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Factors Affecting Supply Chain Integration in Marble Industry
(The Case of Ethiopian Marble Processing Enterprise)

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ADDIS ABABA UNIVERSITY
School of Commerce
Logistics and Supply Chain Management Post Graduate Program

**Factors Affecting Supply Chain Integration in Marble Industry
(The Case of Ethiopian Marble Processing Enterprise)**

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Declaration

I, the undersigned, declare that this research paper entitled “Factor affecting supply chain integration in Marble Industry: the case of Ethiopian Marble Processing Enterprise” is my original work and has not been produced by others in any other universities, for any other requirements in any form and all the sources used to support this particular study have been appropriately acknowledged.

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List of Acronyms

EMPE:	Ethiopian Marble Processing Enterprise
SCM:	Supply Chain Management
SCI:	Supply Chain Integration
SCIP:	Supply Chain Integration Performance
CI:	Customer Integration
SI:	Supply Integration

Abstract

This thesis paper makes an investigation on factor affecting supply chain integration (Supplier, customer, internal, inventory management, sc reliability and information integration) the case of Ethiopian Marble Processing Enterprise. The main objective of this study is to explore what factors can affect supply chain integration on Ethiopian Marble Processing Enterprise to provide a recommendation in order to take corrective action. Primary type of data was collected with the help of questionnaires and personal interviews. Additionally, secondary data was also gathered using previous research works in the sector and different documents. The collected data was analyzed using both descriptive statistics (frequency, table) and inferential statistics (correlation and linear regression). Main findings of the study depicts that, the firm integration with partners affected by several factors, such as, lack of strategic partnership with suppliers and customer, lack of strong networking information communication, weak interdepartmental integration, lack of collaborative demand forecasting and lack of inventory management were among the major determinant factors. Based on the major finding the study recommended that, as the information technology is main source of improvement in customer and supplier relationship integration. When this area is satisfied then automatically supply chain performance will increase. Therefore it is essential that the flow of information and access of information should in according manner. The firms can facilities easily available information network with its suppliers and customers accessibility of Email-connection, providing constant information exchange time, collaborate design of availabilities of information.

Keywords: Customer integration, information integration, internal integration, supplier integration, inventory management, supply chain integration,

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CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Supply chain integration can be defined as the degree to which a firm can strategically work together with its supply chain partners and cooperatively manage intra- and inter-organizational processes to achieve effective and efficient flows of products, services, information, money, and decisions to provide the maximum value to the final customer with low costs and high speed (Msimangira, 2010).

Supply chain integration is becoming one of the academic areas of interests for research and practical applications. In other words, firms have started to question how they can integrate and improve their material and information flow activities and processes inside the organizations and with their supply chain partners.

Manufacturing industries in different nations have taken on numerous performance improvement programs and developed new operating viewpoint to enhance the way they operate to stay competitive. However, among those improvement programs, supply chain integration has become an integral part of corporate strategy and its adoption in manufacturing companies has steadily accelerated since the 1980s (Shield and Rangarajan, 2013).

In order to fully benefit and implement supply chain management concepts, it is important for the firms to integrate efficiently with their suppliers, customers, warehouses, and other intermediate value-adding partners (Loreti K, 2009).

SCM coordinates activities both downstream and upstream to align supply and demand that require a collective performance of stakeholders to support the customer's needs. For effective coordination of operational activities along supply chain, firms require relationships that are cross-functional and cross-firm in nature to maximize achievement of information sharing, close partnering and coordination (GuangyuXiong & Petri Helo, 2008).

Many researchers have mentioned a different kind of classification of supply chain integration challenges based on their own criteria. Loreti K, (2009), explained the challenges of supply chain can be classified through the challenge of system relationships. The supply chain system has two kinds of relationships, which are the relation between sub-systems, and SCM system and the business strategies. This classification emphasizes the technical challenges that came from the relation between SCM system and internal business strategy. However, this classification bypasses the challenges that the companies may face from external environment.

According to Lai, & Cheng (2012), the major barriers of supply chain integration, lack of Trust, lack of knowledge and lack of transparency. After extensive reading to the supply chain integration challenges that the literature mentioned in different resources, Awad and Nassar(2010) found that the challenges from three perspectives: technical perspective, managerial perspective and relationships perspective. Finally, Awad and Nassar (2010) have tried to integrate all challenges in a single comprehensive source and then classify these challenges in three main parts. This classification are first: the Business Micro-environmental challenges, second: the Business Macro-environmental

challenges(relationships), and third: The Technical challenges of Supply Chain integration (Awad & Nasar, 2010).

1.2. Background of the Organization

Ethiopian Marble Processing Enterprise was founded in 1937 G.C. and it has an experience of over eighty years in processing marble product. The enterprise extracts its raw materials from Benshangul Gumuze regional states. At the

Marble is one of the dimension stones used for construction purposes. The raw materials used in polished marble production will be mainly blocks of marbles. Dimension stone is a broader term which incorporates varieties of rocks such as granites, lime stones, sandstones and marble. The products of marble processing can be used or monuments, interiors decoration, statuary, table tops and novelties. But the principal application of marbles is for exterior building works to provide a lasting endurance to walls.

Ethiopian Marble Processing Enterprise established by Italian investors. The establishment dates 65 years back. It was during the time of Italian occupation, a man known as Signore olive Cesar, who erected the first marble processing plant in the name of 'Ethio-Marble'.

In 1974 E.C. during public uprising in the country, the country's economic systems were changed to command economy: Nationalization of private Enterprises took place, as a rule these private Enterprise were nationalized by proclamation accordingly.

After the over throw of the “Derg” regime the transitional Government of Ethiopia Re-organized the industry, by the proclamation of the Ministry of Councils Regulation No. 166/1986 as “The Ethiopian Marble Processing Enterprise”.

As per the transaction announced on March 25/2012, G.C, Ethiopian Processing Enterprise operates as a subsidiary of National Mining Corporation Private Limited.

At the factories, customers will pay four or six months in advance to get their marble. The Enterprise provides job opportunity for 350 employees and generates Gross profit of around Birr 7million per annum.

1.3. Statement of the Problem

Supply chain integration management is applied by companies across the globe due to its demonstrated results such as delivery time reduction, improved financial performance, greater customer satisfaction, building trust among suppliers, and others (Fateme& Ali 2013). While customer expectation is continuously increasing, companies have forced to invest and focus their attention to coordination across and beyond the organizational boundaries. Customers expect wider choice, better service, fast delivery and higher quality as all these are critical factors which affect company's strategies and the bottom line of its operations. Accordingly, the increasing global competition has driven firms to not only develop their own performance, but also concentrate on integrating their supply chain partners into the overall supply chain competitive advantage.

Supply Chain integration in Ethiopian Marble Processing Enterprise doesn't seem well performing based on customer, supplier and interdepartmental integration. This may result from different factors like inflexible firm policies, weak interdepartmental data sharing, weak delivery time, customer and supplier

handling problems, lack of training on how to handle different problems, though it is not empirically tested.

According to Fateme & Ali Molahosseini (2013), there are a lot of factors that can affect firms' supply chain integration of less developed countries such as, lack of information sharing, lack of trust, lack condition, flexibility, joint decision making, organizational efficiency, willingness to collaborate, etc.,. Thus, it is important to first understand how their supply chains work and what factors possibly affect firms supply chain integration. The supply chains that add the most value of customers with the lowest cost in the chain make up the winning network of individual companies. Mamun (2011) added today the new source of competition lies outside the walls of organizations, and is determined by understanding determinant factors that affect effectiveness their operations with their supply chain partners such as suppliers, distributors, wholesalers and customers.

With regard to manufacturing industries supply chain integration issues the study were tried to assess different published and unpublished research results to reduce similarities with other researches. Accordingly, study by Binyam (2016), assess that "the effect of supply chain integration on operational performance in Ethiopian Trading Enterprises" the study focused only in assessing the internal integration efficiency on organization performance, similarly there were also a similar studies conducted by Gebreeyesus & Mekides(2011), both of the study were investigate organizational efficiency and performance on creating effective supply chain integration and their finding implied that, supply chain integration performance of an organization influenced to a greater or lesser degree by the actions of the organizations that integrate the inputs and the supply chain at large extents.

Even though, most of the previous studies addressed the relationship between supply chain integration and organizational performance, but there were no researches are conducted related with factors are affecting the supply chain integration of manufacturing industries specifically that of marble manufacturing. As a result, there is knowledge gap that needs to be addressed with related to the proposed topic of the study.

One of the research gap that the study exclusively focused to investigate on this area, because there is no related area research results.

So, this study tried to investigate factors that affect supply chain integration of marble manufacturing industries in Ethiopia, specifically focusing on one of the marble manufacturing industry of Ethiopian Marble Processing Enterprise, that are located in Addis Ababa Ethiopia.

1.4. Research Questions

Based on the provided statement of problem the study tried to answer the following basic research questions:-

- i. What are the factors affecting relationship with suppliers in EMPE?
- ii. What are the factors affecting relationship with customers in EMPE?
- iii. What are the factors affecting Internal Integration of EMPE?
- iv. What are the factors affecting information integration of supply chain with partners in EMPE?
- v. What are the factors affecting Supply Chain Integration Reliability of EMPE?
- vi. What are the factors affecting Collaborative Inventory Management practice of EMPE?

1.5. Objective of the Study

1.5.1. General objective:

The major objective of the study is to assess factor affecting supply chain integration of Marble Industries in Ethiopia focusing on Ethiopian Marble Processing Enterprises located in Addis Ababa.

1.5.2. Specific objectives of the study

The specific objectives of the study are:

- i. To examine factors affecting firm integration with Suppliers of EMPE,
- ii. To examine factors affecting firm integration with Customers of EMPE,
- iii. To Identify factors affecting Internal integration of the of EMPE,
- iv. To assess factors affecting information integration of sc with partners of EMPE,
- v. To examine factors affecting Supply Chain Integration Reliability of EMPE,
- vi. To identify major factors affecting Collaborative Inventory Management practice of EMPE,

1.6. Limitation of the Study

The study is restricted only to assess, factor affecting supply chain integration of marble industries in Ethiopia, taking a case organization Ethiopian Marble Processing Enterprise located in Addis Ababa.

1.7. Scope of the Study

The topic covers the issues of internal integration, customer integration, supplier integration, internal integration, information integration and supply chain reliability on operational performance and doesn't include other performance measurements like profitability. The study addresses only employees who work under the firm and it doesn't consider the view of customers and supplier. The

geographical scope of the study covers the city of Addis Ababa because, the organization covered under the study is found in the city. The topical scope of this study is limited on factor affecting supply chain integration in marble industry specifically on case of Ethiopian Marble Processing Enterprise.

1.8. Significance of the Study

The result of the study believed to give an insight for the company's management as well as other concerned bodies about the existing challenges of supply chain integration. It will also recommend possible solutions that enable the company to improve its supply chain management system.

Lack of research on the field of supply chain integration in Ethiopia shows that, the area has not received the significance that it deserves. Therefore, the study also serves as a base for further studies in the area.

1.9. Organization of the study

This research is organized in to five chapters. The first chapter deals with introduction of the study, background of the study area, statement of the problem, research question, objective of the study, significance of the study and delimitation of the study. The second chapter introduces review of related literature in the area. The third chapter deals with the research design and methodology. The forth chapter presents the analysis and the fifth chapter includes the conclusions, recommendation and the future studies. Finally list of references, appendix & annexes at the end of the page.

CHAPTER TWO

LITERATURE REVIEW OF THE STUDY

This chapter presents a summary of the conceptual framework, theoretical literature and empirical literature reviewed by the researcher. Theoretical literature reviews includes various concepts and theories related to supply chain integration. Empirical literature review includes review of various empirical studies conducted on supply chain integration while the conceptual framework describes various variables of the study.

2.1. The Concept of Supply Chain Management

Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores; so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements (David, 2003). Supply chain management takes into consideration every facility that has an impact on cost and plays a role in making the product conform to customer requirements: from supplier and manufacturing facilities through warehouses and distribution centers to retailers and stores (Msimangira, 2010).

Globalization and the advent of new technologies are great contributors to prompting business competition. Enterprises are looking to effectively and efficiently satisfy customers' needs to remain competitive (Loreti, 2009). The viability of a firm largely depends on how well the firm responds to customer requirements while becoming lean (Gunasekaran, et al. 2001). Effectiveness calls for enterprises to be equipped with customer-focused common goals among all the related suppliers and manufacturers. The business success would then rely on the capability of quick response to customer requirements. The supplier and the manufacturer need to coordinate in sharing the common goal and strategy of improving product quality and customer service level.

Efficiency requires that enterprises meet customer requirement (David, 2003a). A supply chain is the sequence of organizations their facilities, functions, and activities; that are involved in producing and delivering a product or service. The sequence would begin with the basic suppliers of raw materials and would extend all the way to the final consumer (Stevenson, 2002). A supply chain is viewed as a number of organizations working cooperatively with some shared objectives (Shield and Rangarajan,2013). GuangyuXiong& Petri Helo(2008) viewed Supply Chain Management, SCM, in three facts; as a management philosophy, where systems are viewed as a whole, with a strategic orientation towards the organizational goals; as a set of activities to implement management philosophy, where integrated behavior, mutually shared information and risks as well as rewards have one goal and focus on serving the customers; as a set of management processes where customer service and customer relationship management as well as product development and commercialization are championed.

In order to survive in the global competition and sustain long-term advantages, many firms have introduced SCM (Chan, 2003). SCM thinking is a way of thinking that is devoted to discovering tools and techniques that provide for increased operational effectiveness and efficiency throughout the delivery channels that must be created internally and externally to support and supply existing corporate product and service offering to customers (Cox, 1999).

2.2. Supply Chain Integration

Supply Chain Integration which is emphasized as the cornerstone of supply chain management holds various functions within and across the company's boundary. The Integration supply chain needs both the close synchronization of all daily operational and planning processes and the avoidance of departmental biases and the establishment of strategic congruence and consensus. The integration of physical distribution of product has gone long way to make it practical. The implication of supply chain integration is that companies can work together to properly manage intra and inter-organization processes and to strategically work together with its supply chain partners. The operation of supply chain is highly significant that its prompt delivery enhances value offerings customers need for fulfillments and as such they dictate the place, the time and the mechanisms these goods are delivered to them and in what manner. Supply chain integration enhances these and leads to increase in market share and business performance (GuangyuXiong& Petri Helo, 2008).

Supply chain integration can be affected by several types of factors such as:-

2.2.1. Relationships with Suppliers

Companies are inclined to work with different suppliers in different ways. It is important that the relationship with suppliers satisfies their company needs. Gould, (2002) mentioned that in commodity products, it is common to find an adversarial relationship mainly based on price between buyer and supplier. This type of relationship with suppliers does not allow for cost reduction in the supply chain. It may be beneficial to network the supplier, to develop partnerships and alliances that will benefit both partners. This could be based on production, personal, and or symbolic networking, that will turn on strategic alliances(Hines, 2004), allowing the information sharing, risk sharing, obtaining mutual benefits and coordinating plans, permitting the improvement of the supply chain.

2.2.2. Relationships with Customers

The global markets offer a variety of products of different quality and cost. As a result, companies are always competing and trying to reduce costs and

improve quality. According to Burgess (1998) and Hoek (1999), customers look for more choices, better service, higher quality, and faster delivery. The relationship with customers has turned a strategic issue for today's companies.

2.2.3. Internal Integration

Internal integration is described as the strategic system of cross functioning and a joint responsibility across various functions where collaboration will be made along product design, procurement, sales and distribution functions that will be undertaken to meet customer requirements at a lower possible cost (Awino and Gituro 2009).

Organizations must have willingness to integrate capabilities through data, system and process internally before they engage in meaningful external integration. Awad & Nassar, (2010) explained internal integration, as a systematic way of creating inter-functional interaction, collaboration, coordination, communication and cooperation that takes functional areas together to create a cohesive organization.

2.2.4. External Integration

External integration composed of supplier and customer integration. Supplier integration includes a strategic collaboration among a focal firm and its suppliers to properly undertake cross-firm business processes, such as information sharing, strategic partnership, and collaboration for effective planning and joint product development. Customer integration, also called "forward" integration refers to the systematic way of creating interaction and collaboration between

organization and its customers to ensure the effective flow of products and/or services to the intended customers (Norman, 2003).

2.2.5. Communication Tools

Communication tools are used to facilitate data transfer and communication between the trading parts and this might include EDI, electronic fund transfer (EFT), intranet, internet, and extranet (Li 2002). Electronic Data Interchange (EDI) is used for procurement (purchase orders, order status, and order follow-up). EDI serves as electronic catalogs for customers who can get information, dimensions, and cost about a specific product. EFT provides trading partners with an effective way to transfer funds from one account to another through a value added network (VAN) or the internet. Intranets are corporate local area networks (LAN) or wide area networks (WAN) that communicate through the internet and are secured by firewalls. Usually this type of communication tool is used inside a corporation that features different locations.

On the other hand, extranet allows business to communicate and share business with external collaborators with a certain degree of security and privacy. Another type of communication tool is the internet, a uniform interface that allows global communication with the use of browsers (Bowersox et al., 2007). According to O'Neill (2008) the advances in information technology have made communication tools easier for users, allowing its presence in components to extend in the supply chain. Another significant communication tool is the internet based information and communication technology (ICT), mentioned by Chan, (2003). This study suggested that the use of ICT is a strategic communication tool that improves the organization's competitiveness, allowing cost reduction and permitting the company's effectiveness.

2.2.6. Information Technology

Telecommunications and computer technology allow all the actors in the supply chain to communicate among each other. The use of information technology allows suppliers, manufacturers, distributors, retailers, and customers to reduce lead time, paperwork, and other unnecessary activities. It is also mentioned that managers will experience considerable advantages with its use such as the flow of information in a coordinated manner, access to information and data interchange, improved customer and supplier relationships, and inventory management not only at the national level but also internationally (Handfield and Nichols, 1999). Also the advantages will include supply contracts via internet, distribution of strategies, outsourcing and procurement (Simchi-Levi et al., 2003). All companies are looking for cost and lead time reductions with the purpose of improving the level of service but also to enhance inter-organizational relationships (Humphreys et al. 2001). A study carried out by Tim (2007) states that through the use of communication tools, such as the web sites, industrial organizations can build value in their supply chain relationships.

According to Turner (1993), another key for supply chain management success is the use of planning tools. He also mentions that without the use of information systems, companies cannot handle costs, offer superior customer service and lead in logistics performance. Turner (1993) indicates that firms cannot effectively manage cost, offer high customer service, and become leaders in supply chain management without the incorporation of top of-the-line information technologies. Li (2001) identified 14 such information technology tools, among them electronic data interchange (EDI), enterprise resource planning (ERP), internet, and extranets. Li grouped these tools into three groups in terms of

their primary purpose: communication tools, resource planning tools, and supply chain management tools. Given this classification, two sub-factors are considered in this research: communication and planning tools.

2.2.7. Supply Chain Relationships

Supply chain relationships play an important role in achieving the firm's goals. The coordination and integration of activities with suppliers and understanding of customer's needs results in greater benefits for companies. According to Fraza (2000), supply chain management is directly related to relationship management, which includes suppliers and customers. Strategic supplier partnerships and customer relationships are main components in the supply chain management practices (Li et al., 2005), leading to information sharing, which is one of the five pillars in achieving a solid supply chain relationship (Lalonde, 1998).

2.3. Performance of Supply Chain Management

Supply chain management has been a major component of competitive strategy to enhance organizational productivity and profitability. In recent years, organizational performance measurement and metrics have received much attention from researchers and practitioners. The role of these metrics in the success of an organization cannot be overstated because they affect strategic, tactical and operational planning and control. Performance measurement and metrics have an important role to play in setting objectives, evaluating performance, and determining future courses of actions (Gunasekaran, et al., (2004). Companies must always be concerned with their competition.

Today's marketplace is shifting from individual company performance to supply chain performance: the entire chain's ability to meet end-customer needs through product availability and responsive, on-time delivery. Supply chain performance crosses both functional lines and company boundaries. Functional groups (engineering, R & D, manufacturing, sales and marketing) are all instrumental in designing, building, and selling products most efficiently for the supply chain. Traditional company boundaries are changing as companies discover new ways of working together to achieve the ultimate supply chain goal: the ability to fill customer orders faster and more efficiently than the competition. To achieve that goal, an organization needs performance measures, or "metrics", for global supply chain performance improvements (Gunasekaran, et al. 2001). The organization's performance measures must show not only how well the firm is providing for its customers (service metrics) but also how it is handling its business (speed, asset, inventory, and financial metrics). Given the cross-functional nature of many supply chain improvements, a firm's metrics must prevent "organizational silo" behavior which can hinder supply chain performance.

The basic objective of supply chain management is to “optimize performance of the chain to add as much value as possible for the least cost possible”. In other words, it aims to link all the supply chain agents to jointly cooperate within the firm as a way to maximize productivity in the supply chain and deliver the most benefits to all related parties (Jie, Parton, & Cox, 2007). Measurement is important, as it affects behavior that impacts supply chain performance. As such, performance measurement provides the means by which a company can assess whether its supply chain has improved or degraded. Supply chain performance metrics provide organizations with a standard framework to

assess supply chain operations and performance including internal and external firm links (Burcher, Lee & Sohal, 2006).

2.4. Challenges and Obstacles of Supply Chain Integration

According to Chopra and Meindhl (2001), a number of factors can impede integration along the supply chain, causing information distortion, longer cycle times, stock-outs, and bullwhip effect, resulting in higher overall cost and reduced customer service capabilities (Chopra & Meindl, 2001). Many researchers have mentioned a different kind of classification of supply chain integration challenges based on their own criteria. Stanley, Gregory and Mathew (2005) explained the challenges of supply chain can be classified through the challenge of system relationships (Stanley et al., 2005). The supply chain system has two kinds of relationships, which are the relation between sub-systems, and SCM system and the business strategies. This classification emphasizes the technical challenges that came from the relation between SCM system and internal business strategy. However, this classification bypasses the challenges that the companies may face from external environment. Using review of the literature, Katunzi (2011) reveals the dominating factors motivating manufacturing firms to engage in supply chain management activities, the barriers they face upon implementation, the strategies or bridges used to overcome the barriers, and the benefits that are available to successful companies. The major barriers identified by his research include; silo mentality, lack of supply chain visibility, lack of trust, lack of knowledge and activities causing the bullwhip effect (Katunzi, 2011). After extensive reading to the supply chain integration challenges that the literature mentioned in different resources, Awad and Nassar (2010) found that the challenges from three perspectives: technical perspective, managerial perspective and relationships perspective. Finally, Awad and Nassar (2010) have tried to

integrate all challenges in a single comprehensive source and then classify these challenges in three main parts. This classification are; first: the Business Micro-environmental challenges, second: the Business Macro-environmental challenges (relationships), and third: The Technical challenges of Supply Chain integration (Awad & Nasar, 2010).

2.5. Benefits of Supply Chain Integration

Recent research suggests that the higher level of integration with suppliers and customers in the supply chain benefits at greater extent (Jharkharia & Shankar, 2005; Naude & Badenhorst-Weiss, 2011; Kureshi, 2010). While supplier integration is being increasingly perused around the globe, a comprehensive cost benefit analysis of this phenomenon on case to case basis is required before venturing on it. The most frequently cited reason for firms to engage in supply chain activities is in response to threats and overtures from competitors, both domestic and global. High levels of supply chain performance occur when the strategies at each of the firms fit well with overall supply chain strategies. Thus, each firm must understand its role in the supply chain, the needs of the ultimate customer, the needs of its immediate customers, and how these needs translate into internal operations requirements and the requirements being placed on suppliers. Once these needs for the products and services can be communicated and transported through the supply chain effectively and efficiently, successful supply chain management and its associated benefits will be realized.

2.7. Supply Chain Management Problems

The supply chain management must address the following problems such as; poor distribution network configurations (number and location of suppliers, production facilities, distribution centers, warehouses and customers), poor

distribution strategy, lack of information needed to integrate systems and processes through the supply chain to share valuable information, including demand signals.

According to Baily and Farmer (2000), one of the most important aspects for the buyer of assuring supplies is the maintenance of good supplier relationships. Good supplier relationships can be a major asset to the buyer not only in assuring supplies but also in maintaining quality levels and good prices. Good supplier relations have always been an important factor in the maintenance of supplies. This change has been brought by the increasing use made by buyers of techniques such as quality assurance, zero defect policies, statistical process control (SPC) and Just-in-Time (JIT), all of which place additional responsibilities on to suppliers who will only be willing to accept them if they see some long-term benefit for themselves in the relationship.

So, in return for accepting these additional responsibilities it has become common to offer the supplier a long – term prospect of business in what is referred to as a partnership relationship with both parties offering and accepting complementary responsibilities and helping to solve problems to their mutual benefit. The partnership approach clearly influences the nature of the relationship between buyer and sellers. Choosing the right supplier is frequently the key to obtaining quality, performance and price. One of the most important aspects of the supplier selection process for important contracts is the plant visit known as the vendor audit or capability survey. It is most important that such surveys for the determination of supplier capability are conducted objectively (Baily et al, 2005). Practitioners of lean supply chain focus on eliminating physical waste (in the form of inventory) and process waste (unnecessary steps in a value chain or time during

which assets or goods are unnecessarily idle). Lean supply chain focuses on driving waste out of the entire value chain for a product. To have a truly lean supply chain firms have to go outside their four walls. They have to reach their suppliers because there are going to be constraints present at but their suppliers and customers (Nussle and Morgan 2004). Implementing a Just-in-time (JIT) purchasing system is the first major element of a lean supply chain. A JIT purchasing system means receiving frequent receipts of materials from suppliers to meet immediate requirement.

2.8. Empirical Literature Review

Stank and Keller (2001) studied the 306 firms have been integrated in North America for logistical and performance benchmarking. The study identified

and used six aspects of integration and six different measures of performance. Relationships influence internal, operational and customer; technology & planning integration vs information systems support and advanced shipment notification support; measurement integration with customer satisfaction; finally relationship integration vs financial performance, specifically return on assets.

Awino (2009) conducted a study on supply chain best practices in private manufacturing firms formed an empirical investigation. He noted that critical factors form linkages that enable benchmark performance, strategic alliances and supplier evaluation hence, the cost of production to consumers with strategic emphasis made on the fitness of the manufacturing methods. Large firms focus on efficiency and core competencies that enable the local firms benchmark with global best practices.

Awasthi and Grzybowska (2014) researched on challenges of supply chain integration process using barriers affecting entities in businesses among 17 were identified with methodological tests such as Decision Making Trial and Evaluation Laboratory (DEMATEL). Further research is recommended to allow planning and information sharing. Hudnurkar, Jakhar and Rathod (2014) sought to determine the research papers published and journalized on specific countries based on reviewed papers on collaboration of supply chain in affected supply chain collaborations.

Ralston et al., (2015) studied the firm's performance, a firm's strategy, its supply chain integration efforts using a sample size of 220 of USA firms. Structural Equation Modeling approach was used. Corporate strategy was hypothesized to influence both customer and supplier integration and these two

variables in turn affect demand. Demand on the other hand will influence performance as well as operations. Hypothesis showed that operational performance will influence financial performance. It was found that corporate integration had both customers and suppliers having positive relationship which were also found to influence demand as predicted. This study utilized firm characteristics such variables as market share and control industry size.

According to Bekele (2008), Gebreeyesus & Sonob (2011), Sarmiento & Nagi (2012), Georgiseet (2014) states that, the performance of an organization is influenced to a greater or lesser degree by the actions of the organizations that integrate the inputs and the supply chain at large extents. Even though, the impact of supply chain integration practices vary, depending on the type of firm trick and there are no commonly accepted concepts the impact of supply chain integration on performance. In addition, there is very little empirical evidence as how different supply chain integration influences various types of company performance. For example, Koufteros et al (2007), studies elaborate the sole roles of supplier integration or customer integration in improving performance. Some recent studies also consider both internal and external integration impact to performance, Swinket (2007), Flynn et al., (2010).

Moreover, Huo (2012) supply chain research supply chain integration can be viewed as internal and external integrative capabilities that lead directly or indirectly to company performance. Eventhough, most of the previous studies that address the relationship between supply chain integration and performance but no researches are conducted which components of supply chain integration highly impact on performance. There is a pay little attention to scholarly work focusing on explicitly the impact of various dimensions of supply chain relationships (such

as knowledge, production & design, technology and resource) on performance, rather the general supply chain integrations(internal and external integrations) impacts. A key question is whether the implementation of supply chain integration (such as knowledge, production & design, technology and resource) can make an impact on company quality performance? This paper intends to filling this gap by using data collects from literature review on significant value in supply chain integration and practices is apply.

Few studies describe and show that the Ethiopian Manufacturing Industries including basic metal industries have various challenges and obstacles hamper their productivity performance and competitiveness. Dagne Birhanu(2009), Tolossa et al., (2013), Georgise et al., (2014). But, up to now there is no effort to investigate the effect of supply chain integration on basic metal industry to impact quality performance of basic metal industries in the country. Consequently, this study addresses impact of quality performance improvements through supplychain integration in manufacturing industries. This factors that influence quality performance include knowledge, technology, resource utilization, supplier integration, production and design integration are considered. However, the study analyzes those significant achievement factors of quality performance related to supply chain integration (SCI).

2.9. Literature Gap

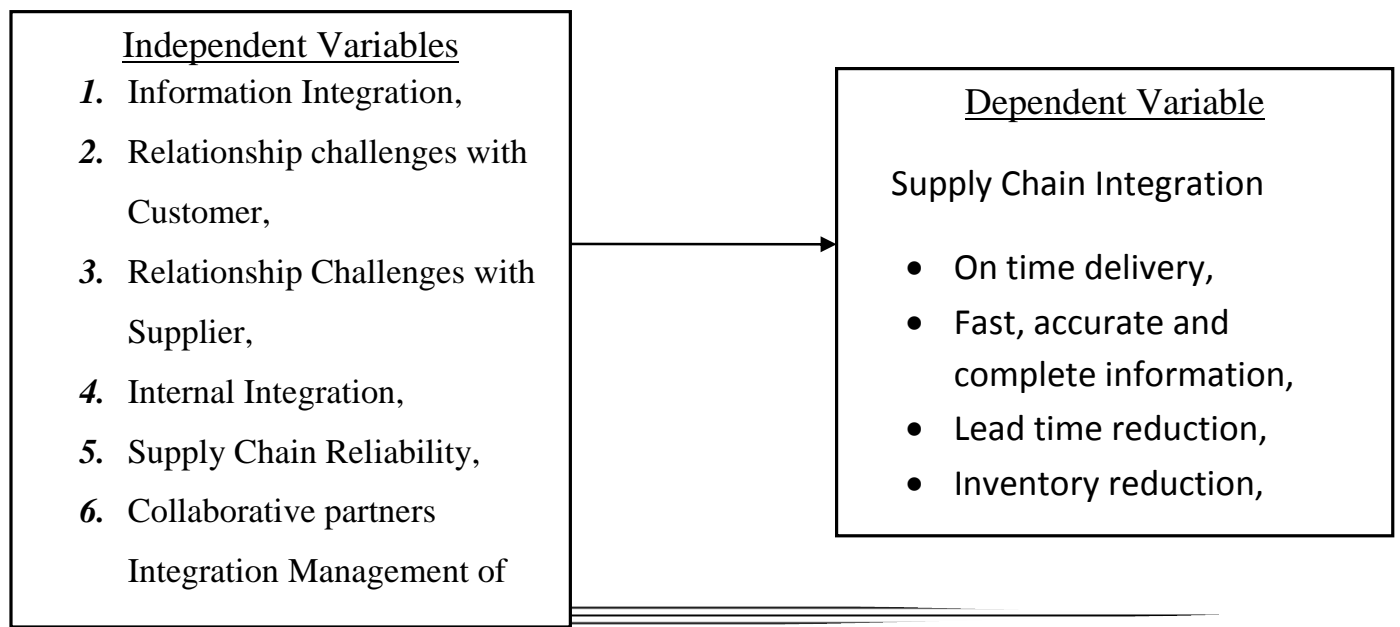
Even though, most of the previous studies addressed the relationship between supply chain integration and organizational performance and effects of supply chain integration on operational performance, but there were no researches are conducted related with what factor are affecting supply chain integration of manufacturing firms, specifically by marble industry.

As a result, there is knowledge gap that needs to be addressed with related to the proposed topic of the study. This paper intends to fill this gap by using data collects from literature review on significant value in supply chin integration.

2.10. Conceptual Framework

The main objective of this study is to assess factor affecting supply chain integration of marble industry in Ethiopia. Based on the objective of the study, the following conceptual model is framed. As it described previously in the related literature review parts, supply chain integration of manufacturing sectors affected through several factors, however, in this study attempts will be tried to focused on identifying factors that affect the supply chain integration of the organization and supplies, barriers of the integrating with customers, and barriers of internal integration, barriers of supply chain reliability and inventory management. According to this idea the study developed the following conceptual frame work:

Figure 1, Conceptual Framework of the study:-



Adapted Conceptual Model of this Research (Canbolat et al., 2008)

CHAPTER THREE

METHODOLOGY OF THE STUDY

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 instrument, and finally data analysis.

Selection of 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 to find out the answer to the research questions more exactly and easily.

3.1. Research Design

The study will use descriptive and explanatory research design. This is because, using the descriptive research design the collected data described and expanded what they implies using descriptive data analysis techniques such as, percentage, frequency, mean, standard deviation, tables and other techniques that can used to describe the facts. While, to test dependent and independent variables case effect relationship the study will also use explanatory (case – effect research design) and analyze using Correlation data analysis method. According to Muranaga and Ohsawa (2002), a descriptive and explanatory types of research design is important for a research types if the dependent variable affected by several independent variables such as, supply chin integration performance (dependent

variable) affected by several independent variables, including, information management system in the supply chain, factors affecting suppliers – firms relationship, customer – firms relationships, managerial co-ordination, transportation facilities, human resources potential, etc. Based on this an integration of supply chain management practice of manufacturing industries can be affected by several factors.

3.2. Unit of Analysis

The unit of analysis of the study includes employees who work at the different departments of the Ethiopian Marble Processing Enterprise.

3.3. Source of Data

To achieve the objectives of the study both qualitative and quantitative data were collected from primary and secondary data sources. The primary data were collected using self developed structured questioner as well as unstructured interview from each department of the study organization on the other hand the secondary data were collected from profile of the organization, related literatures, such as, articles, journals and research's.

3.4. Sampling Techniques and Procedures

The study used non – probability sampling technique. From the given non – probability sampling frame particularly purposive sampling technique were applied. This is because the researcher wants to select, employee who work on organization different department and positional levels.

3.4.1. Sample size of the study

It would be impractical and unmanageable to include all population in the study, but it shall be advisable to come up with representative samples and generate the findings of the study. Accordingly, purposive sampling technique was used. This is because the researcher wants to find adequate information from the different department by selecting knowledge full employs on particular area.

Besides, the results of purposive samplings are usually expected to be more accurate than those achieved alternate forms of sampling. The number of sample represented as stated in the rule of thumbs. "A sample account 20% to 30% for number of total population less than 400 is found to be appropriate" (Thumbes, 2000). With regards to this, total numbers of target population of the study are 350. According to the rule 25% (87) employee participate as sample of the study.

3.5. Method of Data Collection

The quantitative and qualitative data collection tools were applied to collect data from the concerned bodies. Accordingly, self developed structured questionnaire and unstructured interview were used, the questioner was structured close ended types of questions. The study was collect secondary data from different sources such as, documents of the organization, journals, related articles as well as researches.

3.6. Method of Data Analysis

The study employed both descriptive and inferential tools in analyzing the data. Data collected through questionnaires were edited and categorized according to their dimensions. Based on this the data were analyzed using descriptive and explanatory data analysis method, in the descriptive analysis method the study

were describe respondents response using tools table, frequency and percentage mean and standard deviation. On the other hand in the explanatory part the data analyzed the casual relationship between the dependent and independent variables based on correlation analysis technique. The data were processed using Statistical Package for Social Sciences (SPSS version 20).

3.7. Data Reliability and Validity

Reliability refers to the degree to which the data collection tools or analysis procedures were yield consistent findings. (Saunders, lewis & Thornhill, 2009). Reliability analysis measures the internal consistency of a group of items which is used in questionnaire construction. Reliability analysis examines the homogeneity or cohesion of the items that comprise each scale. Cronbach's alpha coefficient is the most frequently used index of reliability. Cronbach's alpha coefficient is the most common way to assess reliability. According to Tavakol et al., (2011), Chronbach's Alpha value ranging from 0.70 to 0.95 is acceptable. A value of Cronbach's alpha coefficient above 0.70 is regarded as acceptable. (Saunders, lewis & Thornhill, 2009).

For the purpose of this study, the Cronbach's alpha coefficient was calculated by distributing 26 pilot questionnaires. According to George and Mallery(2003), a Cronbach's alpha coefficient greater than 0.9 implies excellent, greater than 0.8 is good, greater than 0.6 is acceptable, greater than 0.5 is poor, and less than 0.5 is unacceptable. Based on the principle in order to establish the degree of reliability, consistency, and accuracy of the instrument, a pilot study was

conducted. Accordingly the reliability of the Cronbach's alpha result indicates that:

Table 3.1. Reliability Statistics:

Questionnaire Scale	Cronbach's Alpha	No. of Items	No. of Respondents
Supplier integration	0.862	6	87
Customer Integration	0.812	5	87
Internal integration	0.929	5	87
Information integration	0.833	4	87
Supply Chain Reliability	0.934	4	87
Inventory Management	0.865	7	87

As indicated from the reliability scale measurement of the above table the scale of reliability test is acceptable and show good internal consistency.

3.8. Ethical Consideration

Ethics is becoming an increasingly prominent issue for all researchers. Researchers are encouraged to employ knowledge of research ethics in practice. Ethical issues were prominent throughout this research process, including during the data collection, during the analysis and writing up of the final report.

During the course of administering the questionnaires, names and any identifying remarks were not used. The confidentiality of the respondents is kept and any data received for the study kept at the hands of the researcher and the advisor. The data's were used based on the questionnaires and interview of respondents rather than using the researcher opinion and input. The researcher stayed truth full to responses of the respondents and free from any personal assessment. Results depicted were only from out puts of truth full inputs.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

This core chapter deals with the discussion and analysis of data collected from the organization employee. As indicated in the methodology part the study conducted basically using questionnaires filled by respondents. The study totally distribute 87 questionnaires however, the analysis were done only based 75 and 12 questioners were omitted due to their errors and some of them were not returned back.

4.1. General Information on Respondents

Supply Chain Integration can be affected employees demographic characters such as, employee educational status, and work experience.

Accordingly assessing employee background is necessary to associate their effects on the study variables.

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, department of respondents, academic qualification of respondents and experience of respondents. Accordingly these variables are summarized and described in tables shown below:-

Table 4.1 Characteristic of Respondents:-

Item	Category	Frequency	Percentage (%)
Sex	Male	50	66.7
	Female	25	33.3
	Total	75	100
Age	26 - 35 years	46	61.3
	36 - 45 years	22	29.3
	above and equal 46 years	7	9.3
	Total	75	100
	Diploma	13	17.3

Education	B/A or BSc	57	76
	MA/MSc	5	6.7
	Total	75	100
Work Experience	Less than 3 years	17	22.7
	3 - 5 years	44	58.7
	Above 10 years	14	18.7
	Total	75	100

Source questionnaire, 2018

Based on the above table from 75 total respondents 50 (66.7%) of them were male while the rest, 25 (33.33) of them were female. With regard to gender issues there were balance number of male and female employee in the studied organization.

With regards to the age condition of the respondents, the distribution of frequency and percentage shows that, 46 (61.3 %) of respondents found between the age groups of 26– 35, about 22 (29.3%) of them found between the age groups of 36- 45, the rest 7(9.3%) were equal and above 46 years. According the age distribution of the respondent’s majority of them found at young and youth age group.

With regards to educational level of the respondents the data show that, 57(76%) BA/BSc and 13 (17.3%) Diploma holders, only 5(6.7%) MSc/MA holders. According to the data level of education in the organization dominated by BA/BSC holders, followed by Diploma holders. Therefore, educational levels of employee were satisfactory.

With related to the employee work experience 17 (22.7%) of them were found less than three years of service, on the other hand 44 (58.7%) of respondent between the service years of 3 – 5 and, the rest 14 (18.7%) were above 10 years of work experience. As the data indicated majority of the respondents were found between 3 – 5 years' experience. With regard to the organization work service condition, it can be said that employee were well experienced.

4.2. Descriptive Analysis

Factor Determining Supply Chain Integration:

Supply chain integration can be affected through several internal and external factors, however for this study, the author were interested to focused on some specific area such as, determinate factors of between suppliers and organization, customer integration, internal organizational integration challenges, information flow challenges, supply chain reliability challenges as well as inventory management challenges.

In this regard the study was analyzed in two basic analyses system. In the first section the collected data were analyzed through descriptive approach that can help to create clear image on the determinant variables how and to what extent determine the dependent one. Considering the existing supply chain integration challenges, respondents were asked to indicate the level of their agreement for the alternative questions arranged in five point Likert scale method, where 1 stands for strong disagreement and where 5 stands for strong agreement. Accordingly each of the major determinates analyzed as follow:

4.2.1. Factors that affect Supply Chain Integration - Company with Suppliers,

It is important assessing and indicating major determinant factors that determine supply chain integration of organization with suppliers. Accordingly the study assessed a related question and below the table implied respondents view as follow:

Table 4.2.1. Respondents view on: Factors affecting Supplier – Organization Supply Chain Integration,

No	Questions	SD	D	NW	A	SA
1	There is strong information exchange with major supplier through information network,	10(13.3%)	27 (35.5%)	13 (17.1%)	20 (26.3%)	5(6.6%)
2	There is quick ordering system with major supplier,	11(14.7%)	32(47%)	3(4%)	18(24.3%)	11(14.7%)
3	There is strong strategic partnership with major supplier,	24(32%)	27 (36%)	3 (4%)	14(18.8%)	7(9.3%)
4	There is stable procurement through network with major supplier,	38(54%)	18(24.3%)	9(11.2%)	6 (8.11%)	2 (2.7%)
5	Joint forecasting of demand and planning inventory with key suppliers,	20(26.7%)	39(52%)	4(5.3%)	11(14.7%)	1(1.3%)
6	Sharing long term production and raw material requirement plans with key strategic suppliers,	16(21.3%)	28(37.3%)	9(12%)	18(24%)	4(5.3%)

Note: a) The weighted average score (WAS) was calculated by giving score as 5 for strongly agree (SA), 4 for agree (A), 3 for neither agree nor disagree (NW), 2 for disagree (D) and 1 for strongly disagree (SD)

As implied on the above data respondents of the organization were forwarded their view regarding information exchange challenges between suppliers and organization and how it affects supply chain integration. In this regard the study was provided several related questioners that assumed as barriers

of supply chain integration between those two parts. The analysis below described each of the respondents view:

Regarding information exchange between supplies and organization, the study were assessed whether there is strong information exchange with major supplier through information network or not, accordingly respondents accounted for *13% and 35%* respectively implied strongly disagree and disagree, which implies there is no strong relationship between suppliers and organization such as, lack of using digital technologies, lack of automated data flow, lack of special mechanism that used suppliers and organization exchanges of information over a temporal and spatial processes.

However, the rest respondent accounted for *26.3% and 6.6% respectively* implied their level of agreement in contrary implied that, the organization information exchange with supplies took place using telephone as well as email information exchanges. However, it doesn't have coupled, self- organized network of business corporate to provide product and service.

The study was also assessed whether, there is quick ordering system with major supplier, or not, however respondents accounted for *14% and 47%* in their level of disagreeing implied, there is no quick ordering system that the organization used as a system, such as, the organization doesn't have a demand driven supply network that can easily facilitates the quick ordering system. However, respondents accounted for *24.3% and 14.7%* that implied their agreement may indicate the tradition system of the organization ordering system as good as quick ordering.

The study also assessed the strategic relationship between suppliers and organization and their effect on supply chain integration, as strategic partnership is one of a good mechanism that enhance supplies and organizations information flow. The relation between organization and suppliers should be strategic when the firm perceives that it needs the relation in order to be competitive in the industry and that if the partners go out of a business it would have to change its competitive strategy. However, majority of the respondents accounted for *32% and 36%* implied in their level of disagreement the company doesn't have common strategic partnership with suppliers.

The study also assessed the organization procurement practice and its stability, accordingly respondents accounted for *54% and 24.%* respectively in disagreement implied there were no consistent procurement practices between the firm and suppliers, this is because the organization didn't have common strategic partnership with specific suppliers so that, the firm procured materials based on assessing the markets prices.

In regard to procurement network as of manufacturing operations, respondents explained their company procurement network that can support and react to the supply chain needs and in selecting a strategic supplier that provides manufacturing locations with consistent global quality and a reliable local service, is a challenge. According to them there is a less procurement network that can support and react to the supply chain needs.

The study also assessed whether the organization have demand forecasting and planning in collaborate with the suppliers however, respondents accounted for

26.7% and 52% respectively implied the organization didn't have joint forecasting and planning practices with supplies.

Finally respondents accounted for 21.3% and 37% in their level of disagreement implied that, there were no sharing long term production and raw material requirement plans with key strategic suppliers.

Overall the analysis of the above data implied that the firm integration with suppliers were affected through several factors such as lack of strategic plan with suppliers, strong networking information communication, collaborative demand forecasting and inventory were among the major determinant factors.

4.2.2. Factors that affect Supply Chain Integration - Company with Customers,

The other critical dimension of supply chain integration is the integration of customer with firms these activities can be affected through several variables. Below the data depicted the assessment of the study and how variables determine the customer – firm’s integration.

Table 4.2.2. Respondents view on: Factor affecting Customer – Organization Supply Chain Integration,

No	Questions	SD	D	NW	A	SA
1	There is linkage with customer through information network,	9(12%)	21(28%)	6 (8%)	29(37.7%)	10 (13%)
2	Computerized system for major customer ordering,	10(21.3%)	38(50.7%)	8(10.7%)	10(13.3%)	3(4%)
3	Establishment of quick ordering system with major customer,	16(21.3%)	30 (40%)	6 (8%)	20(26.7%)	3(4%)
4	There is follow up with major customer for feedback,	17(22.7%)	37 (49%)	4(5.3%)	14(18.7%)	3(4%)
5	Involving key customers in demand forecasting process,	19(25.3%)	33(44%)	6(8%)	13(17.3%)	4(5.3%)

Sources questioner, 2018

Based on the above table respondents view 37.7% and 13.3% respectively indicate that there is linkage with customers through information network

however, respondents accounted for 12% and 28% respectively implied there is no effective linkage between customers and suppliers. Similarly, 21.3% and 50.7% respondents in their disagreement level implied the organization integration with customers is not applied computerized system unless customers are communicating face to face and using telephone.

Respondents accounted for 21% and 40% respectively implied the organization didn't establish quick ordering system such as orders for special customers in crediting system was not established.

As implied 22.7% and 49.3% the organization didn't effectively use customers feed backing in correcting some of organization working mechanism.

Regarding the organization collaborative work with customers on demand focusing process respondent of 25% and 44% in their disagreement implied demand forecasting is majorly done by the organization than participating customers.

4.2.3. Factor affecting Internal Organizational Integration,

Internal integration is the integration of all internal functions, from material management to production, sale and distribution. At this stage, the firm focuses on the internal flow of goods into the organization and on the way out to the customer. Moreover, internal integration is characterized by full system visibility required integration across functions under the control of the firm to achieve customer satisfaction.

In practice, it means that special attention must be given to the interface between functional areas such as procurement, production, logistics, marketing, sales and distribution. In this regards the study provided a related question to determine what factors affect the internal integration of the studied firm. Accordingly, below the table implied respondent response related to internal integration,

Table 4.2.3. Respondents view on the factors affecting Internal Organizational Integration,

No	Questions	SD	D	NW	A	SA
1	Cross functional teams information exchange,	6 (8%)	25 (33.3%)	4(5.3%)	30 (40%)	10 (13.3%)
2	There is Enterprise application integration among internal functions	16(21.3%)	28(37.3%)	9(12%)	18(24%)	4(5.3%)
3	There is strong integrative inventory management,	10(13.3%)	23 (30.7%)	3 (4%)	33(44%)	5(6.7%)
4	Real time searching of the level of inventory,	9(12%)	29 (38.7%)	7 (9.3%)	25(33.3%)	5(6.7%)
5	There is better data integration among internal functions,	20(26.7%)	39(52%)	4(5.3%)	11(14.7%)	1(1.3%)

Source questionnaire, 2018

As implied by 40% and 13% respondents level of agreement the organization cross functional team as well as information exchange is good, the information cross functionally integrated such as, including employee from finance, human resources, marketing, management and other units. However, respondents accounted for 8% and 33.3% in their disagreement level implied still

the organization didn't use maximum of its potential that implied well established integration system internally.

Regarding the organization enterprise application integration among internal functions respondents accounted for 21% and 37% in their disagreement implied the enterprise application integration there is enterprise application integration is an integration that is a composed of a collection of technologies that enable integration of system across an enterprise.

Regarding effectiveness of the organization's integrated inventory management practice 44% and 6.7% respondents respectively in their agreement level implied that, the organization have strong integrative inventory management system however, the rest respondents accounted for 13.3 % and 30.7% in contrary implied there is no strong and well integrated inventory controlling and management practice.

Regarding the organization's real time inventory management effectiveness, 12% and 38.7% respectively implied in their disagreement there are challenges in the internal organization to keep track of inventory in real time. This is because lack of strategic management of inventories ordering such as, identifying and ordering priority demanded resources from suppliers.

Finally, the study were assessed whether there is better data integration among internal function of the organization or not accordingly, respondents accounted for 26.7% and 52% respectively implied no better data integration among internal functions. That means the data were not handled through

integrated manners such as, all of the departments hold their own data, however, there were no centralized integrated data access on the organization.

4.2.4. Factor affecting Information Integration of Supply Chain,

Supply chain management emphasizes on the flow of information and products along the members of supply chain in an organization and also encompasses; suppliers, customers, producers, and service providers that integrates together the acquisition, purchase, store, manufacture and assemble products from suppliers to the ultimate users.

Proper information utilization will lead to greater coordination in the chain and a better coordination in the flow of information between partner's results to growing impacts on the timely delivery(speed), accuracy, quality of products. A critical emphasis on information technology without the interest of sharing information will not contribute to associate organizations together. Effective utilization of information technology has the potential to develop supply chain partners in order to perform together for better delivery of products to consumers. In this regards the study was assess what factors affect the supply chain integration information exchange of the studied organization and below the table implied respondents view,

Table 4.2.4. Respondents view on the factors affecting Information Integration of the organization,

No	Questions	SD	D	NW	A	SA
1	There is high level of free sharing of accurate information across members of supply chain,	20 (26.7%)	31 (41.3%)	5(6.7%)	13 (13.3%)	6 (8%)
2	Timely sharing of information across the members of supply chain,	20(26.7%)	37 (49.3%)	6(8%)	20(26.7)	5(6.7%)
3	Strong coordination in the flow of information among partners,	18(24%)	31 (41.3%)	8 (10.7%)	14(18.7%)	4(5.3%)
4	Use electronic mail system for data exchange,	14(18.7%)	29 (38.7%)	5 (6.7%)	20(26.7%)	7(9.3%)

Source, questioner 2018

Information integration is another core dimension of supply chain integration. The above table pinpoints the implied respondent's level of agreement and disagreement on the adverse impact of information integration. It seems surprising that, the respondents are under complain due to the absence of free sharing of accurate information in the line of supply chain and timely sharing of information with members of supply chain with a average number of respondents implied their level of disagreement at 67.7% and 76% respectively. Respondents also show their disagreements on the existence of strong coordination on the flow of information among supply chain partners and the strong utilization of information among supply chain partners with disagreement level (24% and 41.3%) and (18.7% and 38.7%) respectively.

The effect of information integration is reflected in various ways in: the low level of accurate and timely sharing of information along the supply chain and poor utilization of information among supply chain partners. However, Koçoglu *et al* (2011) states that, sharing of information across the chain is a key and critical component in achieving an integrated supply chain because it is believed that *SCI increases collaboration, minimizes uncertainty, increases the speed of material flow, accelerate order fulfillment, reduction of inventory costs, increases the satisfaction of customer through reliable and fast delivery of products.*

The other problem that arises due to poor integration of information is a fragmented coordination on the flow of information which results for ineffective utilization of information. So, from the outputs we can easily infer that there is a deteriorated utilization and coordination of information in EMPE. The research done by Fasika *et al* (2014) on supply chain integration of manufacturing firms shows the same result, which states firms still practice the traditional information exchanges between the different functions such as telephone, letter, and verbal instructions.

4.2.5. Factor affecting Supply Chain Reliability of the organization,

Supply Chain Reliability can be caused by several factors such as the performance of the supply chain in delivering the correct product to the correct place, at the correct time, in the correct condition and in the correct quantity, with the correct documentation, to the correct customer and other related activities that might need high level of commitment both from the firms side supplies as well as customers and other concerned bodied that may engaged in the supply chain

pipeline. Regarding to this the study assesses some of related factors how they affect supply chain integration of the studied firms.

Table 4.2.5. Respondents view regarding Supply Chain Reliability of the studied organization,

No	Questions	SD	D	NW	A	SA
1	There is quick response by the company to changes in market demand,	20(26.7%)	40 (53.3%)	2 (2.7%)	13(16.3%)	-
2	The company always meet delivery time committed/promised date to customers,	2(2.7%)	10(13.3%)	1(1.3%)	39(52%)	23(30.7%)
3	The company provides cost effective service to customer,	6(8%)	35(46.7%)	8 (10.7%)	16(21.3%)	10(13.3%)
4	The lead time for fulfilling the receipt of customer's order and the delivery of goods is short,	10(13.3%)	43(57.3%)	2(2.7%)	7(9.3%)	13(17.3%)

Source questionnaire, 2018

Above on the table the study tried to assess respondents view regarding reliability of the supply chain activity of the organization accordingly, respondents implied the intensity of the challenges based on their disagreement or agreement level as follow demand and market driven supply chain had been gaining popularity over the past couple of decades, however, as implied 26.7% and 53.3% respondents that implied strongly disagree and disagree the company didn't respond demand change of the market.

The response of respondents regarding the organization delivery accuracy were negative, accordingly, *52% and 30.7%* respondents which collectively account for *80.7%* implied in their disagreement level the organization not meet delivery time at a promised time.

Regarding the company service and its cost effectiveness respondents accounted *8% and 46.7%* respectively implied the company SC integration were not cost effective accordingly, the organization can reduced the cost of supply chain by providing joint working with distributors, allocating task to the most cost – efficient partners, planning cost saving method, elimination of redundant activities , etc., however, even though the studied organization tried to maximize benefit using several activities however, there were no well-organized method of cost effective strategies provided by the organization.

Finally respondents accounted for as implied by *57.3% and 10.3%* disagreement level there are a problem on the supply chain management realm from the moment the customer places an order the lead time inventory management.

4.2.6. Factor affecting Inventory Management of the organization,

Perhaps the most fundamental role that inventory play in supply chain integration is that of facilitating demand and supply. To effectively manage the forward and reverse flows in the supply chain firms have to deal with upstream suppliers exchange and downstream customer demands. Based on this the study were provided several question that can assess how organization are managing inventories.

Table 4.2.6. Respondents view on factor affecting Inventory Management Practice of the studied organization,

No	Questions	SD	D	NW	A	SA
1	Company set Standard Inventory Replenishment, Reorder level as well as Min/Max Inventory Policy,	7(9.3%)	13(17.3%)	2(2.7%)	43(57.3%)	10(13.3%)
2	Company implement Collaborative Planning, Forecasting and Replenishment (CPFR) approach with its partners,	25(33.3%)	30 (40%)	4(5.3%)	10 (13.3%)	6 (8%)
3	Company coordinate and manage inventories with all the supply chain partners,	16(21.3%)	30 (40%)	6 (8%)	20(26.7%)	3(4%)
4	Company implemented automated warehouse and inventory, management system that facilitate coordination regional warehouses,	17(22.7%)	37 (49.3%)	4(5.3%)	14(18.7%)	3(4%)
5	Company jointly manage raw material inventory with strategic suppliers,	20(26.7%)	37 (49.3%)	6(8%)	20(26.7)	5(6.7%)
6	Company jointly manage inventory with customers ,	18(24%)	31 (41.3%)	8 (10.7%)	14(18.7%)	4(5.3%)
7	Company has centrally coordinated regional distribution centers for product distribution,	22(29.3%)	40 (53.3%)	3 (4%)	8(10.7%)	2 (2.7%)

Source questionnaire, 2018

As implied from the above table, company set Standard Inventory Replenishment, Reorder level as well as Min/Max Inventory Policy, this was indicated by 57.3% respondents that side agrees and 13.3% who said strongly

agree. Therefore, the company design policy to administer internal integration of inventory, however, as indicated by 33.3% and 40% respondents disagreement, the plan was not collaborative and it was not comprehensive approach that consider its partners.

In addition as implied by 22.7% and 49.3% respondents' disagreement the company didn't implement the automated warehouse and inventory management system that facilitate coordination regional warehouses. Similarly respondents accounted for 76%, and 82.5% in their disagreement level implied the company didn't jointly manage inventory with partners.

4.3. Correlation Analysis

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. Correlation is the relationship between two

variables. According to Field (2005) correlation coefficient is a very useful means to summarize the relationship between two variables with a single number that falls between -1 and +1.

The most common correlation coefficient Pearson's correlation coefficient (r) which measures the strength and direction of a linear relationship between variables is used. Values of Pearson's correlation coefficient are always between -1 and +1. A correlation coefficient of +1 indicates that two variables are perfectly related in a positive sense; a correlation coefficient of -1 indicates that two variables are perfectly related in a negative sense, and a correlation coefficient of 0 indicates that there is no linear relationship between the two variables. A low correlation coefficient; 0.1 - 0.29 suggests that the relationship between two items is weak or non-existent. If r is between 0.3 and 0.49 the relationship is moderate. A high correlation coefficient i.e. >0.5 indicates a strong relationship between variables.

The direction of the dependent variable's change depends on the sign of the coefficient. If the coefficient is a positive number, then the dependent variable will move in the same direction as the independent variable; if the coefficient is negative, then the dependent variable will move in the opposite direction of the independent variable.

Hence in this study both the direction and the level of relationship between the dependent and independent variables conducted using the Pearson's Correlation Coefficient. The table below presents the result of the correlation analysis:

Table 4.3.1. Correlation Coefficient Analysis:

		SC. Integration
Supplier Integration	Pearson Correlation Sig. (2-tailed) N	.969** .000 75
Customer Integration	Pearson Correlation Sig. (2-tailed) N	.943** .000 75
Internal Integration	Pearson Correlation Sig. (2-tailed) N	.629** .000 75
Information Integration	Pearson Correlation Sig. (2-tailed) N	.833** .000 75
Supply Chain Reliability	Pearson Correlation Sig. (2-tailed) N	.885** .000 75
Inventory Management	Pearson Correlation Sig. (2-tailed) N	.862** .000 75

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

Source: own survey result, 2018

As it is clearly indicated in the above table, a strong positive relationship was found between supplier and company supply chain integration ($r = .969$, $p < .01$), followed by customer integration challenges ($r = .943$, $p < .01$), Supply Chain reliability, ($r = .885$, $p < 0.01$), inventors management ($r = .862$, $P < 0.01$), information integration ($r = .885$) and internal integration ($r = .629$, $p < 0.01$) which are statistically significant at 99% confidence level.

The result further implied that, all of the independent variables are strongly and positively correlated with the dependent variable which implies that a change made in one of the variables can change the company S.C integration positively. Hence any improvement in one of the dimensions will positively contribute in enhancing the supply chain Integration of studied company.

4.4. Multiple Regression Analysis

Multiple regression analysis was employed to examine the effect of independent variables over the dependent one. The result also helps us to have overall understanding between the relationship of dependent and independent variables: Below in the table coefficient, standard error, t-value, and p-value for all explanatory variables and the value of R-squared, adjusted R-squared, S.E of regression and F- statistics with p-value analyzed as follow:

Table 4.4.1. Regression Analysis result:

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.12	.849		7.312	.011**
	Supplier integration	.421	.090	.831	9.612	.017**
	Customer Integration	.512	.046	.719	-4.212	.014**
	Internal integration	-.626	.160	.239	.2321	.001**
	Information integration	.572	.076	.616	.7455	.006**
	Supply Chain Reliability	-.835	.192	.521	.4483	.002**
	Inventory Management	-.346	.134	.643	.6432	0.11**
R-square	.873					
Adjusted R-square	.837					

S.E. of regression	.24911					
Prob. (F-statistic)	0.000					
** Significant at 5%						

Source: own survey result, 2018

a. Dependent Variable: Supply Chain Integration

The R^2 values indicate that the explanatory power of the model and adjusted R^2 value which takes in to account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the models. As the regression result described in table above, the R-squared statistics and the adjusted-R squared statistics of the model are 87.3% and 83.7% respectively. This indicates that the changes in the independent variables collectively explain 83.7% of the changes in the dependent variable and the remaining 16.3% of changes was explained by other variables which are not included in the model. Thus the variables collectively are good explanatory variables.

The null hypothesis of F-statistic (the overall test of significance) that the R^2 is equal to zero was rejected at 1% as the p-value was sufficiently low. Prob(F-Statistic) 0.000 indicates strong statistical significance, which enhanced the reliability and validity of the model. The beta weight is the average amount the dependent variable increases when the independent variable increases by one standard deviation (all other independent variables are held constant).

Thus, the largest influence on SC Integration of the studied company was lack of collaborative work with suppliers as indicated at (beta = .831) followed,

lack of integration with customers (beta = .719), lack of integration working of inventory (beta= .643), challenges of information integration (beta = .616) and supply chain reliability (beta= .524). On the other hand internal integration challenge of the studied organization indicated at (beta = .239) is the poorest predictor of factors affecting supply chain integration of the studied company when it is compared with the other explanatory variables under study.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter presents summary of key data findings on the factors affecting supply chain integration in Ethiopian Marble Processing Enterprise. It gives conclusive findings and recommendations.

5.1. Summary of the findings

The major objective of the study was to analyse factors that affect the supply chain integration progress in marble industry in the case of Ethiopian Marble Processing Enterprise.

The study was analyzed in to two parts; in the first part the collected data were analyzed using descriptive approach and in the second part the study analyzed using inferential statistics such as, testing the relation between dependent and independent variables using correlation and linear regression. Based on this the major finding of the study summarized as follow:

The study finding shows that, the firm integration with suppliers were affected through several factors such as, lack of strategic plan with suppliers,

strong networking information communication, collaborative demand overcasting and inventory using were among the major determinant factors.

Regarding customer – Firm integration, the finding shows that, among the major factors that affect collaborative (integrated) work between suppliers and firms mostly arise from the company ineffective activities such as, lack of computerized integration or information exchange system facilities, lack of organizational quick ordering system not participating customers in continuous feed backing system and lack of demand forecasting activities.

Unlike challenges observed between firms with suppliers and customers relation, relatively, firm internal integration were good however, the organization integration with its suppliers and customers were effective. Thus, the firm was focuses on the internal flow of goods within the organization, rather than also focusing the ways out to reach customer and inputs from suppliers.

Information integration is another core dimension of supply chain integration. The finding regarding information facilities complain due to the absence of free sharing of accurate information in the line of supply chain and timely sharing of information with members of supply chain, in addition there were no well-established information exchange system among members of the organization as well with suppliers and consumers.

The study finding regarding to *supply chain reliability* and its effect on partners integration implied that, partners integration were affected by several factors interms of reliability such as, the performance of the SC in delivering the correct product to the correct place, at the correct time, in the correct condition, in the correct quantity, with the correct documentation, to the correct customer and

other related activities that might need high level of commitment both from the firms side supplies as well as customers side.

However, as the study were focused on the manufacturing firm it can be conclude that, unlike consumer and supplies much effort expand from the firm to create reliable supply chain integration among them, but the firm didn't provide an effective governing procedures to be reliable such as, delivering on time, delivery of product with agreed quantity, and other related criteria on the pipeline between partners.

Regarding the firm integration of inventory with partners the finding implied that, company set Standard Inventory Replenishment, Reorder level as well as Min/Max Inventory Policy and it became relatively effective in integrating inventory inside of the company. However, the plan was not collaborative and it was not comprehensive approach that considers its partners.

5. 2. Recommendation of the Study

Based on the study findings, the researcher suggests the following points as credible recommendations to the problem,

1. In order to improve the supplier integration, the enterprise should provide effective governing strategies between the pipeline of suppliers and firms,
2. Linking the customer through information network with the company to get feedback from the customer and creating an access of computerization for

customer ordering is crucial factors while considering the integration of customer,

3. The firm have to create an access of computerization for customer ordering,
4. It is essential that the flow of information and access of information should in according manner,
5. Improvement is needed the lead time for fulfilling the customer order & delivery of goods,
6. The firm should design strong collaborative policy with its partners,
7. The firm should implement automated warehouse and inventory management system that facilitate coordination regional warehouses.

5.3. Future Directions

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Appendix - I



ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE
DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT
FOR MA PROGRAM

Questionnaire to be filled by employees of EMPE

Dear respondent,

First I want to put my gratitude for your time in responding to the research questions provided below. I'm a postgraduate student at Addis Ababa university school of commerce from the department of logistics and supply chain management, currently working on thesis project. The response you provide me gives a critical input to my research **“Factor affecting Supply Chain Integration in Ethiopian Marble Processing Enterprise.”**

You have been identified as one of the respondents for this study and you are kindly requested to fill the questionnaire. Information given will be held with confidentiality and will be used purely for research purposes.

Instruction: Please give the requesting information by putting () marks on the appropriate spaces.

Part one:-

1. Gender?

Male (1)	Female (2)

2. Select your age group,

20-30 (1)	31-40 (2)	41-45 (3)	50 and Above (4)

3. Select your highest academic or professional qualification? Select only one,

Diploma (1)	Degree (2)	Master Degree (3)	PHD (4)

If other _____

4. Years of Experience in EMPE,

Below 1-5 Years (1)	5-10 Years (2)	Above 10 Years (3)

5. Professional Status: _____

6. Current Position: _____

Part Two:-

The following questions are designed to assess factors affecting supply chain integration of your organization. Please indicate the level of your agreement or disagreement using (√) on the following statements based on your experience in your company on the following supply chain integration management practices. The rating is from

1= Strongly Disagree

2= Disagree

3=Neutral

4=Agree

5=Strongly Agree

S.N.	Statement	Score Values				
		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
A	Supplier Integration					
1	There is information exchange with major supplier through information network,					
2	There is quick ordering system with major supplier,					
3	There is strong strategic partnership with major supplier,					
4	There is stable procurement through network with major supplier,					
5	Joint forecasting of demand and planning inventory with our key suppliers,					
6	Sharing long term production and raw material requirement plans with our key strategic suppliers,					
B	Customer Integration					
1	There is linkage with customer through information network,					
2	Computerized system for major customer ordering,					
3	Establishment of quick ordering system with major customer,					
4	There is follow up with major customer for feedback,					
5	Involving key customers in demand forecasting process,					

S.N.	Statement	Score Values				
		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
C	Internal Integration					
1	Cross functional teams information exchange,					
2	There is Enterprise application integration among internal functions,					
3	There is strong integrative inventory management,					
4	Real time searching of the level of inventory,					
5	There is better data integration among internal functions,					
D	Information Integration					
1	There is high level of free sharing of accurate information across members of supply chain,					
2	Timely sharing of information across the members of supply chain,					
3	Strong coordination in the flow of information among partners,					
4	Use electronic mail system for data exchange,					
E	Supply Chain Reliability					
1	There is quick response by the company to changes in market demand,					
2	The company always meet delivery committed/promised date to customers,					
3	The company provides cost effective service to customer,					
4	The lead time for fulfilling the receipt of customer's order and the delivery of goods is short,					

S.N.	Statement	Score Values				
		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
F	Inventory Management					
1	Company set Standard Inventory Replenishment, Reorder level as well as Min/Max Inventory Policy,					
2	Company implement Collaborative Planning, Forecasting and Replenishment (CPFR) approach with its partners,					
3	Company implement Vendor Managed Inventory (VMI) system,					
4	Company implemented automated warehouse and inventory management system that facilitate coordination regional warehouses,					
5	Company jointly manage raw material inventory with strategic suppliers,					
6	Company jointly manage inventory with customers ,					
7	Company has centrally coordinated regional distribution centers for product distribution,					

Thank For Your Time and Responses