Nature And Performance Of Wood And Metal Work Clustering: Implications For Micro And Small Scale Enterprises Development (In The Case Of Mekelle City)

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Abstract
This paper examines the nature and performance of metal and wood work cluster in Mekelle and its implication in micro and small scale enterprises development. The premise of the paper is to examine the performance of enterprises in the cluster. Both primary and secondary data were used, to analyze the data qualitative and quantitative approaches were employed. Total 42 enterprises out of 104 populations were randomly selected from the list of enterprises in Mekelle UNIDO agent. Structured questionnaires were used to gather/elicit information from enterprises. The study found out that enterprises in the cluster improved their sales and fixed asset. By establishing networks they started, although it is at infant stage, to exchange information and discuss to seek solution for their problems. However, they have low level of skill, lack of working places (premises), shortage of finance and not created forward and backward linkages. The study proposes that encouraging and creating conducive environment for adopting modern technologies from national and abroad, government or non governmental organizations should establish financial institution that tailored to micro and small enterprises. Creating strong relationship with suppliers, vocational colleges and other institutions is indispensable in curbing shortage of raw materials supply and skill problem.

Introduction
Ethiopia is one of the poorest countries in the world. Based on the national poverty line of the year 1999, 44 percent of the population is absolutely poor (MOFED, 2002). This poverty affects both urban and rural parts of the country. To reduce the poverty and bring urban development, the government initiates urban development policy. In order to make urban development accelerated, equitable and also sustainable in which the great majority will benefit, focus should be made on expansion of micro and small businesses that would create job opportunities for the low income group of the society (Urban development policy, March 2005).

There are many constraints that inhibit the performance of small and medium enterprises. First, there is a widespread consensus that lack of access to finance is the leading constraint for small and medium enterprises. Although clearly linked to other problem areas such as: lack of access to credit, lack of information about business opportunities, lack of physical and institutional infrastructure, lack of business management skills, lack of incentives, problem of packaging and marketing products, difficulty in acquiring a property are some of the most representative problems discouraging the development process of small enterprises [Tefera, 2004]. Second, in purchasing input individually they incur cost for the raw material as well as transportation. But in case of cluster, firms purchase input collectively in large sum so that reduce cost of purchasing and transportation. Business networks and industry clusters are seen to be a powerful means to overcome the size constraints of micro and small enterprises (MSEs) and succeeding in an ever more competitive market environment.

The clustering approach is designed to make micro and small enterprises more effective instead of working individually. The industrial district or cluster approach emphasizes that firms found geographically and sectorial clustered benefit from external economies and joint actions. The former is gained labor market pooling effect; intermediate input effects, technological spillovers and also access to market (krugman, 1999) joint actions are results of inter-firm cooperation and are manifested in bilateral or multilateral relations. Humphrey and schnimitz (1995) state that there are two types of joint action namely individual firms cooperating (e.g., sharing equipment for developing a new product or groups of firms joining forces in business associations, producer consortia and the like). In Mekelle there is metal and wood work clustering situated in northern part of the city. In order to achieve for the cluster progress, identifying the success variables and addressing the problems facing the cluster is indispensable.

Problem Statement
Despite the efforts made by the trade and industry and United Nations industrial development organization (UNIDO) to establish and strengthen clusters, the impacts are not yet assessed regarding its performance. This study assesses the performance of enterprises after joining the cluster. The study also assesses the role of
clustering in micro and small enterprises development. In Mekelle there is wood and metal work cluster established by the help of trade and industry bureau of the region and agent of United Nations industrial development organization (UNIDO) in Mekelle.

Clusters are formed in order to make enterprises performance more effective and efficient because clusters are assumed to help enterprises in knowledge and technology transfer, easy to get training and other support from government and non government organizations, economies of scale in input purchasing and attraction of customers due to more alternative products in one place. Micro and small enterprises in Mekelle city were suffering with lack of finance, low level of skill, market problem and not creating forward and backward linkage. Is establishing cluster really benefit enterprises to exhibit better performance than before by addressing the above mentioned problems?

Research Objectives

General objectives
This study examines the nature and performance of wood and metal work clustering in mekelle city in order to be strong enough to compete with other similar enterprises by addressing their problems.

Specific objectives
a) To examine the nature of metal and wood work clustering in mekelle
b) To assess their sales, assets, number of employees, number of customers, input usage, competition, and number of products, infrastructure, and network before and after participation in cluster
c) To identify the main variables which affect their performance (innovation, technology, forward and back ward linkage, subcontracting, problems of cluster, training and raw materials.
d) To explore the role of cluster in MSEs development

Research Questions
a) What are the levels of sales and assets of enterprises before and after participation in cluster?
b) What is the technical level of education of enterprise owners?
c) Is there a change in number of operators, customers, input usage and number of products of enterprises after joining cluster?
d) Is there sufficient training given to enterprises operators and their level of expenditure after participation in cluster?
e) What looks like situations of innovation, technology, infrastructure, forward and back ward linkage, subcontracting, problems in cluster?
f) What is the main problem of enterprises in competition and expansion?
g) What is the benefit of establishing cluster to MSEs development?

Hypothesis
a) Monthly mean sales after participating in cluster is greater than before
b) There is a significant difference in the value of assets of enterprises after participating in cluster

c) Research Relevance
a) Assessing the performance of metal and wood work cluster in Mekelle is very crucial because no similar study has been conducted in this area before, so that the study will serve as a spring board for future studies.
b) The study also serves as an input for local government whether to enhance cluster program in order to develop MSE or not.
c) MSE owners or any other interested stakeholders /actors who in one or another are engaged in cluster development will get knowledge about its performance.

Scope Of The Research
The study assessed the nature and performance of metal and wood work cluster and its implications for micro and small business development in Mekelle city. The variables analyzed were sales, asset, number of employees, number of customers, input usage, innovation, technology, competition, networks, subcontracting, number of products, expansion, problems of cluster, linkages, infrastructure and role of cluster on MSEs development.

Literature Review
Theories
Clusters are defined as geographically proximate groups of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities (Porter, 1998). Clustering refers to geographically proximate producers, suppliers, buyers, and other actors that develop and intensify collaboration with mutually beneficial effects.

The spatial proximity of a group of firms specialized in making the same or a similar product does bring benefits. More importantly, it is a major factor facilitating the division of labor among specialized producers, the emergence of suppliers, buyers and institutions aimed at providing specific services, the circulation of information about technology, the market and so on. The density, quality and type of these linkages are crucial to explaining the real economic advantages of clustering.
Firms due to different forces come close to each other so as to drive benefits. A cluster of micro and small enterprises can enhance their competitiveness against external economies. External economies means cost savings due to the general development of an industry.

(Marshall, 1920). Seitousky (1954), tried to explain external economies in two ways. The first is drive from the general equilibrium theory which deals with pare to optimality in competitive market. The second appears in theories about industrialization in developing countries.

From learning point of view, two factors can be identified in order to understand better how inter-firm cooperation facilitates growth in clusters. First strategic cooperation among clustered firms facilitates the effective processing of novel business information, thereby enhancing innovation. Secondly, a change in the perception of the cost and benefits of cooperation can induce and increase in cooperative links between producers and traders. The latter a change in perception is a necessary condition for the former-increased inter firm cooperation and innovation.

Firms due to different forces close together each other so as to drive benefit. A cluster of micro and small enterprises can enable to enhance competitiveness from external economies. As Marshall 1920 stated external economies means cost savings due to the general development of an industry. (Seitousky, 1954) tried to explain external economies in two ways. The first is drive from the general equilibrium theory which deals with pare to optimality in competitive market. The second appears in theories about industrialization in developing countries.

McCoromic 1999, stated that cluster firms achieve a growth potential arising from external economies. Three main types of external economies in enterprise clusters: Labor market pooling, intermediate input effects, and technological spill-over. Labor market pooling, refers to the concentration of specialized skill that then develops within the manufacturing clusters. Intermediate input effects are externalities associated with the emergence of specialized suppliers of input and services while technological spill over involve the diffusion of know-how and ideas, Market access also added to the three forms of external economies. (Tegegne, 2005)

The literature is saturated with views on geographic proximity, or clustering of industries, companies and institutions (Asheim, 2001). The geographic scope of clusters can vary from a single city, state or region to a network of companies across state borders or even country borders. There are various clustering forms that may ensue to optimize competitive advantage. Clustering can be formal or informal, in the public or private sector; horizontal or vertical; physical; and even sometimes virtual. In horizontal clustering companies within the same industry sector are co-located in a particular geographic area and might share an industrial or technological base, operate within a common market and a use a common purchasing and/or distribution channel (Michael, 2001). Vertical networks include horizontal cluster participants as well as supply chain members such as suppliers, consumers and related services (Boekholt, 1997). Diagonal clustering refers to the concentration of complementary or symbiotic activities, whereby each firm adds value to the other. There are of course many other cluster dimensions that could be examined, e.g., density elements, breadth and depth of a cluster, industry activities, cluster governance, to name but a few, which fall outside the discussion scope of this paper.

As industry clusters become more accepted, their definition, boundaries and composition become more complex, which has led some cluster researchers, e.g., Rosenfeld (1997, 2001, 2003), to focus on clustering activities rather than on clusters as such. This paper focuses on regional SME clustering activities with an emphasis on regional relationships and local network learning. The cluster definition adopted for this paper is a geographic co-location of activities that are linked horizontally, vertically or diagonally along the value chain. This co-location serves as an attractant to new companies wishing to access intelligent services and goods (McKinsey and Co, 2000) and facilitates knowledge transfer, either formally or through spillovers. Learning and knowledge creation among cluster participants can improve cluster efficiency and effectiveness, and may act as a spur to innovation. As the cluster gains an identity it becomes an attractant to new entrants, e.g., suppliers, buyers and institutions, and creates major external economies for cluster participants. With the exception of virtual clustering, where geographic proximity is not necessarily applicable, much of the cluster literature emphasizes the importance of local networks and local/regional relationships for competitive advantage (Taylor, 2005).

Clustering is partly determined by industry. McKinsey and Co (2000) suggest that intelligent capital intensifies with geographic proximity. Industry type influences knowledge dynamics through the impact on intelligent capital, specialized labor, ‘industry’ knowledge and customized product. Whilst both industry and geography are necessary elements, neither is sufficient on its own; one factor might dominate or, each factor might operate effectively only in the presence of the other (McRae-Williams et al., 2005). In this paper it is suggested that industry plays a key role as knowledge is embedded within industry.

Clustering is also partly determined by knowledge diffusion, which relies on two critical factors: (1) geographic proximity and (2) social structure (Enright 2001). Rosen-
networks has proven to be a central driver for clustering. The need for access to localized explicit and tacit knowledge contributes factors for small business clustering, the advanced business services/production are clearly major ties such as R&D, access to a global client base and ad-
tensity of social infrastructure and firm interaction, fir m-
(2005) posit that clustering simulates large firm beha v-
and intelligent capital. Taylor and McRae -Williams
MSEs are limited in their access to specialized resources able to do so because they have economies of scale.
eral, horizontal and vertical scope of a cluster. They are
planation is that large firms internalize much of the lat-
elment of its knowledge base. Porter actually suggests that
there is a gap in the cluster literature around social stru c-
tion of its knowledge base. Porter actually suggests that
knowledge revolution and increasing global competition
rica would not be successful due to challenges of the
ance, e.g., when small firms are not in a position to intern-
ze of scale, they cluster to access resources, to reduce costs, to compete
with larger firms, and to innovate. In other words, by
etworking and sharing knowledge, small firms are able
to compete for and access specialized resources and informa-
systems as well as internalize competencies and assets that typically are internalized by large firms with economies of scale (Tayler & McRae-Williams, 2005). Clustering hence provides MSEs benefits that would be unavailable or be available at a greater cost to non-clustering members. While value-added and activities such as R&D, access to a global client base and advanced business services/production are clearly major contributing factors for small business clustering, the need for access to localized explicit and tacit knowledge networks has proven to be a central driver for clustering (Keeble, 2000).

Empirical Evidence
Douglas 2006 indicated that the growth and sustainability of cluster in the long run will, to a large extent, depend on how they can cope with challenges. If they are successful, they could be expanded and scaled up – otherwise, their future may be uncertain. Clusters in Africa would not be successful due to challenges of the knowledge revolution and increasing global competition as a result of firms in the clusters are small and, in general, lack of access to capital, skills, and technologies; for the most part, they demonstrate limited innovation. The other reason is lack of a critical mass of skills and talent, to sustain competitiveness; firms require having more talented technicians and engineers, who currently are not available in most clusters.

Teegagne, 2006 indicated that leather, leather products technology institute is supposed to act as engine of development in the sector and provides training in technical managerial and marketing. In the case study mentioned that some of them have already received short term training in different fields such as design, women shoe making etc. Douglas 2006 stated that on the job training, on site training and expert contracting are also available in most clusters, such as Nnewi and Kamukunji, have higher technology intensity than clusters based on natural resources or assembly. Training organized or provided by public institutions is also available in most clusters (Douglas, 2006).

One of the bottlenecks of micro and small enterprises is capital. Financial institutions are not initiated to lend micro and small enterprises as they couldn’t provide collateral. The first form of finance considered is bank debit. One of the main problems affecting enterprise financing in transition economies, is the persistence of non-economic practices in credit allocation, which depend on delays in the transformation of the banking system (Sverrisson, 2000).

There is ample evidence that knowledge spillovers cause firm clustering (Dumais, 2001). There is also evidence that knowledge spillovers are more important for industries with small, competitive firms. A recent study compared two clusters of the electronics industry, California’s Silicon Valley and Route 128 near Boston (. Knowledge spillovers are more important in Silicon Valley because its network of specialized companies generates an atmosphere of collaboration, experimentation, and shared knowledge. In contrast, the firms in the route-128 cluster are less interdependent so there are fewer knowledge spillovers (Saxenian, 1994).

Knowledge and technology are after acquired through in formal learning in the cluster. Technicians in the cluster share mutual. This trust facilitates technological spillover and learning process. The transfer of knowledge and technology can take place in different forms such as through forms factory workers who, after being laid off, seek self employment in the cluster. Other sources of knowledge and technology transfer are workers from large companies who come to work in the cluster during their free time, especially during weekends, or run business parallel to their jobs (Douglas 2006).

The Network
The network is closely related to the industrial district, and is argued by some to be type of cluster. Networks have been defined as a specific form of relationship be-
tween economic actors which are neither markets nor hierarchies but are based on mutual dependence, trust and co-operation (Malecki and Tootle, 1997). They are not necessarily geographically concentrated, but some authors argue that they also work best when localized (Cooke and Morgan, 1994s and motivation that cannot be duplicated by global partnering (Porter, 1998).

Creative people who travel to meetings, workshops, and shows build even more extensive networks and contacts. But it is the regional networks that really sustain the cluster (regional technology strategies, inc. 2003).

The associative structure of the cluster is more apt to be along shared interests within the cluster. Just as the social capital of many high tech clusters is not association among companies but association among engineers, or human resource managers, or purchasing agents; symphonies, weavers, potters, and web designers have their own networks and organizations. They associate for marketing and promotion, learning, cost sharing, and accessing services. Facilitating relationships, a wide range of non-profit associations that serve various interests represent the creative enterprise cluster. In the arts sector in particular, nonprofits provide both a social infrastructure and source of services. Furthermore, these associations are important sources of employment and income, and contribute to the sector’s productive capacity. x A study in the mid-1990s of non-profit arts organizations in the U.S. found that they employed 1.3 million people and had expenditures of $36.8 billion that supported another 0.9 million full-time employees. An economic study of this sector conducted in 1997 for the Governor of Montana confirmed this impact.

Linkages
In a ‘cluster’ view of the world, competitive advantage builds from the linkages between activities. Strengthening the linkage improves the competitive advantage of both ends so that, for example, product development between a semiconductor design firm and a mobile telephone manufacturer enhances the global reputation and export prospects of the former, and the cost and capability of the latter’s products. An objective data-oriented approach to inter-industry relationships is difficult, because there is not a great deal of data on linkages.

A linkage view of clusters is difficult to summarize, simply because there are so many potential linkages. Using the limited information that is available, we have confirmed some of the common-sense clustering effects we might expect to find, but we have also been able to gauge the strength of those effects - and thus the strength of any virtuous - or vicious - circle whereby one industry can pull its other cluster members up or down by good or bad performance.

Technology And Innovation
Innovation lies at the core of this cluster and represents its strongest competitive advantage. Technology and the creative arts are increasingly intertwined through computer based design, drafting, and graphic arts programs; filming, digital photography, art, and music; optics and imaging; and web-based marketing. Firms with products that incorporate art into products and creative content into services also use a variety of industrial and information technologies to meet market demand. Proximity to the developers and producers of the technologies is perhaps less important than it is in embryonic or mature clusters, but nonetheless it is an advantage. Access to the experts among companies in the supply chains who keep abreast of new market technologies suffices and is an adequate substitute for most of the enterprises and entrepreneurs in this cluster.

Despite the use of technology in some parts of the cluster, however, businesses in this cluster are not typically associated with highly advanced technology. The technology of the New Media industry, for example, is assumed to rest in its delivery, not in its content. The technologies associated with handicrafts are often developed by an individual and shared informally.

Skills
The cluster relies heavily on people with creative minds and highly developed skills. Many of the creative skills and interests of Montanans are developed at an early age, as a result of a supportive parent, teacher, or friend. Children are influenced by how their schools teach and reward creativity. Although the Department of Public Instruction has no positions for the arts, the subject does have its supporters. Schools are required to offer the fine arts to meet state accreditation standards. During the elementary school years there are no specific time requirements.

Even though formal credentials may be less important to success in this cluster than talent, experience, and demonstrated abilities, many people still depend on higher education to find out if they have the talent they need to succeed, to hone their skills or, in those parts of the cluster where it matters, to earn the credentials.

Methodology
Research Strategy
In the study both qualitative and quantitative methods were employed. Qualitative research covers several terms of inquiry that help to understand and explain the meanings of social phenomena with as little disruption of the natural setting as possible. Together with interpretive research, the other terms that are often used interchangeably are naturalistic inquiry, field study, observation, inductive research, case study and ethnography.
Nature Of Data And Methods Of Collection

Data were collected from both primary and secondary data sources. The primary data was collected using structured questionnaire. Important variables on nature and performance of aspects of the cluster were already included in the questionnaire. Enumerators were selected from high school students. The enumerators were given intensive training in order to assist respondents while filling the questionnaire and detailed contents in the questionnaire. Close and intensive supervision made in the data collection process to minimize errors that may occur during data collection.

The questionnaire designed to obtain information on the following aspects of enterprises. Characteristics of sample enterprises’ owners such as sex, educational background, sales, infrastructure, technology/machinery, expenditure, asset, number of employees, number of customers and input usage. In addition, to enhance the reliability of data collected during the survey and to supplement the missing information from documents, bulletins of UNIDO and data from reports (quarter, semi-annual, and annual) of the bureau of trade, industry and transportation (BOTIT) were used.

Structured questionnaire was taken as instrument to gather information at enterprise level. The questionnaire first prepared in English and then translated into Tigrigna latter on. For pretest the Tigrigna version distributed to five respondents in the cluster. Based on the response it was possible to ratify its clarity, acceptability, flow etc and became easy to make modifications.

Method Of Data Analysis

The data gathered from primary and secondary sources were analyzed using different statistical techniques. Enterprises survey questionnaires were tallied and analyzed by computer using the statistical package for social science (SPSS) software in order to examine the performance of cluster. In order to attain the stated objectives of the study, descriptive statistics were used to test whether participation in cluster brought better performance or not. Moreover, inferential statistics of Wilcoxon signed Rank Test (WSRT), paired sample T-test were employed to compare variation in key variables before and after the participation in cluster and the results of analysis were presented in the form of tables, graphs, and in description.

Results Presentation, Analysis And Discussion

Poverty is often manifested in insufficient household income. To reduce poverty in urban areas developing and promoting MSEs was taken as one strategy in many countries including Ethiopia. MSEs in our country faced many problems in their operation and trying to tackle collectively by forming cluster is vital. Mekelle metal and wood work cluster is one of them and this study identified its nature and performance considering sales, asset, number of employees, technology, skill, linkage with other organizations, competition, subcontracting, network formulation etc and the results were discussed below.

Demographic features

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>42</td>
<td>-</td>
</tr>
<tr>
<td>Female</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td><strong>Mean age</strong></td>
<td>37</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>30</td>
<td>71</td>
</tr>
<tr>
<td>Not married</td>
<td>12</td>
<td>29</td>
</tr>
</tbody>
</table>

The demographic characteristic of the owners show that all the sample wood and metal work enterprises were owned by males. The average age of enterprise owners was 37 and 30(71%) of the respondents were married.
4.2 Establishment of the cluster
Clusters come in many forms; each has a unique development trajectory and set of organizational principles; each faces a specific challenge. Two broad categories can be defined, however. In the first are clusters that originate as spontaneous agglomerations of enterprises and other related actors. The second includes clusters induced by public policies, or “constructed”, these range from “technopoles” and industrial parks to incubators and export processing zones (Zhihua, 2006).

The mekelle metal and wood work clusters was emerged through the government support. The government initiated the idea and much effort was exerted to convince enterprises working in different areas of the city to join cluster. Owners of enterprises had not have knowledge about cluster and they were suspicious each other to cooperate. Building trust was the main problem facing the government in establishing cluster and latter on reduced the resistance. All respondents confirmed that the cluster established by government initiative and enterprises willingness after many discussions. The main reasons they explained that instigated them to join cluster were: means of cooperation among enterprises to share experience, exchange information, to have power of bargaining and establish bilateral relationship with governmental and non governmental organizations.

4.3 Type of enterprises
Enterprises that engaged in cluster were metal work, wood work and both. Respondents were asked the type of enterprises they were engaged in and considering the skill they had, potential market and other variables owners chosen in what type of enterprises they should have to engage and 22(52%) of respondents indicated that they were engaged in metal work, while 12(29%) of respondents replied that they had both metal and wood work in an enterprise and the remaining 8(19) of respondents reported that they engaged in wood work enterprises. From the response most of owners were engaged in metal work and this was due to the higher demand of metal products in market.

4.4 Number of employees in the cluster
One of the advantages of micro and small scale enterprises is employment creation as they are easy to start and require relatively less skill. In order to observe the performance of cluster considering size of employees working in the enterprises before and after participation in cluster was one indicator. It is normal to increase number of workers when enterprises performance improved and decreased in situation of bankruptcy. In an enterprise the number of workers could be determined by the work load, but on average enterprises maintain operators.

Accordingly, enterprises were asked whether the number of workers increased, decreased or remain the same after joining cluster. As in table 4.2 depicted 25(60%) of respondents indicated that the number of employees increased after joining cluster. This was due to improvement in performance and to satisfy the demand forced them to increase workers the rest 17(40%) of respondents replied that the number of workers in an enterprises remain constant before and after joining cluster. Enterprises normally increase their employees if there is progress and the increment of operators after joining cluster was indicator of better performance. Having adequate, motivated and qualified workers would decide the performance of enterprises and could enable enterprises to produce on time.

**Level of Education**
Since most producers work as owner operator, their educational qualification could be a measure of their entrepreneurial talent (Tegegne 2006). Those owners having better educational background are expected to have better skill of managing enterprises strategically compared with those illiterate.

![Fig 1 Level of education of owners](image-url)
Figure 1 shows that 0% of the respondents have no educational background, while 4(7%) and 29(20%) of respondents were completed primary and junior education respectively.

Secondary school completed and diploma holders were 19(48%) and 8(18%) respectively, those who have degree and above level of education were 2(7%). All respondents were literate; this could be due to the fact that metal and wood work requires a sort of measurement, design and specifications. The management of enterprises was promising as owners of enterprises were literate, but the levels of education that most owners acquired were low and their technical knowledge was also low, so that they could encounter difficulties in leading enterprises strategically and innovatively. Entrepreneurs’ education levels have a positive correlation to their performance. Education increases the possibility of knowledge based production and innovation, and the ability to adapt to changes in the business environment (Douglas 2006).

Input Usage
Enterprises input usage depends on its performance, if there is sustainable market for their product and exhibit progress they normally increase input usage to entertain demand and vice versa. Respondents were asked whether their input usage increased, decreased or remain constant after joining cluster.

Table 4.3 Input usages

<table>
<thead>
<tr>
<th>Input usage from year to year</th>
<th>Number of respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased</td>
<td>24</td>
<td>57</td>
</tr>
<tr>
<td>Decreased</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>No change</td>
<td>14</td>
<td>33</td>
</tr>
</tbody>
</table>

Based on the above data 24(57%) of respondents stated that the input usage from year to year increased as a result of increment in sales. About 4(10%) of respondents indicated that their input usage decreased from year to year. The most common reason for the decreased of input from year to year was unable to compete in the market. However, 14 (33%) of respondents reported that they experienced no change in input usage. Most enterprises reported that their input usage increased after joining cluster and as a result the quantity of products produced also increased. From the increment of input usage and production it is possible to indicate better performance of enterprises after joining cluster.

Number of customers in the cluster
The number of customers in an enterprise normally increases if there is improvement in quality of products produced, good customer handling and fair price etc and vice versa. Enterprises considering the above and other variables that customers interested up on, should try to improve and satisfy them. So that the number of customers increases and as a result enterprises would be benefited.

Table 4.4 The number of customers after joining cluster

<table>
<thead>
<tr>
<th>The number of customers after joining cluster</th>
<th>Respondents response on the number of their customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased</td>
<td>Decreased</td>
</tr>
<tr>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>26%</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
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</tbody>
</table>

To examine the number of customers of enterprises before and after joining cluster they were asked a question whether their customers increased, decreased and remain the same. Accordingly, 11 (26%) of respondents indicated that the number of customers increased after joining cluster, this is due to the effort exerted to entertain comments and interests of customers, product quality improvement from time to time and some of them also mentioned the convenience of marketing place to customers and 28(67%) of respondents replied that the number of customers were the same before and after joining cluster the rest 3(7%) of respondents also asserted that the number of customers decreased after joining cluster and the main reason for the decreased was unable to compete with other enterprise that was cost wise and skill. Those enterprises which their customers decreased after joining cluster were in need of finance and additional training so they can survive in the sector.

The number of customers of most enterprises remain the same before and after joining cluster, this was due to lack of skill in customer handling and not making sales promotion to attract customers from the society and depending to sell to government organizations.

Market Linkage
Market was one of the serious problems enterprises faced, in order to curb this problem the regional government made decision to give different projects that were below 500000 birr with out bid. This was meant to save enterprises from death. Enterprises were asked whether they benefited from the market linkage activities and the results were compiled in the following table.
Table 4.5 market linkage activities

<table>
<thead>
<tr>
<th>Are you benefited from market linkage activities</th>
<th>Enterprises response to market linkage</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>No</td>
</tr>
<tr>
<td>26</td>
<td>16</td>
</tr>
</tbody>
</table>

In table 4.5, 26 (62%) of respondents indicated that they benefited from the market linkage activities and 16 (38%) of respondents asserted that they did not benefit from activities of market linkage.

While the researcher undertaking the study agreement made between enterprises in the cluster and Tigre bureau of rural and agricultural development coordinated by UNIDO agent in Mekelle to produce agricultural products. Guna trading house took the responsibility to provide them raw materials and enterprises would pay back after receiving from bureau of rural and agricultural development. The researcher asked them their view about the market linkage activities in informal discussion made with owners and they stated that the problems of market, raw material and finance were some of the critical problems encountered by them. The agreement made now the above mentioned problems would be solved for the particular task. They claimed that the choice of joining and continuing in cluster is due to such and other benefits. The regional agriculture and natural resources bureau has been developing new schemes to promote metal and wood works by ordering 80000 beehives, 20000 treadle pumps, 21320 drip irrigation system, 10000 pressurized treadle pumps through fixed price having 10% profit margin to all metal and wood workshops in the region while more than 60% of the order was produced by the Mekelle cluster. (Tigabu, 2006)

Those 62% enterprises benefited by making contract with government to accomplish tasks in the market linkage program. But after government tasks started to decrease, enterprises were suffering market problem for their product. So that enterprises should not depend only on government tasks, rather device mechanism to penetrate market and attract customers from the society.

**Number of products Produced after joining cluster**

Enterprises due to the different trainings received and diverse demand from the society, would increase to produce the number of products.

Table 4.6 Number of products

<table>
<thead>
<tr>
<th>Increase</th>
<th>Decreased</th>
<th>No change</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>-</td>
<td>10</td>
<td>42</td>
</tr>
</tbody>
</table>

The number of products produced in your enterprises after joining cluster.

After joining cluster enterprise owners receive different training and so that asked whether the number of products produced in enterprises increased, decreased or remain the same and as a result 32 (76%) of respondents asserted that the number of products produced in their enterprise increased after joining cluster, 10 (24%) of respondents also replied that there was no change in number of products produced in their enterprises before and after joining cluster. As respondents tried to say the type of products produced by enterprises before joining cluster were house and office furniture’s and doors, windows etc. But after joining cluster in addition to the above mentioned products they started to produce like beehive, treadle pumps and other agricultural products although they are seasonal. From the informal discussion made the researcher observed that their readiness to produce new products. If there is demand of new product they could draw their resource and produce to tap (use) the opportunity.

**Expansion**

The metal and wood work enterprises faced them stiff competition in their operation as the number of enterprises increased from time to time and different tasks given to enterprises from government started to decrease, but some enterprises win the fierce competition and brought remarkable progress. Those successful enterprises exhibited better performance compare to other enterprises. Such enterprises developed rapidly in terms of skill improvement, technological upgrading and successful penetration of market.

The quality of products of the successful enterprises increase and as a result the demand for products also rises. To satisfy the demand enterprises would made expansion like increasing the number of their skilled labor, purchasing of machineries and equipments, receiving training and introducing technology etc. To undertake the above mentioned activities enterprises require finance.
Expansion of an enterprise was an indicator of well performing. Unless there is bright future (potential for growth) or better activities carried out in an enterprises there would not be intention of expansion .The sample enterprises asked whether they had intention for expansion and accordingly 27(64%) of respondents indicated that in the near future they intended to expand their enterprise, out of those 21(78%) assured their financial strength for expansion but the main problem raised by them that inhibits from expansion were lack of their own permanent premises and 15(36 %) responded that they did not have intension of expansion in the near future. Out of the total having intention to expand 6(22 %) replied that they did not have financial capacity but if they could get loan from financial institutions and working premises from municipality they were ready to make expansion.

From the field survey 64% of enterprises indicated their intention for expansion and this show there was improvement in performance of enterprises or existence of bright future after joining cluster.

Networks

Networks can be defined as a group of firms that work together in production and/or marketing. Working together helps to overcome specific problems such as access to expensive technology or market information. Networks are not necessary geographically concentrated and often do not emerge spontaneously, and consequently many MSEs operate isolated from each other. Business network is an association of producers that meet on a regular basis to discuss prices of their products at various markets in the regions. A business network can also consist of products that share equipment or skilled workers as a joint strategy to reduce production costs.

The strength of clusters lies in the quantity and quality of the interfirm learning collaboration among members. Collaboration generates positive externalities that reduce average transaction costs- a benefit that individual enterprises may not be able to generate by themselves. Lack of cohesiveness, by contrast, can limit the capacity of MSEs to defend their collective interests and effectiveness. Interfirm links, whether horizontal or vertical, determine overall cluster performance and can ultimately improve competitiveness on a large scale. Now a day establishing and strengthening of networks between SMEs have given due attention as a significant ingredient for growth and competition on the global market. With out cooperation, enterprises can not survive in isolation in this world. Hence interrelations and cooperation among each other, which are meant to maintain economy of scale and reducing costs of production through purchasing of inputs, take market opportunities of large production quantities. There is some inter linkages among operators of best friends in purchasing raw materials, working together specially in new product development. In the wood and metal work cluster there are 12 networks having 8-10 enterprises each. In the network owners of enterprises meet regularly to discuss about their problems and opportunities, as well as to exchange information and share experience. In the interview respondents indicated about the importance of establishing network, they believe that network helped them to strengthen cooperation among enterprises.

<table>
<thead>
<tr>
<th>Table 4.7 Tendency of enterprise for expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you intend to expand your enterprises in the near future</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>27</td>
</tr>
</tbody>
</table>

| If yes, do you have financial capacity | Yes | No | Total |
|---------------------------------------|
| 21 | 6 | 27 |

Networks were established to exchange information, share experience and seek solution for their problem. Considering this enterprises were asked whether they exchange information and technology using the network. As shown in table 4.8, 42(100%) of respondents indicated that they exchange information but the 4 (9.5%) of respondents replied they believed that the exchange of information and sharing experience using the network was not a such important and complain discussions kill their valuable time. In the network they discuss about training needs, price of raw materials, relation with institutions and others. But not yet developed to exchange technology.

One strong point acquired by enterprises was the belief of the importance of networks, although it was not strengthen to benefit them at the required level. For example, through their network discussions they convince the city administration about their infrastructural problems and as a result the city administration pledged them to allocate capital budget for the next Ethiopian fiscal year. But networks were expected to accomplished more, establishing backward and forward linkages, introducing modern technologies, and creating strong relationship with governmental and non governmental organizations etc would be tasks of networks. Those tasks were basic so as to improve performance of enterprises and networks had significant role in facilitating them. So that
networks should be strengthened and encouraged to shoulder their responsibilities.

Inter-firm cooperation also gives rise to a collective learning space, where ideas are exchanged and developed, and knowledge shared in a collective attempt to improve product quality, upgrade technology and move to more profitable market segments. Lastly, networking among enterprises, providers of business services (e.g. training institutions, technology centers, etc.) and local policy makers can help to shape a shared local development vision and give strength to collective actions to enhance the competitiveness of SMEs (Ceglie and Dini, 1999). In the wood and metal work cluster, the established networks were not strong but started to exchange in formations although the cooperation not reached to the extent of sharing technologies among enterprises in the network. The other advantage of their network was, they brought problems beyond their capacity to UNIDO agent in Mekelle and BOTIT for discussions to seek solutions. One basic thing UNIDO agent and BOTIT have to focus on was building trust among enterprises in the network, so that they would cooperate fully and brought significant change.

**Major problems in cluster**

The metal and wood work cluster has faced different problems and identifying and then trying to curbs the problem with all concerned bodies is indispensable. Agent of UNIDO in Mekelle tried to identify the main problems of the cluster. During the survey assessment on the diagnostic study of the cluster we asked MSMEs of metal and wood work enterprises operators to identify their current top three business problems. They identified quite diverse type of problems out of which lack of finance (21) was identified as the first and major problem of the cluster. Lack of sufficient market for their product (12) was identified as the second problem. Problem of managerial and skill know-how was indicated as third problem. Based on this their response compiled in this table.

<table>
<thead>
<tr>
<th>Problems</th>
<th>Enterprises choose their priority problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to loan</td>
<td>27</td>
</tr>
<tr>
<td>Premises</td>
<td>11</td>
</tr>
<tr>
<td>Market</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
</tr>
</tbody>
</table>

Respondents asked to indicate their prior problem that had critical negative effect on their performance. Based on this 11(26%) of respondents indicated that lack of their own working place (premises) was the most critical problem encountered them. All 11 of respondents work in rented houses, they claimed that the size of working places were very small, not convenient for wood and metal work enterprises as most of them were residential areas, and not stable as the owner could displace them at any time. Considering the above mentioned and other problems of working place took the first serious problem by 11 respondents and needs attention in order to improve performance of enterprises. In the diagnostic study made by UNIDO agent in Mekelle, the major problems of not having their own premises were:

a) Continuous increments on workshop rent price (e.g. with in two years period increased from ETB 350 to ETB 1000).

b) They forced to use a single phase electric power due to high installation cost and non-transferring of electric power from one workshop to other premises. On the other hand they could not utilize their machines at full capacity by using a single phase of electric power.

c) Located out side the main roads and market areas.

d) No location advantage (Tsegabu, 2006)

While 27(64%) of respondents indicated that the most serious problem hampering their progress was lack of access to finance. Many enterprises complain that they lack access to capital. The government and private banks require huge collateral that enterprises are lacking. The other option is from micro financial institutions. In our city the only micro financial institution is Dedebit credit and saving institution (DECSI). DECSI give loan through group collateral but the problem is the amount of money given through group collateral is very minimal, that is not more than 5000 and the remaining 4(10%) of respondents replied that more than any thing market was the priority problem. Those who advocate to this notion believed that due to stiff competition and lack of skill to search market, they were suffering a lot. They accustomed to take bulk works from government and when governments’ works started to decrease their market also decreased as they did not develop skill to provide products to customers. In the diagnostic study made by UNIDO cluster agent in Mekelle, pointed out that the major issues to market problems of enterprises were: nonexistence of sub-contracting, out sourcing arrangements; low customer handling; lack of marketing skill and know how; stiff competition.

**Training**

A training need is knowledge and/or skill gap between a set of standards of performance for a given task and knowledge or skill capacity of an individual who is assigned to perform task. Precisely, a training need is a condition whereby an employee lacks the knowledge or skill or proper attitude to perform an assigned task satisfactorily. The existing practice on provision of technical
and managerial training by different institutions in the region are not based on training need assessment (not demand rather supply driven) as a result the impact of training not as such helpful for their works. Low level of skill was identified as one of the main problems of cluster. Two pronged strategy to upgrade the skill levels of workers is needed. On one hand, need based training should be developed and concerned institutions should be able to provide the training. On the other hand, firms should be encouraged to internalize the training costs of their workers by introducing non-market intervention such as developing contractual agreements (Tegenge, 2006).

UNIDO coordinates the skill upgrading activities, some of the type of trainings given to enterprise operators were metal cutting, welding, and drawing in collaboration with Mesfin industrial engineering (MIE). But the training was all short term training and focuses on particular skill. Respondents in the interview clearly stated that they need training on designing, and product specification formulation. Agent of UNIDO in mekelle realized the designing and products specification formulation need through the diagnostic study and preparations for the training are being carried out in collaboration with BOTIT, technical education and vocational training (TVET) and MIE. The other thing that enterprises need was marketing. Unless there is market for products enterprises would not exist. Acquiring marketing skill could be crucial in order to win the fierce competition among enterprises. Some of the trainings given listed in the following table and the detail indicated in Annex II.

**Infrastructure**

The role of sound infrastructure in metal and wood work enterprises operation is critical, electric power was not mainly used for lighting purposes only instead enterprises use to operate their machineries. Without proper communication their activities could be hampered, telephone for example was very important as supposed to remove the constraints to information and facilitate networking and partnership. The vitality of water service is also obvious. Proper road to enterprises was also another important infrastructure; in order to make available raw materials and transport products, at the same time suitable road is indispensable for customers in order to purchase products. Accordingly, enterprises were asked to mention their prior infrastructure problem that had critical effect on their performance.

![Infrastructural problems](image)

**Fig.2 Infrastructural problems**

As indicated in the diagram, enterprises stated their main infrastructural problem that has to be curbed first, based on this 20(48%) of respondents indicated that water supply as their main problem and this was obvious that there was serious shortage of water even for drinking and 14(33%) of respondents replied that inappropriate road was their main problem as the road was not suitable to use vehicle and customers suffer specially at summer, the rest 8(19%) of respondents reported that about electricity problem, there was power interruptions that constraint their operation and another serious problem was installation of 3 phase electricity beyond their capacity because of higher cost requirement and even those who can afford could not installed as they were operate in rented premises, not possible to transfer it to other place easily. From the response of enterprises it was clear that they had serious infrastructural problems and those problems had negative effect on their performance. So that enterprises should exert effort to solve their infrastructural problems in collaboration with governmental and non governmental organizations. Through the discussions made among enterprises using their networks and all concerned bodies the problems of infrastructure were identified and Mekelle city administration give due attention and promised to allocate capital budget for next year to give solution phase by phase.

**Raw materials**

The major raw materials required for the production of the cluster out put include wood, angle iron, sheet metal, rectangular bar, round pipe, cheep wood, flat bar, pipe, compostato, galvanized iron sheet metal etc. All the required raw materials are imported from abroad such as China, Turkey, Indonesia, and Austria and so on. These raw materials are imported by local traders. It has a long distribution channels, which contributes to the inflation of the raw material price. Operators in the cluster are facing problems related to the raw material supplies especially in a continuous rising of price and in obtaining quality raw material on time.
The sources and market places were designed as local, regional, national and international.

Purchasing of raw materials is the major expense bear by enterprises. Raw materials purchasing would given due attention by enterprises as it is critical to their progress, so they were asked from where they purchase their major raw materials and 37(88%) of respondents indicated that they purchase raw materials from their city. But they expressed that sometimes encountered them shortages of supply of raw materials and the rest 5 (12%) of respondents replied that they purchased raw materials from national market. Procurement of raw materials, almost the major raw materials required for the production of individual producers in the cluster are imported from abroad. Even the existing suppliers of raw material in the town are procured from Addis Ababa sole importers and they are price taker. Some times the sole suppliers of the raw materials making artificial scarce of supply of raw material in the market with this in mind the price of the raw materials are always fluctuating and in many occasions producers are forced to purchase at higher price. In addition to this the quality of raw materials are also not available in the market, its quality became questionable from time to time. All these are affects for the quality of the products and cost of production. Which produced by the cluster by implication they did not become competitors in the market for their product.

In the cluster there was no established forward and backward linkage. So that enterprises purchase raw materials individually and this created problem in their performance because establishing backward linkage (supplier) have many advantages such as the problem of shortage in raw materials faced enterprises would be solved due to reliable supply, cost of purchasing raw materials reduced as cost of purchasing large amount and transportation decreased if they could to purchase collectively. This indicates that 88% of enterprises purchased raw materials from suppliers brought from national and abroad as the major raw materials did not originate in the region. As a result of transferring among different suppliers the price of raw materials increased and enterprises suffer more.

<table>
<thead>
<tr>
<th>Type of linkage</th>
<th>Linkages formed at cluster level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backward linkage</td>
<td>Yes</td>
</tr>
<tr>
<td>Forward linkage</td>
<td>Yes</td>
</tr>
</tbody>
</table>

As in table 4.13 indicates all respondents replied that there was no established backward and forward linkage. Failing to establish linkages in the cluster level have negative impact because having such linkage would enable to increase the quality of products with the help of comments and information of buyers and suppliers, reliable and low cost of raw materials provision. The other benefit was creating regular customers. In the informal discussions made they disclose that the failure to establish backward and forward linkage was at cluster level. But some enterprises individually try to create linkage especially with suppliers and they have an intention to strengthen the linkage.

**Innovation**

Enterprises in order to grow and win the fierce competition in the city, they have to be innovative and use different new technologies. Enterprises should communicate with indigenous and exogenous enterprises to share experience about the methods of doing activities and equipments and machineries. BOTIT established technology demonstration center, one of its aim is technology transfer to enterprises. Establishing the center is very good idea, as it was established to be helpful for enterprises because expected to bring new technologies from different sources and display in the center for any one interested, but the center was not functional due to insufficient and inexperienced personnel hired, serious shortage of budget, not prepared manual how to carry out activities to meet its goals.

Only few enterprise owners tried to visit large metal and wood work enterprises in Addis Ababa to get exposure, they explained in the informal discussion, but most of enterprises did not made such type of experience sharing activities. All respondents asserted that they did not establish relation with similar enterprises abroad through e- mail or other means of communication.
In the discussion the researcher asked them whether they gave due attention to innovations. Owners replied that they give concern to invention but due to less skill, shortage of finance and out dated technology they did not succeed. But they complain that there is no governmental or non governmental bodies motivate innovators. These are the reason for the less innovation prevailed in our city.

Table 4.14 skill acquired

<table>
<thead>
<tr>
<th>Compare skill you and your operators have through training and experience sharing with other similar enterprises</th>
<th>Number of respondents</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Good</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Poor</td>
<td>22</td>
<td>52</td>
</tr>
<tr>
<td>Very poor</td>
<td>16</td>
<td>38</td>
</tr>
</tbody>
</table>

Respondents were asked whether the skilled acquired were very good, good, poor or very poor. None of respondents believe that the skill acquired was very good, while 4(10%) of respondents indicated that the skill acquired were good. The reasons for this good skill were, they engaged for many years in the sector and the training received added with the accumulated experience made them to acquire good skill and 22(52%) of respondents reported that the skill acquired were poor. They had little experience and took training for short period of time; as a result the skill acquired by them was poor the remaining 16(38%) of respondents replied that the skill acquired were very poor. Those respondents were recently engaged to the sector and not taken training. The qualities of products produced and as a result of the skill the amount of sales were used as variables to compare the skill acquire among owners.

Competition

In free market, enterprises faced competition among each other to succeed in the sector. Through providing high quality products, lowering price, good customer handling, making better sales promotion etc enterprises would strive to win the competition.

Accordingly, respondents were asked to mention their main problem in competition. So that 18(42%) of respondents indicated that fixing high price to products was the main problem in competition. This high price to products was due to increment in price of raw materials, high cost of rented premises and skilled labor, while 4(10%) of respondents replied that producing less quality products was the main problem in competition as the skills acquired were low, the quality of products would be less on the other hand 12(29%) of respondents asserted that the none or minimum sales promotion made by their enterprises were the main problems of competition and 6(14%) of respondents also indicated that the increasing cost of skilled labor from time to time was the main reason for the problem in competition and the remaining 2(5%) of respondents said other reasons like not convenient marketing and production place and other reasons were the main problems for competition.
Unless enterprises become smart in the prevailing competition they could not survive, live alone to show good performance. From the above data fixing higher price was mentioned as the main problem of competition by most of enterprises and this was mainly due to high purchasing cost of raw materials, high cost of rent of premises etc. The other main stated problem was not carried out sales promotion, they were weak to introduce their product through different written papers like brochure and they did not even display their product at appropriate place to be easily seen by customers.

**Machinery/Technology**

The efficiency and effectiveness of production would be assured by the existence of technology in enterprise. Technology can be expressed in terms of type of machinery, workshop lay out, methods used and quality control etc. The level of technology possessed by many owners of enterprises in the cluster workshop was backward. Many owners in the cluster workshop make use of local machineries as a result of limited capital. The local made machineries would not durable and suitable for production compare to machineries imported. Due to this the quality of products could be less, and this possessing inappropriate technology was one of the reasons that inhibit enterprises from subcontracting.

Generally, many enterprise operators in the city were using different types of machineries and equipments such as arc welding, work bench, welding stand, drilling machine, sheet metal sheer, combined wood machine, jig saw, bench grinder, circular saw etc. In order to improve the outdated technology they possessed, they have to access to finance for acquisition of modern technology, so that they can improve their performance. Although there is a little bit improvement in technology after joining cluster but remarkable improvement should be brought in technology considering its significance for enterprises performance. To measure their capacity and to give standard for the workshops a census study on 183 individual products (61 metal, 24 wood and 87 metal and wood workshops), 11 metal and wood cooperative associations and 19 scrap material recycling producers was conducted by bureau of Trade, industry and transport in collaboration with Rural technology center in September 2005 and the compiled table, which indicates the number of machines and equipments excluding hand tools in the surveyed enterprises are shown in annex III.

**Government rules and regulations issue**

The government of Ethiopia formulated a strategy to develop MSEs believing that they are very helpful in reducing poverty in urban. Respondents were asked about their knowledge in MSEs strategy.

<table>
<thead>
<tr>
<th>The level of your knowledge on MSE strategy</th>
<th>Good</th>
<th>Poor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
<td>33</td>
<td>42</td>
</tr>
</tbody>
</table>

Accordingly, 9(21%) of respondents reported that the level of knowledge about MSE strategy was good, they tried to have knowledge about the strategy through attending meetings and reading the strategy itself although they did not have detail knowledge and the remaining 33(79%) of respondents indicated that the did not have knowledge about the strategy. But almost all respondents know that developing MSEs is top priority of government and pledged to support them in the strategy. From the discussions made and their own knowledge, they indicated that the strategy itself does not have major problems rather the problem lies in its implementation; as a result MSEs could not develop as expected. The problems encountered them were:

- a) In adequate or lack of support on getting business premises.
- b) Non-availability of alternative credit institutions for MSEs (apart from DECSI)
- c) High bureaucratic requirement especially in governmental tender process.
- d) Low level of BDS support program on the area of subcontracting, provision of demand based training, technology transfer and development etc.

Most enterprises did not know the strategy of MSE and this lead to not know to ask their right to enjoy the supports provided by government.

**Expenditure**

Enterprises have different expenses in running their business. Among the different expenses the major one in the cluster was expenditure to purchase raw materials. Purchasing of raw material and cost of transportation holds a great portion of expense of enterprises in operations. Examining expenditure of enterprises was an indirect indicator of whether an enterprises doing well or not.

### Table 4.17: Average monthly expenditure for raw material

<table>
<thead>
<tr>
<th>Monthly average raw material expenditure</th>
<th>Monthly average raw material expenditure after joining cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decreased</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>50%</td>
</tr>
</tbody>
</table>

According to the field survey, 37(88%) of respondents were indicated that the average monthly expenditure
after joining cluster increased. This was due to good performance resulted in increasing raw material usage and increasing price of raw material and 3(7%) of respondents replied that the expenditure remains the same the rest 2(5 %) of respondents asserted that the expenditure for raw material purchasing decreased after joining cluster. The reason for the decreasing was the volume of raw materials purchased by them decreased as a result of unable to compete in the market.

Table 4.18 Monthly average expenditure for purchasing of raw materials before and after joining cluster.

<table>
<thead>
<tr>
<th>Raw expenditure</th>
<th>N</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before joining</td>
<td>2589</td>
<td>1100</td>
<td>3800</td>
<td></td>
</tr>
<tr>
<td>After joining</td>
<td>2760</td>
<td>1420</td>
<td>4200</td>
<td></td>
</tr>
</tbody>
</table>

Similarly, respondents were also asked about how much money they monthly spend for raw material purchasing. As it can be seen in table 4.18, the mean annual raw material purchasing expenditure before joining cluster was 2589 birr, while after participating in cluster; the mean monthly raw material expenditure is 2760 birr. On the other hand, the minimum and maximum enterprises raw material purchasing expenditure ranges from 1100 to 4200 birr. One can argue that increasing expenditure has a negative connotation towards enterprises activities. This notion is true but expenditure increment whether due to increasing usage of raw materials or increasing price of raw materials, enterprises are affording the expenditure. So that expenditure could be one of the indicators of performance of enterprises.

Although affording the increasing expenditure of enterprises show indirectly their performance, but effort should be made to reduce expenditure. Through the network the main expenditure of enterprises purchasing and transporting of raw materials should be addressed, so that network themselves should purchase from the source suppliers in order to reduce cost of purchasing and cost of transportation.

**Sales**

Cluster program is source of cooperation and experience sharing among enterprises. Many studies indicated that participation in cluster resulted in improvement on enterprises.

From the 379 metal and wood work enterprises filled the questionnaire those 273(72%) enterprises assured that they brought progress in their performance and the rest 106 (28%) of enterprises responded that there was no change in their performance. One of their positive changes was indicated in employment creation so that 49% of enterprises were hired one up to three operators and 57% of them hired more than three operators and the rest 15% created three and above for their family operators (BOTIT census, 2006).

Initial capitals of all enterprises were below 10000 birr but know 56% of them have capital of 10000-50000 birr, 14.5% of the enterprises have 50000-100000 birr and 5% of them accumulate more than 100000 birr capital.

Fig. 3 Situation of capital some metal and wood work enterprises
nal. This indicated that, even though there was tendency of understating their capital, most enterprises exhibited remarkable performance (BOTIT census, 2006). Below in the figure indicated some metal and wood work enterprises capital situation. An enterprises performance can be observed from the point of level of sales.

Table 4.19 frequency distribution of respondents’ monthly sales change

<table>
<thead>
<tr>
<th>Change in the level of sales after joining cluster</th>
<th>De-crease</th>
<th>In-creased</th>
<th>No Change</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respond-ents</td>
<td>4 (9.5%)</td>
<td>26 (62%)</td>
<td>12 (28.5%)</td>
<td>42</td>
</tr>
</tbody>
</table>

As depicted in Table 4.21, respondents were asked whether their monthly sales improved, decreased or remained the same. The response was that about 26 (62%) of respondents had their sales increased due to the training received and market linkage activities etc. About 4(9.5%) of respondents indicated that their monthly sales declined after joining cluster. However, 12(28.5%) of the respondents reported that they experienced no change in their monthly sales.

Table 4.20 Percentage distribution of enterprises' monthly sales before and after joining cluster

<table>
<thead>
<tr>
<th>Sales</th>
<th>N</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly sales before clustering</td>
<td>42</td>
<td>4867.26</td>
<td>250</td>
<td>7750</td>
<td>1309.49</td>
</tr>
<tr>
<td>Monthly sales after clustering</td>
<td>42</td>
<td>5354.76</td>
<td>240</td>
<td>9400</td>
<td>1512.73</td>
</tr>
</tbody>
</table>

Similarly as indicated in Table 4.22 the descriptive analysis shows that the mean monthly sales of respondents before joining in cluster was birr 4867.26. However, after joining cluster the mean monthly sales is birr 5354.76. From Tables 4.19 and 4.20 it is possible to conclude that monthly sales of enterprises increase after joining cluster. To ratify the above results T- test was employed and indicated below.

Table 4.21 Paired sample T- test result of respondents mean monthly sales before and after joining cluster

<table>
<thead>
<tr>
<th>Monthly sales</th>
<th>N</th>
<th>Mean monthly Sales</th>
<th>Std. Diff</th>
<th>Mean Diff</th>
<th>t-value</th>
<th>df</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before joining cluster</td>
<td>42</td>
<td>4867.26</td>
<td>1309.49</td>
<td>487</td>
<td>-4.349</td>
<td>41</td>
<td>0.00</td>
</tr>
<tr>
<td>After joining cluster</td>
<td>42</td>
<td>5354.76</td>
<td>1512.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As indicated in table 4.21 paired sample T- test was employed. The result of T- test confirms that respondents mean sales is higher after joining cluster than it was before. The mean sales of the respondents before joining cluster was 4867 birr, while after joining is 5354 birr. The difference is statistically significant at 95% confidence interval.

The difference in sales of respondents before and after joining cluster was also tested using WSRT. Accordingly, the following null and alternative hypothesis was formulated.

\[ H_0= \text{There is no significant difference in mean monthly sales before and after joining cluster.} \]

\[ H_1= \text{Mean monthly sales after joining cluster is greater than before.} \]

Table 4.22 Wilcoxon sign rank test result of respondents of sales before and after joining cluster

<table>
<thead>
<tr>
<th>Ranks</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
<th>Z-value</th>
<th>Sign.</th>
<th>Z-tabulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative Ranks</td>
<td>4*</td>
<td>6</td>
<td>24</td>
<td>-4.29</td>
<td>0.00</td>
<td>1.96</td>
</tr>
<tr>
<td>Positive Ranks</td>
<td>26</td>
<td>16.9</td>
<td>441</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ties</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As indicated in table 4.23 the calculated Z- value (4.29) is greater than the tabulated Z-value (1.96). As the decision rule suggests, we reject the null hypothesis and accept the alternative hypothesis at 95% confidence inter-
val indicating that enterprises after joining cluster have more sales than before. Therefore, it is possible to conclude that there is an improvement in sales after joining cluster.

SAJC = Sales after joining cluster
SBJC = Sales before joining cluster

Impact of cluster program on asset

Another indicator of the impact of cluster program is asset creation. Ownership of durable asset such as machineries, equipments, household equipments and so forth are regarded as one of the most important indicators of improvement in the enterprise.

In this regard, respondents were asked to judge whether their assets improved or not. As indicated in the table 4.23, 3(7%) responded that their asset position is the same while 39(93%) of respondents indicated that their assets improved after joining cluster.

Table 4.23 Percentage distribution of respondents’ asset

<table>
<thead>
<tr>
<th>Improvement of asset after joining cluster</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved</td>
<td>39</td>
</tr>
<tr>
<td>Not improved</td>
<td></td>
</tr>
<tr>
<td>No change</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
</tr>
</tbody>
</table>

The variation in asset holding of respondents before and after the intervention was also tested using WSRT. Accordingly, the following null and alternative hypothesis was formulated and tested.

Ho = There is no difference in the amount of value of asset of the enterprises before and after joining in the cluster.

H1 = Amount of the value of asset of the enterprises after joining to cluster is greater than before.

As indicated in table 4.24, the calculated Z- value (5.444) is greater than the tabulated Z- value (1.96). As the decision rule suggests, I reject the null hypothesis and accept the alternative hypothesis at 95% confidence interval (Z = 5.444) indicating that a significant numbers of clients after joining cluster have more ownership of asset than before.

Therefore, it is possible to conclude that there is a significant improvement in asset ownership after joining in the cluster.

Table 4.25 paired sample T-test result of respondents mean asset before and after joining cluster.

<table>
<thead>
<tr>
<th>Asset ownership</th>
<th>N</th>
<th>Mean Asset</th>
<th>Std. Dev.</th>
<th>Mean Diff</th>
<th>t-value</th>
<th>df</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before joining</td>
<td>42</td>
<td>68821</td>
<td>18920</td>
<td>11181</td>
<td>-10.251</td>
<td>41</td>
<td>0.00</td>
</tr>
<tr>
<td>After joining</td>
<td>42</td>
<td>80002</td>
<td>22354</td>
<td>0</td>
<td>1.96</td>
<td>41</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table 4.24 Wilcoxon sign rank test result of respondents for value of asset before and after joining cluster.

<table>
<thead>
<tr>
<th>Rank</th>
<th>N</th>
<th>Mean rank</th>
<th>Sum of ranks</th>
<th>Z-value</th>
<th>Sign.</th>
<th>Z-tabulated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neg. Ranks</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>-5.44</td>
<td>0.00</td>
<td>1.96</td>
</tr>
<tr>
<td>Pos. Ranks</td>
<td>39</td>
<td>20.00</td>
<td>780.00</td>
<td>4^a</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Ties</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AAJC = Asset after joining cluster
ABJC = Asset before joining cluster

For better understanding, paired T- test was employed to assess if the difference is statistically significant or not. Using the paired T- test, it was found that enterprises after joining cluster increased their ownership of asset than the enterprises before joining cluster. The mean value of asset before joining cluster was 68821 birr while after clustering the mean value of enterprises is 80002 birr.

Thus, from WSRT and paired sample T-test result it is possible to conclude that ownership of durable asset of enterprises increased after joining cluster.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

a) Enterprises in the cluster established network with full will and believe about the importance of network. In the network they started to exchange information about market for their product, cost and availability of raw material and price of their product. The other thing was they discuss their problems and forward alternative solutions. Those problems that need involvement of other organizations would be discussed in the general assembly to seek solu-
b) Enterprises at network or cluster level did not established back ward (suppliers) and forwards (buyers) linkage. Lack of backward linkage resulted in shortage of raw materials supply, increasing cost of raw materials and provision of less quality. Such problems forced enterprises to spend more money in acquisition of raw materials. Absence of forward linkage also impaired them from having reliable market for their products.

c) Enterprises after joining cluster brought improvement on average monthly sales and fixed asset ownership. The increment of sales and asset ownership was mainly due to works given by government with out bid and enterprise started to diversity their products to satisfy new demand. But tasks from government would not be reliable market as they couldn’t continue giving workers to enterprises with out bid for longer period of time. So that enterprises should device means to increase their market share from the society by providing quality product and improving their customers handling skill.

d) The technologies / machineries used by enterprises were out dated and inefficient. This was due to limited capital to introduce modern technologies. As the result of not having appropriate technology, the cluster operators have limited market due to poor quality of products and not able to get a subcontracting from large companies.

e) Enterprises faced many problems in their operation, lack of access of finance, problem of permanent working place and market problem for their products were some of the priority issues. The limited number of financial institutions in the city and the requirement of huge collateral by the existing financial institutions would hamper enterprises from introducing of modern technologies and making expansion. Not having permanent premises would unstable the operation of enterprises and increasing cost of rent from time to time. Lack of marketing skill and depending on government tasks could be sources for the market problem.

Recommendation

a) Formulating a policy framework that seeks to enhance the ability of MSEs in the cluster to adopt and adapt new technology. This would be done by improving institutions that support technology development, thereby increasing overall access to information and technical skills. Relevant governmental and non governmental institutions should establish one committee responsible with reviewing the current modes of technology acquisition and transfer. First, they have to come up with laws and legislation that would regulate and promote local and international technology transfer. Second, they have to encourage subcontracting and franchising in order to develop cluster and easily access to new technologies.

b) Recognizing that the local capacity to create technology is low and that technology therefore must be imported from abroad. Efforts should be made to encourage the commercialization of technology and to enhance research and development. Those to be realized, strengthening links between MSEs and universities, technical intuitions and research bodies etc should given priority.

c) The cluster should create backward and forward linkages. Creating backward linkage enabled to get reliable raw materials supply with reduced cost. Establishing forward linkage also create sustainable market for their product. So that striving to establish forward linkage with whole sellers or retailers could be significance to sell their product. So that government bodies and UNIDO agent should persuade raw materials suppliers and product sellers about the importance of creating strong relation with the cluster to establish back ward and forward linkages.

d) The cluster given different tasks from government and non government organizations with out bid, in the market linkage activities. But giving tasks with out tender has a long term negative effect on competition as they could develop dependency syndrome. They always look hands of organizations for work to be given with out bid and become unable to compete in the free market. The other problem is enterprises out of cluster harmed as they are denied their right to compete in different tasks. The decision made by Bureau of trade and industry to establish technology demonstration center was very useful for enterprises development. Although the center was established recently that is before one and half year but even since establishment did not participate actively in introducing new technologies. The center should strengthen itself and create strong relationship with other similar centers and institutions so that it would bring new technologies and disseminate to enterprises.

e) Lack of access to finance was one of the critical problems encountered enterprises. So that government should establishes financial institution or create conducive environment for non governmental organizations, private investors to establish financial institution that tailored to finance micro and small enterprises. Other option like accessing goods and services but payment to be made after sale of products should be accustomed. This option was already begun in small scale, for example Guna trading.
house and enterprises agreed in one time to get raw materials and payment would be effective after sale. Such activities should strengthen with other organizations also, so that problem of finance could be reduced.

f) Joining to cluster and establishing network was not mainly to get support from organizations rather enterprises themselves should cooperate to exchange information and share experience, more than this they discuss about their problem to solve collectively. So that bureau of trade and industry and UNIDO agent in Mekelle should work their assignment to convince enterprises about the decisiveness of strengthening networks and cooperation among enterprises for growth. Building trust so that they can exchange technologies and help each other in promoting innovations.

References
