

VALUE CHAIN ANALYSIS AND ITS APPLICATION OF
CONSTRUCTION PLASTIC.
THE CASE OF ETHIOPIA PLASTIC INDUSTRY

Thesis

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CERTIFICATE OF ORIGINALITY

This is to certify that the project titled Value chain analysis and its application of construction plastic; The Case of Ethiopia Plastic Industry is an original work of the Student and is being submitted in partial fulfillment for the award of the Master's Degree in Business Administration of Indira Gandhi National Open University. This report has not been submitted earlier either to this University or to any other University/Institution for the fulfillment of the requirement of a course of study.

SIGNATURE OF SUPERVISOR

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Contents

1. BACKGROUND	1
1. RATIONALE AND OBJECTIVES	3
General objective	4
Specific objectives	4
3. LITERATURE REVIEW	4
3.1 Value chain approach	4
3.2 Construction: A Growing Sector in Ethiopia	8
3.3 Construction Plastics	9
4. METHODOLOGY	13
4.1. Overview; choice of methods	13
4.2 Case Study: Ethiopia plastic industry	13
4.2 Data collection	14
Primary data	15
Secondary data	16
Value Chain Mapping	16
SWOT Analysis	18
4.4 Analysis	19
5. FINDINGS	19
5.1 Profile and development pattern of the plastic industry	19
5.2 Inputs and their suppliers	24
5.3 Production process	26
5.4 Sales processing	29
5.5. Consumption (Customers' perspective)	39
5.6. Overall chain management issues	41
6. CONCLUSIONS AND RECOMMENDATIONS	45
7. REFERENCES	52
8. ANNEXES:	57

1. Background

These days, value chain approach is becoming an important tool for analyzing industries and markets with an ultimate goal of improving performance. Chain analysis is a dynamic approach that examines how markets and industries respond to changes in domestic and international demand and supply for a commodity's technological changes in production and marketing, and developments in organizational models, institutional arrangements or management techniques (Anandajayasekeram & Berhanu, 2009). The analysis should look at the value chain as a set of institutions and rules; as a set of activities involved in producing, processing, and distributing commodities; and as a set of actors involved in performing the value adding activities. This study aims to apply the value chain approach for studying "plastic," an important building material, in the booming construction sector in Ethiopia.

It has been widely and verifiably recognized that Ethiopia has become one of the fastest growing economy not only in Africa but also in the world. In the last eight years, the economy has registered not only sustainable double digit growth but also broad based prosperity, indicating that the country is on the right path to meet its development objectives (MOFED, 2010). Ethiopia's achievement in both social and economic development is widely acknowledged by the UNO and international financial organizations. During the fiscal years (2009-10), overall economic performance measured by growth in real GDP has registered 11.3 percent on average (MOFED, 2010).

The growth of the economy has been multi-sectoral. An important economic component that has been showing significant and visible growth is the construction sector. There has been increasing investment in road construction by the government to facilitate its infrastructural development necessary for the fast economic growth. A high rate of building construction growth has also been registered due to private sector investment, and the priority and action of the state on urban housing development, among others. With the very high emphasis put on infrastructure development in the Growth and Transformation Plan (GTP, 2010), the construction sector growth is envisaged to be further increased.

The predicted high growth construction calls for increased material supply including plastic construction material. With the rising prices and market unavailability of steel, plastic is becoming an important building construction material. Plastics play a significant role in the building and construction industry. In fact, these days, the construction industry is one of the largest consumers of plastic. In the construction industry, plastics are used for many purposes like pipes, cables, valves etc. Till recently, Ethiopia has been importing a major proportion of the plastic material it needs for its growing construction sector resulting in the nation's scarce hard currency outflow. As part of the pursuance of its policy of import substitution, Ethiopia has now started producing construction plastic domestically. Production of these construction materials is a business arena that has a long way to go to develop and at the same time become competitive.

A value chain approach is one of the best tools for understanding and enhancing industries. It is important for an industrial company to analyze the specific activities performed in order to measure how it creates a competitive advantage over other organizations within the industry. In order to conduct this analysis, it is useful for an organization to model itself as a chain of value generating activities that is identifiable as the value chain analysis approach (Porter, 1985). The objective of the value chain activities is to generate value that exceeds the actual cost of providing the specific product or service. The performance of the construction plastic industries remains unexplored and its bottlenecks and opportunities are unknown. This study aims to develop a basic understanding of the characteristics of the construction plastic value chain.

1. Rationale and Objectives

Construction is booming in Ethiopia. This calls for increased supply of building materials including plastic construction materials. To satisfy the growing demands, Ethiopia has been importing a huge quantity of construction materials. Importation of the construction materials needs large amount of foreign currency which the nation cannot sustainably afford. There is a need for domestic production and thus substitution of these imported materials is timely and should be an important priority of the nation. In response to the growing demand for the products and to the call for saving foreign currency, local industries have started producing them. However, these domestic industries cannot sustain their production unless they are efficient and competitive. There is a paucity of information on performance of this industrial sector in Ethiopia.

General objective

- To identify and analyze the construction plastic value chain of Ethiopia Plastic Industry.

Specific objectives

- To explore the overall patterns of construction plastic production as a basis for developing contextual understanding on how the value chain prevails in Ethiopia.
- To identify the value chain of construction plastic in Ethiopia.
- To analyze the construction plastic value chain of Ethiopia plastic Industry addressing components like raw material input, supply, production, marketing and their integration

3. Literature Review

3.1 *Value chain approach*

Value chain refers to all the activities and services that bring a product (or a service) from conception to end use in a particular industry—from input supply to production, processing, wholesale and finally, retail. It is so called because value is being added to the product or service at each step. Taking a value chain approach to economic development means addressing the major constraints and opportunities faced by businesses at multiple levels of the value chain (Pil & Holweg, 2006). Value chain management has been labeled as the single most wide-ranging approach in considering how organizations utilize their suppliers' processes, technology, and capability to enhance competitiveness (Tucker et al., 2002: Ross, 1998: Saunders, 1998). The value

chain framework quickly made its way to the forefront of management thought as a powerful analysis tool for strategic planning (Landry, 1998: Martin, 2009: Mitchell et al., 2009).

Value chains are also the conduits through which finance (revenues, credit, and working capital) move from consumers to producers (Kaplinsky, 2000). The concept of the value chain simply links all the steps in production, processing, and distribution, together and allows us to analyze each step in relation to the preceding steps and the steps that follow (Stuart, 1993: New, 1995). The *value chain* describes the full range of activities required to bring a product or service from the source, through the different phases of production (involving a combination of physical transformations and inputs of various producer services), delivery to final consumers and final disposal after use. The most important implication of applying the value chain approach is that all decisions made at one step in the process, have consequences for the following steps and such decisions may be irreversible (Lummus et al., 1998).

It is important for an organization to analyze the specific activities performed in order to measure how it creates a competitive advantage over other organizations within the industry. In order to conduct this analysis, it is useful for an organization to model the organization as a chain of value generating activities that is identifiable as the value chain analysis approach created (Porter 1985). The objective of the value chain activities is to generate value that exceeds the actual cost of providing the actual product or service.

Value chain analysis is a sequential process of value creating type of activities which is in essence the amount that the buyers will be willing to pay for the product or service that an organization provides (Stevens, 1998: PE Consulting, 1997). An organization is profitable only to the extent that the value it has received will exceed the total costs required to create its product or service to the customer (Chao *et al*, 2000).

Porter (1985) discussed the components of value chain that are very relevant in analysis of industrial companies including the plastic construction industry addressed in this research. The inbound logistics is the first of the primary activities within the value chain and deals with the receiving, storing, and distributing of inputs to the final product or service (raw materials). One would measure the efficiency and effectiveness of the material and inventory control systems. The operations activity is associated with the actual transformation of the inputs into the final product or service by ensuring efficient plant operations, appropriate level of automation, quality control systems, and efficient workflow design.

The outbound logistics are associated with the collection, storing, and distribution of the final product or service to the ultimate buyer. This is done by evaluating the effectiveness of the shipping process and quality material handling equipment. The marketing and sales activity deals with the purchases of products and services by the end users and the inducements involved in an effort to get the customers to actually purchase the product or service. The final primary activity is the area of service, which

is associated with the provision of service to enhance or maintain the overall value of the product or service.

An industry value-chain is a physical representation of the various processes involved in producing goods (and services), starting with raw materials and ending with the delivered product (Tan & Kannan, 1998). Value chains conceptualize raw material transformation irrespective of scale (Wong and Fung, 1999).

Value chain analysis is utilized to recognize the probable sources of an organization's economic advantage within its own industry. The analysis involves a deep understanding of the interrelationships of the business and technology units, linkages between the primary and support activities, and how the performance of one activity affects other activities along the chain of value within the organization (Pil & Howleg, 2006).

Technology development plays an important role in the support of creating value along the chain within the organization. This includes research and development, process automation, and other information systems creation that is utilized to support the overall value chain activities. As the value chain analysis has evolved over the years since first introduced by Porter (1985), the success will depend on an understanding of how the organization's own value chain relates to and interacts with the value chains of competitors, suppliers, and customers. Information systems will play an important role in

the new approach of the value chain by the determination of methods to exploit the upstream and downstream information.

Relationships among firms in an industry can facilitate production and marketing efficiencies and enable the flow of information, learning, resources and benefits. Thus, industries' stakeholders need to strengthen or restructure relationships and address resource constraints to increase the global competitiveness of the industry and the ability of small firms to contribute to and benefit from this competitiveness.

3.2 Construction: A Growing Sector in Ethiopia

National and international evidence is demonstrably showing that Ethiopia has been economically growing consistently over the last eight years. In this period, its double digit economic growth has been sustained. Infrastructural development is one the sectors that have registered remarkable progress. The concerted infrastructure push has been a particularly important factor in driving growth. Over the past five years, the government and public enterprises have invested about US \$ 6 billion in roads, telecommunication, and energy sector. Those huge investments have led to a major expansion in infrastructure, albeit from a low base (AFDB, 2010).

The construction industry is a typical example of the booming sectors in the country. The enormous growth in construction sector has resulted in shortage of local supply of construction materials and consequently leading to their importation in large quantities. Ethiopia has a vision of becoming middle income country in the coming one and half

decade (MOFED, 2010). The price of steel construction materials is rising and thus becoming unaffordable for the nation. Thus, plastic materials are being produced and used for many components of building construction.

Ethiopia has largely been importing these materials so far. In order to overcome its shortages of foreign currency and address challenges of employment generation, Ethiopia is presently promoting industries that produce products which enable to substitute imported goods. Hence, state and private industries have been set up and operationalized to produce such highly demanded materials like construction plastics. However, these domestic factories cannot sustain their production unless they are efficient and competitive. Such proliferating industries need to be supported by research and development so that they remain viable and resilient in the competitive market. This study will closely look into the plastic construction material production and put the way forward by applying the value chain analysis approach. To this effect, the oldest and the largest plastic industry, Ethiopia Plastic Industry, will be studied. The plastic construction material, the value chain approach and the case study-industry are reviewed as follows.

3.3 Construction Plastics

Plastics are a large group of synthesized carbon based compounds produced by polymerization. The building blocks of a plastic (monomers) are combined into a large variety of long, chain-like polymers. The type of plastic produced depends on the nature of the monomers used and their configuration in the polymer chain. Plastics can be as

hard as stone or as soft as cotton, as strong as steel, clear as glass or as elastic as rubber (Green Building press, 2006).

Plastic-based products including construction plastic currently represent a sizeable subsector in the chemical industry in the world. Consumers choose plastic products for their versatility, durability, lightness and excellent insulating properties. Manufacturers like to produce plastic goods because of low production costs and energy-efficient production processes. Driven by these forces, the global production and consumption of plastic goods have significantly increased from a mere 1.5 million tonnes in 1950 to 230 million tonnes in 2009 (Plastic Europe, 2009).

Global production of plastic products is dominated by developed nations, with the European Union producing about 24 per cent and North America producing about 23 per cent of total global plastic production in 2009 (Jahan and Khan, 2009). The plastics industry is ranked as the third largest manufacturing industry in the United States of America.

In comparison, China as the largest manufacturer of plastic goods among developing countries, contributed about 15 per cent to the world's total plastic production in 2009 (Plastic Europe, 2009). Other large plastic manufacturing countries in Asia are India and Thailand. Recently, developed nations have opened their markets for plastic products from developing nations. One of the reasons for this shift is the low cost of production in developing countries due to cheap labour and low transportation costs. As developing

countries are increasingly moving towards accelerated industrialization, the plastics sector becomes an important backward linkage industry in manufacturing.

Plastics play a significant role in the building and construction industry as well. In fact, the industry is the second largest consumer of plastic, followed only by the packaging industry. In the construction industry, plastics are used for items such as pipes and valves. They are also used for decorative elements and heavy-duty uses because they are so easy to handle, are durable, and are attractive. Some decorative places plastics are commonly found include bathroom units, plumbing fixtures, flooring, siding, panels, insulation, windows, doors, gratings, glazing, and railings (Green building press, 2006).

Plastic construction materials have many advantages. Plastics last forever. They are very cheap to make and do not biodegrade. Within piping and valves, plastics are highly used because of their superior resistance to corrosion. In fact, they can be used for everything from freshwater to saltwater, from crude oil to laboratory waste. In addition, they are much lighter than steel materials and easier to install. They are also less expensive.

Glass-reinforced plastic (GRP) pipe is used for the transport of water and wastewater in pressure and non-pressure systems. GRP is a filament-wound, structural plastic composite made with glass fiber and polyester resins. The pipe is lightweight, corrosion-resistant, and designed for ease-of-installation. Its corrosion resistance can give products made from the material a long, effective service life with low maintenance

costs while making it a strong candidate for piping applications in environments with acidic soil content.

Plastic products require very little maintenance, and their low weight reduces transport energy requirements. The best U-values are obtained by foamed plastic insulates, which may be important where insulation thickness is an issue. Plastics play an important role in sealing and caulking buildings to ensure air-tightness. The plastic industry is growing, with the USA now producing around 39 million tons per year, with around 60,000 different compounds being produced (Green Building Press, 2006).

The same source indicate that around 22% of plastic sales are for building products in North America, making construction a very significant sector in the plastics industry. Apart from the obvious, such as cladding, flooring, pipe work, cable sheathing and foam insulation, plastics are used in everything from the concrete foundations to the final coat of paint. In response to the rising demand owing to the increasing building construction industry in Ethiopia and its comparative advantage, domestic production of plastic construction material is increasing which requires inquiry to explore status and future improvement opportunities. EPI, located in Addis Ababa, is *t*he oldest and the largest construction industry in Ethiopia. The study investigated Ethiopia Plastic Industry (EPI) as a case to study the plastic construction industry in Ethiopia.

4. Methodology

4.1. Overview; choice of methods

The main interest of the study is to identify and analyze the construction plastic value chain of Ethiopia Plastic industry. This will form the basis for exploration of the future competitiveness advantage of the industry. Choice of research methods is guided by on research objectives which direct required information that in turn influences type of data collection. This research uses a qualitative research methodology. The nature of qualitative research allows flexibility between gathering data and interpreting them within framed theories (Silverman, 2007). Qualitative researchers usually work with small samples of people, nested in their context and studied in-depth, very different from quantitative researchers, who aim for larger numbers of cases and seek statistical significance (Miles & Huberman, 1994).

Qualitative research is not to generalize the results but to gain a greater understanding of a studied phenomenon, concentrates more on finding the opinions, experiences and feelings of the individuals and producing subjective data, and explaining them (Zikmund, 2000).

4.2 Case Study: Ethiopia plastic industry

A case study is one of the most commonly used methods qualitative research. A case study is an extensive examination of a single instance of a phenomenon of interest which involves gathering detailed information about the unit of analysis with a view to

obtaining indepth knowledge (Collis & Hussey, 2003). According to A case study enables to explore and characterize a certain phenomena and develop the understanding in a particular context (Yin, 1994).

This research examined Ethiopia plastic industry, EPI, as a case study for identifying and analyzing construction plastic value chain in the country. EPI, located in Addis Ababa, is the oldest and largest plastic producing industry in the country whose establishment dates back to 50 years. The main objective of EPI is production and sales of plastic related to construction, packaging, and household materials.

The sales volume of industry has reached beyond 140 million birr. With 366 personnel, it is the largest employer in the plastic industry in Ethiopia. EPI gives an opportunity to examine the historical trends of the plastic sector as construction changes in scale with an impact on demand for building materials. The total production potential of the industry is underutilized thus implying a great potential for improvement. It is also expected that the industry will have relatively more developed value chain given its age and experienced challenges. This makes it suitable for the research. Hence, emanating from the above considerations, EPI was purposefully selected for the study.

4.2 Data collection

The study used primary and secondary sources to collect data. First, the primary data is from the interviews. The secondary data is intended to gives supporting data in to fulfill the gap from the interviews.

Primary data

The use of individual and group interview is a common a common practice in qualitative research. Because interviews address complex subjective research issues, are relatively economical in terms of time and resources (Silverman, 2007). Saunders et al., (2007) described three types of interviews. The first type is structured interview in which an interviewer physically meets the respondent, reads them the same set of questions in a predetermined order, and records his or her response to each. Semi-structured interview is a type in which the interviewer commences with a set of interview themes but is prepared to vary the order in which questions are asked in the context of the research situation. The other type is unstructured interview which involves loosely structured and informally conducted interview that may commence with one or more themes to explore with participants but without a predetermined list of questions to work through.

This study applied a combination of a semi-structured interview and an in-depth (unstructured) interview in retrieving primary data. Key informant interviews and focus group discussions were conducted with members of management, and with officer and staff of the different sections of EPI including procurement and input acquisition, production and sales processing departments. Additionally, open individual interviews and group discussion were also done with customers of EPI.

Secondary data

Secondary data generally refers to the use of existing information from the website, company data and sources, directories, magazine or other published sources (Hague et al., 2004, Yadin, 2002). This study gathered data from the profile document and annual and quarterly reports of Ethiopia plastic industry. The types of information collected via secondary methods include general industry profile, facts and figures of the growth pattern of EPI.

Value Chain Mapping

As part of the characterization of the plastic construction material production, value chain of the industry was studied. The value chain is defined as the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use (Kaplinsky & Morris, 2001; Cliff, 2007).

Anandajayasekeram and Berhanu (2009) proposed a process for value chain analysis which includes the following steps:

- Selection of the value chain to be studied;
- Defining the value chain with respect to perceived problems and the need for investigation, i.e. drawing a basic value chain map;
- Identifying key areas of study; collecting data and analysis;

- Identifying and evaluating leverage interventions to overcome constraints and exploit opportunities; and developing report and list of recommendations.

In studying value chain, questions about the working process or the flows were raised. The interviewees also gave the reflections about the way the process helps or hinders the performance. This study was intended to analyze the interaction of actors along each step of the production system (from raw producer to consumer). The chain actors were identified and their interactions explored. However, although key suppliers of raw materials were also singled out and they were not accessible for physical interviews and discussions as almost all of them were international. As a subsequent chain component, the production process was also examined. The actors and their modalities of trading and retailing of the plastic were investigated. Opinions of the consumers were captured over the constraints and opportunities in the linkages in the industry. After close scrutiny of each step, process map (flow chart) of the plastic production was developed. To recap, the process mapping ranged from input supply to production, marketing and consumption. Anandajayasekeram & Berhanu (2009) have defined ways for mapping value chains which include review of secondary literature, analysis of secondary data, discussion with key informants, discussion with knowledgeable observers, discussion with market participants.

As indicated above, to get an overview of the value chain, iterative key informant interviews and focus group discussion were held with top, middle and low level management of the industry. The top managers are responsible for oversight of the

industry and thus provided an overall picture of the value chain. The middle and low level managers provided more elaborate information on components of the chain. The industry management clarified the inlet (input), and outlet (marketing and consumption dimension) of the chain, in addition to the production component which it is directly responsible.

SWOT Analysis

Once the overall plastic construction value chain was mapped out, each component was analyzed in terms of bottlenecks and possible improvement options. A major benefit of value-chain analysis is through the identification of the nature and extent of barriers to entry along the chain. As a result, such an approach is amenable to explain many of the distributional outcomes that occur in the course of globalization as well as the evolution of such relationships over time (Kaplinsky & Morris, 2001). In such a business venture, SWOT analysis is a popular method used to evaluate the Strengths, Weaknesses/Limitations, Opportunities, and Threats involved. Through SWOT's, the study got the objective of the plastic industry clarified and identifies the internal and external factors that are favorable and unfavorable to achieve that objective. These factors are expected to emanate from the value chain. Identification of SWOT's is essential because subsequent steps in the process of planning for achievement of the selected objective may be derived from the planning.

The SWOT's analysis involved different methods. Meetings were conducted with managers at all levels to identify internal and external factors governing the production performance and overall competitiveness of the industry.

4.4 Analysis

Analysis strategy will depend on method of data collection. Qualitative information collected from key informant interviews, focus group discussions and meetings were systematically described. Value chain was mapped using VISIO diagramming program to illustrate flow chart and show linkages among components. VISIO helped to produce and visualize flow charts describing largely internal processes ranging from input requisition to acquisition, production and sales processing in EPI. SPSS was used summarize and present descriptive numerical information in a graphical and tabulated manner.

5. Findings

5.1 Profile and development pattern of the plastic industry

The overall profile of the Ethiopia plastic was explored via key informant interviews and focus group discussions with the top management as well as industrial records. In accordance with those sources, Ethiopia plastic industry was initially established by five Italian private entrepreneurs in 1960. In 1978, the Government became full owner of the company. The main objective of EPI is production and sales of plastic related construction, packaging, and household materials.

EPI is a pioneer in the manufacturing of plastic products in Ethiopia established with the vision of producing polyethylene based fluoroplastic based, polycarbonate based and

rubber based products of airplane, automobile, building parts. The industry reports show that its actual production and sales volume has reached 4,743,770 kg and 141,261,670 birr respectively which is about 60% of the total capacity (EPI, 2010). Currently, the industry upgrading and expansion works are in progress to assure better customer satisfaction and business development.

The company operates under stiff competition and this is an opportunity for high level improvement to produce and provide quality products and service delivery. At the end of 2011, the company had 366 workers. The staff includes professionals in plastic technology, engineers, processors, management and marketing experts. Looking at the underutilized total capacity (40%) and the growing demand for plastics especially in the construction sector, the Ethiopia plastic industry has great potential to increase its production and sales volume.

Table 1: Production Statistics of Ethiopia plastic over 4 Years (2008-2011)

S/N	Product Type	Quantity of product produced per year (kg)			
		2008	2009	2010	2011
1	Polyethylene Products	233,281	289,770	297,472	377,161
2	Electrical wires & cable	794,789	895,613	1,109,453	1,313,237
3	PVC products	885,377	1,143,916	1,184,540	1,652,774
4	House Hold utensils	4,606	19,934	32,658	44,757
5	Boots	27,995	28765	31375	34,109
6	Flexible Conduits	24,850	108,713	25,719	101,135
7	Switch box	12,070	7,746	9,513	37,406
8	Polyether high-density	65,987	79,334	105,494	224,160

The company requires input from research and development to enhance its effectiveness and efficiency. There is a need to look into how the industry operates from a value chain perspective.

EPI has been generally growing in terms of production over the last four years. As presented in table 1, the volumes of production of most of the plastic products such as flexible conduits, house hold utensils, boots, switch box and Polyether high-density have significantly increased.

The production of some construction plastic products, for example, electric wires and PVC products has almost doubled over four years. This indicated the growth of demand in the construction industry.

Table 2: Sales Statistics of EPI during 2008-2011

S/N	Product Type	Quantity of product sold per year (kg)			
		2008	2009	2010	2011
1	Polyethylene Products	257,610	267,214	300,760	332,044.87
2	Electrical wires & cable	816,880	879,012	1,317,210	1,133,499.10
3	PVC products	581,140	860,033	951,720	1,066,866.74
4	House Hold	10,060	28,426	33,530	33,584.06
5	Boots	32128	35349	50128	66,700
6	Others	36,060	26,650	47,842.16	503,993

Similarly, there has been concurrently increment in level of sales of products over the last the four years period (Table 2). However, the sales volume does not perfectly match the level of production because of products in stock.

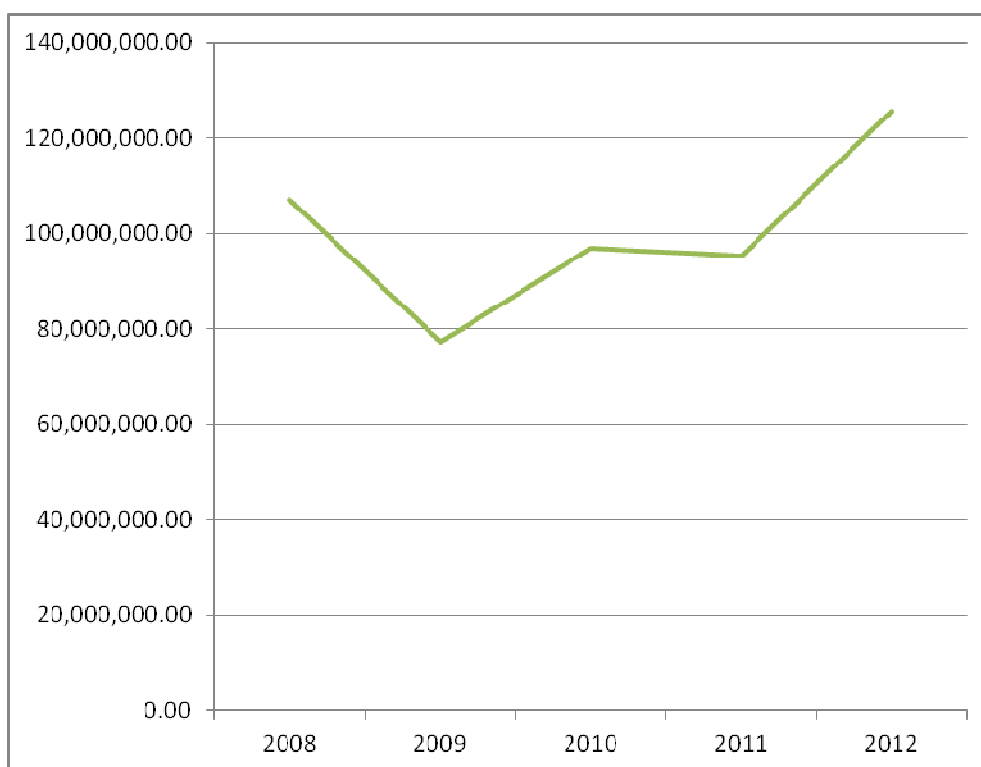


Fig.1: Total value (birr) of Raw Materials procured by EPI during 2008-2012

Although the scale did not show consistent pattern, total financial investment on procurement of raw materials did increase over the years (Fig 1.). Analogously, the total value of sold products of the industry did increase over the period (Fig 2.)

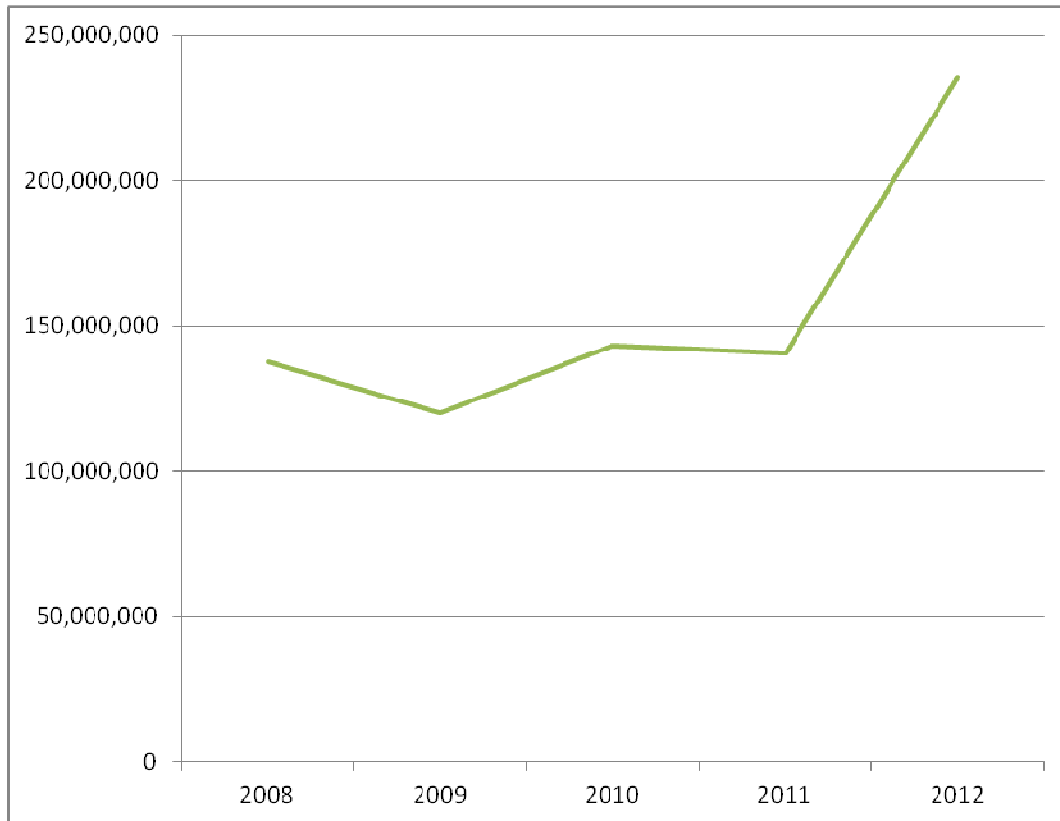


Fig.2: Total Value (Eth .birr) of sold products by EPI during 2008-2012

When viewed from the perspective of level of raw materials acquisition, human resources, production, sales volume and value , Ethiopia plastic industry had grown over the last four or five years possibly owing to market expansion and consequently internal capacity development of the industry. Beyond looking at its industrial profile and trend, the study examined value chain of the Ethiopia plastic industry in terms of input, production, and marketing.

5.2 Inputs and their suppliers

It is known that input suppliers are the front actors in the value chain. For EPI, almost all the input suppliers are international companies from within and outside Africa. It was found out that major suppliers of electric and wire include United Industries-Elswedey (Egypt), UMT Uluslalarasi (Turkey), and Metal Fabrication (Zambia). Suppliers of inputs for PVC pipe and conduit products include A.T.M Company (Egypt), Technochem (U.A.E), and Endeco ((Italy). Many of these input supplying companies have agents in Addis Ababa.

During focus group discussions with the input planning and acquisition officers of EPI, the key and commonly types of inputs procured by the company were identified. These include copper, primary insulation, secondary insulation, L.D.P.E, PPR and PVC. There are hardly any inputs supplied from local sources other than from the international ones indicated above. A major weakness of this international supply is the foreign currency depletion and the resulting high cost of inputs. An additional challenge the industry is facing the long and sluggish international purchase system. Table 4 presents the process flow of international purchase of inputs in EPI as per the discussions with pertinent staff and officers of the industry.

Table 4: Process steps description for international purchase

step	Process steps
1.	Receive approved purchase requisition and register it.
2.	Check the contents of the PR whether the description stated is enough to proceed on the purchasing processes.
3.	If checked, doesn't fulfill the necessary requirements, then it will be returned back to PA. However, if fulfills, then will proceed to the next purchasing process step 4.
4.	Bidders will be invited directly, open tender or short list tender basis based on the type and quantity of the purchase quantity and then quotations will be collected.
5.	Collect quotations from the suppliers.
6.	Open and evaluate quotations by purchase committee and submit the proposal for decision by the general manager.
7.	If the proposal is approved, then proceed to step 8; but if the proposal is rejected, then stop the purchasing process.
8.	If the supplier is supplying for the first time , ask for sample, receive sample and deliver to PA to issue to QMS or requesting unit for testing/inspection, however if the supplier has supplied previously, get confirmation letter and proceed to step 10 .
9.	If the sample tested/inspected is accepted, proceed to step 10, but if the sample tested/inspected failed, then the management will decide on the outcome.
10.	Prepare purchase order, award letter, and contract document and sign and send to the winner.
11.	Collect performance bond from the supplier, if required.
12.	Effect payment by cash or telegraphic transfer or letter of credit for the purchase to the supplier.
13.	Follow up the delivery process of the purchase, receive and deliver the material to property administration process and collect goods receiving note collect declaration from customs office.
14.	Inspection form will be filed by PA and issued to quality management service or requesting unit for inspection or test; if checked and accepted, GRN will be prepared, if not accepted , the management will decided on the

5.3 Production process

EPI has a procedure with intent to assure the implementation and execution of production process steps that contribute the fulfillment of product quality and reputable customer service. This procedure applied for all products and production processes of Ethiopia Plastic Industry.

The purpose of this procedure is to assure the implementation and execution of production process steps that significantly contribute the fulfillment of product quality and reputable customer service. The production core process is responsible for the procedure. The procedure involves raw material, process and product. The raw material is input material to the process which means a series of activities that convert one or more inputs (raw materials) into a product which in turn is defined as is an output that has value to customers. This component of the internal value chain aims to timely mobilization of resources, speed up production and delivery, minimize non-value adding activities and improve product quality.

The chain of activities in the production component of the chain was sequentially mapped out and constructed together with the officers and staff of the EPI (Fig 3.) The process steps ranging from raw material acquisition to production are briefly described

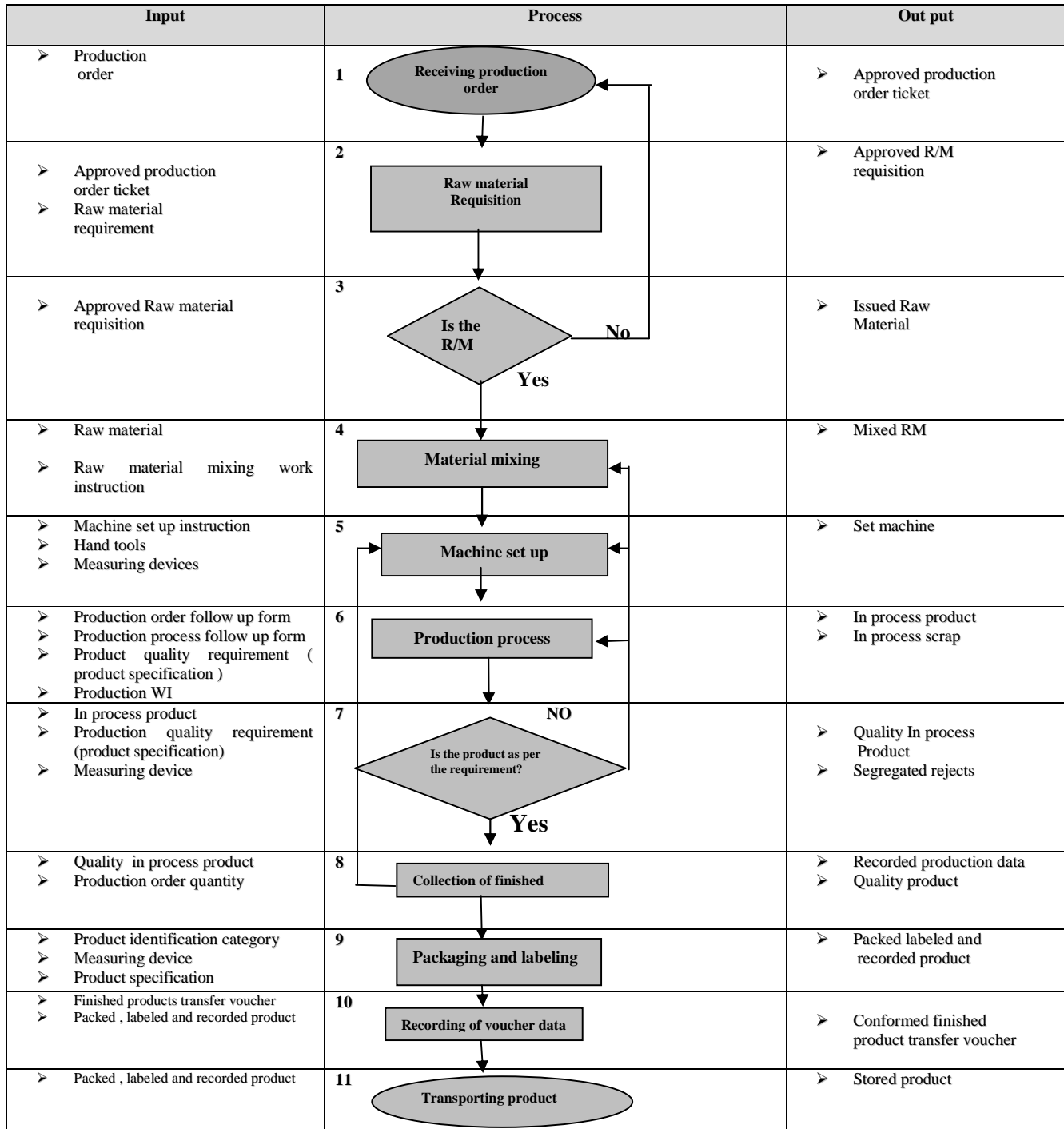


Fig 3: Input acquisition and production process flow chart

in table 4 as an elaboration of schematic representation given in Fig. 3. It was observed that the machinery operation is guided by operation manuals and that work instructions

have been developed for following production process steps. EPI does also have quality approval of product requirements.

Based on the on-site observation, the factory has a monitoring and evaluation using indicators and records, like daily scrap and non conforming product, daily machine down time, production order follow up, daily raw material issued and returned, daily finished product transfer and production progress follow up. These records are used to gauge the status and progress of the production process of the factory which signal at least partially symptoms of performance of the value chain.

Table 5: Description of the production process Steps (Input Requisition, acquisition to product):

step	Process Steps
1.	Production order is received from BDS. Job order ticket and order follow up forms are developed and passed to PD.
2.	Raw material requisition is prepared by PS and approved by EH/ PP.
3.	The availability of raw material is checked by EH/ PP and then if the answer is no, return the order back to step 1.
4.	Do the mixing as per mixing ratio CD
5.	Machine set up is conducted as per work instruction. Check the necessary hand tools.
6.	Check all necessary measuring devices whether calibrated or not continuing machine operating process as per production order follow up form prepared by supervisor. Check in process product whether it is as per customer requirement or as per industry standard.
7.	In process product is checked by quality controller and PS whether the product meets the requirement or not, if not check back to step 6,5 and 4
8.	Continue production process as per the requirement in process products and finished products are collected as per the specification if the product is left with another process steps continue the process by going back to step 5. (This is for printing, bag making, cable production etc.) In process scrap and nonconforming products should be identified by MO and collected and labeled by PW and then checked by quality controller and PS. Rejects and scraps are transfer to

	recovery center.
9.	Packing and labeling of products is conducted as per the labeling and packing criteria
10.	Finished production information is recorded on transfer voucher.
11.	Finished products are transported to finished products store.

It was observed that the actual production process involves material mixing, machine step, transformation and product development. For example for PVC, Cac03, Resin, Master batch and lubricant are mixed. For electric wires, primary insulation, secondary insulation and F.L. insulation are mixed and processed. Main categories of products are poly, electric wire and cable and PVC. Products are labeled in terms of date, quantity, diameter and length of production. In the packaging phase, products are wrapped and sealed. Voucher data management involving good transfer, receiving and delivery notes follows packaging. Storage and transport proceeds and precedes the sales procedures which are described below as per the practice of EPI.

5.4 Sales processing

EPI has designed a sales procedure aiming at ensuring that review is conducted prior to the industries commitment to supply product to the customer and to verify that requirements of the contract are well understood, and at examining sales contracts for its relevancy, profitability and capability. The sales performance management targets that there is no misunderstanding of customer requirement and that customer's orders are processed in time.

The industry uses various sales modalities such as a sales process through performa invoice and cash Sales, Prepaid sales process, Sales under Credit and Contractual

Agreement and Retail sales (sales process at shop) . Each modality is schematically described below.

The Sales Process through Performa Invoice and Cash Sales involves giving prices through Performa invoice including delivery time, terms of payment and price validity date (see Fig 4 and Table 5). In this case, winning customers can directly pay and collect the product. The sales staff of EPI opined that this procedure is strong because it

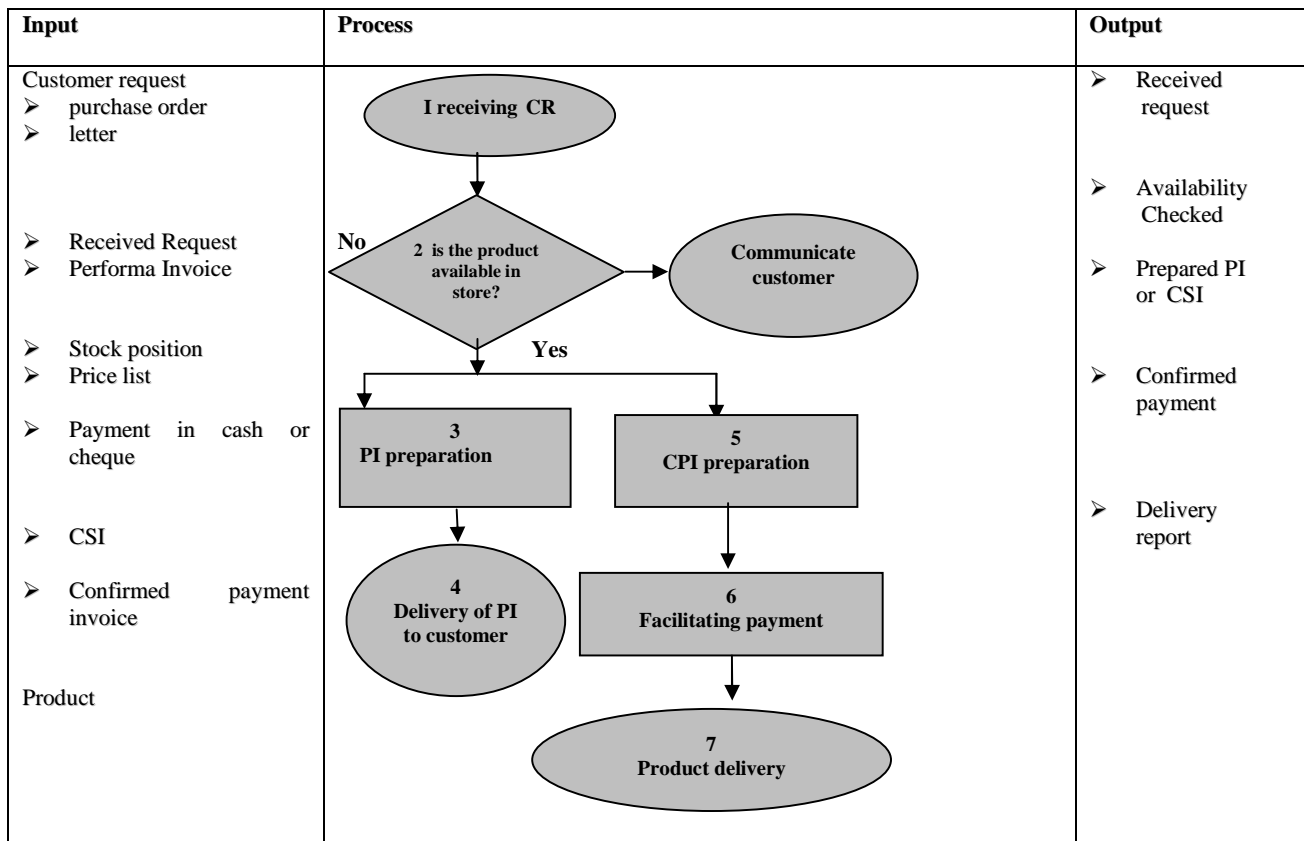


Fig. 4: Process Flowchart: A Sales Process through Performa Invoice and Cash Sales

Source:

Table 5. Sales Process through Performa Invoice and Cash Sales

Step	Process Steps
1.	Receiving customer's request that could be presented in words, purchase order, request letter /perform invoice or other means.
2.	The sales person checks for the product availability in the store. If not he will communicate the customer, if the product is available continue to step 3 or 4
3.	If the need of the customer is to take Performa invoice, PI will be prepared up on customer's request.
4.	Deliver the Performa invoice to customer personally or through fax
5.	If the customer needs to buy directly or when customer accepted the Performa cash sales invoice will be prepared by sales person.
6.	Cashier verifies the payment receipt for its accuracy and collects the money
7.	The store assistant checks the accuracy of delivery documents and the product is delivered to the customer.

is easy to collect money and customers can be satisfied when they get the product quickly. However, on the weak side, the factory needs to have products in stock always in situations where markets are fluctuating. On the other hand marketing staff of EPI speculated that the increasing number of such customers in Ethiopia is an opportunity to expand sales volume of the industry.

In the prepaid sales process, EPI requires customers will pay either 50% or 100% in advance. Order will be transferred to production based on their requirement. Delivery time will be set by agreement with the customers and production. Customers will be informed through telephone when the product is ready for delivery. The sales staff said that this procedure enables EPI to collect money easily. In addition, EPI does not need

to have products in stock. On the down side, customers have to wait until the product is produced.

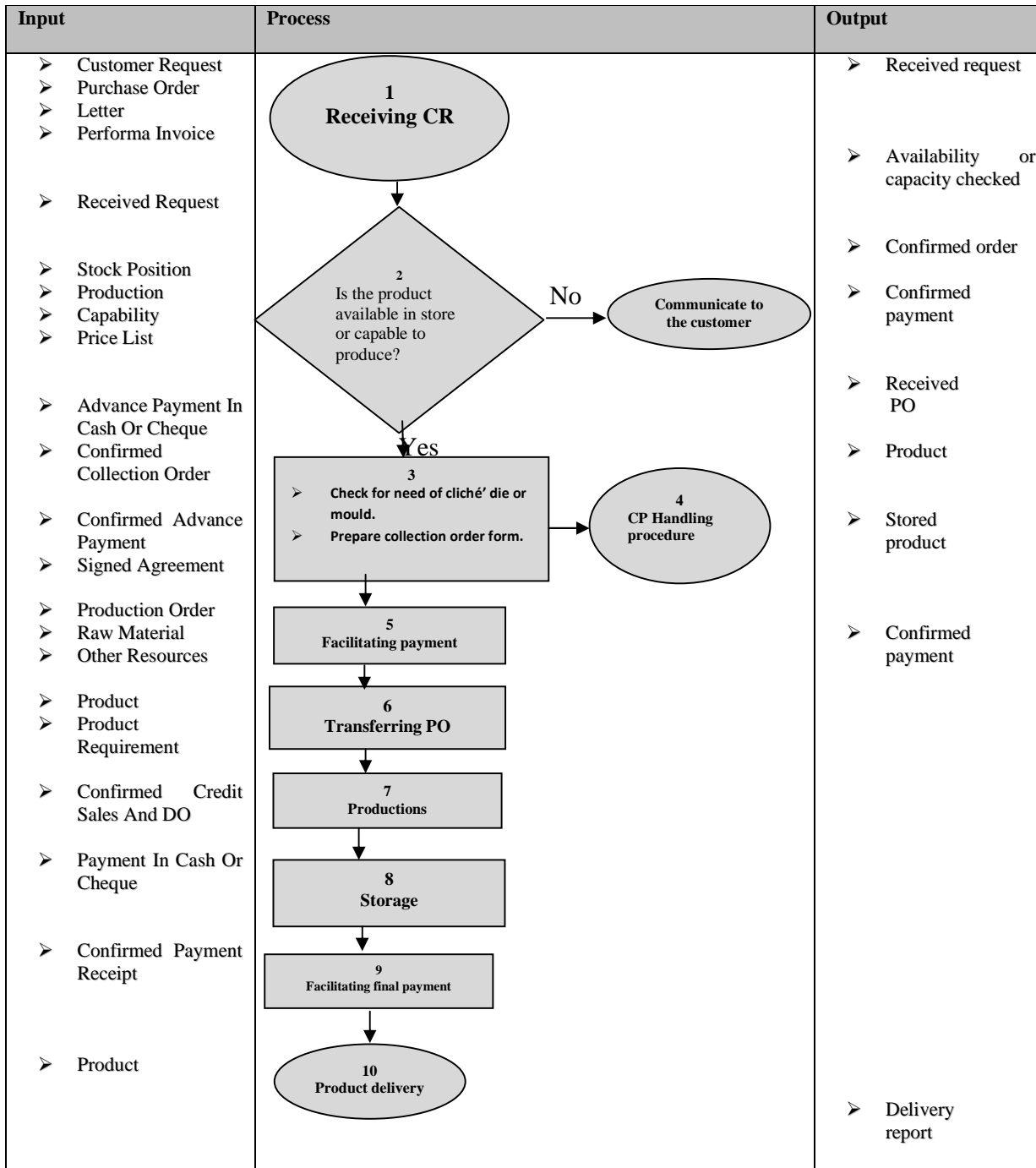


Fig. 5: Prepaid sales process

Table 6. Process of Prepaid sales

Step	Process Steps
1.	Receiving customer's request that could be presented in words, purchase order, request letter /perform invoice or other means.
2.	The sales person checks for the product availability in the store or capability to produce. If not it will be communicated to the customer, if the product is available in store or capable to produce continue to step 3
3.	The sales person checks the need of clichés, die or mould and prepares collection order form advance payment.(50%- 100%)
4.	Customer property is treated as per customer handing procedure.
5.	Cashier verifies the payment receipt for its accuracy and collects the money.
6.	Prepare production work order form according to the specification of the product and distribute the production order to production core process, General Manager, quality management service and finished product store.
7.	Based on the production work order, the items are produced by using the right input and process. <ul style="list-style-type: none"> ➤ Deliver the finished product to the store before or on delivery date promised to customer.
8.	Finished products shall be assorted in store manner to maintain its original quality until it is delivered to customers. Incoming and outgoing product items shall be recorded and reported to sales and customer service process periodically.
9.	The sales person communicates with customer to facilitate for final payments. <ul style="list-style-type: none"> ➤ Credit sales invoice and delivery order are prepared by sales person. ➤ The remaining balance will be is collected by cashier.
10.	The store assistant checks the accuracy of delivery documents and the product is delivered to the customer.

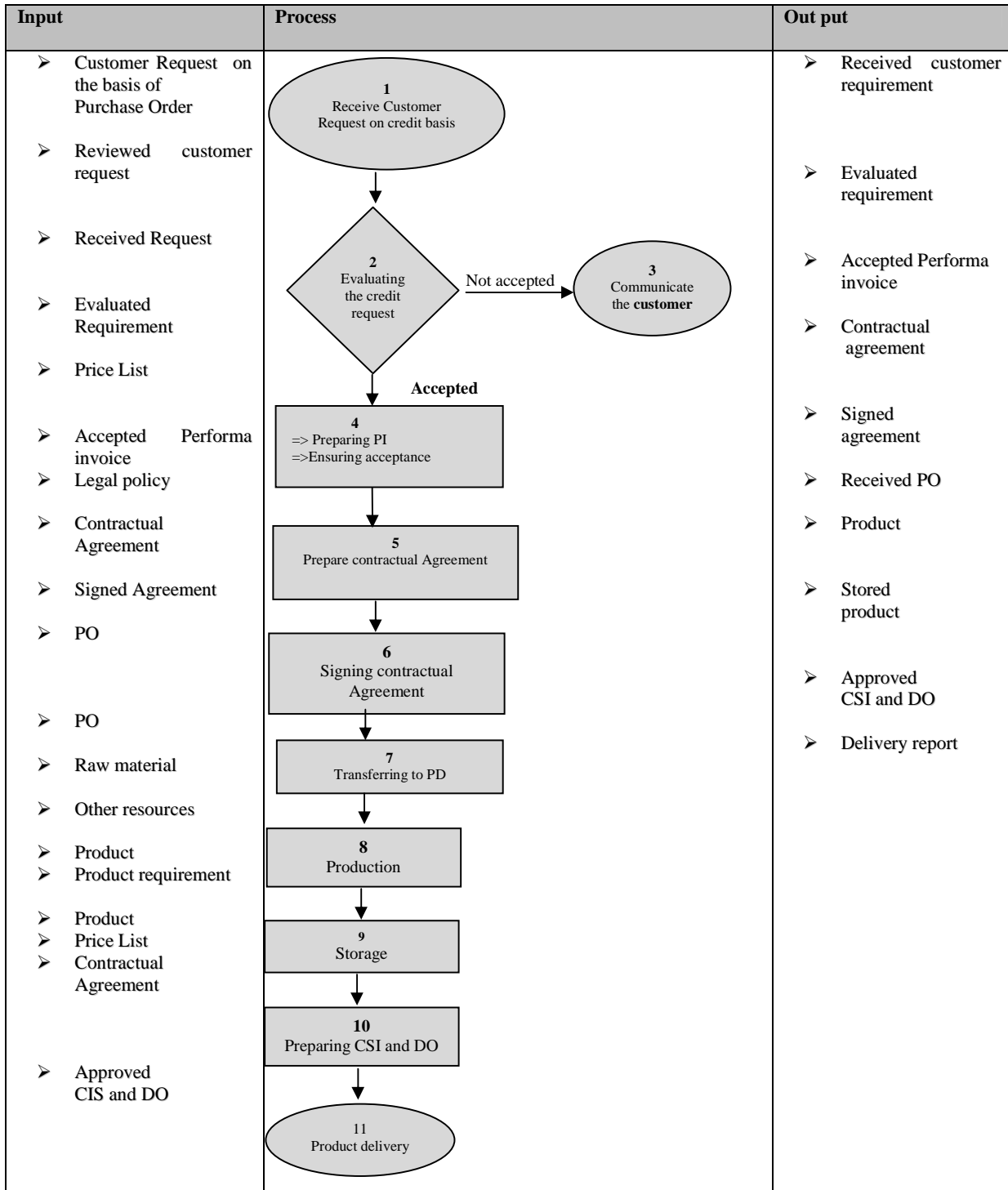


Fig. 6: Sales under Credit and Contractual Agreement

The credit and contract agreement based sales procedure is used with big organizations (both governmental and non-governmental) and when it is bid. The EPI sales managers said that this procedure increases sales volume because it usually involves bulk orders. Additionally, it helps to have long terms customers. On the other hand, the staff lamented that this needs high cash amount and working capital. Further, it demands for high follow up to collect money. Table 5 and Fig 6 demonstrably illustrate the credit and contract agreement based sales process.

Table 7: Sales under Credit and Contractual Agreement

Step	Process Steps
1.	Customer's requests on the bases of credit are received.
2.	The request is evaluated in terms of price, volume, delivery time etc and if it is accepted continue step 4 if not communicate to the customer.
3.	If the proposal is accepted by the G/manager continue step 4 if not the G/manager will discuss with BDS manager up on the proposal.
4.	Performa invoice will be produced based on the proposal and its acceptance will be checked.
5.	If both parties reach common understanding contractual agreement will be prepared.
6.	Contractual agreement will be signed on both parties and administration and finance support process will be informed.
7.	Prepare production work order form according to the specification of the product and distribute the production order to production core process, General manger quality management service and finished product store.
8.	<p>Based on the production work order, the items are produced by using the right input and process.</p> <ul style="list-style-type: none"> ➤ Deliver the finished product to the store before or on delivery date promised to customers.
9.	<p>Finished products shall be assorted in store in a manner to maintain its original quality until it is delivered to customer.</p> <ul style="list-style-type: none"> ➤ Incoming and outgoing product items shall be recorded and reported to sales and customer service process periodically.
10.	Based on the contractual agreement credit sales invoice and delivery order are prepared by sales person and administration and finance support process will be informed for payment facilitation.
11.	The store assistant checks the accuracy of delivery documents and the product is delivered to the customer.

EPI undertakes the retail Sales procedure through sales agent which involves a couple of steps. The shop worker requests necessary products needed by the customer. The sales person checks for the product availability in the store and prepares credit sales invoice and delivery order based on shop worker's request. Then, the store assistant checks the accuracy of delivery documents and the product is delivered to the shop. The shop worker will come to the customer and receive customer's request and check the availability of the product. If the product in need is available in the store continue next step if not communicate to the customer. If the product is available he/she will prepare VAT ticket, collect the money and deliver the product. At the end of working hour of day the shop worker cross checks the collected money against VAT ticket sold, summarizes and transfers to cashier.

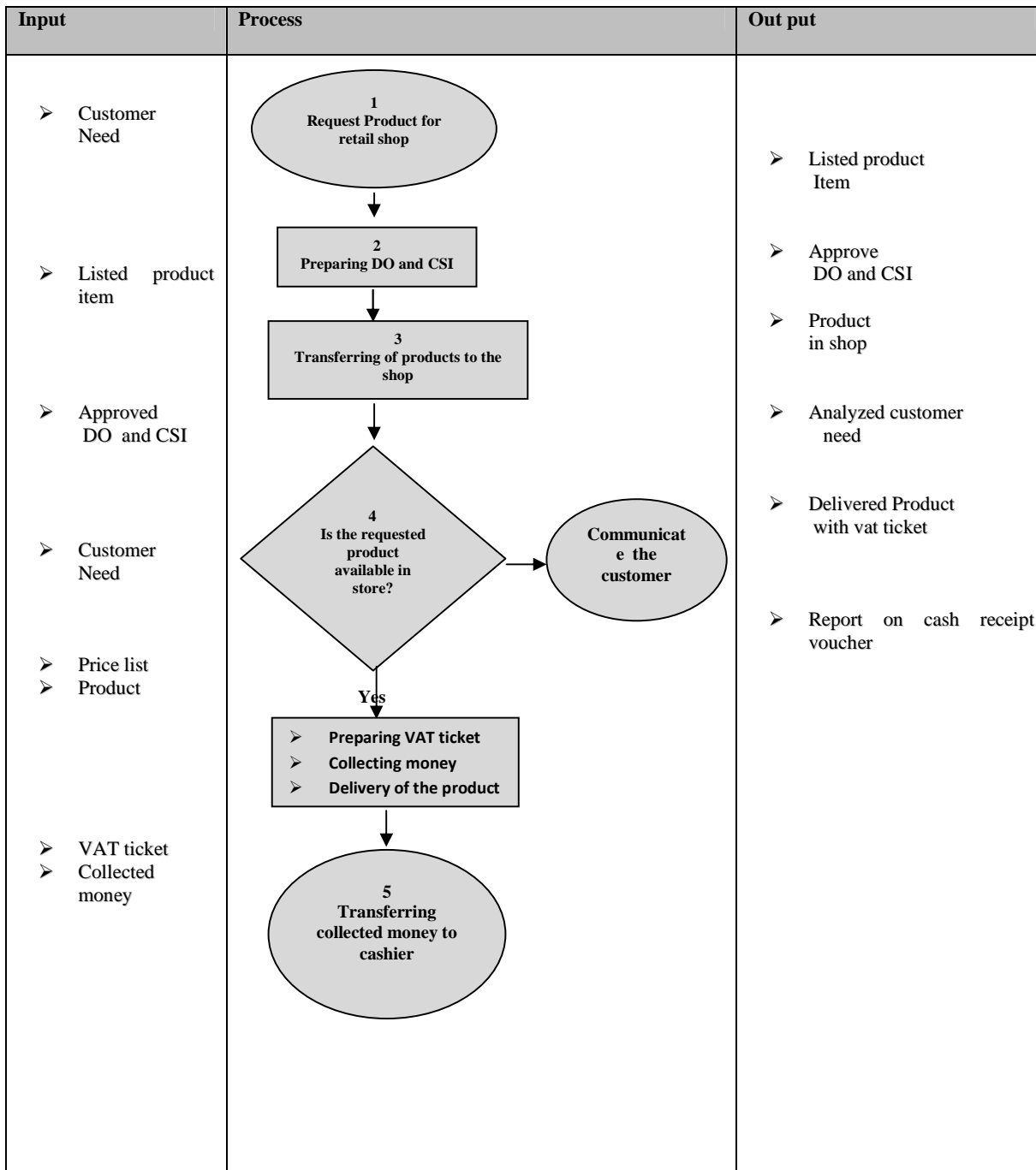


Fig. 4: Retail Sales /sales process at shop

5.5. Consumption (Customers' perspective)

EPI has a number of relatively big and large numbers of customers including governmental and non-governmental organization in Ethiopia. Major customers of the construction plastic (electric wire, cable products, PVC pipe and conduit products) are housing development, Project offices, for example, Addis Ababa, Oromia, Tendaho housing Development projects and real estate's ((like Gift and Eny), construction industries (e.g. Defence, Akir, Teklebrhan etc) and government organizations (e.g. Telecom, EEPCO).

The perspective of customers is important for the future competitiveness of the industry. In recent years, there has been growing interest in the value construct among managers and researchers. This interest is triggered by the belief that managing companies from value-based perspective will increase the likelihood of gaining competitive advantage and long-term success. Literatures show that superior value of products or service delivered to customers leads to customer loyalty, which is the real driver of financial performance (Kalifa, 2004). Therefore, there is a strong connection between loyalty, profits and value created for customers. Customers will be loyal to the company, if it offers them superior value compared to company's competitors (Kalifa, 2004).

From the discussions with some of the customers of EPI listed above, the overall relationship of the Ethiopia plastic industry is good. However, EPI can still improve some areas of its operation. The industry needs to show improvements in such areas as

sales delivery and information in real time. EPI can create value through consolidating customers' supply chain base through fast and sustainable relationships. Customers need no longer be mere passive recipients of value propositions offered by companies (Ramaswamy, 2008). Thus, customers of EPI should be involved in the process of co-creating value. If efficient communication process and interactions is created between customers and EPI employees, this can lead to the successful customer involvement.

Customers said the use of information technology is underutilized by EPI. For example, EPI does not have a website. EPI should always follow developments in information technology and, thus, with the right information flow, it can establish high quality customer service, where all doubts and problems can be solved immediately. The use of information systems can help to maintain and enhance image of the industry, which cares about close contact with customers. Moreover, information systems are the foundation for promoting new products and facilitation of the procurement and sales process. Information systems can simplify and speed up most the complicated procedures ranging from input acquisition to sales processing.

If EPI is to become modern industry, it needs to be increasingly automated by means of information technologies. First of all, the industry can perform successfully only when information about its activity is easily accessible by the business partners and the customers. Secondly, the information flow in the industry's units should be clear and dynamic. It happened that information is considered as one of the most important assets in the business reality.

Therefore, if more and more values are to be created for customers, EPI has to use communications tools widely. EPI customers revealed that the industry lacks systems of communication with customers on the products it delivers. Customers' satisfaction is the key element of the company's success. To understand their requirements and demands, EPI needs to check customers' opinions by sending questionnaires and asking for feedback. The judgments help to improve performance and correct mistakes; make service friendlier and more valuable for customers.

Customers expressed their observations that EPI has been performing largely with paper documents to manage an information flow. Nevertheless, simultaneously with fast development and growing number of orders and production shown in the above, the industry has to create special automated system. When such a system is properly in place, it will help to manage orders, shorten delivery time and reduce number of human errors. Summing up, EPI has to carefully evaluate its internal environment, maintain and enhance its strengths by constantly investing in its resources especially in modern ICT tools and services.

5.6. Overall chain management issues

In order to understand the strengths, weaknesses, threats and opportunities for competitiveness of the industry, a series of key informant interviews and focus group discussions were conducted with top and middle level management of EPI.

The managers gave reflections on the context in which the industry operates based on the principles of Porter (1985). Accordingly, the managers envisage that there is a threat of new entrants to the industry in the long term due to the growing market for plastic driven by the booming construction sector in Ethiopia. However, they believe new entrants will face challenges before they can become competitive. The sector of plastic products is sanctioned by standard requirements. Companies operating on the market are obligated to possess special quality certificates which confirm that their products fit to the norm which takes time to meet. Therefore, it is quite difficult for the new competitors to come up on the market.

New entrants can also find difficulties in gathering raw material for production from international sources since the sector suffers from the lack of domestic supply. Moreover, the new entrant needs to have a relatively high technological sophistication (automation) of the process especially if it is to become a market leader. Nevertheless, as the construction sector is characterized by high growth, its attractiveness for the new entrant increases despite those challenges. Thus, EPI has to strengthen its business relationships that already exist on the market and create a more optimal situation to sustain its competitiveness in the future.

The EPI managers expressed the concern that this industry has not yet created wide network with input suppliers in the international market. The existing suppliers are limited and their bargaining power is high. They can negatively affect EPI activity by setting high price for the raw material as there is no supply or substitute in the domestic

market. Therefore, it is a good idea is to sign long-term contracts to reduce or avoid the risk of price hike. Diversification of suppliers via proper communication and modern promotion system is another approach EPI can use for lessening its vulnerability to high bargaining power of suppliers.

Bargaining power of buyers explores how strong the buyer's position is in the industry. EPI managers feel that given the growing demand of the construction, power of negotiation of buyers' is limited. However, especially big housing projects such as those in the ministry of construction and urban development have strong position as they order big amount of products which gives them such a big power. Despite the national growth in the construction sector, the managers think that with the envisaged entrants in the long term to the market, negotiation power of buyers' will increase in the future.

An analysis of threat of substitute products or services explores how large possibility and impact of substitute products can be within the industry. EPI managers expressed that the range of products is rather small but there still exist some substitutes in the international market. Nor are they available locally. Nevertheless, popularity of substitutive products is not high and their relative quality and economic efficiency is hardly known. Therefore, there is no high threat that substitutes can revolutionize the construction plastic industry in Ethiopia.

Rivalry among existing competitors is based on the exact market competition among the same industries. Presently there are hardly any other industries that can compete with Ethiopia plastic industry. However, in order to achieve the superior competitive position,

EPI has to increase its quality and punctuality. Therefore, the construction plastic is perceived to be attractive although there are quite high entry barriers for new members to cross. This is a great opportunity for EPI to further flourish. Thus, EPI might opt for spending its surplus on both production and marketing as there is high potential for quick development.

The factors described above that addressed the external environment are favorable for the competitiveness of the EPI. However, an internal environment plays a decisive role in an industrial competitiveness. By analysing the internal environment, companies can determine what they are able to do, i.e. actions permitted by company's resources, capabilities and core competencies. Therefore, it is significant to identify elements that can help to gain greater market share and be successful. Therefore, we will evaluate EPI's resources, capabilities and core competencies, which are the main factors that give company the foundation for the competitive advantage.

According to EPI's managers, financial situation is rather stable with some seasonal problems with cash flow. The problem occurs when it comes to access to raw material as it involves foreign currency. Therefore, sometimes the EPI suffers from the lack or delay of raw materials all of which cannot be replaced by other material from local market.

On the other hand, the managers said that EPI has yet to be led by experienced management staff which is not currently in place. Although the existing bodies believe in success and put a big effort to develop EPI's performance, they have to further

professionalize themselves if they are to, concretely gain customers' satisfaction which is one of valuable measure of business effectiveness. According to human resource managers of EPI, sales representatives are trained but need to possess additional skills to gain new customers and their appreciation. It was observed that the EPI has not built brand awareness yet, and, therefore, can lose many of the potential customers if progress is not made in this arena.

The other factor which helps to gain competitive advantage is the company's capacity to use all its resources effectively. Mostly, it is the human component of the company which is the base for many capabilities. Therefore, the most significant capabilities are an effective customer's service led by experienced sales representatives and production employees, who make their job with the highest diligence assuring quality of the products. EPI has yet to develop effective management techniques, if it has to result in the fast growth and development of the industry in the near future. EPI needs to have clear view for the future and ability to emerge both existing and future resources by developing required core competencies. The industry has to empower its human resources by introducing, implementing, monitoring, evaluating and continuously improving state of the art quality management systems.

6. Conclusions and recommendations

The overall objective of this study was to identify and analyze the construction plastic value chain of Ethiopia Plastic Industry as a basis for developing an understanding for

the constraints to and opportunities for enhancing the competitiveness of the industry in the country. When viewed from the perspective of level of raw materials acquisition, human resources, production, sales volume and value , Ethiopia plastic industry had grown over the last four or five years possibly owing to market expansion and consequently internal capacity development of the industry. The study identified inputs and their suppliers which are totally from international sources. A detailed and participatory information inquisition process has made it possible to properly single out particularly the internal value chain of the industry. A series of internal activities and their linkages were mapped out to understand production process ranging from input requisition, acquisition, raw material mixing to product development and delivery. Various modalities of sales processing were identified including their advantages and disadvantages that shape the competitiveness of the industry. Additionally, customers perspective on the strengths and weaknesses of the industry was also explored. The study has also given the top and middle management of EPI to reflect on the industrial environment using Porters forces. Those being the recaps of the findings of the study, reflections are given below on the implications.

For a company such as EPI to survive in today's highly flooded markets a company must, at least temporarily, achieve a competitive advantage which is achieved via two generic management strategies such as price leadership and differentiation. Price leadership is simply when a company keeps prices below those of his competitors. Differentiation occurs when a company creates a distinctive position in the market through product functionality, service, or quality.

If either of these two management strategies is chosen to be implemented by a company, value chain analysis can help the firm focus its plan and thus achieve a competitive advantage. There are two components of value chain analysis: the company's internal value chain and industry value chain and. The internal value chain of a company includes all the value creating activities within that specific firm. The industry value chain includes all of the value-creating activities within the whole industry, beginning with the basic raw material and finishing with the delivery of the product.

A firm's like EPI internal value chain includes all the physical and technological activities within the company that add value to the product. The key to evaluating a company's internal value chain is to understand the activities that give that company a competitive advantage, and then pin point and exploit those advantages better than other companies in the industry. This research explored the internal value chain of the EPI. However, the industry needs to further evaluate itself and enhance its competitiveness. The self evaluation of the internal value chain of the industry can be done using the following steps.

Firstly, the industry has to identify its value chain. A series of discrete activities that create value in different ways have to be identified. They will include different costs, different cost drivers, separable assets, and different personnel involved. Along this line, the industry has to identify structural, procedural, and operational activities. Structural activities determine the basic economic nature of the company. Procedural activities include all aspects of the firm's operations and reflect the company's ability to

carry out the processes efficiently and effectively. Proponents of value chain analysis say that structural and procedural activities need to be focused as operational activities are too narrow and may not be able to give the company an overall competitive advantage.

Secondly, the industry has to determine which activities are strategic. To determine which activities are strategic a company such as EPI must identify which product characteristics are valued by existing customers. Via relationship with customers, a company should then find characteristics that it can exploit, and thereby create value for future customers. Examples of these characteristics are quality, service, or any tangible or intangible product features.

Thirdly, the industry has to trace costs to activities. For example, EPI needs an accounting technique that traces costs to different value chain activities inside the industry. This is important for a company to focus on these value-added processes, so they will be able to manage them more efficiently.

Finally, the industry has to improve management of value chain activities. To achieve a competitive advantage a company must manage their value chain better than their competitors. This means reducing a company's total cost while enlarging the competitive advantage. This does not however mean that all costs have to be reduced; it means that all costs that do not adversely affect the competitive advantage can and should be reduced. Thus, industries like EPI undertake a self evaluation using the above steps; they will find the entry points for becoming competitive.

Value chain approach helps firms to assess competitive advantage via following types of analysis: The first is internal cost analysis which determines the sources of profitability and the relative cost positions of internal value-creating processes. The second is internal differentiation analysis which helps to understand the sources of differentiation (including the cost) within internal value-creating processes.

Additionally, vertical linkage analysis enables to understand the relationships and associated costs among external suppliers and customers in order to maximize the value delivered to customers and to minimize cost. There has been growing interest in the value construct among managers and researchers. This interest is triggered by the belief that managing companies from value-based perspective will increase the likelihood of gaining competitive advantage and long-term success. The literature shows that superior value of products or service delivered to customers leads to customer loyalty, which is the real driver of financial performance.

The role the use of information and communication tools has to be emphasized when to addressing customers and suppliers. There is a need for continuous learning about customer value, as its magnitude and the attributes that customers use to judge value can change over time. Companies cannot depend only on what they currently know about customer value, they have to anticipate what customers will value next, so that they will be ready to implement changes faster than competitors. Thus, continuous and fast communication with customers is needed.

The study showed that information technology tools are underutilized by EPI. The industry has to invest also in a website development and continuous up-date. This website

should be used to communicate with the environment, to inform about the new products changes in an offer, helps to find new domestic and international customers and suppliers. Information about EPI should also be found on thematically connected internet sites. Through the website, EPI needs to check customers' opinions by displaying online-questionnaires and asking for feedback and understand their requirements and demands. The judgments help to improve performance and correct mistakes; make service friendlier and more valuable for customers.

Summing up, the value chain approach for assessing competitive advantage is an integral part of the strategic planning process. Like strategic planning, value chain analysis is a continuous process of gathering, evaluating and communicating information for business decision making. By stimulating strategic thinking, the analysis helps managers such as those of EPI to envision the company's future and implement decisions to gain competitive advantage.

Finally this study has examined the value chain of the Ethiopia plastic industry. The research is exploratory and largely focused on the internal environment of the industry. In order to capture a complete picture of the competitiveness of the industry more detailed and rigorous studies need to be conducted on the sources of profitability and the relative cost positions of internal value-creating processes (internal cost analysis) and on the sources of differentiation (including the cost) within internal value-creating processes (internal differentiation). In addition to the internal environment, future researches can analyze vertical linkage in which the relationships and associated costs among external suppliers and customers can be understood in order to maximize the

value delivered to customers and to minimize cost. Such future researches have to apply a value chain approach and assess competitive advantage of the industry.

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8. Annexes: