S(Distance) = sqrt\{n1\,[(Xr - X1)2 + (Yr - Y1)2] + n2[(Xr - X2)2 + (Yr - Y2)2 + \cdots + nn[(Xr - Xn)2 + (Yr - Yn)2]\}$$

Where,

S= Distance of location of cluster from the reference area (Merkato)

X_r, Y_r is Location of the reference area (i.e. X_r reference latitude (horizontal), and Y_r reference Longitudinal (vertical)

X_n = Latitude (horizontal) coordinate of the sample n metal work MSE's of Addis Ababa

Y_n = Longitudinal (vertical) coordinate of the sample n metal work MSE's Addis Ababa

$n_{1,}$ n_2, n_3...n_n the weights of MSE's in the specified sub cities industry

Under this study the reference area is selected based on the area of potential market (especially area of suppliers) of the raw materials for the metal works MSE's. As it is described on the survey result these metal works MSE's obtain their raw materials from the local shops, almost all of them are found in Merkato area. Therefore, Merkato area have a close linkage with all metal works MSE's and because of this, the area is considered as a reference area. The geographical location of reference area (i.e. Merkato) is 471224 in the north (horizontal) and 998276 in the east (vertical). The geographical location (i.e. horizontal (latitude), vertical (longitudinal)) of each metal works MSE's are found in Annex- C.

On the figure below the metal work MSE's assessed during the study are plotted on the map of Addis Ababa based on the reading of GPS obtained for each small scale metal work enterprises and Ethio- GIS 2008.

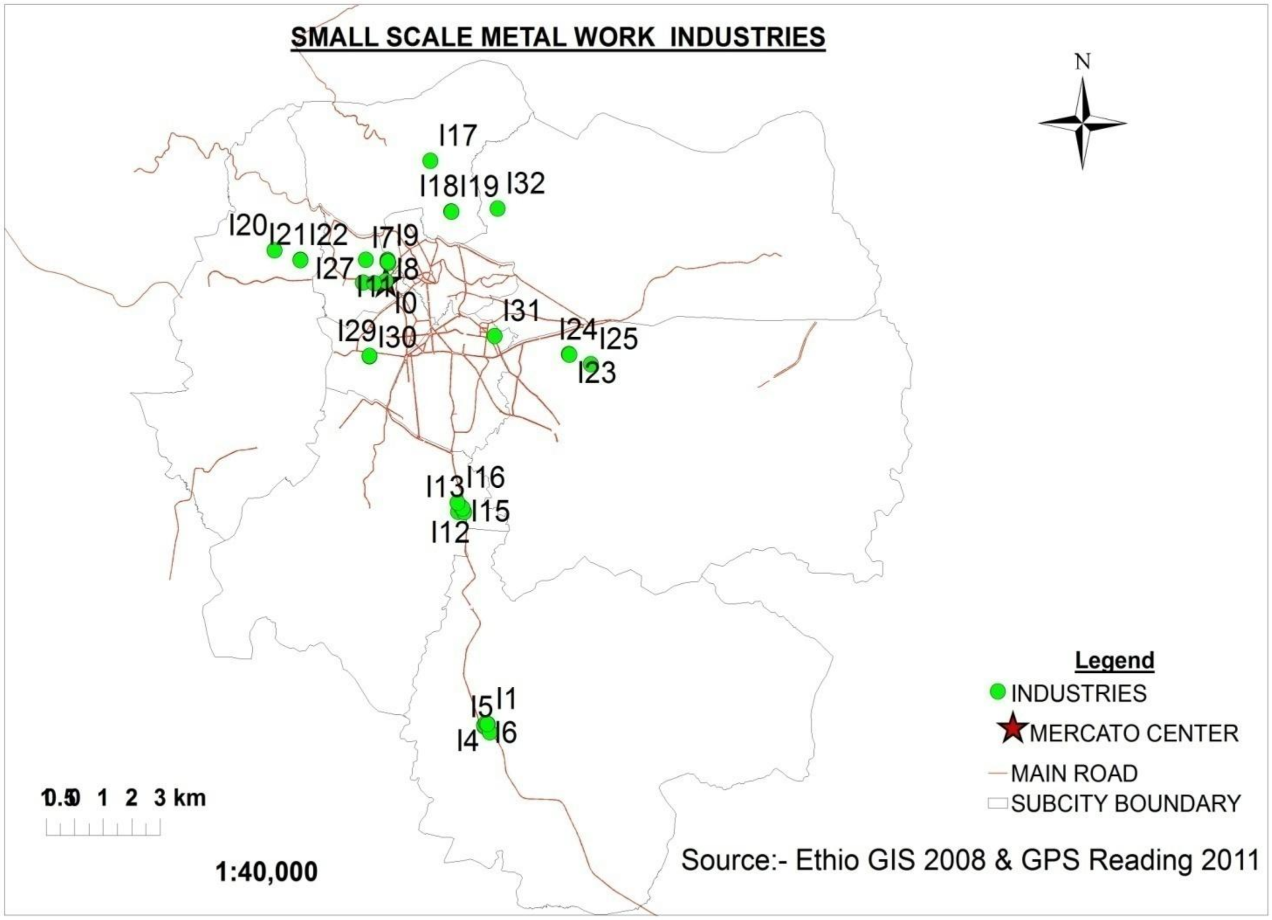

Figure 5.1: Location of selected MSE's metal work in Addis Ababa

Assuming the weights for the sub cities is calculated using the ratio of established metal and wood work MSE’s within the sub city to the total established metal and wood work MSE’s in the region (Addis Ababa).The total number of metal and wood work MSE’s established in Addis Ababa between 1996- E.C-2002 E.C is 1041[2].

The weight of the metal and wood work MSE’s in the specified sub city is calculated using the above assumption and presented in the table below:

[2] Report of Addis Ababa Micro and Small enterprise development Agency from 1996 E.C to march 2002 E.C

Table 5.1: Weight of metal work MSE's in the specified Sub city

Sub city	Total Number of metal and wood sector MSE's established in specified sub city	Total Number of wood and wood sector MSE's established in the region Addis Ababa	Weights of the established MSE's under specified sub city
Akaki/Kaliti	48	1041	0.04611
Arada	63	1041	0.06052
Nifas silk Lafto	237	1041	0.22767
Gullele	24	1041	0.02305
Kolfe Keraniyo	228	1041	0.21903
Bole	174	1041	0.16715
Addis Ketema	112	1041	0.10759
Ledeta	48	1041	0.04611
Kirkos	30	1041	0.02881
Yeka	77	1041	0.07396
Total	**1041**		**1**

Using the above in puts and the global positioning model formula, the distance of Metal Work MSE's cluster location from the reference area (i.e. Merkato area) is 13,176.23m**.** As it is observed in the result above the cluster location identified lies either in the east or south area of Addis Ababa, this is because of the data obtained Ethio-GIS 2008 describes the distance from Merkato (center for the study) to the other four direction as follow as: Merkato to the east boarder 17.4Km, to the west boarder 7.4Km, to the north 6.3Km and to the south 19.6Km.

Here the facilitator of the cluster development programme or CDA should have to identify the specific location of the metal work cluster by setting the criteria like availability of space (land), availability of Training Institutions, availability of financial institutions and suitability of infrastructure in the direction.

CHAPTER SIX

CLUSTER DEVELOPMENT MODEL OF ADDIS ABABA MICRO AND SMALL METAL WORK INDUSTRIES

6.1. Introduction

It is believed that Micro and Small Enterprise's (MSE's) have important roles by creating jobs and means of incomes, and as an engine of economic growth in the developing countries (economies). However this potential role of MSE's is often not fulfilled because of particular set of problems characterizing them related with their size. Addis Ababa metal work MSE's faced with the following problems based on the writer's findings and the secondary data (research done by Addis Ababa Micro and Small Enterprise Development Agency in June 2002). These problems are: Market problem (Lack of demand); lack of skilled manpower; lack of availability of manpower and raw material supply; unable to identify the existing technology; Expensiveness of advanced technology, materials, and spare parts; unfamiliarity of MSE's with different websites; flexibility of the price and quality of raw material in the local shops; lack of product displaying space/land.

Based on the findings of the different researcher's on industry clusters in developed countries (like northern Italy, southern Germany, UK and Denmark), the close collaboration between the enterprises that made up industry clusters helped MSE's to overcome the disadvantages imposed by their small size, while also enabling them to learn from one another. In addition to the developed countries cluster experience, the developing countries (like India, Pakistan, Indonesia, etc) experience on clustering gives us evidence on the cluster development to minimize the problems of MSE's (like the problems of Addis Ababa metal work MSE's observed during the survey).

6.2. Cluster Development Model for Addis Ababa Micro and Small Metal Work Industries

Development process of Addis Ababa metal work MSE's cluster is done by the combination of the UNIDO's cluster development steps approach and stages model of cluster formation described on Handbook of Research Cluster theory. Under this study the Cluster development process of Addis Ababa metal work MSE's is categorized in to two phases.

These phases are: Phase I: Stages up to the metal work industry cluster being operational; and Phase II: Stages after the formation of Addis Ababa micro and small metal work industry cluster.

Phase I: Stages up to the metal work industry cluster being operational includes:

- Identification of common issues or problems of micro and small metal work industries in Addis Ababa;
- Recognize the need or opportunity of metal work industries to cooperate;
- Locating micro and small metal work industry cluster in Addis Ababa;
- Cluster map analysis of Addis Ababa micro and small metal work industry cluster (Identification of components of Addis Ababa micro and small metal work industry cluster); and
- Building initial collaborative projects within the cluster

Phase II: Stages after the formation of Addis Ababa micro and small metal work industry cluster includes:

- Diagnostic study;
- Trust building;
- Preparation of annual action plan;
- Implementation of action plan; and
- Monitoring and evaluation of the implementation phase

6.2.1. Stages up to the Metal Work Industry Cluster Being Operational

Stages up to the metal work industry cluster being operational include the following points:

A. Identification of Common Issues or Problems of Micro and Small Metal Work Industries Addis Ababa

During the study based on the secondary data and the survey result, the problems of Addis Ababa micro and small metal work industries are identified and listed on chapter four above. The identified problems of the industries cannot be addressed by individual micro and small metal work industries. The writer of the research argues that the MSE's should share their resource and capability in order to overcome their common problems or constraints. The existence of this common constraints or problems of Addis Ababa micro and small metal work industries are the potential for the development of metal work cluster in the city.

B. Recognize the Need or Opportunity of Addis Ababa Micro and Small Metal Work Industries to Cooperate

Once the problems of micro and small metal work industries in the city are identified, the facilitator of cluster development in the city should recognize the need of the industries to cooperate with each other in order to overcome their common issues or problems. In addition to this the facilitator must also pushes the micro and small metal work industries in the city to collaborate with like-minded business through training or any other awareness creation mechanism on the benefit of working together.

C. Locating Metal Work Industry Cluster in Addis Ababa

As described in the literature part of the study, geographical proximity of the metal work industries are necessary for the development of metal work cluster in Addis Ababa. Therefore, locating a cluster in a suitable area in the city is required in the process of cluster development.

This locating of cluster is done in the previous chapter based on geographical location of individual micro and small metal work industries in the region (Addis Ababa), the role of metal work industries in employments generation, the establishment number of micro and small metal work industries in sub-cities, and the potential market area.

D. Cluster Map Analysis of Addis Ababa Micro and Small Metal Work industry cluster

Cluster map of Addis Ababa metal work industry cluster should provide a lot of information regarding: core industries of cluster: micro and small metal work industries (the stakeholders of the cluster), the existing linkages among the stakeholders, forward and backward linkages of the cluster (i.e. the linkages of the stakeholders of the cluster with the machineries and raw material suppliers, their customers, the support institutions like financial institutions, research centers or universities or TVET in the city, governmental institutions like FeMSEDA, Addis ReMSEDA, MoI, MoT, etc.and with different Nongovernmental organizations). Furthermore the cluster map should also include Business Development Service (BDS) providers and cluster development Agent.

Below figure shows Addis Ababa micro and small metal work industry cluster map developed on this study:

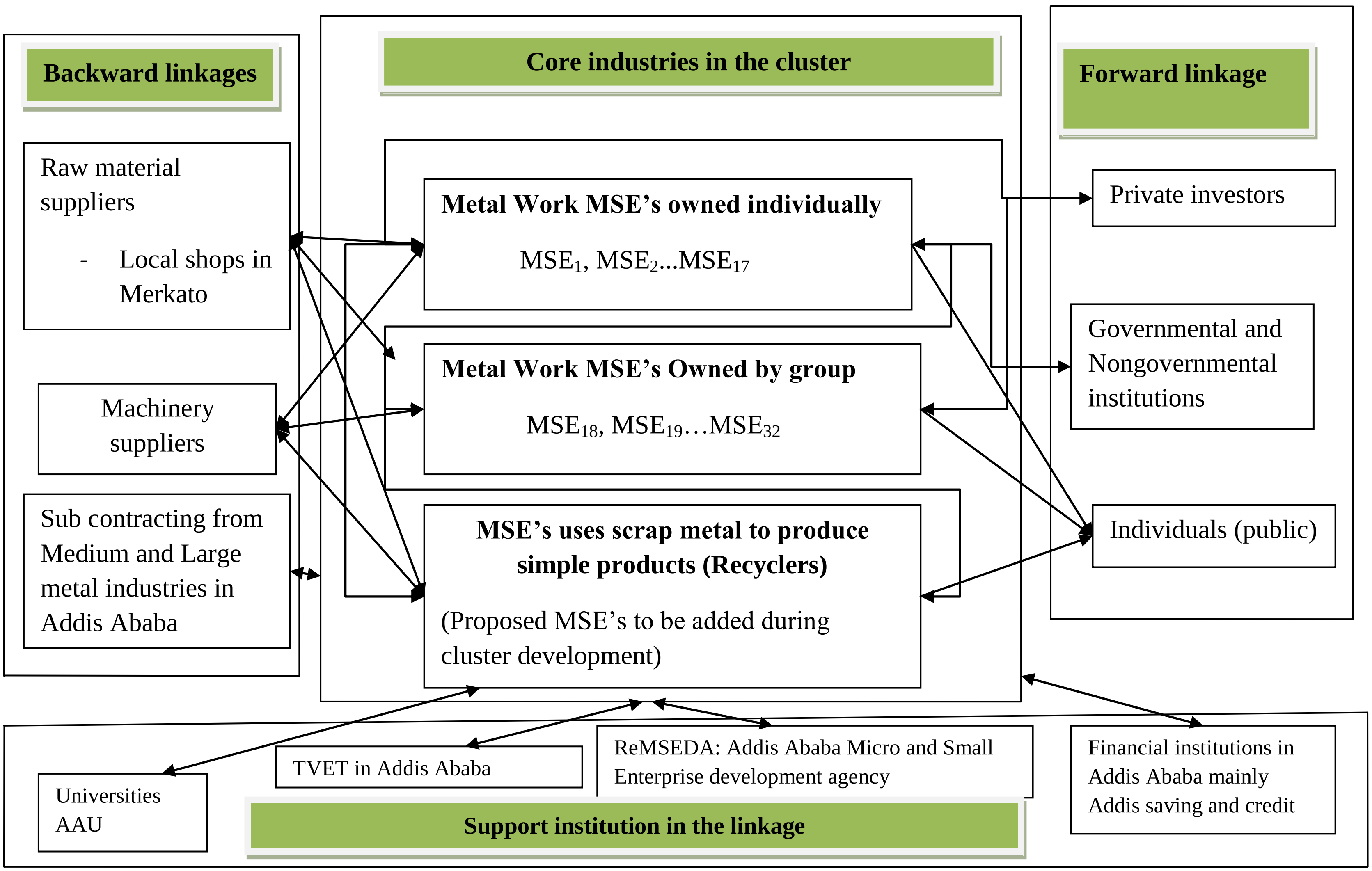

Figure 6.1: Addis Ababa micro and small metal work industries cluster map

Core Firms in Addis Ababa Micro and Small Metal Work Industry Cluster: The core firms of Addis Ababa micro and small metal work industry cluster should comprise of the following three groups:

- **Group 1: Individually owned micro and small metal work industries:** under this group 17 micro and small metal work industries are categorized (Note: the number is based on the sample selected under this study, not as the whole number of metal work MSE's in the city). Currently, all of these metal work industries are scattered overall sub-city of Addis Ababa region, but when the metal work cluster in the city established they must be organized into cluster location.
- **Group 2: micro and small metal work industries owned by group:** nowadays, in all regions and cities of Ethiopia, a number of cooperative (enterprise owned by the group) are formed in different sectors, like metal and wood work, textile and garment, construction, etc and the country policy is being understood the advantages of formation of cooperatives in different sectors. According to the data collected for sample metal work MSE's under this study, among 32 selected metal works industry's 15 of them are owned by the group or they are cooperative associations of metal works with the help of Addis Ababa micro and small enterprise development agency and Addis credit and saving institutions. Even though, in the currently selected metal works in the members are dominated by non trained jobless labour, countries current policies initiates TVET graduates or trained to cooperate in different sectors to reduce un employments in the country.
- **Group 3: micro and small metal work industries use scrap materials to produce different metal product:** even though, there is no micro and small metal work industries under this study that use scrap of metals for manufacturing simple and commonly used household equipments, under the developed metal work MSE's cluster in Addis Ababa, it is necessary to include metal work industries that use the scrap of metal obtained from other metal manufacturing MSE's in the cluster.

Backward Linkages of Cluster: as it is stated in the survey result, one of the main problems of micro and small metal work industries in Addis Ababa is related with insufficient raw material supply. In addition to this , they doesn't have proper or consistent linkages with their raw material suppliers which will leads the metal work enterprises to fear on quality and price of the raw material obtained from those suppliers. The developed metal work cluster map creates a formal linkages with the local shops found in the region (Addis Ababa) mostly found in Merkato. Through time the cluster expected to have the power to attract the machinery and raw material suppliers to the location of cluster, this effect of cluster improve the problems of scattered micro and small metal work industries in the city. Furthermore, the cluster creates a linkage with Large and medium metal industries in Addis Ababa in order to provide subcontracting opportunity for micro and small scale metal work industries within the cluster.

Forward Linkages of Cluster: the major problem of scattered micro and small metal work industries in Addis Ababa is lack of demand for their product (marketing problem). This will happened when there is weak or no linkages between the metal work industries and their customers or when the metal work industries face a problem of promoting their products individually. Even though, micro and small metal work industries in Addis Ababa under this study currently doesn't participate in the export market, their products have local buyers (i.e. Government institutions, Nongovernmental institutions, private investors, publics etc. are the customers of metal work MSE's in Addis Ababa).

Linkages of Support Institutions with Industries in Addis Ababa Metal Work Industry cluster: different literatures pinpointed that one of the most important factors that differentiate the dynamic and vibrant cluster from the static and non vibrant ones is the linkages with among themselves and presence of support institutions. The support institutions that should be involved in Addis Ababa micro and small metal work industry cluster include: governmental organization, Nongovernmental organization and Research and educational institutes (Universities, TVET, etc).

The following are the main institutions in assisting directly or indirectly the Addis Ababa metal work industry cluster:

- FeMSEDA;
- Addis ReMSEDA;
- Addis credit and saving institution S.C (micro finance institute);
- Sub-city MSE development offices;
- TVET in Addis Ababa;
- Addis Ababa University, AAU;
- Ministry of Industry, Ethiopia;
- Ministry of Trade, Ethiopia;
- Cluster development Agent (Brokers)

Governmental Institutions

As cluster map of Addis Ababa metal work industry cluster above describes governmental institutions like FeMSEDA, Addis ReMSEDA, sub-city MSE development offices, TVET, AAU, MoT, and MoI have a linkage with the core firms within the cluster. These governmental institutions have the following key roles in supporting the Addis Ababa metal work cluster:

- Provision of training for the employees in the cluster (i.e. all levels of workers in the cluster should take the training related with their profession);
- Providing working premises and area of product selling for the micro and small scale metal work industries in the cluster;
- Facilitating market linkages of micro and small scale metal work industries with their customers;
- Improving the overall policy environments to make conducive for micro and small metal work industries development; and
- Provide for the industries the financial support.

In addition to the above roles of the government institutions in supporting the cluster, they should also facilitates the formation of cooperative micro and small metal work industry association within the cluster, since the metal work MSE’s cooperative association provides services like bulk purchase of raw materials, receive and distribute bulk orders among the members, and assist the members in sourcing inputs and available markets for their products.

Cluster Development Agents

From different MSE's cluster development literatures and the experience on cluster development of other countries it is understood that external bodies should facilitates the emergence or existence of MSE cluster. These external bodies are called as cluster development agent (CDA). This cluster development agent plays a vital role in the assessment of the development of potential of the cluster. They are also considered as external catalyst, which enjoys the trust of each cluster stakeholders (i.e. micro and small metal work industries in the cluster), helps in the creation of trust among the stakeholders.

The cluster development agent formed during the development of cluster are assigned either from the governmental organizations (like regional and zonal bureau of trade, industry, micro and small Enterprises development agency etc) or from the Nongovernmental organizations that supports industry cluster programme in both developed and developing countries (for instance UNIDO, UNDP etc). From the experience of Mekelle metal and wood work cluster, the cluster development agent those are assigned from the regional and zonal offices of Trade, Industry and office of MSE development and cooperative are the main catalyst for the successful initiation of the metal and wood work cluster development programme in the city.

From the above experience of Mekelle metal and wood work cluster in assignment of cluster development Agent, the writer of the research assigns cluster development agents for Addis Ababa metal work cluster development programme from Addis Ababa and sub cities bureau of Trade, industry and micro and small enterprise development agency.

These formed cluster development agent are: to fill the gaps in the ability of intermediaries, to identify tasks and implement activities on continuous basis, to establish a system of self-governance in the cluster.

E. Building Initial Collaborative Projects within the Cluster

After micro and small metal work industries to be clustered in the city gets awareness of working together through training given by the cluster development agents, the next activities of cluster facilitator is that grouping the metal work industries to introduce the actual cooperation through these group engagement in shared activities.

From this initial collaborative project, the metal work industries in the cluster can see further benefits of collaborative project and open their mind for strongly working with all metal work industries in the cluster. Through time this collaborative projects developed to operational metal work cluster.

In summary, after accomplishing the first phase of proposed Addis Ababa micro and small metal work cluster, the cluster is expected to be operational.

6.2.2. Stages After Formation of Addis Ababa Micro and Small Metal Work Industry Cluster

Once Addis Ababa metal work industry cluster is becoming operational, the cluster development process continuous through diagnostic study of formed Addis Ababa metal work cluster, preparation of the annual action plan based on the diagnostic study, trust building, implementation of the annual action plan and finally monitoring and evaluation of the implemented action plan.

Therefore, based on the writer of the research classification the second phase of cluster development process under (i.e. stages after formation of Addis Ababa micro and small metal work industry cluster) includes the following points:

A. Diagnostic study of Addis Ababa Metal Work Industry Cluster

Diagnostic study of cluster helps the CDA, in order to identify the cluster strengths and weaknesses, the environment in which it or they operate and mostly this step will be undertaken for sustainable development of cluster. Depending on the complexity of the cluster, the diagnostic study can be made by a small team or single consultant *(Bhushan, 2006)*.

The main objectives of Addis Ababa metal work industry cluster diagnostic study will be to:

- ❖ Understand the socio-economic environment of the developed metal work industry cluster;
- ❖ Understand and identify the overall environment that the metal work industry cluster is operating in;
- ❖ Identify the most influential points for intervention in the cluster development programme;

- ❖ Provide a baseline information in the cluster for future monitoring and evaluation of cluster; and
- ❖ Build initial trust with and among the stakeholders.

During the diagnostic study of Addis Ababa metal work industry cluster formed the following activities should be carried out: information about the cluster (like firm size, firm type, firm number, types of products, etc) will be gathered; interviews will be conducted with the sample micro and small metal work industry within the cluster, Support institutions (like Addis ReMSEDA, TVET in Addis Ababa etc as in the cluster map above), and Suppliers of machineries and raw materials; and appraisal of Addis Ababa micro and small metal work industry cluster's structure will be made. After the completion of this diagnostic study, the Addis Ababa metal work industry cluster map will be revised as it reflects the real relationships of the industries with other institutions in the cluster.

B. Preparation of the Action Plan of Metal Work Industry Cluster

Action plan is one of the necessary steps in the process of Addis Ababa metal work industry Cluster Development using the information gathered during the diagnostic Study of the Cluster. This action plan prepared annually helps to improve relationships among the metal work industries in the cluster (stakeholders of the cluster) while it delivers visible results.

At its initial stages Addis Ababa metal work industry cluster, it becomes difficulty to jointly prepare an action plan for the metal work industry in the cluster since it will be expected that the trust formed between them is not strengthened at this cluster emergence period.

Therefore, for this time the CDA (i.e. which are assigned from Addis Ababa City, Sub city MSE development offices and other offices) should initially take the lead in preparing the action plan on the basis of the dialogue with the metal work industries and need their endorsement of the concerned metal work enterprises before finalizing it.

The action plan document which will be prepared for Addis Ababa metal work industry cluster should consist of the following sections which are adopted from UNIDO's training materials:

- Cluster status prior to intervention which provides a brief description of the product range, turnover of the metal work industries in the cluster, size distribution and institutional set-up of the developed Addis Ababa metal work cluster prior to intervention;
- The vision of the metal work industry cluster as a whole in a set of activities that can be implemented through the metal work industries collaborations;
- Major outcomes which was achieved in the previous years of cluster development project implementation;
- Description of the past activities in the metal work industries cluster operations; and
- Overall cluster development strategy and objectives for the current year.

C. Trust Building in the Developed Addis Ababa Metal Work Industry Cluster

In the above chapter, the metal work cluster location is identified in Addis Ababa, which will bring the metal work industries in close proximity (i.e. all metal work industries will be located in specific location identified during the study). From their close proximity the metal work industries can benefit each other since their close proximity provide them passive external economies because this advantages comes despite any planned efforts by the metal work enterprises. Such gains are necessary but not sufficient for the cluster growth.

For the active external economies from metal work industry cluster, there should be joint actions between metal work industries within the gained through trust building among the metal work industries in the cluster and other support institutions. In addition to this the existence or the development of the trust among the industries helps them to cooperate and compute at the same time.

Even though most of the Ethiopian people culture’s practices the habits of supporting one another or cooperation, as it is observed during the survey almost all of the owners of the metal work industries under the study fear about the presence of trust between them to work together.

Therefore, the writer of the research believes that the CDA formed for the metal work industry cluster development program should work hardly on trust building among the metal work industries. Further they should have to change the mindset of the owners on lack of trust between them.

D. Implementation of the Action Plan prepared for the Cluster

Under the implementation step of radical change will be achieved in the way the metal work industries interact and conduct activities in addition to the realization to the target set. For the achievement of the above objective's of the implementation of action plan prepared for Addis Ababa metal work industry cluster, the following steps are required which are adopted from the UNIDO's cluster development materials: implementation of the annual action plan; expansion of activities with the help of professionals; creation of a cluster governance mechanism; and execution of an exit strategy for the CDA. The above listed steps will be processed through the following stages: stage I: the CDA has the most of responsibility for implementation and the contributions of the implementing agency are larger than those of the metal work industries in the cluster; stage II: the metal work industries gain greater trust in their capacities, are more willing to commit their own resources and increasingly learn to find support; and stage III: the cluster intervention is effectively approaching its conclusion and the cluster is characterized by a stronger bonding among the metal work industries in the cluster.

E. Monitoring and Evaluation

This step of metal work industry cluster development helps to distribute best practices and strengthen trust among the metal work industries. It also allows the identification of emerging changes in the relationships among industries within the cluster and the adaption of the cluster activities and governance structure to these.

This steps checks the problems on the implementation of the action plan and if the problem identified, the CDA prepare the action plan that solves the problem observed. Addis Ababa metal work MSE's cluster development process flow chart is summarized in the figure below:

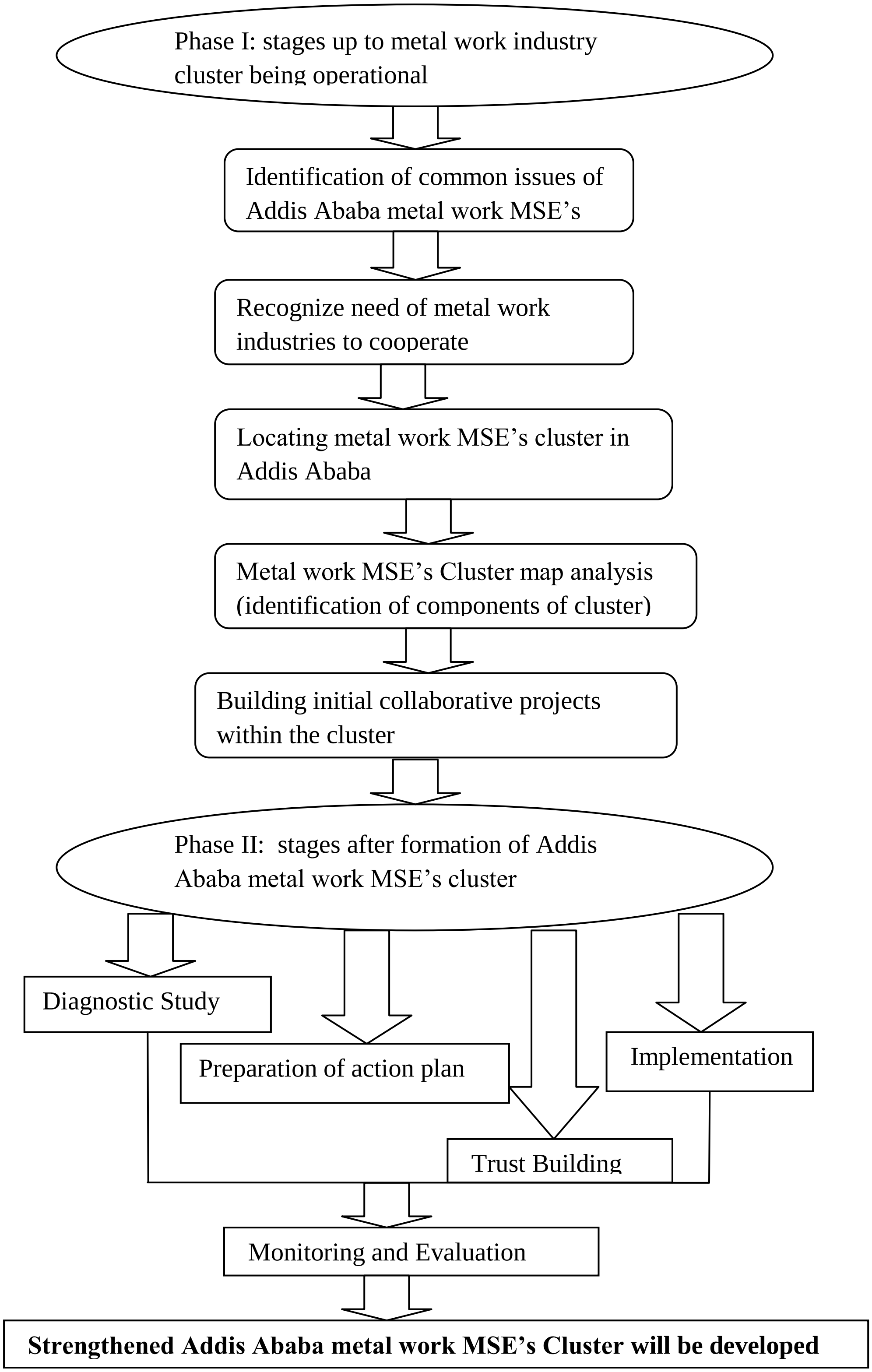

Figure 6.2: Flow chart of Addis Ababa metal work MSE's cluster development

The above shown flow chart of Addis Ababa micro and small metal work industry cluster development structured with the following components so that the problems of the existing cluster in Ethiopia should be solved. These components of the flow chart include:

Suitable metal work industry cluster location in the city based on nearest to accessibility of raw material suppliers and product market using gravity positioning model which is assumed to locate the industry at an optimum facility cost. Due to this suitable location, the products of the metal work industry in the cluster easily obtained by the users.

In the cluster development process, the researcher believes on the strong commitments of the governmental institutions (those selected as cluster development agents) to facilitates the formation of association for micro and small metal work industries found in the cluster which is used as building strong inter-firm linkages among the industries.

The cluster map also includes Business Development services (BDS) that contributes in the industry growth in the cluster by assisting the industries in market promotion, linkage formation, and technical consultancy and provide training.

The Cluster Development Agents (CDA), in the development process creates awareness on the benefits of inter-firm linkages (i.e. benefits of working together) to the owners of the metal work industries to be clustered.

The facilitator of the cluster take time to build momentum for collaboration since building trust among the stakeholders of the cluster takes time for creating real, sustainable changes.

6.3. Clustering as a Mechanisms for Facilitating Technology Transfer

Although technology transfer has often focused on the acquisition of machinery, but it goes well beyond the sale of capital goods and equally involves the transfer of soft goods from one party to another, including knowledge, know-how and management systems that accommodate technological change. In another way the transfer of technology is seen as a dynamic process in which knowledge becomes widely diffused, adopted, and adapted throughout an economy over time *(Thompson, 2003)*.

In a perfect market economy, countries and companies enjoy equal access to and development of technology. However, there are barriers to the transfer of knowledge and technology between economic actors that can be attributed to differences in the legal, regulatory, political and social environments of countries. Human capacity and technical constraints; production and conformity assessment constraints; legal and institutional constraints; and financial and investment constraints are the four main categories of constraints to technology transfer faced by MSME's manufacturing sectors.

Because of the above mentioned constraints, countries and companies are not equally endowed with access to technology. It is therefore important to consider mechanisms and modalities that can create an enabling environment for technology transfer towards MSMEs in the developing country like Ethiopia, particularly in the light of their significant contribution to the generation of income and employment.

In order to overcome the problems of MSME's in developing countries like Ethiopia regarding their contribution to the technology transfer, clustering MSME's are necessary, because of geographically clustered firms have played an important role in Shaping the competitive landscape and technology transfer *(Tallman et al.,2004).* This idea is justified with the following evidences:

Clusters can increase the rate and intensity of inter-linkages among firms. By doing so, the transfer of knowledge and know-how is enhanced as business owners learn from the experiences of others. Lessons from clustering experiences throughout the world demonstrate that clustering can facilitate the mobilization of financial and human resources and, through collaborative action, can reduce the size and cost of investment into small, less risky steps *(Schmitz & Nadvi, 1999).*

From other countries experiences on clustering, geographic clustering of an industry provides greater technology transfer to the area in the sector as compared to the dispersed industries in the sectors.

Evidences from the garment manufacturing sector in China demonstrate that the geographic clustering of industry in Hong Kong has been particularly attractive for foreign investors who have wanted to access Chinese market. In this case, the technology transfer in the sectors was greater in Hong Kong than other, more geographically dispersed garment producing centers in China. In addition backward, inter industry, vertical linkages in the cluster would seem to be a particular effective mechanism to the transfer of technology to the area *(Thompson, 2003).*

Further, the increasing number of the competitors, the proximity and shared resources among competing firms, and the mental models that emphasize the resources and capabilities of the competitors within the cluster contributes in increase innovation capacities of firms within the cluster which in turn facilitates technology transfer to the area.

In generally, the transfer of technologies to MSMEs in developing countries can therefore be facilitated by strengthening clusters and promoting foreign investment opportunities. However, active and appropriate policies are needed to strengthen clusters and networks in a manner that allows them to assist MSMEs to this end. In fact, the development of a cluster and the establishment of a network is a slow process, given that building trust and acting collectively takes time to materialize.

Here under this study the researcher believes that the developed metal work cluster in Addis Ababa when it function in its fully performance, provides greater technology transfer in the metal work sector to the country than other metal work industries geographically dispersed through the country by attracting foreign direct investments to the cluster location area.

CHAPTER SEVEN

CONCLUSIONS, RECOMMENDATION, AND FUTURE RESEARCH DIRECTIONS

7.1. Conclusions

Cluster plays a very important role in an economy. It works as a vehicle for poverty reduction, increasing MSE's productivity, regional economic development and facilitating technology transfer. Many developed and developing countries like Italy, Japan, China, India, Pakistan, Brazil, Mexican, etc has introduced cluster approach in their countries and different case studies shown that these approaches has positive contribution to their regional economic development program. Whereas African countries doesn't benefited as such from MSE's clustering because cluster approach in Africa in generally are said to be plodding along. In Ethiopia cluster development program was started in Addis Ababa (Merkato footwear, Gullele handloom and readymade garment) and in Mekelle (in metal and wood work sector) by the intervention of Ethiopian government with UNIDO and their diagnostic study describes to some extent the emergency of the benefits of cluster in the country.

Even though, currently in Ethiopia in general and in Addis Ababa in particular, the government policy gives an attention in the development of micro and small enterprises (like in metal work sector), the sector doesn't provides the expected benefits to the country and individuals. This is because of the problems of micro and small metal work industries identified under this study and data obtained from secondary sources.

The study identifies the following problems of Addis Ababa micro and small metal work industries. These are: lack of demand, lack of skilled manpower, flexibility of the price and quality of raw material supplied, lack of product displaying area (lack of marketing area), lack of working capital, and power breakage. Taking into consideration of all the benefits of the cluster of regional development for both developed and developing countries, the study develop Addis Ababa micro and small metal work industry cluster to solve the above listed problems of those industries.

The proper implementation of the cluster developed for Addis Ababa micro and small metal work industries with the presence of the intervention of the governmental policy in the cluster development process are believed to improve the industries product market access, knowledge transfer among industries, increase the capacities of industries, facilitates technology transfer activities to the country, and improve the competitiveness of industries in the local market and export market through time.

7.2. Recommendations

From the survey of Addis Ababa micro and small metal work industries and the literatures on the benefits of clustering of MSE's, the writer of the research recommends the following points, which will improve the industries culture of cooperating and at the same time competing each other:

- The city administration should properly implement the micro and small metal work industry cluster proposed under this study;
- Government should make public policy intervention for facilitating cluster development, since the public policy interventions run the developed metal work industry cluster dynamically;
- Cluster Development Agent (CDA) established (or a body that facilitates development of metal work industry cluster in the city) should creates awareness on the benefits of the presence of trust within the cluster stakeholders (i.e. metal work industries) by giving training to the concerned bodies and benchmarking other countries experience on benefits of trust established in their cluster. This is because of the establishment of trust among the metal work industry within the cluster leads to real collaboration between them;

- For the realization of the metal work industry cluster benefits and running cluster in healthier manner, all cluster collaborators (i.e. Addis Ababa micro and small metal work industries, policy makers (Ethiopian government), Business support organizations, Academia (like TVET in Addis Ababa, AAU), and financial organizations like governmental and nongovernmental banks in the city, Addis credit and saving S.C) should properly cooperate together.

7.3. Future Research Directions

Cluster is not a new phenomenon in which both developed and developing countries used as an instrument for the development of micro and small industries and communities related to these industries. However, in Ethiopia the practice of clustering is at its infant stage. This thesis develops a clustering model for micro and small metal work industries in Addis Ababa based on the survey results of 32 selected metal work industries. But after this study the researcher suggests the following potential research areas for the researchers:

- Researchers should do the diagnostic study of Addis Ababa micro and small metal work industry cluster after the cluster being operational
- Researchers incorporating large sample size of metal work industries for the clustering approaches might be necessary.
- Research on cause and effect analysis on the reason why benefits of existing clustering in our country still not realized should be done.

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ANNEX-A: Selected Metal Works MSE's in Addis Ababa

No.	Name of the industries	No. of worker they have	Sub city of enterprise	Establishment year (E.C)
1	Mesfin Eshetu general metal works	5	Akaki Kaliti	1997
2	H/mariam Mengesha general metal works	6	Akaki Kaliti	1997
3	Yonas Getahun metal and Almunium workshops	12	Akaki Kaliti	1997
4	Guesh Key/mariam metal works	7	Akaki Kaliti	1997
5	CT metal work	6	Akaki Kaliti	1997
6	Moges H/sillassie general metal and Engineering Enterprise	9	Akaki Kaliti	1996
7	Mesfin Getachew general metal works	9	Nifas silk lafto	1997
8	Progress metal work	7	Nifas silk lafto	1998
9	Alem Tesfaye general metal works	5	Nifas silk lafto	1998
10	Natnael general metal works	8	Nifas silk lafto	1998
11	Kidus Michael metal work	5	Nifas silk lafto	1997
12	Sira le edget general metal works	8	Arada	1997
13	Elshaday metal and safety works	10	Arada	1997
14	Ahimed Hasen general metal works	6	Arada	1997
15	Universal metal works	10	Arada	1997
16	Kora belu metal works	10	Arada	1997

17	Admas Mididga Kotabi	17	Gullele	2001
18	Dobi metal works	8	Gullele	1997
19	Detami metal works	6	Gullele	1998
20	Bridge metal works	12	Bole (Woreda 6)	
21	Eagle metal works	10	Bole (Woreda 6)	
22	Hailu Abera metal works	8	Bole (Woreda 7)	
23	Worku general metal works	5	Addis Ketema	1997
24	Birhu Tesfa general metal works	12	Addis Ketema	1997
25	Sewenga metal works	5	Addis Ketema	1997
26	Andinet metal works	6	Yeka	2001
27	Bahilu general metal works	5	Kolfe Keraniyo	2001
28	Habtamu general metal work	9	Kolfe Keraniyo	1999
29	Zeleke Shiferaw general metal works	6	Kolfe Keraniyo	1997
30	Tesfa Hulegeb metal works	11	Ledeta	1999
31	Hibret metal works	7	Ledeta	1997
32	Meseratawi general metal works	5	Kirkos	1996

ANNEX-B: Educational Background of the Workers in the selected Metal Works MSE's

Name of industries	Number of workers in the industry	< grade 8	Between grade 9-12	TVET (10+1,10+2)	College diploma	University level
Elshaday metal and safety works	10	0	4	4	2	0
Universal metal works	10	0	5	2	2	1
Sira le edget general metal works	8	0	8	0	0	0
Admas Mididga Kotabi	17	0	0	14	3	0
Progress metal work	7	1	2	3	1	0
Bahilu general metal works	4	0	3	1	0	0
Worku general metal works	5	0	3	2	0	0
Ahimed Hasen general metal works	6	3	1	1	1	0
Moges H/sillassie general metal and Engineering Enterprise	9	2	4	2	0	1
Mesfin Getachew general metal works	9	0	7	1	1	0
Kidus Michael metal work	5	0	4	0	1	0
Guesh Key/mariam metal works	7	1	1	4	1	0
Habtamu general metal work	9	0	3	5	1	0
Yonas Getahun metal and Almunium workshops	12	7	3	1	1	0

Natnael general metal works	8	0	2	5	1	0
Alem Tesfaye general metal works	5	0	2	2	1	0
H/mariam Mengesha general metal works	5	0	5	0	0	0
Mesfin Eshetu general metal works	5	0	4	1	0	0
CT metal work	6	0	3	2	1	0
Kora belu metal works	10	0	4	4	2	0
Dobi metal works	8	0	2	4	2	0
Detami metal works	6	0	2	2	2	0
Bridge metal works	12	2	2	5	3	0
Eagle metal works	10	1	3	5	1	0
Birhu Tesfa general metal works	12	2	3	5	2	0
Sewenga metal works	5	0	1	3	1	0
Andinet metal works	5	0	2	3	0	0
Habtamu general metal work	9	2	4	2	1	0
Zeleke Shiferaw general metal works	6	1	3	1	1	0
Tesfa Hulegeb metal works	11	3	2	4	2	0
Hibret metal works	7	1	2	2	2	0
Meseratawi general metal works	5	1	1	2	1	0
Total	**253**	**27**	**95**	**92**	**37**	**2**

ANNEX-C: Geographical Location of the selected Metal Work MSE's

Name	x coordinate	Y-coordinate	Distance From main road (in m)	Distance from reference point Merkato (in m)	Actual distance from Merkato (in m)	Location
I0	471120	998324	Center	0		
I26	470414	999035	13.43	1226.305	1239.735	Addis Ketema
I27	470308	998273	106.75	905.7542	1012.504	Addis Ketema
I28	470713	998251	175.35	508.3048	683.6548	Addis Ketema
I2	474577	983416	13.91	15058.25	15072.16	Akaki Kaliti
I3	474571	983461	51.94	15013.05	15064.99	Akaki Kaliti
I4	474694	983500	236.8	15003.26	15240.06	Akaki Kaliti
I5	474763	983226	7.11	15285.8	15292.91	Akaki Kaliti
I6	474632	983535	150.86	14954.86	15105.72	Akaki Kaliti
I1	474686	983506	56.29	15241.04	15297.33	Akaki Kaliti
I7	471216	998931	251.82	841.7227	1093.543	Arada
I8	471181	999037	126.8	947.5634	1074.363	Arada
I9	471175	999006	166.27	916.678	1082.948	Arada
I10	471168	998970	199.24	880.8735	1080.113	Arada
I11	471186	998971	208.69	881.506	1090.196	Arada
I23	477546	995879	13.84	6724.726	6738.566	Bole
I24	477562	995866	8.52	6744.114	6752.634	Bole
I25	478314	995548	83.59	7559.092	7642.682	Bole
I31	474939	996482	17.5	4074.54	4092.04	Kirkos
I17	472681	1002351	2.42	4513.125	4515.545	Gullele
I18	473418	1000653	6.32	3393.103	3399.423	Gullele
I19	473421	1000651	10.68	3393.559	3404.239	Gullele

I20	467217	999359	1110	4175.626	5285.626	Kolfe Keraniyo
I21	468117	999036	336.17	3220.209	3556.379	Kolfe Keraniyo
I22	468125	999028	320.6	3210.215	3530.815	Kolfe Keraniyo
I29	470549	995813	139.68	2366.416	2506.096	Ledeta
I30	470542	995823	120.24	2358.725	2478.965	Ledeta
I14	473656	990602	355.56	8127.76	8483.32	Nifas silk
I12	473765	990758	125.96	7768.943	7894.903	Nifas silk
I13	473867	990597	14.32	7954.737	7969.057	Nifas silk
I15	473816	990721	47.47	7820.814	7868.284	Nifas silk
I16	473639	990911	232.74	7583.183	7815.923	Nifas silk
I32	475047	1000752	48.32	4682.601	4730.921	Yeka

ANNEX-D: Simple Machineries Produced by selected Metal Work Industries

Briquetting machine

Agglomerating machine

Note: The above shown machines are used in the production of coal from different wasted wood, which are manufactured by micro and small scale metal work industry found in Gullele sub city named as Admas Mididga Kotabi.

<u>ANNEX-E: Some of Products Produced by Metal Work Industries assessed during the study</u>

Poultry Cage

Door frame

Stove

Safety materials

Lift (used for vertically transporting Construction material)

Stove

ANNEX-F: Some of Machineries used in the Metal Work Industries Workshops

Drilling machine

Cutting machine

Welding machine

<u>ANNEX-G: Questionnaire</u>

Addis Ababa Institute of Technology

School of graduate studies

Department of Mechanical Engineering

(Industrial Engineering Stream)

Title of thesis: "Cluster development for metal work industries. Case study on Addis Ababa micro and small metal work industries"

By: Tariku Tamiru Belis

Address: **Addis Ababa, Tel: +251-912-753-784, Email: seenaatam@yahoo.com**

<u>Acknowledgement to the respondents</u>

I would like to express my deep appreciation to your industry for the willingness and cooperation to answer the questions which are essential to conduct the thesis. This questionnaire is developed for the purpose of fundamental scientific research. Therefore, I assure you that the information obtained from this questionnaire will be kept confidential and will not be transferred to other parties for any other objectives. You may feel free to verify these statements from us personally. For other questions relevant to this thesis, please contact Addis Ababa Institute of technology, Mechanical Engineering Department - Tel. +251-111-232-414.

Yours sincerely

Thank you for your cooperation!!

Advisor: Dr-Ing. Daniel Kitaw (Associate Professor of Mechanical Engineering)

Co-advisor: Ato Gulilat Gatew

Short description of cluster development of micro &small-scale metal work industries

Cluster has become increasingly popular and important as policy tools to boost economic development and competitiveness at regional level. Cluster is defined by different authors in different context but here in this thesis I use definition derived from Schmitz in 1992. Cluster is defined as a group of Micro and Small metal work Enterprises/industries, producing similar products, located in geographical proximity, sharing knowledge and technology among themselves in order to overcome their internal and/or external challenges, and that competes each other but also co-operate with one another.

In overall economic development, a critically important role is played by micro, small and medium enterprises in the developing world. Among different sectors of small scale industries, small scale metal industries are very important for the country to increase employment and shares to Growth Domestic Product (GDP). In addition they support both the agricultural and engineering sector of the country. Therefore micro and small scale metal work industries need to increase their capacity, innovation level, knowledge and information sharing through clustering.

Section I: General information about the micro and small scale metal work industry

1. Name of your small scale industry:________________
2. Establishment year of the industry:________________
3. Address of the industry:

Sub city: __________ Tel: ______________

Kebele: ___________ \ Email: _________________

4. Capital of the industry

   Initial capital investment: ____________ Current capital of the industry: ___________

5. Employment Number:

   - Current employment number of the industry:

     Male employed: __________ Female employed: ________

   Total: _________

6. What is the ownership type of the industry? (put 'x' on your answer)

- ☐ Share Company
- ☐ le proprietorship

7. Educational background of the owner/owners (put 'x' on your answer)

- ☐ Less than grade 8
- ☐ 9-12 grades
- ☐ 10+1, 10+2
- ☐ College Diploma
- ☐ University level

Section II: Industry product analysis

8. How many types of products are manufactured in your industry? (put 'x' on your answer)

- ☐ Only one type of product
- ☐ 2-5 types of products
- ☐ 5-10 types of products
- ☐ 10-20 types of products
- ☐ Above 20 types of products

9. Which one of the following groups of products is produced in your industry? (put 'x' on your answer)

- ☐ Household equipment
- ☐ Modification (e.g. metal cutting, cement mixer, welding, etc)
- ☐ Agricultural equipment
- ☐ In put for Construction industries
- ☐ Others

10. List the type of product your industry is producing?

____

____

____

____

11. What are the basic production activities used in your industry to manufacture the products? (put 'x' on your answer)

- ☐ Milling/grinding
- ☐ Assembly
- ☐ Painting
- ☐ Sanding/polishing
- ☐ Others

12. How many new products are introduced by your industry to the market, in the last two or three years? (list them down)

____

____

____

13. How you produce the products in the industry? (put 'x' on your answer)

☐ By customer order ☐ Others

☐ Make to stock

14. How many of your products are produced per year?

No.	Products	Pieces/year
1		
2		
3		
4		

15. What are the major problems observed in your industry? (put 'x' on your answer)

☐ Lack of skilled manpower ☐ Lack of space/land

☐ Machine break down ☐ Power shortage

☐ Lack of market ☐ Others

☐ Lack of working capital

Section III: Existing resource in the industry

16. List down the type of machineries and tools used/available in the industry

Hand tools	Semi automatic machineries	Fully automatic machineries

17. Fill table below according to the educational background of your industry workers

Educational level	**Number of workers in the given educational level**
Less than 8^{th} grade	
Between Grade 9 and 12	
10^{+1}, 10^{+2}, 12^{+1}, 12^{+2}	
College Diploma	
University level	

18. How much land area is occupied by your industry?

____

Section IV: Issues related to marketing

19. What are the raw materials used by the industry, in order to produce the product?

____

____

____

20. What are your potential suppliers of raw materials?

____

____

____

21. Does your industry have any substantial (considerable) problems with its raw material suppliers?

Yes ☐ No ☐

If your answer is yes, describe

____

____

____

22. Who are your products potential customers? (put 'x' in your answer)

☐ Public individuals ☐ Private investors

☐ Governmental industries ☐ Others

☐ Non Governmental Organizations

23. Is there marketing research in your industry? (put 'x' in your answer)

Yes ☐ No ☐

24. If your answer for question No 23 is yes, how often does your industry conduct a marketing research? (put 'x' in your answer)

☐ Twice a year ☐ Once in 2 years

☐ Once a year

25. How often does your industry order the raw materials? (put 'x' in your answer)

☐ Once/year ☐ Four/year

☐ Twice/year ☐ Monthly

☐ Three /year ☐ Weekly

26. Does your industry create customer-supplier relationships? (put 'x' in your answer)

Yes ☐ No ☐

27. Does your industry is currently working with other micro and small scale metal industries found in the country? (put 'x' in your answer)

Yes ☐ No ☐

28. Does your industry believe on the benefits of working with other micro and small scale metal industries found in the city? (put 'x' in your answer)

Yes ☐ No ☐

29. Who are the industry main competitors? (put 'x' in your answer)

☐ Micro and Small scale metal work industries in the city

☐ Micro and Small scale metal work industries within the country

☐ Products of metal industries outside the country

30. What are the main problems of the industry in the market? (put 'x' in your answer)

☐ Quality problem

☐ Lack of information

☐ Design problem

☐ Problems related with price of the products

☐ Others

Section V: Industry linkages with support institutions

31. Does your industry have linkages with support institutions?

Yes ☐ No ☐

32. If your answer of question number 31 is yes, with which one of the following your industry have linkages? (put 'x' in your answer)

☐ Ministry of science and technology

☐ Ministry of industry

☐ Financial institutions

☐ University or college

☐ Federal and regional micro and small enterprise development Agency

☐ Nongovernmental organizations (NGOs) like UNDP, UNIDO etc

33. Does the government institution prepare training for the workers of your industry?

Yes ☐ No ☐

34. If your answer of question number 33 is yes, how often does this government institution provide training for your workers?

- ☐ Once a year
- ☐ Twice a year
- ☐ Three times a year
- ☐ Four times a year
- ☐ Monthly

35. Does your industry workers takes training related with metal product manufacturing?

Yes ☐ No ☐

36. If the answer for question No. 35 is yes, which one of the following bodies provides the training? (put ‘x’ in your answer)

- ☐ Federal and regional micro and small enterprise development Agency
- ☐ Nongovernmental organizations (NGOs) like UNDP, UNIDO etc
- ☐ Local University or college
- ☐ Others

37. If the answer for question No. 35 is No, what type of training does your industry need?

____

____

____

____

DECLARATION

I hereby declare that the work which is being presented in this thesis entitled "Cluster Development for Metal Work Industries: Case Study on Addis Ababa Micro and Small Scale Metal Work Industries" is original work of my own, has not been presented for a degree of any other university and all the resources of materials used for the thesis have been properly acknowledged.

______________________________ ________________________

Tariku Tamiru Date

(Candidate)

This is to certify that the above declaration made by the candidate is correct to the best of my knowledge.

______________________________ ________________________

Dr.-Ing. Daniel Kitaw Date

(Advisor)

______________________________ ________________________

Ato Gulelat Gatew Date

(Co-advisor)