Research Paper

Article review on supply chain practices

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ABSTRACT

Today companies no longer compete merely as an independent business but rather as supply chains. Individual businesses no longer operate in isolation and neither should their strategic orientation be wholly individualistic. This results in the use of attracted supply chain management concept. Supply chain management is primarily designed by firms to get competitive advantage over the rival firms and to overcome the intense global competition coming from globalization, innovation, free trade and economic cooperation formed in different region. The concept led to cooperation and integration among firms and with their suppliers, distributors, consumers, and transport agency. It is totally systematic coordination and management from upstream to downstream paths of an organization. The importance and research interest in supply chain management are on the increase; however, the number of professional materials and well-organized review literature is limited relative to the growing trend of the area. Therefore, this study reviewed different supply chain management articles, reports, and books by concentrating on logistics practices and information sharing on supply chain performance to develop a well-organized research article that advances supply chain management understanding. Under the logistics practices, the major variables discussed are the effect of the road network, transportation cost, facility location, waiting time, inventory management and mode of transportation, as well as the effect of information sharing discussed from the viewpoints of the level of information sharing and quality of information on supply chain performance.

Key words: Supply chain management, logistics practices and information sharing

INTRODUCTION

Companies today no longer compete simply as an independent business but rather as supply chains. Individual businesses no longer operate in isolation and neither should their strategic orientation be wholly individualistic. This has led to the development of the concepts of the supply chain. The origin of supply chain management dates back to the 1940s and 1950s when logistics was stressed on how to use mechanization to improve the very labor intensive processes, while the 1980s marked the beginning of a change in logistics in the history of supply chain management and the term supply chain management was introduced first time by consultants in the early 1980s (Oliver and Webber, 1992). The logistics boomed in the 1990s by the emergence of Enterprise Resource Planning (ERP) systems and the term supply chain management got widespread recognition as a result of the globalization of manufacturing since the mid1990s (Council of Supply Chain Management Professionals, 2005).

As competition in the 1990s intensified and markets became global, organizations began to realize that it is not enough to improve efficiencies within an organization but their whole supply chain has to be made competitive through an integral collaboration of supply chain management (Gligor et al., 2012) and that is why firms had integrated their physical distribution and logistics functions.
into the transportation and logistics perspective (Tan, 2001; Tan et al., 1999; Childerhouse et al., 2002). As Fisher (1997) and Chen and Paulraj (2004) explained, supply chain management is a composition of planning and control of materials, and information flows as well as the logistics activities not only internally but also externally between companies.

Supply chain management has no unique definitions; however the concepts of all the definitions go around the same concepts. Among the definitions given by scholars at the different time, the earliest definition of supply chain management is given as all functions within and outside a firm that support the value chain system to make and offer products to the customer (Cox et al., 1995). Lummus and Alber (1997) also defined supply chain management as the network of entities (suppliers, carriers, manufacturing sites, distribution centers, retailers, and customers) through which material flows by adding certain value for each partner. Similar to the definition given by Cox et al. (1995), Tan (2001) linked supply chain management to two environments within an organization, and externally along the supply chain. Finally, the Council of Supply Chain Management Professionals (2015) defined supply chain management as management of all activities in sourcing and procurement, conversion, and all logistics activities.

Supply chain management is a key component of competitive advantage when striving to improve organizational productivity and profitability through internal and external integration (Gunasekaran et al., 2004). To be competitive and profitable, supply chains should improve its supply chain performance from the angles of cost, activity time, customer responsiveness and flexibility (Beamon, 1998) and should deliver the best customer value at the lowest cost (Li, Ragu-nathan, & Rao, 2006). Similarly, for better performance of supply chain, a close integrated supply chain is compulsory (Huang and Hsieh, 2015) and activities such as knowledge and information exchange, inventory and transport management should be made wisely (Kwak, 2016).

To overcome the pressure from globalization, industries have tried to upgrade their own operations using techniques of Total Quality Management, Enterprise Resource Planning, Business Process Reengineering, and Lean Technology. However, unable to totally overcome the pressure drives the adoptions of supply chain management, yet companies that have truly integrated their supply chains are still small (Georgise et al., 2014).

Similarly, besides the pressure of globalization, the reports of “United nations development programme ethiopia,” (n.d.) and Debela (2013) indicated the supply chain performances in Ethiopian influenced by logistics issues which resulted in delays, unreliability, and inefficiency of the logistics sector. The same report shows that Ethiopia incurs more than 2% production cost penalty and poor information to integrate supply chain management.

Generally, the purpose of this article was to increase supply chain management understanding and to enable the researcher get an organized article reviewed on the effect of logistics practices and information sharing on supply chain performance. The study specifically focused on the effect of the road network, transportation cost, facility location, waiting time, inventory management and mode of transportation, level of information sharing and quality of information on supply chain performance.

DEFINITION OF SUPPLY CHAIN MANAGEMENT

There are no clear cut definitions of supply chain management, however, to make the present study more manageable and meaningful, it is discussed four more relevant definitions that encompass important activities of the supply chain. First and foremost, Lee and Billington (1995) defined supply chain as all facilities that connect together all supply chain partners. From this definition, supply chain is a chain that connects the supply, process, and delivery of raw inputs and outputs throughout a system.

The second definition of supply chain management considers supply chain as a network among supply chain partners; it is given in Investopedia (2016b) as a network between a company and its suppliers to produce and distribute a specific product, and the supply chain represents the steps it takes to get the product to the customer.

Similarly, supply chain management is the network that links together partners over the entire value chain from the extraction of raw materials to its end of useful life by three important functions: (i) supply of materials to a manufacturer; (ii) the manufacturing process; and (iii) the distribution of finished goods through a network of distributors and retailers to a final customer (Aburadi, 2016).

The fourth definition of supply chain management is from the perspective of resource utilization to achieve competitive advantage. Supply chain management is defined as a system of effective utilization resource, technology, and coordination of the manufacturing and logistics achievement of competitive advantage (Ferrell et al., 2013). From all the definitions given, the summary of the important concept of supply chain management in all definitions are similar and revolve around the same circle. A key point in supply chain management is that the entire process must be viewed as one system. Therefore, the total success of the system is required within the supply chain rather than the sum of the merely individual parts.

THE OBJECTIVE OF SUPPLY CHAIN MANAGEMENT

The basic objective of supply chain management is to
optimize the performance of the chain for the least cost possible. Supply chain management activities desired to: improve performance, retain competitive advantage, and meet long terms or short term needs of organizations (Krause et al., 1997). To achieve the objective, supply chain needs to be efficient and to be efficient supply chain management is desired a higher level of quality information to lower total cost, the higher-order fulfillment rate and the shorter-order cycle time; this leads to high levels of customer satisfaction and quality (Li et al., 2006). Similarly, efficient supply chain is desired to make accessible and up-to-date marketing data and information (Li et al., 2006); deliver the best customer value at the lowest cost (Zeki and Keskin, 2011); and to offer right quality at right cost (Busse et al., 2016), but currently efficient supply chain management is beyond that to affect competitive advantage (such as price, cost, quality, customer satisfaction, and loyalty and delivery time) and performance, such as sales, market share, and profitability.

Generally, the objective of efficient supply chain management is to offer the best customer service and to reduce the cost of supply chain partners, but the two objectives seem two extreme ideas opposite to each other. However, since the game of supply chain management is a win-win game, it benefits all parties rather than a win-loss game.

LOGISTICS PRACTICES

Logistics is one part of supply chain management practices that impact competitive advantage and overall organizational performance. Supply chain management practices are a set of activities undertaken in an organization to promote effective management of its supply chain. A well-managed logistics practices are expected to improve supply chain performance through cost, quality, delivery dependability, time to market, and product innovation (Fernie and Mckinnon, 2011). Logistic has become a very important sector for the international sustainability of the companies. If a logistic company works with high performance, it will create a competitive advantage for both the company and country (Akdoğan and Durak, 2016). The idea of logistics and supply chain management is an interaction of different processes and functions within a firm’s network for the purpose of cost reduction and customer satisfaction (Bichou and Gray, 2007).

Logistics is a multi-dimensional practice. It is a process of planning, implementing, and controlling the efficient and effective flow and storage of goods and related information. At the same time, logistics deal with selection and arrangement of vehicles for transportation of materials and finished goods, and handling/holding of inventory in warehouse/storage until needed for production/consumption. An effective logistics practices on average account for 6.5% of market revenue and 44% of

shorten procurement time; minimize stock maintenance costs and shipment cost and time, offer secured and reliable services (Onay and Kara, 2009; Aziz et al., 2010). The components of logistics are so broad but based on its relevance and research objective, only six broad factors affecting logistics practices are discussed in this study including road network, inventory management, facility locations, transportation cost, mode of transportation, and waiting/lead time.

Road network

For improved supply chain performance, the need for availability of a road network is a key. Road network system is one of the most important infrastructures in any country as it provides the means to move people and goods. Road network design includes defining the routes and allocating the available resources and its performance evaluated by network reliability (Safeer et al., 2014). A road network system shows the standard of roads, connectivity, accessibility, linkages and movement; and poor road network connectivity will make supply chain management uncertain by disruption of transportation that create customer dissatisfaction, low customer responsiveness and low on time delivery (Parmar and Shah, 2016).

Transportation cost

Minimization of transportation cost by the different model is an objective function of modern transport companies. The primary function of transportation models, such as North West Corner method, stepping stone method, least cost method, and others, is the minimization of transportation cost. Logistics companies can truly differentiate themselves, prove to reduce cost, and build high competitive advantage and supply chain performance (Neeraja et al., 2014). Sustained and effective freight transport is fundamental for economic development, where transport cost and supply chain performance is strongly correlated (Kuse et al., 2010). Kotler & Wong (n.d.) stated that improvements in physical distribution can yield tremendous improved supply chain performance for supply chain partners.

An empirical study on transportation cost showed that the most important consideration in the selection of a particular mode of transport is its cost and nearly one-third of the total cost of logistics operations is transportation cost (Alan et al., 2006). A good transport system in logistics activities could provide better supply chain performance by reducing operation cost, and promoting service quality. An empirical finding shows that a fall in transportation cost by one unit leads inventory costs to fall in triple and similarly, a one third to two third of the expenses of enterprises’ logistics costs are spent on transportation and the cost of logistics costs (Wilson, 2004). However, transportation cost
minimization constrained internally by quick-response pressures and externally by increasing traffic congestion on the road network (Fernie et al., 2011).

Facility location

Facility location decisions also play a critical role in the efficiency of supply chain management. Location decisions may be the most critical and most difficult of the decisions needed to realize an efficient supply chain. Problems of facility location are of two types: selection of a facility from existing facilities and selecting the location for building the new facility. Location problems are highly uncertain in terms of travel time, cost and demand. For the location of a facility distance to the customer, time and costs have to be considered (Melo et al., 2009). Many models have been developed with an objective of cost minimization besides maximizing the level of demand satisfaction that can be achieved by the effective utilization of available vehicles and resources (Boonmee et al., 2017).

Facility location has a long-term impact on the supply chain & must be part of the firm’s strategy. Facility location decisions play a crucial role in the supply chain management activities. As Krajewski (2007) defined, facility location is the process of determining the geographic site for a firm’s operations. Facility Location can be of vital importance for the supply chain management for several reasons, such as a limit of production capacity, expansion to a new market, and cost (Thanh et al., 2008).

Facility location decision affects the efficiency of supply chain management by influencing inventory and transportation decisions. Studies have shown a strong relationship between location problem and inventory (Shen et al., 2003) and the linear relationship between transportation cost and location decisions (Shen and Qi, 2007). Generally, locations decisions should consider the availability infrastructure, raw materials, nearness to the consumer, and availability of labor in order to make the right location decision to offer quick service delivery, to deliver at a minimum cost relative to competitors, and to offer quality service to improve supply chain performance.

Average waiting time/ lead time

Waiting time is a time between placements of order to acceptance of product from the carrier at the destination point. Lead time is affected by the processing time of order and time to be taken by the carrier on delivery. Attention to lead time reduction originally aroused by JIT production, even though JIT literature stressed more on waste reduction than lead time reduction; and lead time reduction improves the speed of delivery (Treville et al., 2004). Traffic congestion is a cost factor, comprised of time delay and rise operating expense. Traffic congestion has been defined as a condition of traffic delay (that is, when traffic flow is slowed below reasonable speeds) because the number of vehicles trying to use a road exceeds the design capacity of the traffic network to handle it (Weisbrod et al., 2001).

Congestion creates delay and uncertainty in logistics practices that increase inventory level, holding cost of inventory and make capital unproductive (Disney et al., 1997). Average waiting time is also negatively affected by any additional time consumed within a distribution network due to uncertainty, unexpected delays at loading or unloading points, failures within the distribution network and unforeseen situations that totally negatively affect the efficiency of supply chain management (Stajniak et al., 2008). An increase in average waiting time or factors that increase average waiting time can increase the delivery time/ lead-time, and decrease customers dependency and reliability that negatively affect the performance of supply chain performance.

Inventory control

Effective inventory management is very critical for the success of supply chain performance. Inventory management is part of supply chain management function which creates an issue for the imbalance of inventory (Biman and Chaki, 2012). The vast majority of supply chain literature is concerned with minimizing operation cost or maximizing profit, but research on effects of inventory management on the performance of supply chains has only recently received significant attention (Melo et al., 2009). There is a direct relationship between the performance of supply chain management and inventories handling system of an organization (Dong et al., 2001). Supply chain management is concerned with inventory to overcome the problem of excess or shortage of inventory and for customer’s satisfaction levels and flexibility to meet unpredicted demand (Lieberman et al., 1999).

Generally, for a better supply chain performance, effective inventory management is essential since inventory account for a large percentage of assets of an organization. Therefore, while designing warehouse, attention should be given to warehouse design, size and location to reduce transportation cost, holding cost, spoilage cost, insurance cost and leading time. Similarly, during warehouse design as James et al. (1998) stated, considerations should be made to effective utilize space, loading and unloading areas, equipment required to perform certain processes, the flexibility of moving products within the warehouse facility and protection of the items from damaging.

Type of vehicles / Mode of transportation

A critical problem in the mode of transportation is to determine the shortest time path between origin and destination. Decisions of transportation model have a critical impact on supply chain performance because the employed modes of transportation affect reliability, quality
of service, capacity, delivery time, cost of transportation, and dependability. The decisions of the selection of the right transportation carriers based on the objective functions of the firms and the objective functions are either minimization of travel cost and travel time. Minimization of travel time leads to improvement in overall response and is sought for identifying the right path with minimum risk for transportation (Safeer et al., 2014); travel cost (Ben-Tal et al., 2011); travel time (Barbarosoglu et al., 2002; Yuan and Wang, 2009); and loading and unloading time (Barbarosoglu et al., 2002).

Transportation medium such as road is compounded with uncertainties that seriously affect the performance of supply chain and to address and overcome these challenges, tools such as optimization and fuzzy logic (Sheu et al., 2005), queuing theory (Mendonca and Morabito, 2001), decision theory, and reference point method are used to overcome problems of logistics. Transport is highly affected by inefficient loading and unloading, drop queuing, capacity loss, infrastructure loss, congestion loss and poor quality (Mason and Lalwani, 2007).

The mode of transportation is an important consideration when desiring target level of supply chain performance. Besides the costs, the urgency of the shipment, the value of the goods being shipped as well as the size and weight of the goods to be moved need to be considered when determining the mode of transportation.

INFORMATION SHARING

The emergence of new thinking in the managing of supply chain practices has been largely facilitated by developments in information technology and it results in new opportunities for more effective collaborative transport management (Mason et al., 2007). Information sharing leads to high levels of supply chain integration, where supply chain integration is the amount of relationship between a supply chain partners (Lotfi et al., 2013), and supply chain integration enables organizations to make dependable delivery and quick delivery of product to the market quickly. Information sharing and information quality contribute positively to customer satisfaction (Li et al., 2006).

Moberg et al. (2002) reported that information sharing has two aspects: quantity and quality. Both aspects are important for the efficiency of supply chain management and have been treated as independent constructs in the supply chain management studies.

Level of information sharing

Level (quantity aspect) of information sharing refers to the extent to which critical and proprietary information is communicated to one's supply chain partner (Monczka et al., 1998). Shared information can vary from strategic to tactical in nature or from information about logistics activities to general market and customer information (Monczka et al., 1998).

According to Stein et al. (1998), supply chain partners who exchange information regularly are able to work as a single entity, and information sharing is the important determinant of supply chain performance (Sukati et al., 2012). Supply chain partners together understand the needs of the end customer better and respond to market change quicker and information flow is the key to the performance of the supply chain (Childhouse and Towill, 2003).

Quality of information sharing

Quality of information sharing includes aspects such as accuracy, timeliness, adequacy, and credibility of information exchanged (Monczka et al., 1998). While information sharing is important, the significance of its impact on the efficiency of supply chain depends on what information is shared, when and how it is shared, and with whom (Chizzo, 1998).

Divergent interests and opportunistic behavior of supply chain partners, and informational asymmetries across supply chain affect the quality of information. It has been suggested that organizations will deliberately distort information that can potentially reach not only their competitors but also their own suppliers and customers (Mason-Jones and Towill, 1997) since information disclosure is perceived as a loss of power. Given these predispositions, ensuring the quality of the shared information becomes a critical aspect of the effective supply chain (Feldmann and Müller, 2003). Organizations need to view their information as a strategic asset and ensure that it flows with minimum delay and distortion.

SUPPLY CHAIN PERFORMANCE AND ITS MEASUREMENT

Performance measures and metrics are essential for effectively managing supply chain management practices. Performance measurement is the systematic way of quantifying the productivity of all efforts that lead to performance. Performance measures and metrics is a core activity for evaluation or comparison. Supply chain performance measurement offer sufficient information concerning finance, innovation, and improvement of a system for internal and external parties (Fawcett and Magnan, 1996).

The idea of measuring the supply chain performance emerged a long time ago and only a few supply chains are often overlooking the performance measurement in critical supply chain contexts (Gunasekaran and Kobu, 2007). As Tetik (2003) indicated, performance is a degree of achievement attained by an enterprise within a specific
period, whether expressed in a quantitative or qualitative way. Performance measurement is always a challenging issue due to lack of consensus on measurement dimensions as a result of the complex nature of supply chains (Kwak, 2016). Therefore, setting a well-defined supply chain goal and performance indicators enhance the complexity of supply chain performance measurement (Panayides and Lun, 2009).

Traditionally supply chain performance is more dependent on if it is measured and expressed by financial instruments but now multi-dimensional measurement is adopted to overcome the drawback of the tradition by incorporating non-financial indicators of performance (Başat, 2010). Different scholars tried to identify supply chain performance measurement as: cost, activity time, customer responsiveness and flexibility (Beamon, 1998); customer service and flexibility (Beamon, 1999); delivery reliability, responsiveness, cost reduction, lead times, conformance to specifications, process improvements and time-to-market (Panayides and Lun, 2009) and delivery time, quality consistency, productivity, sales costs, production time, delivery security, service quality, flexibility, market share, customer loyalty, activity, efficiency and conformance to standards (Morgan et al., 2009; Aziz et al., 2010). Finally, quantitative and qualitative methods (Gunasekaran and Kobu, 2007) and delivery cycle, delivery speed, dependability on the supplier, manufacturing lead time, quick confirmation of orders, quick customer complaints handling, and frequency of new product development have been proposed as performance measurement instruments (Jayaram et al., 1999).

The ability of the metrics to estimate the desired object of a system due to the variability of the nature of the performance is the greatest issues. As Maskell (1989) indicated whatever the proposed system of measurement, a system needs to follow seven basic principles of performance measurement, it should be (1) directly related to the firm’s strategy; (2) nonfinancial measures; (3) vary between locations (departments or companies); (4) vary as situations do; (5) simple and easy; (6) provide fast feedback; and (7) inspire continuous development.

RESEARCH GAPS

We no longer isolate and talk about suppliers, producers, distributors, and customers as they are managed and treated as independent entities because of their interdependence on supply chain partners. Firms that efficiently use supply chain direct and utilize their effort towards customer service, profitability, and long-term superior performance. Based on the above literature review, the following research gaps have been identified to be fulfilled by this research:

1). Several studies have been carried out in a different dimension of supply chain management in the case of a developed country, but limited research in developing countries. However, still, there is a gap even in the developed country in case of supply chain management research because research remains hampered by missing information on effects of logistics and information sharing on supply chain performance as underlined by De Langen et al. (2007). Therefore, this research will fill the gap of literature on this issue.

2). It is clear that there is a huge difference in technology and infrastructure facility, business environment, and industry development between a developed country and developing one. To be applicable in all environments, it should cover heterogenic business environments and managers’ attitudes that would increase the understanding of supply chain performance (Kwak, 2016). Therefore, the available literature and theoretical work do not totally fit well with the context of a developing country. As such, this research will fill the gap of literature relevant to developing country and different types of industries in general on the effects of logistics practices and information technology on supply chain performance.

3) Finally, prior research conducted on supply chain performance was based on identical firms that limit the generalizability and applicability to another sector. Therefore, the finding is probably not applicable to all type of industries due to the difference in nature and size of firms. Therefore, to overcome this limitation, this research will cover different types of industries to improve the generalizations of its findings.

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Availability of data and material

The data used in this research were collected from Article published in different journal online.

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