

# The Impacts of Supply Chain Management on Product Quality

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**Abstract:** Today collaboration between different departments and companies in the chain is vital for the success of each chain. Although the importance of supply chain relations is widely acknowledged, seamless coordination is rarely achieved in practice in most companies. The paper investigates the impacts of supply chain integration on product quality as a case in Biruh Tesfa Plastic Products Plc. Biruh Tesfa Plastic Products Plc is a private company established under DEJENNA Endowment in September 2004. The factory is found at Mekelle the capital of Tigray regional state, the prime objective of the factory is to produce different PE pipes applicable for both pressurized Irrigation as well as water transportation purposes fittings of different size. Tabular films useful for seeding conduits flexible rigid and other plastic products designed for supporting the agricultural sector of the country play a major role in the endeavor for securing sustainable food production with the application of scarce water resources. Bruh Tesfa irrigation\_water technology company has been producing different plastic products; such as conduits, water supplying pipes (with different sizes), drip irrigation elements, tabular films. And the company has a distribution center in the company and three additional distribution centers in Addis Ababa, Alamata and Mahoney. However the company has faced the quality problems in two critical areas, which affects the quality of the final product of the company;

1. Quality problems in production processes. These problems are raised due to operator, machine and raw material quality problems. Raw materials quality problem occurred due to lack of communication between production and purchasing department. The purchasing request from production department does not have detail specification of raw materials similarly purchaser does not try to cross check the request with specifications of items. Simply, the raw materials are purchased as per the production department order.

2. Lack of in-coming raw materials inspection. There is no responsible person in the company to inspect the in-coming raw materials and similarly the raw materials are not inspected before production. Due to this problem, the company is not able to take delivery of the purchased raw materials from suppliers swiftly; the purchasers exterminate their time to search the person who is able to check the quality of raw materials. This delay affects the collaborative relationships of the company with suppliers. Lack of information about purchased items in store management section is also another factor for delay to receive purchased items. The objective of this study is to discover, interpret and introducing the supply chain Integration models for improving the quality of the product within the company. Due to scarcity of quantifiable data on the integration system in the company, this study heavily depends on qualitative analysis of the internal, supply and customer integration system for the company.

**Keywords:** Supply Chain Management, Product Quality, Supply Chain Integration

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## I. Research Questions

Recent studies have indicated that supply chain integration will directly lead to considerable improvement in firm's performance. And also to achieve competitive advantage, supply chain integration is crucial. However, most of the previous researches have failed to separate supply chain integration into different stages. Therefore, this study will specifically aim to present and test hypotheses linking the stage of supply chain integration and product quality.

### Supply Chain Integration and Product Quality Performance

According to Total Quality Management (TQM), the key issue, regarding extension of a total quality approach across the organizational interface is, essentially, related to integration and effective collaboration between functions and between customers and suppliers can increase product quality. To support this statement, Wisner and Staley [6] surveyed 500 purchasing professionals and found that their high level of service quality, leading to customer satisfaction, was related to the level of collaboration with internal suppliers and internal customers. Moreover, inter-functional integration within a firm can improve performance, in terms of better customer service.

Extended to external integration, integrating with suppliers, in terms of supplier participation and information sharing; can help companies achieve higher product quality performance. In addition, strategic supplier partnership through technology sharing has been reported to yield specific benefits, in terms of product quality. Besides supply integration, demand integration is also significantly related to product quality, in terms

of customer satisfaction and product customization, because firms that closely interact with selected customers will better understand the detailed wants and needs of their customers. *Basnet et al* find significant correlation between information sharing with customers through an understanding of customer need and product quality.

Therefore, the following hypothesis was established:

*Hypotheses 1a-1c: The higher the supply chain integration (a) internal, (b) supply, and (c) customer integration, the higher product quality performance*

## II. Methodology

The research method employed to test the hypothesis is questionnaire and interview. Empirical data was obtained through interview to production, purchasing marketing and quality department managers. The approach utilized was as follows;( 1) Contact production and purchasing managers, who have knowledge of supply chain management practices to know how much they used supply chain management practices in their company; To address these objective the interviewed questions were focused on; Communications between different departments regarding new product or process development project and type and quality of purchased raw materials, Transparency between production and Inventory management section. This question helps to know whether the production section has transparent information about the status of inventory or not, the last questions for these departments were raised to know activities of different departments in the company on, providing each other with their plan, Collaborations of them with the company development program, Sharing of Technical Information, ideas and resources with each other quickly if required

(2) Contact Quality and marketing department managers to get information associated with product quality. To know the current quality control system of the company and how much they know, the impacts of supply chain integration on product quality. The following questions were raised to;

How do you control the quality of the product?

Do your customers satisfied with the quality of your product and the way how they get feedback from their customers.

Do you have effective communications with your customers on product quality and new product development?

Finally, after discussing about the role and benefits of each supply chain integration with the workers of the company, questionnaire was distributed to them to rate the importance of these variables on product quality as per their company perspective. Some of the questionnaires have been filled through structured interview. The total numbers of distributed questionnaires were 80. Among these, 75 responses were returned at a response rate of 93.75%, which is a good response

## III. Results Found From the Study

On the study, the impacts of independent variables (internal, customer and supply integration) on the dependent variable (product quality) was analyzed

### Internal Integration

The main actors for internal integration in the company are supply department, marketing department, production department, quality department, store management section, human resource management and the company manager. But on that instant in the company except supply department, all others have not knowledge about the applications of supply chain management constructs. The respondent said that the quality issues of a product in the company is left to quality department, and also the quality controlling system of quality department mainly focuses on production process. In production process, quality inspectors faces the following quality problems on the manufactured product; oval shape formation, thickness variation, hole formation, incorrect hole position, space variation and flow rate variation. All these possible problems are happened due to quality problems of raw materials, machine and operator. But these situations are not communicated to other departments to take an immediate action to improve the problems. So communication among these entities is not always clear or consistent, and each may optimize to their own objectives without regard for others. The results can drastically affect profitability and quality of product.

Quality problem in production processes in the company is due to lack of internal integration within it as shown below

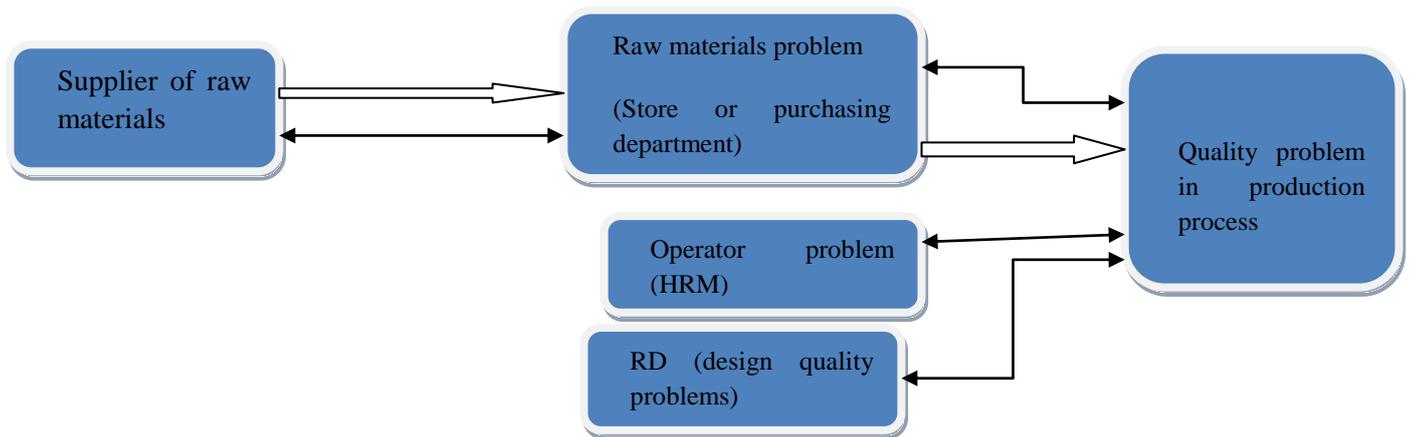


Fig 1; causes for quality problems in production process

So a product quality problem in the production process is happened due to lack of effective communication on product quality issues with in key internal supply chain processor.

**Key Internal supply chain processors who are responsible for delivering quality product to the customers in the company are;**

#### **Purchasing Processer**

The purchasing section has two purchasers, local and foreign purchasers who are responsible to purchase raw materials and office furniture from local and foreign suppliers. To do so purchasers receive purchase requests from production planning and control departments based on the demand of the production department. But the purchase request does not show detail specification of the raw materials and similarly the purchasers do not know which types of raw materials are needed. Most of the time the purchased raw materials do not fit with the specifications of shop floor workers request, such types of raw materials have a direct effect on the quality of the product.

Activities which should be done by the purchasing processer are;

#### **Recognition of the need**

The initiation of procedure starts with the recognition of the need by the needy section. The demand is lodged with the purchase department in the prescribed purchase requisition form forwarded by the production planning and control department. The purchase requisition clearly specifies the details, such as specification of materials, quality and quantity, suggested supplier, e.t.c.

#### **Placing the order**

Once supplier is selected the next step is to place the purchase order. During this time, at least six copies of purchase order are prepared by the purchase section and each copy is separately signed by the supply officer. Out of these copies, one copy each is sent to store management section, supplier, accounts section, quality department and to the department placing the requisition and one copy is retained by the purchase department for record and for further investigation on the performance of suppliers.

#### **Receiving and inspection of the materials**

For this activity, the store management section, purchaser and quality departments have to be responsible to receive the purchased items on time

#### **Store Management Section / Logistics processer/**

The store in the company has two main sections for raw materials and finished goods and one additional semi-finished goods store.

The store receives finished goods from production departments and distributes it to customers and other distributions centers. Drip element which is used as a raw material to produce drip pipe is produced in the company and sent to store departments. The drip elements stay for a long period of time until drip pipe ordered from customers, this incurred extra storage cost and it is also depreciated. But, while they are doing it, they do not consider its cost and quality effect on the production process. It is done as per the annual plan of production department. It is possible to produce it while the customer ordered the drip pipe. To do so production

department, marketing department, supply department and store management section needs to have, a joint planning and objective, and transparent communication among them on the quality issues, customer demand and capacity of the work station. The store also receives purchased raw materials from suppliers, but in this area there is no responsible department to inspect the purchased items to receive it from suppliers due to this, a delay is happened until the raw materials are inspected. This situation affects the collaborative relationship with suppliers, since the supplier needs fast service from the company. Owing to these reason suppliers are not interested to take responsibility to supply quality raw materials on time and give special supports to the company on the next times. The basic reason for this is lack of internal integration with in the company. The store section, quality department, finance department and production departments are not informed about the ordered items from the purchasing departments. The store management section knows only when the purchased goods arrived at the company.

### **Operation Processer**

Operation processers are responsible to transform raw materials in to final products. Production and quality departments are near to observe any quality problems on the production processes. But in the case industry, these departments have not a joint planning approach to resolve product quality related problems. Due to this reason, these quality problem issues couldn't be resolved within a short period of time.

So, from the above analysis it can be concluded that most of the product quality problems are due to lack of cooperative and collaborative manner of working in the company. To arrive at mutually acceptable out comes for the company, the key internal supply chain processors have to work in integrated manner. Most of the respondents also agreed that if we are doing together we can resolve our product quality problems. Customer satisfaction is dependent on the output of more than one worker or one functional area.

### **Research and Development Section**

Regarding the product development processes, the case company is working with experts from Quality department, Marketing department and Product Design and Development department. Marketing department receive customer order and sent it to product design and development. Quality department receive the order and check the feasibility as per the capacity of the Industry. If the order is feasible it is sent to supply department to purchase the required raw materials and manufacturing it. With this practice, it is observed that the case Industry did not follow an integrated heterogeneous team approach; due to this reason the Industry has faced problems on the quality of its product. To resolve quality related problems at each stage of the production process, Industries have to have an integrated system which involves experts from all the concerned and interested functions, i.e., marketing, design and development, engineering and production, departments. This expert team is working at the first stage on the needs of the customers' of the Industry. Such practice will help the industry to identify quality problems at the development stage. The manufacturing expert could point out to the designers and /or engineers the difficulty or impossibility of the manufacturability of the designed parts or the required particular specifications for each component of the order.

The marketing people could even reject, at the design level, some engineering process features that might increase only the product cost where as they are not needed by the customers likely unwilling to pay for them. Being more integrated with customers also enables the company to more quickly respond to their product changing needs in the product development processes. So the company should give more focus on customer integration than supply integration for product development stages. To do so the company should develop a plan for customer relation management system to integrate technology and operation process to meet customer requirements at any given moment

*This helps the company to create long-term, collaborative relationships with customers based on trust.*

### **Benefits of Integration**

#### **Track, trace and monitor production and inventory**

An integrated internal process of supply chain can help the company to identify items, cases and pallets for purposes of accounting, inventory control, shipping verification, billing and material handling decisions within manufacturing and distribution facilities.

- Make more informed production, inventory stock and delivery promise decisions with insight into the location of the company parts, tools and other assets at any given time.
- Take proactive control of forecasting and production scheduling, and improve turnaround times with near real-time views of asset utilization and inventory.
- Increase accounting accuracy and lower costs by tracking individual items, cases and pallets.
- Drive productivity while helping to lower the costs of downtime and waste, with better data quality, stricter item management, improved asset visibility and stronger material maintenance.

### **Requirements for Internal Integration**

Collaborative interdepartmental integration in the company involves based on trust, mutual respect and information sharing, the joint ownership of decision on quality product problems and collective responsibility for the delivery of high quality product to customer. The collaboration has to be based on cooperation (willingness) rather than on compliance (requirement). To deliver Quality Services within the Manufacturing Industry, Departments (quality, production, supply, store management, marketing, research and development, human resource management and finance departments) have to have a common agendas on the areas stated below.

### **Shared goals**

The extent to which the manager of each department is familiar with the strategic goals of each of the other department

- 1) Strategic goal of supply department
  - To search quality supplier
  - To purchase quality raw materials
- 2) Strategic goal of production department
  - To produce quality products efficiently and effectively
  - Better utilization of man power and equipment
  - Better methods and tooling
  - Better service of production control, stock control, purchasing
- 3) Strategic goal of quality department
  - Managing quality. This factor can be designated as focusing on the operational aspects of managing quality.
  - Managing employee relations in quality. This factor can be designated as focusing on the operational aspects of managing quality
  - To have better inspection and quality control in all parts of the company
  - Make operators become familiar with the work and produce jobs of consistent quality
- 4) Strategic goal of human resource department
  - Man power development
  - Giving training on processes management.
- 5) Strategic goals of marketing department
  - Better quality products of proven design at reasonable cost which leads to generates sales volume
  - Better product delivery
  - Customer relationship management (CRM).
- 6) Strategic goal of store management section
  - To manage the quality of raw materials and finished goods in the company
  - Integrative inventory management

### **Collaborations**

Internal integration refers to the collaboration and coordination among each department to resolve quality related problems and provide quality products and services to the company customers. Collaboration and coordination means that these functional areas in the company must have.

- Formal teamwork and share ideas, information and other resources.
- A joint planning to anticipate and resolve operative problems,

In this case, most of the product quality problems in production processes are due to raw materials, machines and operator problems. To resolve these operational problems, the integrated departments should have a joint planning. Firstly, each department should get information and based on these distributed information, they can create knowledge and take action together on it. The link should be looks like the figures mentioned on fig 2.

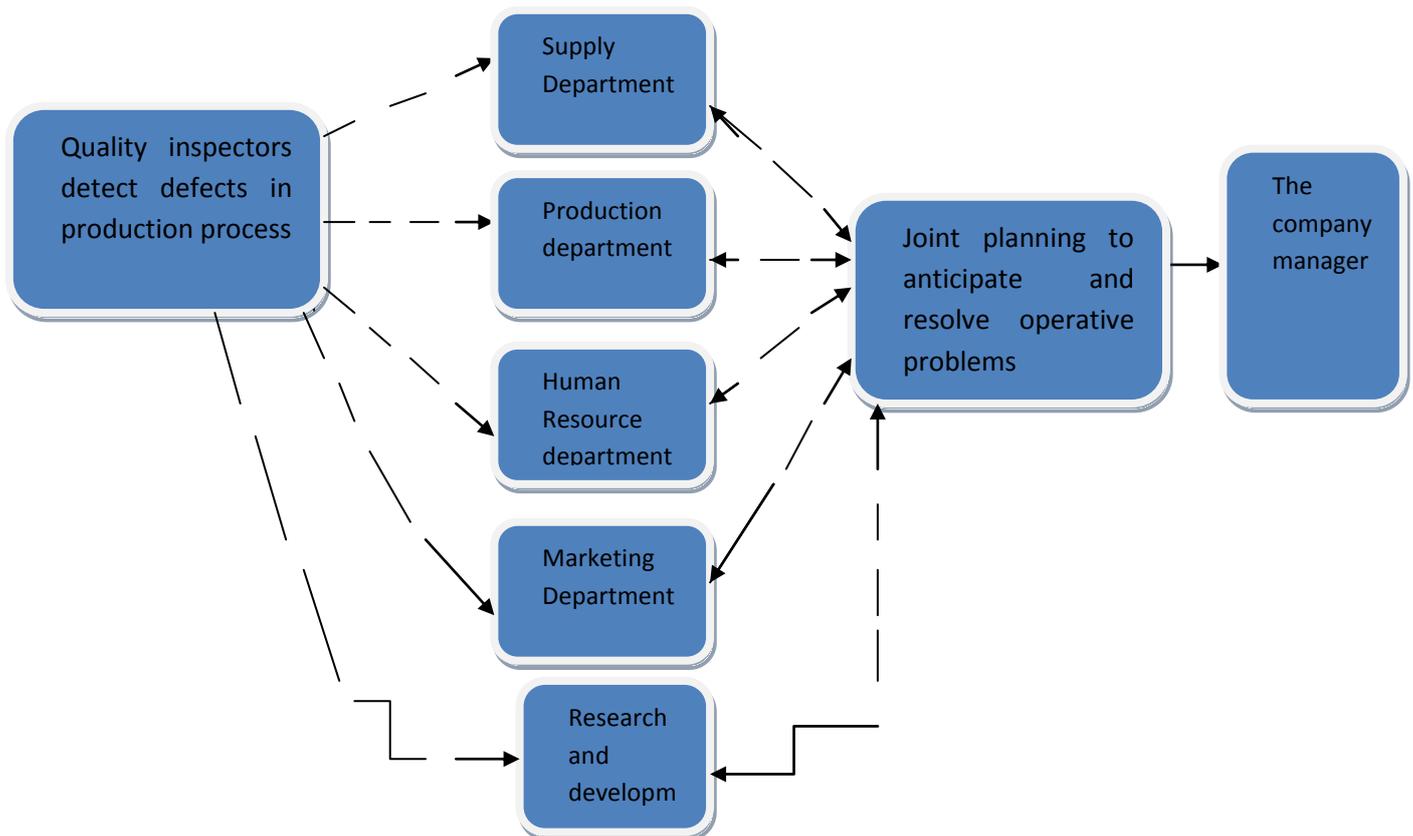


Fig 2 information sharing in joint planning to resolve operative problems

The integrated functional teams should forward the output of their joint discussion to the company manager, if the problems are beyond the capacity of the integrated team. If the problem is happened due to man power problem, the joint planning is on how to improve the performance of the operator. Giving training is one option; there by the human resource department facilitate the training program to the operator. But if it is a problem of raw materials, the supply department should immediately discuss the issues with the raw materials suppliers using the supply integration system. Data and information integration is vital for successful implementation of this integration

### Data and Information integration

Information integration refers to the sharing of information among members of the supply chain. The ability to seamlessly connect with customers, suppliers, and co-workers is vital for success; yet the company store and exchange data in dissimilar formats. The meaning of all data items must be understood and the same data item must have the same definition across multiple applications both within and outside the company. To make the integration process worth the effort, the data must be of high quality - timely, accurate and relevant.

- A joint establishment of objectives,
- A joint development of the responsibilities' understanding and
- A joint establishment of decisions about ways to improve cost efficiencies and quality. This implies that there is a need to move from an arm's length type of relationships to a more partnership approach, where trust and sharing of information are vital. And the firm could reduce the risk of failure due to quality problems. But, these joint planning should be carried out keeping in mind future growth and expansion plans, market trends, sales forecasting, availability of raw material and capacity of the company.

### Information Technology

Another requirement is increased information flow. Company must invest in the technology that will provide access to greater amounts of timely information. Information makes it possible to move to more instantaneous merchandise replenishment and allow all departments in the chain to respond quickly to all changes. Information facilitates the decisions of the supply chain such as evaluation and exploration of

alternatives. Information flow is key to the visibility of the product as it flows through the supply chain and is needed at every stage of the customer order. Improving the intelligence of where products are in the chain also improves inventory management and customer service capabilities. Issues of trust and security are fundamental to information integration.

**Customer Integration**

The company delivers its products to different areas of the country. The company has warehouses in Addis Ababa, Mehonney and Alamata. There is no distinct supply chain network model but, the flow channel for finished product is as follows.



Fig .3 flow channel for finished products

Most of the end-users of the company products are farmers who are found in the rural parts of the country. Currently, the company does not have a direct link or interaction with the end-users. The company only produces its product and sent it to the company distribution centers. Similarly the distribution center does not try to hear feedback from their customers on the quality of company’s product, but the demand of the company products are decreasing year to year. Due to lack of open communications with customers, the company is not able to improve the quality of its product, since it doesn’t know whether its customers are satisfied or not. So to improve the quality of the product, the company should integrate with its key customers. In order to design the customer integration with the company, the integration has to be started with the specific customer needs and designing the chain to satisfy these needs, instead of starting with the company and working forwards. Demand integration is significantly related to product quality, in terms of customer satisfaction and product customization. So the marketing department has to interact first hand with the customer in order to understand the customers, desires, needs and wants and to convert them in to the product, i.e. product design. The next step consists for the marketing department in interacting with the internal integrated processes.

**Benefits of Customer Integrations**

Such integration with customer seems mandatory in today’s market place, where customers benefit from having real- time access to their accounts, making real-time changes in their customized product configurations and communicating their individual services requirements. It also helps the company prioritize and ensure fulfillment based up on the shared generation, dissemination, interpretation and application of real-time customer demand. The company will have an opportunity to get the used products from its customers to re-use them again as raw materials. The company crashes defect products in the production area to re-use it as a raw materials, but the company did not think to collect used products from customers. They think, it is difficult and also customers are not willing to return back used products. But, if the company implements this integration, the company can create a good relationship with customers and the customers will be willing to collect and return back the used products. To do so the company has to give some payments for the customers and integrated with them. This makes the customers be responsible to collect any used product to the company distribution centers

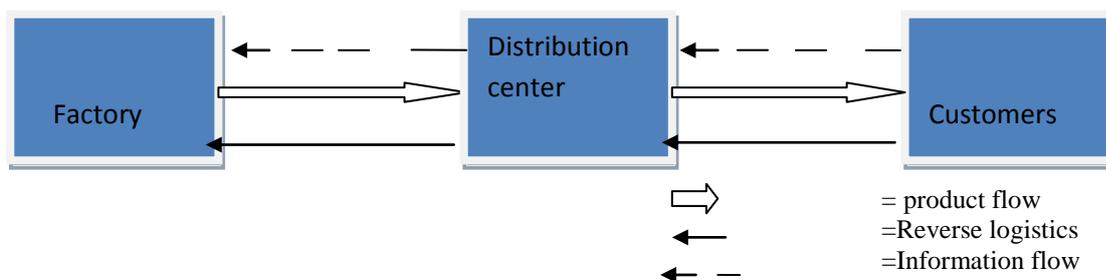


Fig 4 Relationship between company and customers

### Requirements for Customer Integration

For strong effective customer integration, information must already flow easily between Departments. A Company must focus on customer, market and supply chain. Marketing, Quality, Supply and Research and Development departments integrated in the same department. This is because new product development reflects the demand side from the customers. These departments have to discuss with customers on product quality issues and give feed back to the internally integrated systems. The customers determine quality in two ways as Requirement and Assessment as shown on fig 5.

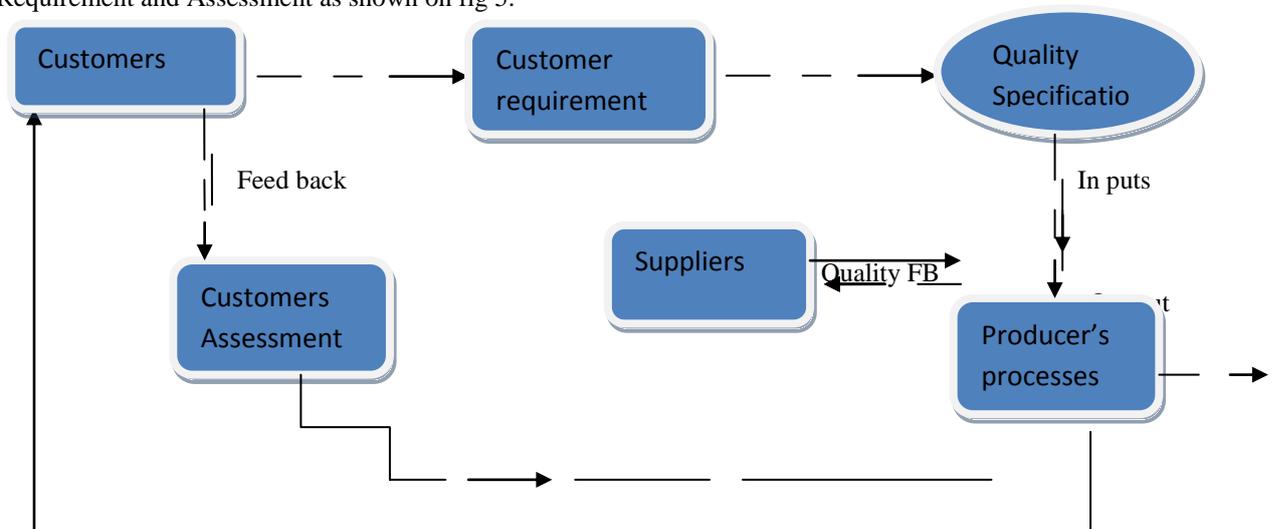


Fig 5 Customers determines Quality in two ways; Requirement and Assessment

In the above networked structure, marketing, quality, supply and research and development departments must be integrated and responsible to identify the customer's need and determine the involvement of customers in any activities of the company to produce a quality product. And the company needs to implement a mechanism how it could be possible to meet with the end-user. But, in the current aspect; the customer requirement and Assessment on the company product can reach to the company through the distribution centers. And the company should implement a customer relationship management policy to have transparent information about each other. It is discussed as follows.

### Customer Relationship management

CRM has been defined as a macro level process "that involves the development and leveraging of market intelligence for the purpose of building and maintaining a profit-maximizing portfolio of customer relationships" (Zablah et al. 2004)

This helps the company to strengthen long-term, collaborative relationships with customers based on trust. So the company will be benefited by implementing CRM policy. Customers have to share technical information with the company to get quality products from the company. The customer relationship management development plan should be based on the project lifecycle as discussed below;

- *Planning* - identifying how managers will use customer information at various levels in the organization and gaining senior management support.
- *Research* - assessment of the firm's structure, culture, hardware, software, vendors and suppliers.
- *Systems analysis* - identifying employee information needs to interact successfully with a customer.
- *Design* - to include a detailed specification of needs and core technologies.
- *Construction* - developing software to meet design plan.
- *Implementation* - including a solid training programme at all levels,
- *Maintenance and documentation* - evaluation and modification of the system dependent on data quantity and quality.
- *Adaptation* - continuous improvement of CRM system

### Supply Integration

Currently the company has got the raw materials from both inland and foreign suppliers. But as per the respondents said, the company has not any mechanisms to share technical information with suppliers if required, since it has not a constant supplier for the required raw materials. Due to lack of effective communication with

its supplier on quality of raw materials and research and development, the company has faced so many problems which affect the quality of the final product delivered to customers. Most of the time specifications of raw materials are not fit with the ordered request. And due to lack of internal integration in the company, the purchased raw materials received from suppliers without inspecting it clearly. This also makes the company to earn additional costs to re-processes the defected products to re-use it again as a raw material for other processes. The respondents also said that the quality of these raw materials are not equal with those of which are purchased from suppliers, there by most of the respondents agreed that the company must do together with supplier to alleviate such problems and to deliver quality products to customers. In order to jointly find solutions to material problems and design issues, the company and suppliers must commit a greater amount of information and be willing to share sensitive design and quality information. This is often achieved through engineer-to-engineer communication on design issues, in order to improve process capability, manufacturability, and performance without affecting profit margins. When communication occurs among design, engineering, quality control and other functions between the company and supplier firms, in addition to the purchasing–sales interface, the supplier's quality performance is superior to that experienced when only the purchasing department in the company and supplier's sales department act as the inter company information conduit.

So from the above analysis it can be concluded that supply integration has a great impact on product quality, since most of the product quality problems in the company is due to raw materials problem. The sources of the raw materials are the company suppliers. To resolve this problem the company has to work in cooperative and collaboration manner with its suppliers.

### **Benefits of Supply Integration**

Some of the benefits that the company can acquire by implementing supply integration are;

- Reduced cost and improved quality of purchased materials.
- Reduced product development time, and improved access to and application of technology Since one of the primary goals of the purchasing function is recognizing or creating sources of competitive advantage, and improving new product development processes is an important source of competitive advantage
- Supplier integration through strategic purchasing is expected to improve the company's performance in new product development and other strategic initiatives.
- Improve operational efficiency and quality
- Increase supplier visibility (quality)
- Respond faster to change and opportunity
- Enable innovation
- Manage supplier information results in lower purchased costs and risks due to factors such as non-compliance, missed deliveries, etc

Similarly, suppliers can also get benefit by forming integration with the company;

- ✓ Suppliers have open communication with the company to get feedback on their performance.
- ✓ Suppliers create long-term business relationship with the company

To get all those advantages and to produce quality product, Biruh Tesfa Plastic Factory has to implement supply integration

### **Requirements to Implement Supply Integration**

#### **Supplier selection**

Selection of the right supplier is the responsibility of the purchasing department. Since suppliers can contribute substantially to the fundamental objectives of the company to produce quality products. The abilities to meet quality standards and deliver products on time as well as performance history are the most critical determinants in choosing suppliers. Thus, quality has always been one of the most important performance criteria even with the conventional purchasing strategy. Quality and performance should be the base line measure for the company-supplier interaction; any existing competition must support the achievement of this standard

#### **Communication**

There should be an open communication between suppliers and the company

#### **Trust and commitment**

Cooperation, whereby firms exchange bits of essential information and engage some suppliers–customers in longer-term contracts, has become the threshold level of supply chain interaction. Trust is

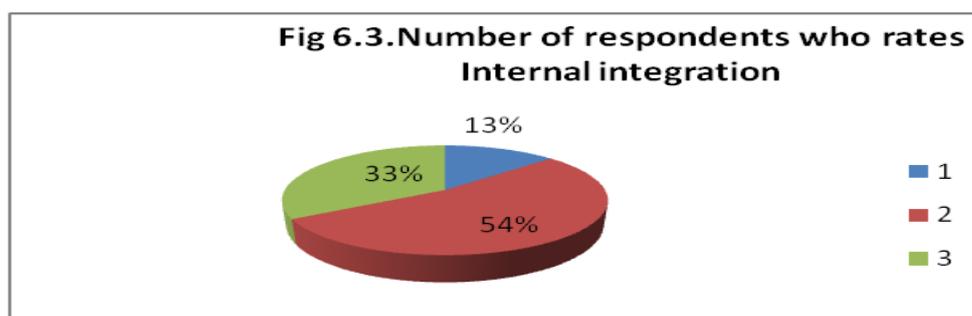
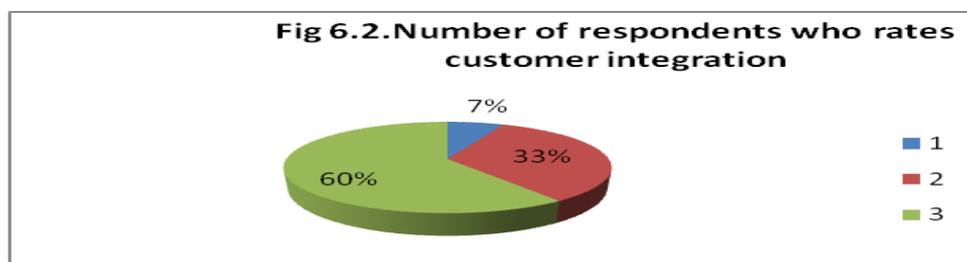
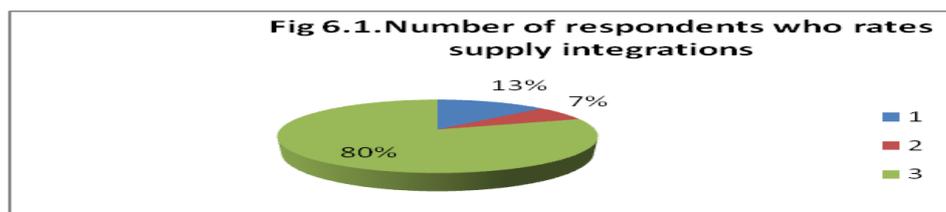
conveyed through faith, reliance, belief or confidence in the supply partner and is viewed as willingness to forego opportunistic behavior.). Commitment implies that the suppliers are willing to devote energy to sustaining the relationship with the company. That is, committed partners dedicate resources to sustaining and furthering the goals of the supply chain. With commitment, the internally integrated departments become integrated into their major suppliers’ processes and more tied to their goals. While trust comes in various forms such as ‘cognitive trust’ and ‘calculative trust’, it is the calculative trust that can have a significant impact on company–supplier relationships and, consequently, supply chain performance.

#### IV. Analysis and Decision Making

After I have discussed the output of the study i.e. the role and benefit of supply chain integration practices (internal, supply and customer integrations) with the workers of the company, questionnaire was distributed to them to prioritize the impacts of each supply chain constructs on product quality as per their company perspective. The respondents were from each functional departments of the company. These steps provide me with statistical confidence for the decision that has to be made on the conclusion. On the questionnaire, the respondents are also asked to give their comment with the rate to the integration variables. The total number of distributed questionnaire was 80. The total 75 responses were returned and the out puts from the questionnaire is stated on Table 1;

Table 1:- Respondents’ ratings of the Supply Chain Integration Variables.

Variables	Number of respondents rate at (1)	Number of respondents rate at(2)	Number of respondents rate at (3)
Internal supply chain integration	10	40	25
Customer integration	5	25	45
Supply integration	60	10	5
<b>total</b>	<b>75</b>	<b>75</b>	<b>75</b>



From this it can be concluded that 80% of the respondents said that supply integration has a great impact on product quality. The reason for this is that no one can make a good product from unsatisfactory raw materials. The quality of the raw materials is the most dominant factor to determine the quality of the product. The respondents also said that Quality requirements and manufacturing processes should be discussed with the suppliers easily if the company will have this integration. 54% of the respondents are also said that internal integration has an impact on product quality next to supply integration. The reason for this rating is if there is no open communication between the functions within the company, it will be difficult to produce quality products as per the customer order. Cooperation and collaboration manner of working is also vital to produce the quality product. Quality problems in production process and materials management can be resolved by internal integrations of the functional departments within the company. And 60% of the respondents rate customer requirements at third place

## V. CONCLUSION

From this study it can be concluded that supply chain integration practices has a great impact on product quality in Biruh Tesfa Plastic Factory. So operating in highly collaborative practices internally and with suppliers and customers are likely to have an excellent performance in product quality, due to the improvement of information visibility in the supply chain. All process must be integrated between all functional departments in the supply chain to produce quality products.

It is obvious from the above analysis that everybody in the company, has to be responsible for product quality. Indeed, quality is everybody's business. Unfortunately, if care is not taken, it ends up being nobody's business. It is therefore important to ensure that everyone is quality-conscious and that they all work together on matters related to quality.

## Reference

- [1]. CHEN I.J.& PAULRAJy A. Understanding Supply Chain Management: Critical Research and a Theoretical Framework, International Journal of Production Research, Vol 42,No.1 PP131-163
- [2]. Joel L. & Cutcher-Gershenfeld.D.Customer and Supplier Integration Across the Supply Chain, Massachusetts Institute of Technology and Babson College,1999
- [3]. GIMENEZ C, Logistics Integration Processes, .Universitat Pompeu Fabra. 2003
- [4]. Trkman P. & Groznik A., Measurement of Supply Chain Integration Benefits. Journal of information, knowledge and management,3-10,2006
- [5]. Hussain.A.H. & Nasser .O.M Supply Chain Integration Definition and Challenges. Research paper presented at International Multi Conference of Engineers and Computer Scientists, March 17, 2010.Hong Kong.
- [6]. Wisner,J.D.and Staley,L.L. Internal relationship and activities associated with high level of purchasing service quality, The journal of supply chain management 35(3),PP 25-32(1999)
- [7]. Basnet,C.,Corner,J.,Wisner,J and Tan,K.C. Benchmarking supply chain management practice in New Zealand, An International journal of Supply Chain Management, 8(1),PP,55-64(2003).
- [8]. Sakun Boon-iTT, The effects of Internal and external supply chain Integration on product quality and Innovation: evidence from Thai automotive Industry: International Journal of Integrated supply Management
- [9]. Hussain,A.H Awad and Mohammad Othman Nassar, Supply Chain Integration : Definition and Challenges. IMECS, VOL I. 2010.
- [10]. <http://www.transtutors.com/homework>.