

# Innovation Practices of Manufacturing Firms' and Competitiveness: evidence from firms in Eastern Ethiopia

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**Abstract-** Innovation is generally regarded as a critical success factor in sustaining growth and competitiveness of firms in domestic and global markets. This study aims to investigate the innovation practices and identify factors that hinder innovation capability of Large and Medium Enterprises (LMEs) that are based in the eastern economic corridor of Ethiopia-Dire Dawa. Questionnaires were based on *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. The data were analyzed using percentage, correlations and mean score; and presented in graph and table format. The results of this study indicate that technological innovation practices of LMEs are remarkably low. Cooperation aimed at using external knowledge with universities and research institutes are also weak. Collaborative research is almost null and their recent cooperation with universities is limited to trainings. Most LMEs don't have written innovation plans and don't place efforts in Research and Development (R and D) except in cement and chemical products producing firms. Firms' performance is triggered by their efforts in marketing and organizational; and regions' natural resource. It is also revealed a positive relationship between efforts in internal R and D and being exporter. The major barriers of technological innovation LMEs are: too high cost of innovation, lack of skilled personnel, lack of innovation culture and perceived economic risk; among others.

**Index Terms-** Innovations, Manufacturing Firms, Competitiveness, Dire Dawa-Ethiopia.

## I. INTRODUCTION

### 1.1. Background and Thesis Statement

In today's globalized business environment, world firms are facing fierce competition to sustain profitability in the market and meeting customers' needs. To respond effectively to the demanding global environment, firms need to develop a range of export capabilities by accessing new technologies, managerial practices, and technical and marketing skills and continuously upgrade them over time. The brunt of the competitiveness challenge manufacturing firms with no exception. The main challenge facing firms is how to take advantage of new resources and markets.

Entrepreneurship Innovation is generally regarded as a critical success factor to growth and competitiveness of firms on domestic and global markets. Hence, innovation decisions are the key strategy for every firm; and it is the most fundamental

instrument to enter to new market, to increase market shares and to increase competitiveness (Gunday et. al., 2011).

The early concept of innovation in economic development and entrepreneurship was popularized by Joseph Schumpeter, a German economist who is considered as the founding father of the theory of innovation in innovation literatures.

Innovation, in his view, comprises the elements of creativity, research and development (R&D), new processes, new products or services and advance in technologies (Lumpkin and Dess, 2001). According to Beaver (2002) innovation is regarded as an essential element for economic progress of a country and competitiveness of an industry. Similarly, Bakar and Ahmad (2010) add that the capability in product and business innovation is crucial for a firm to exploit new opportunities and to gain competitive advantage (as cited in Rosli M. and Sidek S., 2013).

Innovations would create competitive advantage in terms of resulting new or improved products, diversified product, low cost of producing outputs, producing quality products, new approach of delivering and marketing the product. Thereby, it enhances firm's productivity; firms export capacities and improve countries overall performance. Hence, innovation is an essential element for economic progress of a country and competitiveness of an industry. Thus, innovation is no more a luxury, but a necessity (Kaplan and Waren, 2007).

Innovation is never easy, but it is always possible. It could be simple or sophisticated. Innovation may start from small ideas; yet, it needs room and time to grow. Innovation activities in many cases may become sophisticated and require huge investment. Hence, firms can follow different strategies in innovation practice; that is, they may rely on own efforts or they may outsource.

To be competitive in local and global markets, firms in Ethiopia need to develop innovation capabilities that allow them to take advantage of market opportunities. This also needs strategies and coherent policies which should be based on scientific inquiry that investigates the innovation practice and innovation ecosystem where firms are operating.

According to the World Economic Forum's Global Competitiveness Index (GCI<sup>1</sup>), Ethiopia ranks 109 out of 140

<sup>1</sup>The current GCR consider factors such as macroeconomic stability, corruption (or the absence of it), security, education (both basic and advanced), the health of the labor force, regulation, financial development, then efficient use of talent, the right incentives for firms to invest in research and development (R&D), market size, the participation of women in the workforce, and the use of modern production and distribution techniques.

countries with a score of 3.7 out of 7.0 in the 2015-16 report whereas it was ranked 118 out of 144 countries in 2014-15 report [Global Competitiveness Report(GCR), 2016].In the Global Competitiveness Index framework, innovation is one of the pillars and in 2016 WEF an updating thinking was vivid and indicated that emphasis will be given to innovation, education and financial market which will be lead to updated version GCR in the coming edition of GCR (GCR, 2016).

Innovation research in developing countries and in Ethiopia is generally low and recent focus among researchers. So far, few researches have been conducted focusing on firms in AddisAbaba and others focus on selected survey at country level.

So far, no innovation research is conducted focusing particularly on country's eastern economic corridor and industrial zone-on manufacturing firms in Dire Dawa. This work; hence, focuses on assessing the innovation practice of firms in this economic zone of the country and comprising main aspect innovation as indicated in Oslo Manual, 2005.

Further, this research initiated and aimed at complementing the effort of Dire Dawa trade and industry bureau in transforming the existing manufacturing firms in the region to the export market and identifying specific problems of these manufacturing firms that hinder them to be competitive in foreign market. Thus, this research tries to assess the innovation practice of privately owned medium and large scale enterprises and to identify factors that hindering them to be innovative firm and competitive in the local and global market. Thus, the main research questions here include the following:

- ✗ Do firms made own innovation practice/efforts in Rand D?
- ✗ What are the focuses and patterns of innovation practice of manufacturing firms?
- ✗ What are the sources of firms' innovation practices?
- ✗ What factors are hindering firms from innovation activities?

## II. THE OBJECTIVE OF THE STUDY

### 2.1. General Objective

To assess the innovation practice and hindering factor that affect innovation and competitiveness of manufacturing firms in eastern Ethiopia.

### 2.2. Specific Objectives

The specific objectives include the following:

- i. To investigate manufacturing firms' innovation practices;
- ii. To explore the focuses and patterns of innovation activities of manufacturing firms;
- iii. To inspect the source of innovation practice in firms and;
- iv. To inspect the hindering factor in firm innovation and competitiveness.

### 2.3. Significance of the Study

The findings in this paper would be useful for firms in putting innovation strategies and entrepreneurial development of

firms, as well as to design and implement adequate industrial and innovation policies and designing innovation cooperation with other institution.

## III. CONCEPTUAL FRAMEWORK

### 3.1. Definition of Key Concepts

Based on Oslo Manual (2005), an **innovation** is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations. The minimum requirement for an innovation is that the product, process, marketing method or organizational method must be new (or significantly improved) to the firm.

**Innovation activities** are all scientific, technological, organizational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations. Innovation activities also include R&D that is not directly related to the development of a specific innovation.

As the *Frascati Manual* states, R&D is only one step in the innovation process. Innovation involves a number of activities not included in R&D, such as later phases of development for preproduction, production and distribution, development activities with a lesser degree of novelty, support activities such as training and market preparation for product innovations, and development and implementation activities for new marketing methods or new organizational methods. In addition, many firms may have innovation activities that do not involve any R&D (Oslo manual #310, 2005).

### 3.2. Types of Innovation

The idea of innovation dates back to seminal works by Joseph Schumpeter. He distinguishes different basic types of innovation and defined innovation as encompassing the entire process, starting from a kernel of an idea continuing through all the steps to reach a marketable product that changes the economy.

According to Oslo manual (OECD/ Eurostat, 2005) innovation could be product innovation, process innovation, marketing innovation and organizational innovation.

First, a **product innovation** is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics (Oslo Manual #156, 2005).

Second, a **process innovation** is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software (Oslo Manual #163, 2005). This type of innovation is designed to decrease unit cost of production or delivery time, to improve product and delivery quality.

Third, a **marketing innovation** is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing (Oslo Manual #169, 2005). Of The target this type of innovation designed to better meet customers' need, to open up new markets, or to give the firm's products a new position in the market with the intention to increase sales income.

This innovation is highly related to the core business process of firms i.e., related to 4Ps these tools is generally referred to as 4P's of Marketing, product offers, pricing strategies, Promotion and Placement and promotion activities (Kotler P., 2002). Marketing innovation has direct effects on firm performance and it certainly facilitates the introduction and acceptance of radical new product innovation (Robert P. Cascio, 2011).

Lastly, an **organizational innovation** is the implementation of a new organizational method in the firm's business practices, workplace organization or external relations (Oslo Manual #177, 2005). Such innovations have a tendency to increase the performance of firms by reducing administrative and transaction cost, improving work place satisfaction. They also include the introduction of training programs for developing the skill of employees or the initiation of supplier or customer development programs.

Firms that implemented at least one element of each type innovation during the period under review are considered as **innovative firm** of that specific innovation type (UNESCO: Institute for Statistics, 2015).

#### IV. RELATED INNOVATION RESEARCH IN ETHIOPIA

A few innovation researches have been undertaken in developing countries in general and particularly in Ethiopia. Gebreeyesus, M. (2009 and 2011) examines the factors that encourage and inhibit innovation among micro enterprises in Ethiopia's manufacturing, trade and services sectors. His result shows that larger firms and those in the manufacturing sector are more likely to engage in innovative activities.

On the other hand, Talegeta, S. (2014) analyses data from a sample of small and medium enterprises (SMEs) in Addis Ababa, and finds that there is a low level of technological innovation. He also identified the main obstacles to technological innovation for SMEs in Addis Ababa.

Another by Wakeford, J. et al. (2017) using a mixed method involving semi-structured interviews and survey questionnaires assesses the strengths and weaknesses of the emerging sectorial systems of innovation in three manufacturing sectors in Ethiopia – the cement, leather and textile sectors – with a view to establishing the extent to which they are geared toward supporting green innovation and hence green industrialization. Their results reveal that the extent of product and process innovation is generally rather low, and green innovation is even less common.

Again, by World Bank Group (2016) using World Bank Enterprise Survey on Ethiopia, found that which found that innovation is found to be positively associated with firm performance; and 68% of large firms, 49% of medium enterprises and 42% of small enterprises reported product or process innovation (extracted from their figure A, page 4). However, the country performs unfavorably vis-à-vis the selected comparators, as the share of firms that innovate in Ethiopia is about half of the share of the firms that do so in both China and Kenya.

Further, the World Bank research group (2016) analyzes the extent of innovative activities of firms in Ethiopia and identified that Ethiopia's innovation performance stifles its

overall competitiveness and the increase in government budget in the R&D was a result of the increased headcount of R&D personnel and not researchers. On the other hand, business sector spending on R&D has sharply declined contrary to higher education and government institutions.

#### V. OVERVIEW OF MANUFACTURING SECTOR IN ETHIOPIA

Modern manufacturing industries in Ethiopia emerged in 1920s (Gebreeyesus M., 2013). Currently, Ethiopia's long term development framework is underpinned by the second phase five year Growth and Transformation Plans (GTP II) which runs from 2015/16 to 2019/20. Building on GPTI and GTP II, Ethiopia plans to become a middle-income country by 2025 (African Development Bank, 2016). The GTP II targets annual GDP growth of 11% (driven by the manufacturing sector and rise in exports) and enable the country to reach its targets to middle income status (Ethiopia Economic Outlook, 2016).

Developing the manufacturing sector and enhancing export-led growth is the Ethiopia's government's policy of agriculture led-industrialization to sustain economic growth trajectory. The agriculture sector still remained a dominant sector, its share in GDP 36.7 percent in 2015/16 while the industry and services stood at 16.7 and 47.3 percent, respectively. While; the industrial sector showed a 20.6 percent annual growth and accounted for 16.7 percent of GDP and its contribution to GDP growth increased from 2.0 in 2010/11 to 3.1 in 2015/16 (National Bank Ethiopia, 2016).

The government under GTP II largely stresses the facilitation of structural transformation through developing a dynamic domestic industrial sector. It targeted to bring significant growth of the manufacturing industry; so that, it plays leading role in job creation, technology learning structural shift in Ethiopia's export and address trade imbalance (National Planning Commission, 2015).

The manufacturing sector is the key productive sectors of the economy. It has enormous potential for capital accumulation, employment generation and poverty alleviation. In 2015/16, the sector increased by 18.4 percent and constituted about 32.4 percent of industrial total production output (National Bank of Ethiopia, 2016). It accounts merely 6% of GDP; and it is dominated by food, beverage, textiles, hides & skins, and leather industries, and faces low growth rates. In order to combat this, the government has been building an Industrial Park Program. This initiative is aimed at boosting the manufacturing industry via foreign direct investments (Ethiopia Economic Outlook, 2016).

#### VI. OVERVIEW OF THE EASTERN INDUSTRIAL CORRIDOR: DIRE DAWA

Dire Dawa is located 515 km from Addis Ababa and 313 km from Port Djibouti. The latter is the main trade outlet for the country. Dire Dawa is the eastern economic corridor of Ethiopia it is one of the Industry zones of the country. So far, the industrial village has been established to meet satisfactory response for investor's request. Besides, the federal government is undergoing the construction of industrial park. According to Dire Dawa administration office; the administration has

working towards making Dire Dawa the commercial, industrial, and efficient service center of eastern Ethiopia. In line to this, the Dire Dawa's trade and industry office also envisions transforming selected manufacturing and competitive in the export market.

## VII. METHODOLOGY AND DATA

### 7.1. Approach to Data Collection: Choice of the Survey Approach

According to 3<sup>rd</sup> edition Oslo Manual (2005) for innovation survey there are two main approaches to collecting data on innovations: The first is the "subject" approach starts from the innovative behavior and activities of the firm as a whole. The idea is to explore the factors influencing the innovative behavior of the firm. These surveys are designed to be representative of all industries so that the results can be grossed up and comparisons can be made between industries. Whereas the "object" approach involves the collection of data about specific innovations (usually a "significant innovation" of some kind or a firm's main innovation). Hence, for this study the "subject approach" was found appropriate and applied for data collection.

### 7.2. Research Design and Analysis

Innovative activities can take place in small and medium-sized units as well as in large units. For this study primary data is collected from almost all medium scale enterprises (about 95%) and all large scale enterprises operating in Dire Dawa during the study period. Stratification was made in selecting firms in medium scale enterprises. And when relatively more number of industries found in the same category representative firms are included to represent that industry category. Accordingly, primary data were collected from LMEs in the food and beverage, mineral water, construction materials (cement), detergents, Metal crafts, and wood-based sub industries. Textiles and clothing firms are excluded since such firms have shut down their business and/or not operating for the study period. Therefore, from a total of 15 LMEs in the administration 10 MSE and 5 LSE are participated in the study. The assessment was carried out between March and April 2017.

### 7.3. Data Instruments and Data Analysis

The survey questions were based mainly on OECD/Eurostat's (2005) *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. Hence, a structured interview questionnaire was developed in line with a harmonized survey questionnaire based on community innovation survey 2012 and Oslo manual OECD, 2005. Questionnaires were pre-tested with managers who were not part of the sample before it is used in the field. Respondents were identified by name, address and telephone by Dire Dawa trade and industry office. Hence, it was easy to make appointment and administer interview questionnaires. The data were analyzed using percentage, correlations and mean score; to solicit relevant information about innovation practice, and presented in graph and table format.

## VIII. MAIN FINDINGS

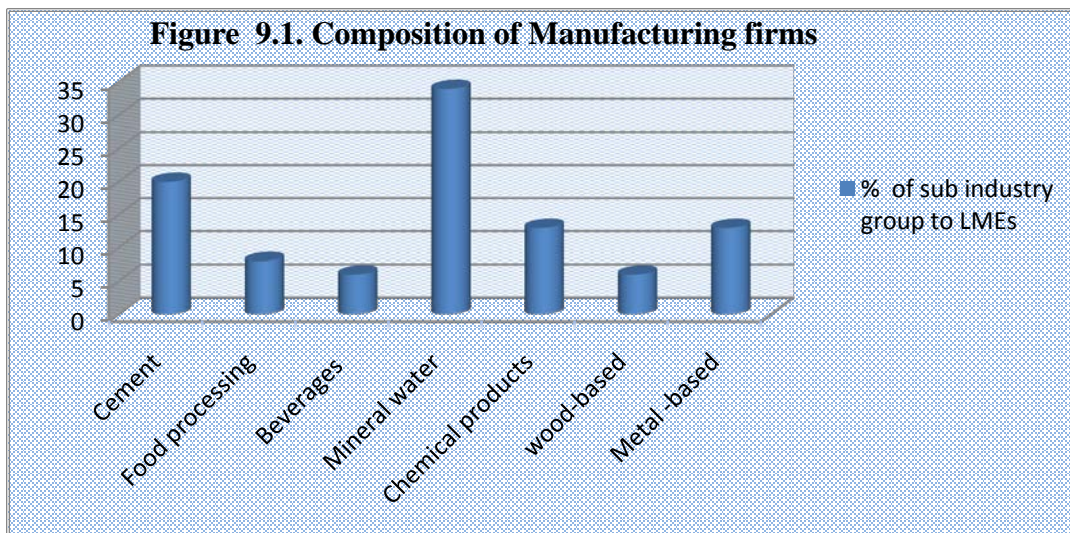
### 8.1. Composition of Manufacturing Firm

The classification of manufacturing enterprises, according to Ethiopian Central Statistical Agency (CSA) and Federal Micro and Small Enterprise Development Agency (FeMSEDA), the classification of enterprises into small, medium and large scale depends on a number of variables such as level of employment, turnover, capital investment, production capacity, level of technology and subsector.

Manufacturing Industries in Dire Dawa largely is largely dominated by small enterprises. Whereas, large and medium enterprises (LMEs) represent another segment and they are a building block of the manufacturing sector in the region. Out of 15 LMEs operating in Dire Dawa five of them are large enterprises operating in cement, food processing, chemical products (detergent and lubricants) and mineral water. The remaining is categorized under medium scale enterprises. LMEs are operating in cement, chemical products, food processing, metal based, wood based, beverages, and in mineral water.

The composition by sub-industry as seen from figure 9.1 below total LMEs that included in the study 34 percent operating in mineral water, 20 percent in cement, 13 in chemical products, 13 percent in metal based, 14 percent constitute firms in food and beverages and 6 percent are in wood-based. Textile industries were out of operation during the study period, hence excluded.





Source: Dire Dawa Trade and Industry(2017)

Respondents in this study were top management of firms and 93 percent are male and 7 percent are female. All respondents had tertiary education. With respect to legal registration of the business, a majority of the business was sole proprietorship and

private limited. Below in table 9.1 firms' imported input and export orientation are also indicated. Though most LMEs operation is using regions natural resource, they still depend on complementary imports.

Table 9.1: LMEs key Import and Export

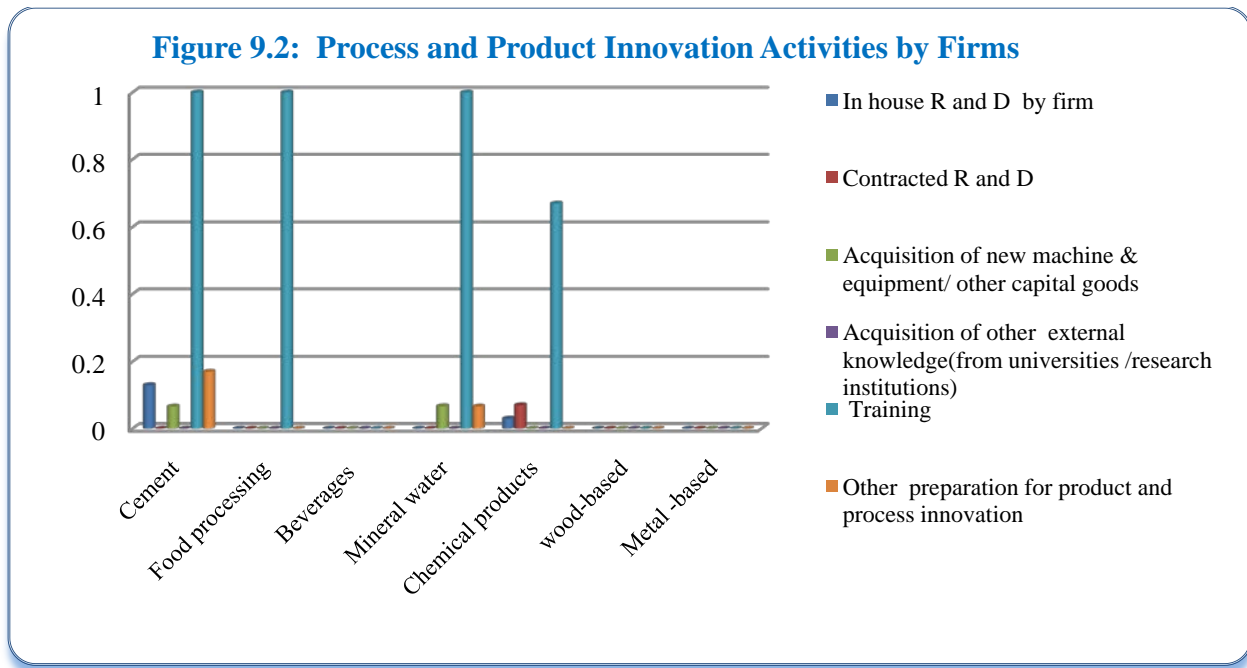
Industry Category	Imported Key inputs	Export of industry output	Export Market Destination
<b>Cement</b>	Energy(Coal)	Cement	Djibouti, Hargessa
<b>food Processing</b>	Wheat	-	
<b>Chemicals Processing</b>	Chemicals & Packing Materials	Detergents	Djibouti, Hargessa
<b>Mineral Water</b>	Plastic Bottles, Plastics, labeling materials	-	
<b>Beverages</b>	Packing Materials	Semi-Processed coffee	USA and Europe
<b>Wood based</b>	MDF, Chemicals	-	
<b>Metal based</b>	Metal	-	

Source: own survey results, 2017

### 8.2. Innovation Activities

**Innovation activities** are all scientific, technological, organizational, financial and commercial steps which actually lead, or are intended to lead, to the implementation of innovations. Some innovation activities are themselves innovative; others are not novel activities but are necessary for

the implementation of innovations. Innovation activities also include R&D that is not directly related to the development of a specific innovation (Oslo Manual#149). Providing innovation index for proper effort 1 to 0 for poor or non-existent effort, in each innovation categories as summarized in figure 9.2 below.



**Source: Based on sample survey (2017).**

Innovation in product and process is remarkably low and insignificant. It is limited up on firm start up and most remain in the status quo. In house R and D are only exist in cement and chemical and only in cement the accusation of improved equipment and machineries which improved product quality, cut production time and sustaining production.

Besides, as reported in almost all LMEs, firms do not have written down innovative plan. Most of firms don't have new products during the last two years. An attempt was reported in one of cement industry though not successful in the market. It is also reported in mineral water and chemical products producing firms they focus on marketing activities some of like metal and wood based on organizational and their attempt of innovation is inclined towards marketing and organizational innovation. Most of firms' production is based region's key natural resource and cheap labour force. In general, technological innovation (process and Product) are remarkably low among LMEs in Dire Dawa.

### 8.3 Innovation and Firm Performance

Perception of managers about performance of firms is mainly due to their effort in marketing and next on organizational change. Except for cement firms their sustainable performance is due to their newly acquired machinery that replaces manual efforts and that cut production time. It is also found that there is a positive correlation between investment on R & D and being an exporter firm. This association is for cement and chemical products.

### 8.4 Cooperation with Institutions

Cooperation is the active participation in joint innovation projects with other organizations. The partners need not derive immediate commercial benefit from the venture. Pure contracting out of work, where there is no active collaboration, is not regarded as cooperation (Oslo Manual #271).

Here, institutions are universities or other higher education institutions or public research institutes. The overall assessment indicates that, the cooperation and linkages with these institutions are remarkably low. It merely limited to training. Collaborative research is almost null. The sources of any attempt of innovation are manly from internal. Other countries knowledge limited to commissioning and training for the newly imported machinery which is made in fulfilling commercial commitments. Their business partners in such case are mainly South Africa, China, India, Malaysia and Singapore.

### 8.5 Hampering Factors

Policymakers and business leaders need accurate information on factors that support innovation, as well as on the obstacles that may hinder it, which may take many forms. In this study, the hampering factors for innovation activities have been divided into four categories: cost factors; knowledge factors; market factors; and others. These factors are similar to the factors indicated in Oslo Manual #410).Based on the degree of importance of the factors hampering innovation as rated by respondents (top management of LMES), the results are presented in table 9.3.The respondents' rate are scored and aggregated in summary for LMEs participated in this study.

**Table 9.3: The degree of importance of the factors hampering innovation**

Cost factors			Knowledge factor			Market factor		Others	
<b>Innovation costs are too high</b>	lack of funds within enterprise	Lack of appropriate source of finance	Lack of skilled personnel	Lack of information on technology	Lack of cooperation partner for innovation /Lack of innovation culture	Lack of customer responsiveness to new products	Lack of information on market	Perceived economic risk	lack of government policy and regulation
<b>High</b>	<b>Low</b>	<b>Low</b>	<b>High</b>	<b>Low</b>	<b>High</b>	<b>Low</b>	<b>Low</b>	<b>High</b>	<b>Low</b>

Source: Own summary from Questionnaires (2017)

Hence, based on respondents rate, the major barrier or hampering factor for most manufacturing firms or from factors hampering firms from innovation are too high Innovation cost, lack of qualified personnel, perceived economic risk, lack of cooperation partner for innovation or/ and lack of innovation culture are rated high, among other factors.

### 8.6. SWOT-Analysis

In innovation assessment, it is important to identify the issues affecting innovation in LMEs. The following SWOT analysis in table 9.2 is intended to provide information about firms' innovation ecosystem.

**Table 9.2: SWOT-Analysis**

Strengths	Weaknesses
Access to information technology and business run by Managers access to information about Market, competitors few identify innovation as one of organization's values	Some with short term vision and remain on the status quo and low process and product innovation. Most don't have innovation agenda, most depend on initial investment They focus on 'large' domestic market and Low export profile Focus on marketing and low attention to product improvement
Owner is truly interested in company not only a source of finance huge potential to be leveraged regarding employment Some LMEs opt for alternative energy source Produce products that are Import substitutes	Lack of competencies and contact networks High dependency on imported input Concentrate on similar manufacturing sector that uses region's natural resource Poor management in dealing with working force and high employee turnover
Some owner with competitive advantage from prior exposure	Most don't have special employee (department) for innovation and R & D
Awareness at some LMEs of the lack of and need for innovation Awareness for the importance of training for employee	Poor relationship with universities and research institutes; Poor linkage to external knowledge Non-existent personnel responsible for industry-institution(university)linkage
Awareness about supply chain and plan to integrate current business to expansion projects	Lack of initiation by managers in innovation practice Lack of knowledgeable consultants, low initiation of LMEs to co-funded R&D and innovation programs Focus only 'on the job trainings'.

Opportunities	Threats
Innovation policy and support for manufacturing sector(GTP II) Agency that support manufacturing sector	Globalization Technological Competition meeting quality standard
Clustering firms in industrial zone and construction of industrial park. Possible integration strategy with firms that appear in industrial park Common and improved facility and service will ease bureaucratic and increase efficiency	Lack of subsidy for innovation Non innovative SMEs tend to disappear soon Innovation requires more and more expensive technologies
Technology transfer foreign firms that appear in industrial park	Suspicion about employees readiness and fit to technology transfer
Anticipated market changes and competition will Push innovation Knowledge about Innovation as a resource for gaining competitiveadvantage	Competitive advantage obtained via innovation could be difficult to be sustained with internal Shortage of foreign exchange for key imports Technological and Managerial from insider- foreign firms resources
Firms are located near to port Djibouti Firms are located in region with international Airport and Railways and roads. Availability of natural resource that can be used as raw material for some industries	Environmental regulations standards for foreign firms may applies to them

Source: Own summary from Questionnaires (2017).

#### IX. CONCLUSION AND RECOMMENDATION

Product and process (technological innovation) practices of LMEs are remarkably low. The source of innovation practices is internal. Cooperation aimed at using external knowledge with universities and research institutes are also weak. Collaborative researches are almost null and their cooperation with universities is limited to trainings. Most LMEs don't have written innovation plans and don't put efforts in R and D except in cement and chemical products producing firms where there are some efforts. Firms' performance is triggered by some efforts in marketing and organizational changes, except in cement producers; and the uses of natural resources. It is found in those firms that, a positive relationship between efforts in internal R and D and being exporter firm in these firms. The major barriers of technological innovation LMEs are: too high cost of innovation, lack of skilled personnel, lack of innovation culture and perceived economic risk; among others.

Therefore, manufacturing firms need to promote process and product innovation if they are to remain competitive in local and global markets. Exclusively, to be an exporter, technological innovation in product and process is highly required. Firms should show their commitment to innovation by designing innovation strategy, establishing R and D department and allocate innovation budget. To complement this, the government should allocate subsidy for innovators. Moreover, to use external knowledge for innovation firms should design appropriate collaboration strategy and department in their structure.

Hence, manufacturing firms need to promote process and product innovation if they are to remain competitive in local and global markets. Exclusively, to be an exporter, technological innovation in product and process is highly required. Firms should show

their commitment to innovation by designing innovation strategy, establishing R and D department and allocate innovation budget. To complement this, the government should allocate subsidy for innovators. Moreover, to use external knowledge for innovation firms should design appropriate collaboration strategy and department in their structure.

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