EFFECT OF SUPPLY CHAIN INTEGRATION ON LEAD TIME: THE CASE OF ETHIO-NIPPON TECHNICAL COMPANY S. C.

BY

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Effect of Supply Chain Integration on Lead Time:

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Declaration

I, Tsion Mulugeta, announce this research paper entitled 'Effect of Supply Chain Integration on Lead Time: The Case of Ethio-Nippon Technical Company S. C.' is my own study made for partial fulfillment of the requirements for the degree of master of arts in logistics and supply chain management and this original research work has not been produced by others in any other universities for any other requirements in any form.

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Letter of Certification

This to certify that Tsion Mulugeta has carried out her thesis work on the topic entitled 'Effect of Supply Chain Integration on Lead Time: The Case of Ethio - Nippon Technical Company S. C.' under my guidance and supervision. Accordingly, I here assure that her work is appropriate and standard enough to be submitted for the award of Master of Arts in Logistics and Supply Chain Management.

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Dedication

This thesis is dedicated to my mother W/ro Almaze Iwanetu and my father Ato Mulugeta Mekonnen, who are not here today to see my achievement.

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Presentation, Inspiration and Motivation have always played a key role in the success of any ventures.

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Acronyms

ECR – Efficient Customer Response

ENITCO – Ethio-Nippon Technical Company S.C.

JCB – Joseph Cyril Bamford

MNC – Multi-National Company

MMC – Mitsubishi Motors Corporation

MFTBC – Mitsubishi Fuso Trucks and Buses Corporation

SCI – Supply Chain Integration

UK – United Kingdom

USA – United States of America

Abstract

Over the years, the concept of Supply Chain Integration (SCI) and its effect on firm performance has been an essential topic of interest in the field of Supply Chain Management (SCM). Short Lead time is one of the contributor to improved organizational performance. The purpose of this paper is to assess the effect of supply chain integration on lead time in the case of Ethio-Nippon Technical Company S.C.. A conceptual framework is developed linking the three supply chain integration dimensions (Supplier, Customer and internal) with lead time.

An explanatory research design was employed to assess the current relationship between lead times and the three dimension of supply chain integration. By using non probability sampling technique i.e. purposive sampling technique from a total of 113 employees who are working in the company Procurement & Sales and After Sales Support Department 56 employees were selected whose educational status is diploma and above, who have a thorough knowledge and direct relation with the topic in discussion. Structured questionnaire was used as a research tool for collecting data. Interview was conducted with the Managers of Procurement & Sales and After Sales Support Departments.

From the total questionnaires distributed 53 were returned. The collected data was analyzed using both descriptive statistics and inferential statistics such as correlation and linear regression. Findings of the study shows that there is a poor Supply Chain Integration in the company. Majority of the respondents disagree in the availability of good supply chain integration in the company and short lead time for the provision of services required by customers by rating low in all the dimensions of supply chain integration and lead time. The Study concluded that the company has weak supply chain integration and extended lead time for the services provided to its customers. Supplier Integration, Customer Integration and Internal Integration have significant relationship with lead time of the company. But even if supplier integration has significant relationship with lead time it doesn't have a significant effect on the company's service lead time.

Based on the findings, the study also recommends a number of points that improves the integration between the various supply chain partners and the company in addition to the recommendation direction for future research are provided.

***Keywords**: Supply Chain Integration, Lead Time*

Chapter One

Introduction

1.1 Ethio-Nippon Technical Company S.C. Profile

Established in May 1969, Ethio-Nippon Technical Company S.C. (ENITCO) is one of the pioneer Automotive Distributors in Ethiopia which started business as Distributor of Mazda Motor Corporation, then known as Toyo Kogy Ltd., covering passenger cars and medium duty commercial vehicles.

In 1981, ENITCO signed Distributorship Agreement with Mitsubishi Motors Corporation (MMC) for the supply of wide range of Motor Vehicles, including heavy duty FUSO Trucks and Buses with which it made its debut into the market and soon followed by passenger cars, pickups and station wagons.

When MMC split into Mitsubishi Motors and Mitsubishi Fuso Truck and Bus Corporation (MFTBC) in 2003, ENITCO signed a separate Distributorship Agreement with MFTBC/FUSO and Continued the Truck Business.

As part of its diversification strategy, ENITCO entered into Distributorship Agreement with JCB of the United Kingdom in 2010 for the supply of construction Machinery and Power Products. JCB has factories in the UK, Spain, India, China and the USA from where ENITCO sources the products suitable to the market.

ENITCO's extensive experience in the trade has given it the opportunity to understand its customers and win their genuine confidence. Management and employees are fully committed to serve their customers and maintain a fair share of the market for the products the company distributes.

Its head office is located in front of the new African Union Conference Hall; easy to reach from any corner. To meet the ever growing demand for after sales support of the products ENITCO supplies, construction of additional facilities is underway in the capital, about 10km from the head office on the road to Kality. Parts and service dealers are also appointed in major regional capitals to deliver after sales support at close proximity to their customers.

1.2 Background of the Study

In this highly competitive business era, organizations have to work exceedingly proficient in order to remain competitive in the business. Ensuring higher customer satisfaction has become the motto and vision of many companies nowadays. Nevertheless, only those who deliver service that meet and exceed the demand of customer and achieve customer satisfaction become successful and survive in the business. Supply chain integration is concerned with the close alignment and coordination among parties within a supply chain as a means of improving performance.

Researchers agree that integrative practices and a high level of integration have a positive impact on corporate and supply chain performance and suggested that integration leads to increased performance. Nathalie and Marianne (2008) on their study about the relationship between supply chain integration and performance, from total of 2017 papers from 2000-2006 on logistics and supply chain management, 152 articles discussing relationships between supply chain integration and performance. Mohamed and Veera (2014) in their Meta-Analysis of Supply Chain Integration and Firm Performance conclude that SCI significantly has positive influence on firm performance. However, very few researchers have considered the impact of supply chain integration specifically on the resulted lead times.

Supply chain integration is a performance improving approach that develops seamless linkages between the various actors, levels and functions within a supply chain to optimize customer service. The objectives of supply chain integration are to improve efficiency and reduce redundancy while also enhancing product availability. Supply chain integration strives to better connect demand with supply, which can both improve customer service and lower costs.

Lead time is the key issue for enhancing performance of organizations across various industries (Treville et al. 2004). Higher levels of integration results in reduced lead times. Singh, Sohani and Marmat (2013) noted that in an information-enriched supply chain, firms are closely connected with suppliers and customers both internally and externally because of information sharing resulting in reduced lead time and increased performance. Hence, the purpose of this study is to show the relationship between supply chain integration with lead times and to assess which supply chain integration factor has a significant effect on the lead time of Ethio-Nippon Technical Company S. C..

1.3 Statement of the Problem

As organization strives to provide products, services, and information that adds value for customers and other stakeholders in these competitive business era, many researchers have investigated and suggests that supply chain integration is crucial for increased performance in order for business entities to reach into their aims to satisfy and add value to their customers and stakeholders needs. However, due to lack of knowledge or not giving proper attention to the supply chain loop where the business is working, many companies lack the capacity to deliver the intended service on time as it is required.

ENITCO as authorized dealer of Vehicles and Machinery from the manufacturers it also provides aftersales service for the products it distributes. The aftersales service aims on providing the necessary spare parts and maintenance service for the customers nearby. However, from the data collected from 2014 to 2016 G.C., 58 customers formally complained for not getting the required service on time. Customers complain on issues such as for not getting the required parts on time and when vehicles and machineries enter ENITCO's workshop for maintenance they took more than two to three months minimum and there are also vehicles which records more than five years stay on the workshop, as per the vehicles status report made on September 2016, there are 80 vehicles who accounts more than 100 days to 1736 in the company waiting to be repaired. This long time required to maintain the vehicles and machineries costs the customers more in terms of additional costs due to rental of vehicles, reducing their efficiency and effectiveness, hindering their performance, reducing their profits, providing insufficient service to their end customers and others.

ENITCO's workshop is composed of technicians who have been trained by the manufacturers for each model of vehicles and machineries the manufacturer produces. From the total of 7 Sub-Dealers found on other parts of Ethiopia only one provides maintenance service. Local workshops on the area may not have proven experience to maintain the type of vehicle or machineries provided. Customers from different towns have to come to Addis Ababa ENITCO's workshop to get the required service.

Internal and external partners who provide input for ENITCO to perform its duty with full customer satisfaction also become an obstacle to provide the desired service. Banks doesn't provide the required amount of Forex to import spare parts on time and enlarge the lead time for maintenance of vehicles in the workshop. Human capital is also another problem,

experienced man power on each model of vehicles ENITCO offers to the market are leaving the company for Competitors from 2014 to 2016 G.C. 108 employees left the company, which accounts to 25%, 22% and 17.05% annual turnover rate respectively, by which this in turn adds to the high lead time. Manufacturers also stop producing spare parts for old models and customers are requiring their vehicles/machineries they purchased from ENITCO have the necessary parts whenever they need it. The speed of Manufacturers to reply to requests of ENITCO on the time of parts inquiry or technical support. All the above factors have its own impact on the service level and lead time of services provided by ENITCO. In order to minimize the vehicles who are at the compound waiting for maintenance, even though, it is expensive, and the company is purchasing parts from local suppliers who sells spare parts. Nonetheless, the problem still persists.

1.4 Research Questions

What is the effect of Supply Chain Integration on Lead Time?

Sub-Questions:

1. What is the effect of Suppliers Integration on Lead Time of the company?
2. What is the effect of Customers Integration on Lead Time of the company?
3. What is the effect of Internal Integration on Lead Time of the company?

1.5 Objective of the study

1.5.1 General Objective

The general objective of this study is to assess the effect of supply chain integration specifically on the lead time of the service provided by ENITCO.

1.5.2. Specific Objectives

The specific objectives of the study are:

1. To assess the effect of Suppliers Integration on Lead Time of the company.
2. To assess the effect of Customers Integration on Lead Time of the company.
3. To assess the effect of Internal Integration on Lead Time of the company.

1.6 Significance of the Study

At present customers of ENITCO are not happy with the service they are getting from the company. Longer lead times create dissatisfaction to the loyal customers. This study can help the company to understand the major factors that attribute to the longer lead time provided to its customers. Hence, the result of this study can also help the company to easily identify the loosen loop and problem areas.

Based on the recommendation forwarded, the company can formulate the necessary structures to satisfy its customers, minimize its cost due to longer lead times and to stay competitive in the market.

Furthermore, the result of this study could serve as additional input for future studies in relation to supply chain integration with lead times and can be a source of reference material on the subject.

1.7 Scope of the Study

As a result of the dispersion in the geographical location of major suppliers and customers, the scope of the study is limited to the company's point of view. The study is limited to the company's procurement & Sales and After Sales Support Department employees, in the two centers of the company found in Addis Ababa.

As the study emphasizes on the supply chain integration and its effect on Ethio-Nippon Technical Company S.C. service lead time, it mainly focuses on issues of supplier integration, customer integration, and internal integration of the company from the company's perspective and the resulting lead time.

The study also focused on all the records and data's documented from year 2014 to 2016 by the company.

The purpose of this study is to show the effect of supply chain integration on lead time, though, there are many methodologies to conduct a research work, and hence, this study was conducted by using explanatory research design.

1.8 Limitation of the Study

The major limitation of the study is access to other supply chain partners of the company to be included in the study. The geographical location of the company's major suppliers and customers limit the study to focus only from the company's point of view. The study considered the effect of Supply Chain Integration from the company's perspective only.

1.9. Definition of Terms

Supply Chain – a set of entities (eg. organizations or individuals) directly involved in the supply and distribution flows of goods, services, finances, and information from a source to a destination (customer).

Supply Chain Integration – is a close alignment and coordination within a supply chain.

Supplier Integration - the process of interaction and collaboration between an organization and its suppliers in order to ensure an effective flow of supplies

Internal Integration – a process of inter-departmental interaction and collaboration that brings departments together into a cohesive organization.

Customer Integration – the process of interaction and collaboration between an organization and its customers to ensure an effective flow of supplies

Lead Time - the amount of time that elapses between when a process starts and its completion.

1.10 Organization of the Study

This research paper is organized in five chapters.

In the first chapter the introduction of the study is presented. Review of literature and research methodology with all its components are explained in chapter two and three, respectively. Then in the fourth chapter, Data Presentation and interpretation including discussion are addressed. Finally, in the fifth chapter Summary of findings, conclusion and recommendation for future action and improvement is suggested.

Chapter Two

Review of Related Literatures

2.1 Theoretical Reviews

2.1.1 Supply Chain

Little, A. (1999) defines a Supply Chain as "the combined and coordinated flows of goods from origin to final destination, also the information flows that are linked with it".

A supply chain consists of all stages involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves. Chopra and Meindl (2001).

A supply chain is "the integration of key business processes from end users through original suppliers that provides products, services, and information that adds value for customers and other stakeholders" (Lambert et al., 1998). The Council of Supply Chain Management Professionals (CSCMP) noted that SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion and all logistics management activities. More importantly, SCM also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers and customers. (Edward S. Fekpe and Andrew-Vans Braym 2015).

2.1.2 Supply Chain Management

The objective of supply chain management is to "maximize value in the supply chain" and to allow a company to compete via improved efficiency and market effectiveness (Ambe, 2010). The best companies around the world are discovering a powerful new source of competitive advantage. It's called supply-chain management and it encompasses all of those integrated activities that bring product to market and create satisfied customers.

The Supply Chain Management Program integrates topics from manufacturing operations, purchasing, transportation, and physical distribution into a unified program. Successful supply chain management, then, coordinates and integrates all of these activities into a seamless process. It embraces and links all of the partners in the chain.

Supply Chain Management (SCM) system facilitates inter-enterprise cooperation and collaboration with suppliers, customers, and business partners. Although this system can bring benefits and competitive advantage to organizations, the management and

implementation of this system pose significant challenges to organizations. Awad and Nassar (2010).

2.1.3 Supply Chain Integration

Coordination in the supply chain has many different forms, but, as whole, the purpose of all kinds of coordination is that entities in a chain of end customer information or the final consumer of goods and services, particularly be aware of the amount of actual demand to have the knowledge to produce programs, schedule, control the level of Inventory, design their products in the way that be able to deliver them at the right time, right place to consumer in order to attract customer satisfaction and be successful in competitive market ahead of their competitors (Li & woo, 2004).

Supply chain integration is widely considered by both practitioners and researchers a vital contributor to supply chain performance. Edward S. Fekpe and Andrew-Vans Braym (2015) mentioned that Supply chain integration is concerned with the close alignment and coordination among parties within a supply chain as a means of improving performance. Krishnapriya and Baral (2014) cited that firms have successfully acknowledged integration as an essential facet to a dynamic supply chain. It therefore requires high levels of trust, commitment, and information sharing among supply chain partners. Therefore, it becomes imperative to develop a bundle of knowledge, skills and abilities among employees which are the key to developing and realizing organizational goals along with achieving inter firm integration.

Lambert and Cooper (2000) presented that the success of a company increasingly depends on its management capabilities to integrate the network of trading relations.

According to Hosseini, Azizi and Sheikhi (2012), Studies have been done in years of 2009 and 2010 mainly emphasis on three critical dimension of supply chain integration:

- Integration with suppliers
- Internal integration
- Integration with customers

Flynn, Huo and Zhao (2008) argue that the diverse dimensions of SCI can ultimately be collapsed into three dimensions: customer, supplier and internal integration. Customer and supplier integration are commonly referred to as external integration, which is the degree to which a manufacturer partners with its external partners to structure inter-organizational strategies, practices and processes into collaborative, synchronized processes (Stank et

al.,2001). Customer integration involves core competencies derived from coordination with critical customers, whereas supplier integration involves core competencies related to coordination with critical suppliers (Bowersox et al., 1999). In contrast, internal integration focuses on activities within a manufacturer. It is the degree to which a manufacturer structures its own organizational strategies, practices and processes into collaborative, synchronized processes, in order to fulfill its customers' requirements (Cespedes, 1996; Kahn and Mentzer, 1996; Kingman-Brundage et al., 1995) and efficiently interact with its suppliers.

2.1.3.1 Supplier Integration

According to Flynn, Huo and Zhao (2010) in an integrated supply chain, development of a strong strategic partnership with suppliers will facilitate their understanding and anticipation of the manufacturer's needs, in order to better meet its changing requirements. This mutual exchange of information about products, processes, schedules and capabilities helps manufacturers develop their production plans and produce goods on time, improving delivery performance. By developing a good understanding of the manufacturer's operations, suppliers achieve a high level of customer service, which, in turn, helps the manufacturers improve their customer service. Supplier integration has been found to be related to product development performance.

Supplier integration can range from a simple consultation for a specific feature in a product to making the supplier fully responsible for the development of the component, process or system that will be delivered to the buyer (Ragatz et al., 2002).

Lau et al. (2010) conclude in their research that suppliers might not want to expose their knowledge and resources and thus not be willing to share all valuable information. By only delivering the required information, the innovation process might be disturbed, which will probably lead to less innovative products and lower performance (Lau et al., 2010). This is a fairly short-term thinking by the supplier, as his success increases with the success of the buying firm (Un et al., 2010).

2.1.3.2 Customer Integration

A close relationship between customers and the manufacturer offers opportunities for improving the accuracy of demand information, which reduces the manufacturer's product design and production planning time and inventory obsolescence, allowing it to be more responsive to customer needs. Because customer integration generates opportunities for leveraging the intelligence embedded in collaborative processes, it enables manufacturers to reduce costs, create greater value and detect demand changes more quickly. Customer integration has been found to be related to customer satisfaction Flynn, Huo and Zhao (2010). Chen and Paulraj, (2004) quoted that, despite the use of the latest process improvement techniques and capable management, a firm's neglect of its customers may lead to disaster (Kordupleski et al., 1993). In fact, the pressure to revitalize manufacturing over the last decade has been rooted in customers' demand for a greater variety of reliable products with short lead times (Draaijer, 1992). As customer expectations are dynamic in nature (Shepetuk, 1991), organizations need to assess them regularly and adjust their operations accordingly (Takeuchi and Quelch, 1983). Doyle (1994) writes that satisfying customer needs is the central purpose of any business and Dibb et al. (1994) describe customer satisfaction as the major aim of marketing. The clear message is that the more attention a company pays to researching its customer base in order to identify customer needs, the more rewarding the exchange transaction in the supply chain will be for that company (Carson et al., 1998). Organizations can outperform their competition by exceeding, not just satisfying, the needs of their customers.

To interact with customers could improve the understanding of the wants and needs in the market, and firms can avoid major losses, both in time and money. The risk of large stocks of unsold products and time to market will decrease with the degree of communication (Koufteros et al., 2005).

2.1.3.3 Internal Integration

The key concern in a supply chain is to coordinately managing and controlling of all the primary and support activities of the company that will be achieved with an appropriate integration of supply chain. (Hosseini, Azizi and Sheikhi 2012)

Internal integration recognizes that different departments and functional areas within a firm should operate as part of an integrated process. Because internal integration breaks down

functional barriers and engenders cooperation in order to meet the requirements of customers, rather than operating within the functional silos associated with traditional departmentalization and specialization, it is expected to be related to performance. Although manufacturers may maintain a functional organization structure, customer orders flow across functions and activities. When an order is delayed, customers do not care which function caused the delay; they simply want to know whether the order has been fulfilled. This calls for an integrated customer order fulfillment process, in which all involved activities and functions work together. Information sharing, joint planning, cross-functional teams and working together are important elements of this process Flynn, Huo and Zhao (2010).

2.1.4 Supply Chain Integration and Firm Performance

It is the extent to which organizations integrate with their supply chain "partners" that determines their competitiveness (Christopher, 2011).

Many authors agree that integrative practices and a high level of integration have a positive impact on corporate and supply chain performance. (Fabbe-Costes and Jahre, 2008) on their study on Supply chain integration and performance they have reviewed many studies and the findings across these studies regarding the relationship between integration and performance and acknowledged a variety of performance measures (net profit margins, return on assets, returns on investment, overall competitive position, general profitability and a mix of financial and operational measures, such as marketing and logistics performance).
Lee (2000) suggested that well-integrated Supply Chain create value for the shareholders by decreasing costs and increasing market share.

A number of researchers have also found that higher levels of integration generally lead to better performance (Gimenez and Ventura, 2005; Stock et al. 1998). Some researchers have use all three integration variables in assessing the effect of supply chain integration on performance and found that, SCI directly relates to performance.

2.1.5 Supply Chain Integration and Lead Time

According to Fekpe and Bray (2015), Lead time is defined as the latency between the initiation and the execution of a process. Lead time is the key issue for enhancing performance of organizations across various industries (Treville et al. 2004). Lead time is a major consideration for retailers and customers in the supply chain. Higher levels of integration results in reduced lead times. Chopra, Reinhardt and Dadahardt (2004) showed

that by decreasing the lead time uncertainty, the required safety stock increases. Singh, Sohani and Marmat (2013) noted that in an information-enriched supply chain, firms are closely connected with suppliers and customers both internally and externally because of information sharing resulting in reduced lead time and increased performance.

An increase in level of Supply Chain integration will provide rapid access to required source of information, more sensitivity toward the needs of customers and enabling faster response time creating a competitive edge among competitors (Sezen, 2008). Sharing forecast (Sales Plan and Required Parts List) with suppliers enables them to plan in advance according to the needs of the organization, consequently this will lead to a reduction of lead times. Moreover, the use of efficient communication media and the streamlining of the whole supply process will lead to a further reduction in lead times, Integrated Suppliers (2000).

Mason-Jones & Towill (1999) propose the information enriched supply chain concept, which separates the lead time in a supply chain into material movement lead time & information enriched supply chain, firms are more closely connected both internally & externally because of information sharing resulting in reduced information lead time & reduced total lead time in a supply chain.

2.1.6 Supply Chain Integration and Service Level

Customers are becoming more demanding. Their expectations are evolving toward greater levels of service and response with higher degrees of product and service customization. Value chain partners (suppliers, service providers) integrated to provide differentiated customer segment product/service bundling and superior customer service levels Awad and Nassar (2010). The availability of the supply at the right time, at the right place and in the required quantity and quality is crucial for the success of the relationship. As per the study made on Integrated Suppliers by ECR (2000) shows that in mature relationships of Integrated Suppliers the service levels will be very close to perfect.

2.1.7 Information and Supply Chain Integration

The ability to seamlessly connect with customers, partners, and co-workers is vital for success. Information sharing is a scope that vital and proprietary information runs among supply chain members (Monczkaet al.،1998). Information sharing between supply chain partners has been detected as the central component of effective supply chain management.

Information technology is used to conduct business transactions, share information, and facilitate collaboration as the main determinants of a supply chain's effectiveness (Piderit, Flowerday, & Von Solms, 2011).

As per the findings of Mansoori, Jamshidinavid and Hashemi (2014), the process of sharing information among supply chain members enables the partners of the chain to manage their relationships better by enhancing trust and commitment in their relationships. On the other hand, shared information among members of the supply chain increases the efficiency and reduces the costs of stock maintaining and coordination.

Full demand information transfer occurs when actual demand information is transferred from customer to manufacturer with no distortion. Full demand information transfer is an antecedent to full market mediation. The development of the internet has greatly facilitated such information transfers (Frohlich,and Westbrook 2002).

According to Bhattacharya, Mukhopadhyay and Giri 2014, a survey conducted among top auto makers in India highlighted the fact that technology is widely seen to be a supply chain enabler, reducing inventory levels and stocking, shortening lead times and fostering a spirit of collaboration with suppliers and dealers.

2.1.8 Partner Relationship Management

As per Dwyer et al，1987, the results of many studies showed that collaborative relationships among partner would improve performance Many researchers believe that trust and reliability in business relationships reduce partnerships risks (Das & Teng, 2001).

Daugherty et al (2006) found that firms engaged in collaborative relationships achieved improved visibility，higher service level，increased flexibility，greater end-customer satisfaction，and reduced cycle times. Expressed that activities for creating collaboration and cooperation in the supply chain lead to trust and commitment of the supply chain members to each other which will ultimately lead to more significant of the members and undoubtedly improve supply chain performance. The consistency between customer and suppliers，information sharing in all levels of the supply chain，collaboration and coordination in the whole supply chain，clear goals and realistic expectations for all parts of the supply chain，integration of the existed activities in the processes of supply chain，creating collaboration and partnership based on mutual trust and confidence，equal profit or loss for both sides，response time decrease in the whole supply chain，the use of different suppliers(outsourcing)，providing high-quality goods or services，providing the goods or

services within the stipulated time, the flexibility of taking changes in supply and demand for goods or services, the effective use of information systems in transferring information, and knowledge and technology sharing have been mentioned among the effective factors in the success of supply chain (Hendricks, 2006).

2.1.9 Inventory Management and Supply Chain

Inventory plays a critical role in supply chains because it is a salient focus of supply chains. Perhaps the most fundamental role that inventory plays in supply chains is that of facilitating the balancing of demand and supply. To effectively manage the forward and reverse flows in the supply chain, firms have to deal with upstream supplier exchanges and downstream customer demands. This puts an organization in the position of trying to strike a balance between fulfilling the demands of customers, which is often difficult to forecast with precision or accuracy, and maintaining adequate supply of materials and goods. This balance is often achieved through inventory (Waller and Esper 2014).

Recent studies have shown that tremendous cost savings and potential revenue can be generated with the enhanced management of distribution and inventory. It was estimated that a company could reduce its total expenses by at least two percent through better inventory management and distribution of finished goods. (Schmidt, 2009).

As per Waller and Esper 2014, as items are depleted from inventory, in some cases, both the retailer and vendor work collaboratively to determine when reordering is necessary to replenish the depleted inventory, especially at the distribution center level. This is a balancing of supply and demand because demand information is tracked to determine when to best place replenishment orders based on the time required to get the inventory to the store location. In essence, inventory decisions are used to effectively time when supply inflows are needed to handle demand outflows.

According to IBM Global Services report 2009, smarter automotive supply chains are also highly interconnected even across extended dealer networks. For example, dealers can view their own parts inventory as well as the inventory of other dealers and distribution centers. They can also order the parts they need from any location. Dealers are not forced to choose between locally stocking slow moving inventory and losing business because of service delays.

2.1.10 Challenges and Implementation Process of Supply Chain Integration

The importance of global integration to the Multi-National Company (MNC) lies in the differential advantage to be gained from the ability to exploit differences in capital and product markets, to transfer learning and innovation throughout the firm, and manage uncertainty in the economic or political environment in different countries or regions (Hussain and Nassar, 2010).

Supply chain management (SCM) executives face unique challenges, with respect to integrating supply chain specific strategies with the overall corporate business strategy; hence seamless coordination is rarely achieved in practice (Hussain and Nassar, 2010; Otchere. et al, 2013). Most SCI related problems emanate, either from uncertainties or an inability to co-ordinate several activities and partners. Simultaneously, customers have become more discerning and are demanding better quality products, higher levels of service and reduced prices, (Sweeney, 2011). Unfortunately, obtaining supply chain integration has been an elusive quest for many companies (Fawcett & Magnan, 2002).

Msimangira & Tesha (2014) have explored the global SCM practices and the risks faced by developing countries and found that lack of integration among all the supply chains is a key problem.

According to Msimangira & Venkatraman (2014) the major four supply chain integration problems are insufficient training and competency levels required to maintain existing supply chain (SC) operations and to support implementation of new technologies and increase efficiency, Poor communication between SC members, especially primary members, Some members in the supply chain are dominant in the business relationship, Lack of trust, communication is limited or formal, and information sharing becomes secretive and Lack of internal cost efficiency and speed of delivery in ordering, inventory, marketing, and logistics.

2.1.11 Supply Chain Practices in the Automotive Industry

The industry is the largest manufacturing sector in the world (Nag, Banerjee, & Chatterjee, 2007; Kehbila, Ertel, & Brent, 2009) and is also one of the largest investors in research and development (OICA, 2009). Owing to the increasing number of vehicle models being introduced in segmented markets, executive managers are seeking both growth and cost

reductions in order to be more competitive and profitable (IBM, 2009) quoted by Ambe (2014).

According to the IBM Global Services Report 2000, the smarter automotive supply chain is focused on integrating its global supply chain. This includes integrating the product lifecycle management and enterprise resource planning systems of all its partners. In addition, collaboration, knowledge sharing and social networking tools help close distance gaps and build 'people' networks across the extended value chain.

In the case of Ethiopia, it is observed that the present status of automobile industry in Ethiopia, the potential of the industry and the demand of automobile vehicles including their spare parts. In Ethiopia many imported vehicles from different parts of the world are in daily use. Also the spare parts are imported spending lot of money and time (Narasimha, Rejikumar and Sridhar 2013).

As per the finding of (Narasimha, Rejikumar and Sridhar 2013), the development level of automobile industry in the country is low in comparison to other developing countries. Ethiopia, being a trucking country, the potential is high but not being exploited properly. There are various factors which contribute for hindrance of the sectors development. The main points are Government regulation, tax inconsistent, production output, shortage of road access, lack of foreign currency and finance for the purchase of trucks.

The contribution of the automobile industry for the economy and employment creation is big compared with the investment outlay to the industry. Therefore, attention to be paid in strengthening the Automobile industry is must. Upgrading the capacity in maintenance and servicing of automotive is important.

2.2 Empirical Reviews

Supply Chain Integration were considered as a performance improving approach by many researchers. From the empirical studies reviewed, it was observed that studies conducted around the globe and in our country Ethiopia, an increase in supply chain integration results in an improvement in product quality, innovations, firm performance, competitiveness and operational performance of organizations.

Edward S. Fekpe and Andrew-Vans Bray (2015) on their study Effects of supply chain integration on lead time in the retail industry in Ghana, they have found that an integration in a supply chain results in significant reductions of lead times. Depending on the product

category, and the degree and maturity of the supply chain integration, lead time reductions before and after integration can be as high as 40 %.

Hosseini Baharanchi (2009) investigated the relationship between different aspects of supply chain integration and some characteristics of the product (quality and innovation) in the automotive industry of Iran. Integration is measured by internal integration, integration with suppliers, and integration with customers and product characteristics are measured in two aspects of quality and innovation. Findings showed that integration with suppliers and customers influences on products quality and innovation positively. Internal integration has the weakest relationship compared to other aspects of integration with product quality and has very weak relationship with product innovation.

Martin Boakye Osei and Celal Hakan Kağnıcıoğlu (2017) on their study Supply Chain Integration and Firm Performance: The Food (Fast-Food) Delivery Service industry, the results of the study further compliment the growing evidence which depicts a positive relationship between SCI and firm performance. Analysis of the results and regression showed that the correlation coefficients between internal integration and firm performance showed a very feeble relationship but was significantly related. Similarly, external integration significantly has a positive relationship with firm performance but their relationship was however weak but they were significantly related.

Arash Bahrami and Pooya Sabetfar (2014) on their study the Impact of Supply Chain Integration on Competitive Capabilities in Automobile Parts Manufacturing Industry in Qazvin Province, the results obtained shows that, the aspects of integrated supply chain (internal and external integrations) have a great impact on competitive capabilities. Therefore, it can be said that a higher integration in the supply chain improves competitive capabilities.

Biniyam Gizaw (2016) in his study the effect of supply chain integration on operational Performance in Ethiopian trading enterprises, taking lead time as one of the parameters to measure operational performance, he concludes that Supply chain integration has a significant effect on operational performance.

Salem Samuel (2012) in her study Investigation on the Effect of Supply Chain Integration on Ethiopian Garment Industry's Performance. Taking product quality and competitive advantage as measurements of Industry's performance findings of the study shows that all

the independent variables (supply, customer, and internal integration) have positive correlation with the dependent variables (product quality and competitive advantage) and they have the potential to affect the quality and competitive advantage of the sector.

2.3 Summary of Related Literatures

Best companies around the globe are using supply chain management as a source of competitive advantage. Successful supply chain management coordinates and integrates all activities related to the fulfillment of customer requirements into one process. It facilitates inter-enterprise cooperation and collaboration with suppliers, customers, and business partners.

The purpose of every kind of cooperation is to deliver customer requirements at the right time, right place in the right quantity in order to satisfy their customers and stay competitive in the business.

Many researchers agree that supply chain integration is a performance improving approach. The more there is integration within the supply chain partners, organizational performance will improve.

Previous studies show that supply chain integration has three dimensions, Suppliers Integration, Customers Integration and Internal Integration. Suppliers and Customer integration are referred as external Integration because the company partners with external entities.

Supplier integration is creation of a strong strategic partnership with suppliers which facilitate their understanding and anticipation of the manufacturer's needs, in order to better meet its changing requirements. Customer Integration is creating a strong relationship with customers in order to have accurate demand information in order to satisfy the needs and wants of the customers which in turn helps manufacturer's to reduce production planning time and inventory obsolescence. Internal integration realizes that different departments and functional areas within a firm should operate as part of an integrated process.

Many scholars agree that supply chain integration has a positive relationship with organizational performance by relating it with major indicators such as net profit margins, return on assets, returns on investment, overall competitive position, general profitability, marketing and logistics performance and increasing market share. Collaborative relationships among partner improves organizational performance.

Lead Time is the time between receiving an order and delivering the order. As lead time is one of organizational performance indicators, it is a major consideration in every organizational performance issue. Information is a key factor for an effective supply chain management. In an information enhanced supply chain the integration between partners and their relationship amongst them will be strong and there will be short lead time on the provision of the desired products and services. An increase in level of Supply Chain integration will provide rapid access to required source of information and this will result in reduced lead times because suppliers will know in advance the requirement of their customers.

The smarter automotive supply chain is focused on integrating its global supply chain by integrating the product lifecycle management and enterprise resource planning systems of all its partners.

2.4 Conclusions of Related Literatures

From the above literatures we can conclude that Supply chain is the combined effort of all supply chain partners, to satisfy end customers' needs by collaborating through information sharing and better flow of goods.

The purpose of this review was to help the readers understand how the model was developed based on the theoretical background stipulated on the literature review. Supply chain as a performance improving approach it has three dimensions. Supplier Integration, customer Integration and Internal integration. Inability to coordinate several activities and partners and limited information sharing is the major supply chain integration challenges within the actors.

As the coordination and level of integration among the supply chain partners increased organizational performance will also improve. Hence, Lead time is one of the indicators for measuring organizational performance, least lead time is recorded in a well-integrated supply chain. Better information flow and good relationship with coordinated effort increase the level of integration between the supply chain partners and in turn reduce the lead time for a specific products and service.

Integrated relationship with the help of frequent information flow among the three dimensions of supply chain integration enables suppliers to know in advance the needs of their customers and make ready the required products and services. The end result will be

meeting and exceeding the demands of end customers by providing the required products and services on time.

Findings of empirical studies shows that supply chain integration has a significant effect on product quality, product innovation, firm performance, competitiveness, operational performance, competitive advantage of organizations.

The earlier researches were limited to demonstrate the exact relationship that supply chain integration has and its effect on lead time. Most of the studies focus only on the relationship that supply chain integration has on organizational performance indicators other than lead time. In the present research work, the relationship and effect of supply chain integration and its dimensions have with lead time is addressed.

2.15 Conceptual Framework and Hypothesis

The Research conceptual framework is a conceptual model based on theoretical relationships among a number of factors that have been identified as important Research issues. The theoretical framework underpins the whole Research. This conceptual framework is modified from Baranchi (2009) used in his research Investigation of the impact of supply chain integration in product quality and product innovation.

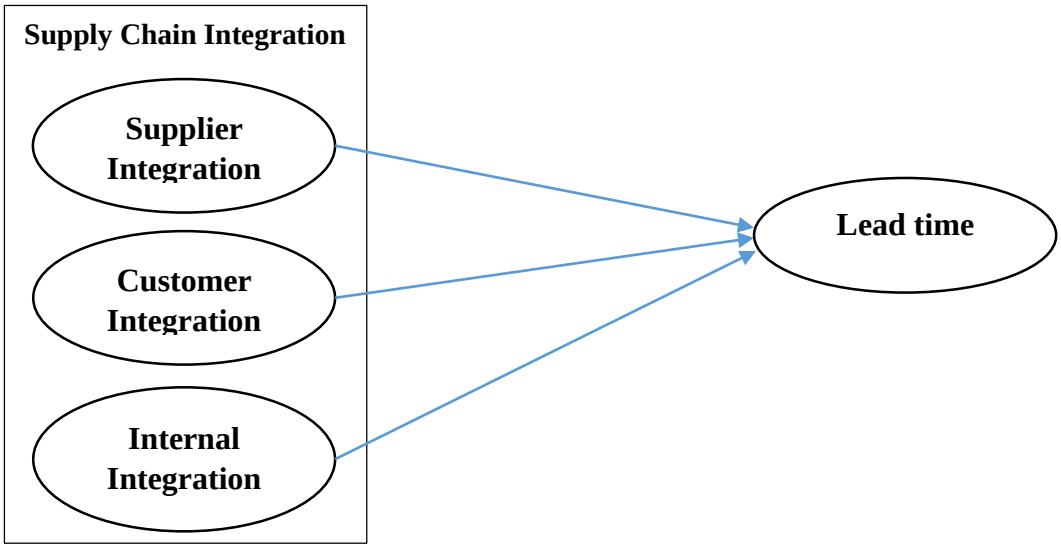


Fig. 1 A conceptual Framework of the Study

***Source**: Modified from Baranchi (2009)*

According to (Sezen, 2008) an increase in level of Supply Chain integration will provide faster response time creating a competitive edge among competitors. Hence, with the above modification, the study came up with this conceptual framework, in order to show the relationship and effects of the three dimensions of supply chain integration (Supplier Integration, Customer Integration and Internal Integration) with lead time.

2.15.1 Hypothesis

Based on the above conceptual framework, the following hypothesis is developed.

H1. Supplier Integration has significant effect on Lead Time of the Company.

H2. Customer Integration has significant effect on Lead Time of the Company.

H3. Internal Integration has significant effect on Lead Time of the Company.

Chapter Three

Research Design and Methodology

This chapter explores the research methodology used in carrying out the research study by describing the research process, research design, population and sampling, data collection approaches and instruments, and finally the data analysis used.

Selection of the research methods depends on the research objectives, nature of the subject and implementing facilities. The purpose of selection of research methodology is to identify an approach which is suitable for getting the required answers for the basic research questions of the study.

3.1 Research Approach

The main objective of this research is to assess the effect of Supply Chain Integration on lead time in Ethio-Nippon Technical Company Share Company. Considering the purpose of the research and the nature of the phenomenon mixed research approach was implemented. Which is using both quantitative and qualitative research approach.

3.2 Research design

Considering the requirements and objectives that have been discussed, this study used Explanatory research design to observe variation in the variable that is assumed to cause the change in the other variable and then measure the changes in the other variable using statistical methods.

Hence, explanatory research design was used to assess the current relationship between the dependent variable lead times and the three dimension of supply chain integration.
On the other hand, the study is descriptive in certain aspects specially to rate the position of the company in relation to the three dimensions of supply chain integration.

3.3 Unit of Analysis

The unit of analysis of the study includes employees of Ethio-Nippon Technical Co. S.C, Procurement and Sales and After Sales Department whose educational level is Diploma and above.

3.4 Method of Data Collection

Data Sources

To attain the aim of the study, both primary and secondary data was used.

Primary Data Sources: The Primary data was gathered from sample respondents (whom are primary Sources) which were chosen through sampling from the total study population. The instruments engaged in order to collect primary data was structured questionnaires and personal interviews.

The draft questionnaire was modified from an already made questionnaire Selam (2012) used in her study Investigation on the Effect of Supply Chain Integration on Ethiopian Garment Industry's Performance and Binyam (2016) used in his study the effect of Supply Chain Integration on Operational Performance. The primary questionnaire was pre-tested with academics and practitioners to check its content validity Baharanchi (2009) used on his study Investigation of the Impact of Supply Chain Integration on Product Innovation and Quality and Binyam (2016).

The questionnaire was divided into five main sections. Section I tries to gather general information about the respondents. Section II focuses on questions related to Supplier Integration. Section III of the questioner focuses on Customer Integration. Section IV of the questionnaire tries to gather information regarding Internal Integration within the company. And Section V of the questionnaire part tries to gather information regarding lead time. For Section II to V Respondents are required to indicate their answer based on 5 point Likert scale as follows:

1. Strongly Disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly Agree

Personal Interviews was conducted with the Managers of Procurement & Sales and After Sales Support Departments.

Secondary Data Sources: The main sources used for secondary data was documented company profiles, various records found in the company's After Sales Support Department, documents, books, articles and journals.

3.5 Population and Sample Size

Target Population: - Study population is an aggregation of elements from which the sample is actually selected. Therefore, for this study, the target populations are employees of ENITCO, particularly those who are working in Procurement and Sales Department and After Sales Service Department. A total of 113 employees who are found in the two centers of the company.

Sampling Technique and Sample Size: - To carry out the study from the total population stipulated, non-probability sampling technique was applied. By using purposive sampling technique, 56 employees were selected whose educational level is Diploma and above. These employees were selected through purposive sampling technique because it is believed that they have better knowledge and their work is related to the topic in discussion.

3.6 Study Variables

Dependent Variable:

- Lead time

Independent Variables:

- Supplier Integration
- Customer Integration
- Internal Integration

3.7 Description of Variables and Measurements

Narasimhan & Kim, 2002 have identified Supplier Integration, Customer Integration, and Internal Integration measurement factors as cited by Biniyam 2016:

Internal integration: is measured through data integration among internal functions, periodic interdepartmental meetings among internal functions, use of cross functional teams and integrative inventory management

Customer integration: is measured through follow-up with customer for feedback, level of computerization for customer ordering, frequency of periodic contact with customer and level of linkage with customer through information network.

Supplier integration: is measured through the level of information exchange with suppliers through internet, establishment of quick ordering system with major supplier and level of strategic partnership with major supplier.

3.8 Method of Data Analysis

The quantitative data collected through questionnaire was analyzed by Statistical Package for Social Sciences (SPSS) version 24.0.

Descriptive analysis was computed to evaluate the demographic characteristic of the respondents and their position related to supplier integration, customer integration and internal integration.

To check the strength of association between the three independent variables and lead time, correlation analysis was computed.

Finally, to check the effect of the independent variable to the dependent variable regression analysis was computed for all variables.

Baharanchi (2009) and Bahrami and Sabetfar (2014) used correlational and regression analysis to Investigate the Impact of Supply Chain Integration on Product Innovation and Quality and The Impact of Supply Chain Integration on Competitive Capabilities in Automobile Parts Manufacturing Industry in Qazvin Province respectively.

The qualitative data collected by using personal interviews was used to explain and elaborate the results which is found through the quantitative data.

3.9 Validity and Reliability

3.9.1 Validity

This study is conducted using the instrument other researchers used in other related studies. The content was checked and validated by academics and practitioners on previous studies. Selam (2012) used in her study Investigation on the Effect of Supply Chain Integration on Ethiopian Garment Industry's Performance and Binyam (2016) used in his study the effect of Supply Chain Integration on Operational Performance.

Furthermore, in order to use in this study its content is checked and validated by academics such as advisor of this study.

3.9.2 Reliability

According to Ho (2006), the reliability of a measuring instrument is defined as its ability to consistently measure the phenomenon it is designed to measure.

The most common technique used in the literature to assess the scale's reliability and stability is use of the Cronbach Alpha Statistics. The internal consistency of each variables was tested using Cronbach's Alpha. As per Sekaran (2003), if alpha is high (0.70 or higher), then this suggests that all of the items are reliable and the entire test is internally consistent.

Reliability Statistics		
Variables	**Cronbach's Alpha**	**N of Items**
Supplier Integration	0.715	5
Customer Integration	0.850	8
Internal Integration	0.847	7
Lead time	0.852	5

Hence, the Cronbach's Alpha for all the variables are over 0.70 which indicates high overall internal consistency among the three independent variable and the dependent variable.

3.10 Ethical Consideration

The aim of this study was clearly described to concerned management officials and for the respondents before distribution of the research questionnaire and to ascertain the confidentiality of the respondents, on the questioner respondents was not required to fill out their names.

In addition to this, any information collected via the instrument, publications and data's obtained from the company would never be used for any other purpose other than its academic intent.

Chapter Four

Results and Discussion

4.1. Introduction

Under this chapter the analysis and interpretation were carried out based on the data collected through questionnaire from the sample respondents who are believed to have thorough knowledge and who can describe the topic in discussion well.

The data was analyzed using Statistical Package for Social Science (SPSS Version 24). Based on the methodologies, research design and tools of the proposal the data was collected from 56 respondents.

From the total of 56 questionnaire distributed 53 were returned. Therefore, the collected 53 were effectively used for analysis that shows the response rate of 95 percent.

Data analysis, discussion and interpretation of the results are presented in the following subheadings: presentation of demographic data and frequency of respondents, analysis of mean, analysis of correlation and regression coefficient.

4.2. Demographic Data Presentation and Analysis

Observing the demographic trend or characteristics of our sample population before starting the data analysis is useful to make the analysis more meaningful for the reader. This part of the questionnaire requested limited amount of information related to personal and demographic status of respondents.

The purpose of demographic analysis in this research is to describe the characteristics of the sample such as proportion of male and female in the sample, academic qualification of respondents and experience of respondents. Accordingly, these variables are summarized and described in the figures shown below.

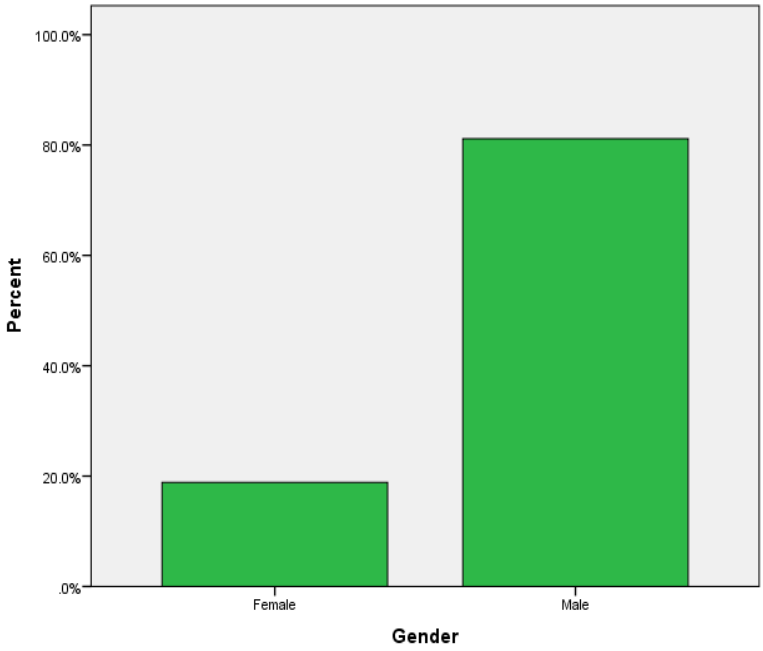


Fig. 2 Gender Distribution of Respondents

Source: Own Survey Result, 2017

The above figure shows that the gender distribution of respondents in ENITCO's Procurement & Sales and After Sales Department is composed of 18.9% of female and 81.1% of male employees. This implies that the gender distribution of ENITCO is mostly dominated by male employees.

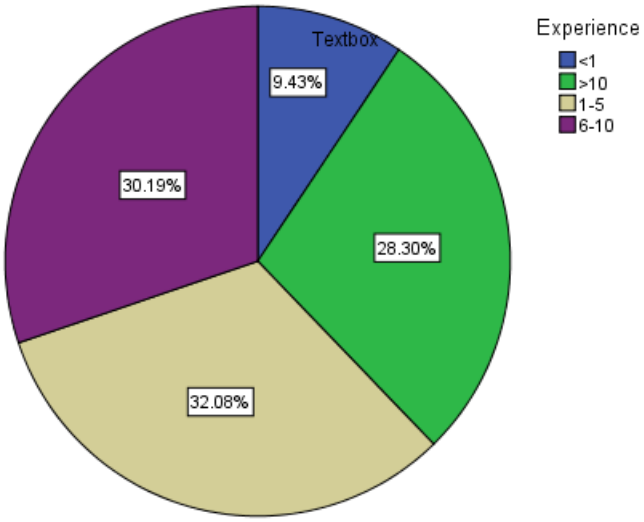


Fig. 3 Experience of Respondents

Source: Own Survey Result 2017

According to Figure 3, 9.4 percent of the respondents indicated that they have work experience of less than 1 year while 32.41percent of the respondents said they had experience

of 1 to 5 years and also 30.2 percent of the respondents replied that they have work experience of 6 to 10 years and 28.3 percent of the respondents replied that they have worked more than 10 years in the company. The results indicate that majority of the respondents have more than 5 years of work experience in the company which is an indication of that they understand the effect of supply chain integration on the company's performance because they had the chance to work in different areas in different positions where it paves a way to analyze the circumstances of different problems.

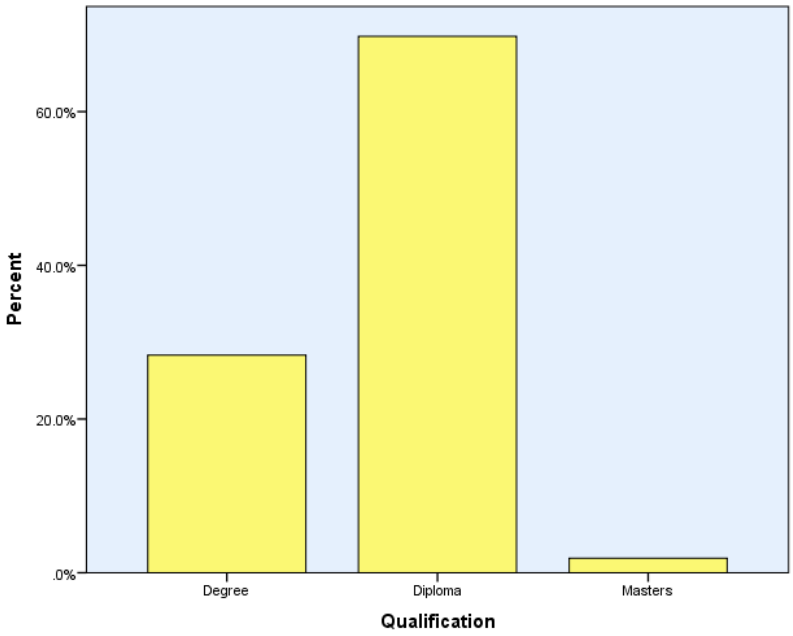


Fig. 4. Qualification of Respondents

Source: Own Survey Result 2017

The respondents were also asked to indicate their educational status and according to Fig. 4, 69.8 percent of the respondents have Diploma, 28.3 percent of the respondents have first degree and the rest 1.9 percent are post graduates. This indicates that majority of the respondents are diploma and first degree holders but the number of Master's degree holders is insignificant. The implication of this is that the respondents are able to understand the concept of the subject and provide relevant information needed for the study on the effect of supply chain integration on Lead Time because their role in the organization has also of significant use. Irrespective of their educational levels and working positions, according to the man power data collected from the company and the company's organizational structure,

there is no Supply Chain Department and employees with supply chain management background.

4.3. Descriptive Analysis

The mean or average is a measure of central tendency that offers a general picture of the data without unnecessarily covering one with each of the observations in the data set. The mean of respondents in each dimensions of supply chain integration suggest that the average amount that each dimension has positive or negative response of respondents. In this case, the mean of each item together with their respective dimension overall mean/average mean was calculated in order to conclude the overall supply chain integration of ENITCO. Accordingly, the mean scores have been computed for all the three supply chain integration dimensions that includes supplier integration, customer integration, internal integration and also the dependent variable lead time by equally weighting the mean scores of all the items under each dimension. The average mean result of each supply chain integration dimension together with their respective variables was separately presented, analyzed and interpreted as follows.

4.3.1 Supplier Integration

Table 1 illustrates responses to the first item of supplier integration which shows their disagreement on the issue of communication in Research and New Product Development with suppliers and transparent information regarding inventory status and sales & production plan.

These items have a mean score of (M=2.11), (M=2.23) and (M=2.34) respectively. Respondents also confirmed that there is no quick ordering system with major suppliers, there is no frequent periodic contact with suppliers and there is no strong information exchange with major suppliers through information network. This items equally have a mean score of (M=2.36), (M=2.28) and (M=2.64) respectively. Respondents agreed in the point where if they have long term relationship with their suppliers and the mean of this item is (M=3.13). This means that the company has long term relationship with their suppliers.

In general from the results acquired from Ethio-Nippon Technical Co.S.C. indicates that, there is no strong integration with supplier and businesses are undertaken through traditional way of operation where there is no supply chain way of thinking which in turn affects the Lead Time of the service rendered by the company.

According to the gathered data, information regarding the inventory status of the suppliers and availability of quick ordering system are the functions that the company didn't give much emphasis. The company is also weak in having periodic contact, participation on R&D activities and exchanging information regarding their plans with suppliers. This has an implication that, the firm is weak in terms of suppliers' partnership practices and did not understand the supply chain management practices that can play a great role in enhancing the company's performance. According to Zigiaris (2000) a two-year study conducted by the Global Procurement and Supply Chain Initiative at Michigan State University, responses received from around the globe showed that companies that involved suppliers earlier on in the product design and development process consistently outperformed those that did not. Hence, the company should consider to participate with supplier's R & D program in order to meet the demands of their end customers.

Table 1. Supplier Integration Mean Value

Items	N	Mean
You have effective communications with your suppliers on research activities and new product development (R&D)	53	2.11
You and your supplier have transparent information about each other's inventory status	53	2.23
You and your suppliers provide each other with each other's Sales and production plan	53	2.34
There is quick ordering system with major suppliers	53	2.36
There is high frequency of periodic contact with major suppliers	53	2.28
There is strong information exchange with major suppliers through information network	53	2.64
You have long-term relationships with your suppliers.	53	3.13
Valid N (listwise)	53	

Source: Own survey result, 2017

4.3.2. Customer Integration

The other critical dimension of supply chain integration is the integration of customer.

The table below depicts that the respondents didn't agree on the existence of linkage with customers on R&D activities, there is no transparent information sharing regarding inventory status and sales plan and there is quick ordering system with major customers with a mean score of (M=2.34), (M=2.3), (M=2.3) and (M=2.77) respectively. Consequently, there is computerized system for major customer ordering and systematic way to measure customer satisfaction with a mean score of (M=2.79) and (M=2.43) respectively. Finally, the respondents expressed their agreement on the existence of long term relationship with their customers and their assistance in providing technical information and assistance with their customers with a mean score of (M=3.77) and (M=3.17) respectively. This shows that the company has long term relationship with their customers and they provide the necessary technical assistance whenever required by their customers. Even though the company has long term relationship with their customers and provides technical assistance, the above result still shows that there is a problem of customer integration in Ethio-Nippon Technical Co.S.C..

Table2. Customer Integration Mean Value

Items	N	Mean
You have effective communication with your Sub dealers and customers on research activities and new product development (R&D).	53	2.34
You and your customers including the sub dealers have transparent information about each other's inventory status.	53	2.30
You and your Sub dealers provide each other with each other's Sales plan	53	2.30
There is quick ordering system with major customers.	53	2.77
There is computerized system for major customer ordering	53	2.79
You and your customers share technical information and technical assistance with each other	53	3.17
You have long-term relationships with your customers	53	3.77
Your company have a systematic way to constantly measure customer satisfaction	53	2.43
Valid N (listwise)	53	

Source: Own survey result, 2017

4.3.3. Internal Integration

Table 3 indicates the average mean value with regard to the use of better data integration among internal functions and effective communication between different departments regarding new product or process development project and availability of transparent information regarding the inventory status of different but related departments with a mean score of (M=2.66), (M=2.45) and (M=2.40) respectively. Provision of different departments plan and collaboration of different departments with the company's development program, sharing of technical information within departments have a mean value of (M=2.17), (M=2.66) and (M=2.64) respectively. Based on the mean results for the questions in regards to internal integration, it shows a weak inter departmental integration in the company.

Besides, Supplier Integration and Customer Integration, emphasis has to be given to the issue of internal integration in order to improve the company's performance and reduce the lead time of the services. The results of the study also infer that, there is a poor interdepartmental coordination in the company which in turn results in longer lead times.

Generally, the results emphasized that the internal integration of the enterprise within the department and across other departments need to be considered deeply in order to improve the company's performance because, the proper functioning of internal activities have a great contribution to shorter lead times.

Table 3. Internal Integration Mean Value

Item	N	Mean
There is better data integration among internal functions	53	2.66
You have effective communications between different departments regarding a new product or process development project.	53	2.45
Different but related production sections have transparent information about the inventory status of each other.	53	2.40
Different departments in your company provide each other with their plan (s).	53	2.17
Different departments in your company collaborate with the company development program (s).	53	2.66
Different departments in your company share technical information with each other quickly if required.	53	2.64
There is strong integrative inventory management	53	2.62
Valid N (listwise)	53	

Source: Own survey result, 2017

4.3.4. Lead Time

As per table 4 from the dimensions of Lead Time respondents disagree on the issue of short time between receipt of customer order and delivery time with a lowest mean score of (M=2.25). Followed by short customer order processing time and short time to solve customer complaints with a mean score of (M=2.34) and (M=2.34) respectively. Finally, the respondents also disagree on the on time delivery record of the company and provision of resources by the company to deliver customer order on time with a mean score of (M=2.49) and (M=2.42) respectively. Based on the indication of variables of lead time it can be possible to concluded that the company take longer time to deliver customer order on time and also to solve their complaints. In order to stay competitive in the business always organizations should stay on the top of their competitors by providing the required service to their customers. But as long as they have long lead time to provide the requested services, customers may shift to other companies who can provide better services as to their requirements. So the company should consider to improve this factors.

Table 4. Lead Time Mean Value

Items	N	Mean
There is on time Delivery Record to Customers by the Company	53	2.49
Customer order processing time is short.	53	2.34
Time to solve customer complaints is short.	53	2.34
To deliver customer order on time the company avail necessary resources.	53	2.42
The time which elapses between the receipt of customer order and delivery is short	53	2.25
Valid N (listwise)	53	

Source: Own survey result, 2017

4.3.5 Summary of the results of all the dimension of Supply Chain Integration and Lead Time.

Table 5. Summary of the dimensions of supply chain integration and lead time

Item	N	Mean
Supplier Integration	53	2.4420
Customer Integration	53	2.7358
Internal Integration	53	2.5148
Lead Time	53	2.3660
Valid N (listwise)	53	

Source: Own survey result, 2017

Table 5 shows the overall calculated mean scores of all the three supply chain and lead time dimensions that have discussed above. According to the respondents, the integration among stated dimensions is not pleasing which is undertaken by Ethio-Nippon Technical Co. S.C. as all the mean scores of each supply chain dimension is very low.

4.4. Correlation among the dependent and independent variables

Under research investigation we are expected to understand concepts beyond the means and standard deviations of the dependent and independent variables so we need to know how one variable is related to another which comes with the concept of correlation. Hence, in this study Pearson Correlation Coefficient (r) was used to examine the relationship; between the three independent variables and the dependent variables by using a two-tailed test.

Table 6. Correlation among the dependent and independent variables

		Lead Time	Supplier Integration	Customer Integration	Internal Integration
Lead Time	Pearson Correlation	1	.448**	.756**	.579**
	Sig. (2-tailed)		.001	.000	.000
	N	53	53	53	53
Supplier Integration	Pearson Correlation	.448**	1	.396**	.411**
	Sig. (2-tailed)	.001		.003	.002
	N	53	53	53	53
Customer Integration	Pearson Correlation	.756**	.396**	1	.458**
	Sig. (2-tailed)	.000	.003		.001
	N	53	53	53	53
Internal Integration	Pearson Correlation	.579**	.411**	.458**	1
	Sig. (2-tailed)	.000	.002	.001	
	N	53	53	53	53

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Own survey result, 2017

Table 6 shows the correlation coefficient of the three factors measuring supply chain integration where all are significantly correlated with the lead time of the service provided by the company within the range of 0.448 up to 0.756. All are significant at $p<0.01$ level. When we further look at into each factor with their coefficients which indicates the three independent variables: supplier integration (r=0.448), customer integration (r=0.756) and customer integration (r=0.579). All are important determinants of supply chain integration and significant to show the effect of supply chain integration on lead time. From this analysis we conclude that Supplier Integration, Customer Integration and Internal Integration has a significant relationship with Lead time.

4.5. Regression Analysis

This regression analysis is conducted to know by how much the independent variable explains the dependent variable. The regression was conducted between the three independent variables (Supplier integration, Customer integration and Internal Integration) and the dependent variable lead time. The results of the regression analysis are presented as follows.

Normality Test

Table 7: Skewness and Kurtosis

Descriptive Statistics

	N	Mean	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Supplier Integration	53	2.4420	.478	.327	.209	.644
Customer Integration	53	2.7358	-.388	.327	-.479	.644
Internal Integration	53	2.5148	-.002	.327	-.147	.644
Lead Time	53	2.3660	-.187	.327	-.834	.644
Valid N (listwise)	53					

Source: Own survey result, 2017

As we can see from the above descriptive table 7, Skewness and Kurtosis statics and test was done. As per the test, the calculation demonstrated that the distribution is normal because Kurtosis and Skewness are in between -1 and +1,

Multi Collinearity Tests

Multi collinearity refers to the situation in which the independent/predictor variables are highly correlated. When independent variables are multi collinear, there is “overlap” or sharing of predictive power. HO (2006)

Table 8. Multi Collinearity test of independent variables

Model		Collinearity Statistics	
		Tolerance	VIF
1	Supplier Integration	.776	1.288
	Customer Integration	.738	1.355
	Internal Integration	.728	1.374

a. Dependent Variable: Lead Time

Source: Own survey result, 2017

The result in table 8 show that the collinearity between independent variables has no series problem Since the value of tolerance for all independent variable is greater than 0.1 and all VIF is less than ten (VIF<10). Thus, multi collinearity does not seem to be a problem for the variables.

Table 9. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.806[a]	.649	.627	.49286

a. Predictors: (Constant), Internal Integration, Supplier Integration, Customer Integration

Source: Own survey result, 2017

The model summary displays the significance and percentage of variation in Lead Time which is caused by independent variables.

According to Field (2009) the adjusted R^2 gives us some idea of how well our model generalizes and ideally we would like its value to be the same, or very close to, the value of R^2.

Multiple correlations R of +0.806 represent the combined correlation of all the independent variables. Adjusted R^2 tells us that 62.7% of the variation in Lead Time can be explained by variation in the three independent variables taken together.

Table 10. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.996	3	7.332	30.184	.000[b]
	Residual	11.903	49	.243		
	Total	33.899	52			

a. Dependent Variable: Lead Time

b. Predictors: (Constant), Internal Integration, Supplier Integration, Customer Integration

Source: Own survey result, 2017

In the ANOVA table, we have the F value of 30.184 which is significant with $p<0.05$. This informs us that the three independent variables taken together as a set are significantly related to the dependent variable. The multiple correlations are therefore highly significant.

In order to see the contribution of factors that affect lead time, regression analysis of supply chain integration dimensions were employed. Table 11, provides the result of multiple regression analysis beta coefficient and significance.

Table 11. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.325	.332		.979	.332
	Supplier Integration	.147	.135	.105	1.088	.282
	Customer Integration	.609	.101	.594	6.027	.000
	Internal Integration	.265	.100	.264	2.663	.010

a. Dependent Variable: Lead Time

Source: Own survey result, 2017

The standardize beta value shows the number of standard deviations that the outcome will change as a result of one standard deviation change in predictor. The standard deviation units are directly comparable; therefore, they provide a better insight in to the importance of a predictor in the model. The large value of beta coefficient in an independent variable has the more important determinant in predicting the dependent variable. The standardize beta value

for customer integration dimension is 0.594. This implies that, this variable has relatively strong degree of importance for analyzing the effect of supply chain integration than others. Respectively, the standardized beta value for supplier integration and internal integration are 0.105 and 0.264 respectively. R-square value indicates only the variance in the lead time as it is explained by independent variables. When we look at the detail to what extent each independent variable influences the dependent variable: customer integration, internal integration and supplier integration were found to be determinant of lead time in decreasing order.

The coefficient table depicts that the significant regression coefficients, such as Customer integration and Internal integration are significant at $p<0.05$. But, supplier integration is not significant. This doesn't mean that the dimension of supplier integration is not significant for the record of low lead time. According to the correlation analysis, we have found that supplier integration has significant relationship with lead time

Since, coefficients of predictor variables are statistically significant at less than five percent for customer integration and internal integration, hypothesis related to these dimensions are accepted. Supplier Integration is not significant at this level and as a result null hypothesis related to this dimension is failed to be rejected.

Moshkdanian and Molahosseini (2013), on their study the Impact of supply chain integration on the performance of Bahman group, having long term relationship with suppliers doesn't have strong effect on performance. In general, the literature on the relationship of supplier integration with performance has very mixed findings. While some studies (Koufteros et al., 2005; Swink et al., 2007 cited by Flynn, Huo and Zaho 2010) found that supplier integration was negatively related to certain aspects of operational performance.

Table 12. Summary of the overall outcome of the research hypothesis

Hypothesis	Result	Reason
H0: Suppliers Integration has no significant effect on Lead Time of the Company H1: Supplier Integration has significant effect on Lead Time of the Company	H0: Accepted H1: Rejected	$\beta = 0.147$ $P>0.05$
H0: Customers Integration has no significant effect on Lead Time of the Company H1: Customer Integration has significant effect on Lead Time of the Company	H0: Rejected H1: Accepted	$\beta = 0.609$ $P<0.05$
H0: Internal Integration has no significant effect on Lead Time of the Company H1. Internal integration has significant effect on Lead Time of the Company	H0: Rejected H1: Accepted	$\beta = 0.265$ $P<0.05$

Chapter Five

Summary, Conclusions and Recommendations

This chapter provides the summary of major findings, conclusions and recommendation of the study.

5.1 Summary of the Findings

In this study, the researcher looked for the effect of Supply Chain Integration on Lead Time in the case of Ethio-Nippon Technical Company S.C.. The study illustrated the relationship that exists between the Lead Time and Supply Chain Integration dimensions and also along the dimensions of supply chain integration with the intent of knowing the strength of the relationship of the dimensions in this particular case. In order to achieve these objectives, data were collected from the employees of the company and processed in both descriptive and inferential statistics, specifically correlation and Regression analysis was made to know the level of relationship and the degree of its effect respectively.

From the demographic characteristics of respondents, 81.1% were male and the remaining 18.9% were female respondents. In relation to their qualification level, the respondents had a minimum of diploma in which we can infer that the respondents are educated and they understood better the subject in the discussion. Finally, when we came to the work experience of the respondents, 41.5 % of the employees have less than five years of work experience. This means that the company's turnover rate is high. In order to keep the internal integration very tight and to reply to customer orders on time, employees who have a record of more than 5 years are preferable. Because by staying long time in the environment, they will be able to know the requirement of their customer very well and they will establish effective communication with their colleagues.

The analysis result depicts that the mean score values for supply chain integration dimensions have low mean value (between 2.4420 and 2.7358) which really indicates the supply chain integration of Ethio-Nippon Technical Company S.C. is poor.

The mean score value for lead time is 2.3660. Which shows there is long lead time to provide the necessary services in the company.

The study also found a significant correlation among the three (supplier integration, customer integration, and internal integration) supply chain dimensions and lead times.

Furthermore, the value of regression analysis shows that customer integration and internal integration have statistically significant effect on Lead Time of the service provided by Ethio-Nippon Technical Company. S.C..

On the other hand, Supplier Integration doesn't show significant effect on the lead time of the company. As per the discussion made with the manager, Procurement and Sales department and Aftersales Service Manager, the company has a long time relationship with their supplies and from the descriptive analysis made earlier most employees agree that the company has a longtime relationship with their major suppliers, but availability of other factors in the macro environment still considered to increase their lead times. According to the Global Competitiveness report 2016, the first six most problematic factors for doing business in Ethiopia are 1. Corruption, 2. Access to financing, 3. Foreign Currency regulations, 4. Tax rates, 5. Inefficient government bureaucracy and 6. Inadequate supply of infrastructure. As per the annual report of NBE 2015/16, the foreign exchange traded in the interbank market is declined by 13% from last year.

In the Enterprise Surveys made in 2015, the average days to clear exports and imports through customs is 19 days for manufacturing firms in Ethiopia which is more than other Sub-Saharan African countries.

According to the reports described above, foreign currency and Custom procedures has also their own impact on the longer lead times provided by the company.

5.2 Conclusions

In order to investigate the effect of supply chain integration in lead times, three research questions were raised in regards to the position of the company with supplier integration, customer integration and internal integration. Employees from the company who has knowledge of the subject and related work exposure were asked to rate the company's position in regards to the three supply chain dimensions and based on the analysis, the company has generally weak supply chain integration.

Based on the correlation and regression analysis conducted to check the level of significance and effect of the independent variable with the dependent, Customer integration and Internal integration has a significant relationship and effect with the lead time of the company. While Supplier Integration has a significant relationship leaving insignificant effect on the lead time of the company.

Finally, for Customer Integration and Internal Integration, the null hypothesis is rejected and for Supplier Integration the null hypothesis is failed to be rejected.

5.3 Recommendations

By relying on the study findings, the researcher suggests the following points as credible recommendations to the problem.

- In order to improve the supplier integration, the company should be engaged in R&D activities with their suppliers and the establishment of quick ordering system and computerized ordering system is necessary. Whenever the need arises for a specific item, the Company can easily check the required item is available at the suppliers store and able to determine the required time to deliver for its customers. This also enables the company to think for other alternative options to minimize the time to deliver the products for its esteemed customers.
- So as to maintain customer integration, the company should link its customers through information network with the company to get on time feedback is necessary, arrangement of quick ordering systems, provide technical assistance on the spot the service is required, including provision of catalogues and brochures of parts, minimizes the long time taken for customers to understand the problem and ask for aftersales service. This enables customers to be proactive than reactive. So, by implementing extended customer networks the company can minimize the order time especially for those customers who resides far in geographical areas.
- The integration of internal function within the organization is a primary activity in any organization. The organization has to work on different retention mechanisms in order to keep its employees. Customers should not wait until new employee is recruited and familiarize with the environment. When we come to service rendering companies, customers has their own preferences in regards to their service providers. Technical and Attitude Changing trainings should be given to employees periodically. The company should establish systems in order to align better data integration among departments. Through these systems the company can reduce beurocracy's and minimize the time required to meet one activity. Develop good cultures throughout the organizations.

The study also recommends the following areas for further study;

- As Supply Chain Management field of study is new to Ethiopia, more studies in relation to the effect of supply chain integration, challenges of supply chain in Ethiopian context has to be done.
- Furthermore, analysis of supply chain practices in the various sectors has to be studied in order to articulate and utilize the benefit of supply chain in the country.

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Annex

ADDIS ABABA UNIVERSITY
School of Commerce

Department of Logistics and Supply Chain Management
Program: MA in LSCM

QUESTIONNAIRE

Dear respondents, the purpose of this questionnaire is to gather data on the effect of supply chain Integration on lead time in the case of Ethio-Nippon Technical Co. S.C and being prepared for partial fulfillment of Master Degree in Logistics and Supply Chain Management at Addis Ababa University School of Commerce. The study is purely for academic purpose and thus not affects you in any case. So, your genuine, frank and timely response is necessary for successfulness of the study. The accuracy of the information you provide highly determine the reliability of the study. Therefore, I kindly request you to respond to each items of the question very carefully.

Do not hesitate to contact me with the following contact address if you have any question/comment about the questionnaire.

Contact Address:

Tsion Mulugeta
Tel - +251 911 392080
E-mail – mailtotsi@yahoo.com

Thank you in advance for your unreserved cooperation!

General Instructions

- There is no need of writing your name
- For Section I please tick (√) for the answer in the appropriate box and indicate the number for your response to each statements of Section II.

Section I: Demographic Characteristics

1. Gender

   A) Male ☐ B) Female ☐

2. Qualification

   Certificate ☐ Diploma ☐ First Degree ☐

   Masters ☐ PHD ☐

3. Experience in the company

   Less than 1 year ☐ 1-5 years ☐ 6-10 years ☐ More than 10 years ☐

Section II:

The Following Statements relate to the effect of Supply Chain Integration on Lead Time in the Case of Ethio-Nippon Technical Company S.C..

Follow the instructions given for your responses

Please Indicate the extent of integration of your company (1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree		1	2	3	4	5
Part 1	**Supplier Integration**					
1	You have effective communications with your suppliers on research activities and new product development (R&D).					
2	You and your supplier have transparent information about each other's inventory status.					
3	You and your suppliers provide each other with each other's Sales and production plan					
4	There is quick ordering system with major suppliers.					
5	There is high frequency of periodic contact with major suppliers					
6	There is strong information exchange with major suppliers through information network					
7	You have long-term relationships with your suppliers.					
Part 2	**Customer Integration**					
1	You have effective communication with your Sub dealers and customers on research activities and new product development (R&D).					
2	You and your customers including the sub dealers have transparent information about each other's inventory status.					
3	You and your Sub dealers provide each other with each other's Sales plan.					
4	There is quick ordering system with major customers.					
5	There is computerized system for major customer ordering					
6	You and your customers share technical information and technical assistance with each other.					
7	You have long-term relationships with your customers					
8	Your company have a systematic way to constantly measure customer satisfaction.					

Part 3	**Internal Integration**					
1	There is better data integration among internal functions					
2	You have effective communications between different departments regarding a new product or process development project.					
3	Different but related production sections have transparent information about the inventory status of each other.					
4	Different departments in your company provide each other with their plan (s).					
5	Different departments in your company collaborate with the company development program (s).					
6	Different departments in your company share technical information with each other quickly if required.					
7	There is strong integrative inventory management					
Part 4	**Information Regarding Lead Time**					
1	There is on time Delivery Record to Customers by the Company					
2	Customer order processing time is short.					
3	Time to solve customer complaints is short.					
4	To deliver customer order on time the company avail necessary resources.					
5	The time which elapses between the receipt of customer order and delivery is short					

Thank you again for your cooperation!