INFORMATION SHARING CHARACTERISTICS IN SUPPLY CHAIN MANAGEMENT

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Abstract:-

This paper seeks to illustrate Information Sharing in Supply Chains as it is getting more consideration in studies about supply chain management. First the paper outlines information sharing process and shows some details about supply chain as well as the management of the supply chain and how about the globally expansion. Further more it covers the benefits and drawbacks associated with shared information along the supply chain entities. The researcher explained the phenomenon that characterized losing shared information between supplier and retailers. Furthermore; conclusion of leak information might affect the supply chain performance.

Key words:-*Supply Chain, Information System, and Information leakage.*

1 INTRODUCTION

Surviving and competing in today's volatile global economy and uncertain environment leads organizations for strong needs to create, share and disseminate updated and appropriate information Lotfi et al., (2013).

The light here is spot on one of the most important process which serves as an essential approach for the survival of organizations and enabler of supply chain integration mainly the information sharing. Recently; the ability to appropriately manage raw materials and adding value to products and services, until achieving an efficient delivery to the end consumer. In the same time maintaining the competitive advantage has been a great challenge for business leaders. So the need here for an efficient supply chain management has risen to handle exchanging material flow as well as information flow amongst participating entities. As a result Tan et al., (2016) revealed that a lot of companies have provided a great focus to enhance the integration and collaborative efforts between different supply chain members to increase visibility across businesses.

Supply chain management has been rapidly grown within the early part of the 21st century because the technology improvement. Software solutions are managed through supply chain to give all business partners the ability to share integrated information across the distribution channels which lead to raise the supply chain efficiency and enhance the organizational performance in all sectors Lu, (2011). On the other side, the great increases of sharing information though supply chain may also bring harm and cause an incidence of the information leakage Tan et al., (2016). The paper here is going to talk about this dilemma that may occur in real world in many different situations.

2 An Overview of Information Sharing and Supply Chain

Before sailing into the beneficial that organization could obtain from sharing the information flow within the supply chain entities; and the consequences that may possibly face an organization; some details should be present profoundly about the sharing information process as long as the supply chain management along with the related aspects.

2.1 The Process of Information Sharing

Information Sharing is considered an essential process. It is defined by (Simatupang & Sridharan, 2001) as the process that facilitates data collection, documentation, and the storing, retrieving, and transferring of private information. Participating members may share information only if they have the willingness to do so; consequently they should redesign their information structure in order to be able to assemble and transfer all private information to increase their capability to make a good decision.

Information sharing within a supply chain has numerous benefits among supply chain members, it reduce different types of uncertainties related to demand, product and technology that add costs to supply chain processes. The information sharing facilitate enhancing the efficiency and effectiveness of supply chain as it obtains certain advantages. Several advantages revealed by (Khurana et al., 2011) as including better coordination between different departments and between supply chain members and improved control of the supply chain processes, also that may reduce product design time, make the production lead-time shorter and stable the outputs along with reliable quality. Sharing information is stated by (Khurana et al., 2011) as a key component for any successful SCM system as they discussed the need to implement a good structure of information sharing. It has been identified as being critical to effective innovation and development of supply chain management at an industry and enterprise level. A lot of papers had been talking about the benefits of information sharing in supply chains; although there are many supply chains do not share much information because of some limitationdue to information systems compatibility, information quality, trust, and confidentiality issues. But still obtaining more information about the final customer of products and services is an essential mean to reduce the uncertainty in future demand as the economic climate volatility is rapidly increased. Enormous benefits provided by sharing information according to (Ali et al., 2017) for example businesses may utilize shared information in their planning. Visibility within supply chin entities provides opportunities for managers to plan efficiently as well as reacting correctly to the proper information. Also that would give the ability to properly manage the inventory, transportation and make better pricing decisions based on greater visibility of information. The process of information sharing has been proved to be the backbone for many coordination and logistics activities such as collaborative planning, forecasting and replenishment, forecast information sharing and efficient customer response; which may eventually lead to a great opportunity for performance improvement (Felea, 2010).

2.2 Supply chain management

This section examining some definitions of the supply chain, supply chain management, advantages organizations could obtain from the supply chain management and what disadvantages could be.

- **A supply chain** can be described as a chain of organizations that may be involved in different processes and activities to produce goods and services for ultimate consumers, both upstream and downstream (Lotfi, et al., 2013). A supply chain therefore, is made up of several companies including suppliers, distributions and the end-customers.
- **Supply Chain Management (SCM)** is defined by (Stadtler, 2008) as the process of exchanging material, information and financial information within organizational units, in order to meet customer's needs as well as enhancing the entire supply chain activities and processes involved.Implementation of supply chain management requires integration of processes between supply chain entities in all functional areas, including sourcing, manufacturing and distribution.

Another definition of SCM by (Lu, 2001) in his books that "SCM is simply and ultimately the business management whatever it may be in its specific context, which perceived and performed from the related supply chain perspective".

There are many **advantages** out of Supply Chain Management (SCM) mentioned by frndzzz website, SCM helps to increase savings in labor and procurement costs, achieve higher revenues, increases performance and profitability and help to achieve better inventory control as well as better controlling over suppliers. Also SCM could increase market visibility, reducing chances of product failure rate. Also Supply Chain Management facilitates achieving regular and better communication with the customers. SCM improve information on customer needs and their tastes and demands. Also helps to improve customer care service. Good management of the supply chain is helping to run transportation, warehousing and packaging costs, production tracking efficiently, increasing capacity, capability and flexibility, enhancing value for money. Finally SCM is used to improve reputation of brand in market and increases the value of shareholder. Similarly there are **disadvantages** of Supply Chain Management; sometimes Supply Chain Management can be very expensive to implement, Competitors can easily copy the strategy of Supply Chain Management. Require high skills and experience to achieve success. As well as requiring various functions which may be difficult to manage.

Business is moving in the new era toward **The Global Supply Chain** which discussed by (Gaurav, 2009) who referred to Global SCM as an integrated processes where business entities plan, coordinate and control the materials, parts or finished goods from suppliers to customers. One or more of these business entities operate in different countries. Several incentives could be obtained like reducing total cost, inventory cost and the cycle time, increasing forecasting accuracy and productivity. Another advantage includes expanding the international connection and also improving the delivery to the customers globally.

3 Benefits & Drawbacks of Information Sharing in Supply Chain
Information sharing influences the supply chain performance in terms of total cost and service level as many scholars agreed that shared information will lead to significant cost savings through lowering inventory and batch size reductions, productivity gains, and other measurable. They conclude that manufacturers can achieve tremendous cost and inventory reductions with demand information sharing initiatives (Marshall, 2015). Information sharing has been estimated as one of the major methods to enhance supply chain performance;it allows companies to improve managing activities with other supply chain partners which may lead to better performance.
Supply chains achieve a list of benefits gained by information sharing some of them mentioned by (Lotfi et al., 2013) as the efficient inventory management, cost reduction, significant reduction or complete lyalimentation of bullwhip effect, optimizing capacity utilization, enhancing resource utilization, better tracing and tracking for the shipment,overall organizational efficiency as well as improving services as a whole.
From the researcher point of view, the most important benefits extracted from the previous studies about the information sharing within supply chain is that shard information increases the visibility between organizations which may lead to detect problems earlier, reduce the cycle time from order to delivery as well as building and strengthening the social bonds specially in the present of new social media. This will directly impact the productivity in a positive way and fasten the responsiveness to new market and expand the chain networks.

On the others side many disadvantages of Information Sharing may exist, one of them is so called Leakage Phenomenon. Information sharing is a commitment to mitigate not similarity of information between supply chain participating members through providing access to private information. Obviously, willingness to share information depends on trust and the economic value of the information. (Simatupang & Sridharan, 2001).

On the other hand sharing information would lead to unwanted result so called information leakage. **Information leakage** refers to share an organization's entity of confidential information with external entities. It means that confidential information is unintentionally revealed to unauthorized parties. In supply chains, information leakage is a serious risk due to real incentives, that is, companies have strong motivations and more than enough capabilities to collect, analyze, acquire, and utilize information from others to gain a competitive edge (Tan et al., 2016).

The Information leakage in Supply Chains
Is difficult and challenging issue for couple of reasons; the complexity of supply chains as well as the complicated process of sharing information within supply chains. First, a supply chain is a complex network, because each partner plays one or different roles. While partners cooperate for some common interests, they have different business objectives and some of them are potential competitors. Moreover, partners may have different security policies and deploy security mechanisms corresponding to their security policies respectively. Therefore, when supply chain partner shares information with another supply chain partner, the shared information may be leaked to third party companies by the second supply chain partner either deliberately or unintentionally. The most common analyzed supply chain structure, claimed that a manufacturer supplying a set of retailers who share demand information with the producer which may be leaked, either directly or indirectly, to other retailers (Kong et al., 2017) However, it has been stated that information would not be voluntarily shared between retailers and the producers; The retailers were willing to share information completely and get side payment for the information sharing when their information was statistically less accurate or they benefited more from the effect of information leakage (Tan et al., 2016). Secondly, there are many kinds of information shared between partners in supply chains. Information that could be shared classified into general information and

confidential information; according to (Lotfi et al, 2013) there are many different types of information that can be shared within a supply chain, including strategic, tactical, business, logistics and etc.. Some other common types of shared information are related to Inventory, Sales Forecasting, Order Information, Product Ability Information, Exploitation Information of New Products and Other Information.

Lots of **drivers** acknowledged by Tan et al., (2016) are behind the leakage; as information leakage may occur when confidential information can be a major part of shared information due to the inherent engineering relationships between different pieces of information. Factors that trigger leakage based on (Tan et al., 2016) could be organizational incentives, individual incentives, leakage through outsourcing, joint-venture, subcontracting activities, or leakage arising from employee movement or people interaction. Making the information available to the different employee's increased the probability of leakage risks, in case security mechanisms are quite inadequate within the databases to prevent unauthorized access or systematic downloading of information (Annansingh, 2012).

Based on (Inderfurth et al., 2012) information sharing reduces the inefficiencies resulting from information shortage but that could be happened only if there is a particular amount of trust and commitment between the supply chain members. Information leakage might impact the supply chain performance, information is shared amongst participating member through the chain but there is a dark side of that process which called information leakage. The impact of information leakage on supply chains has become more significant with recent advances in Information Technology (Tsung, 2011), organization must be aware, protect their information especially the confidential one and try to mitigate such phenomena due to its negative impact. Theoretically (Tan et al., 2016) discussed that there are basically two major factors of leakage which are either natural factor or human factor. Natural factors are factors that could not be controlled by any party in the supply chain such as Communications or human movement, whereas human factors include the leak of critical information to external parties because of unethical behavior or hidden intentions by human have made deliberately like human errors or for Incentives as Figure 1 depicted.
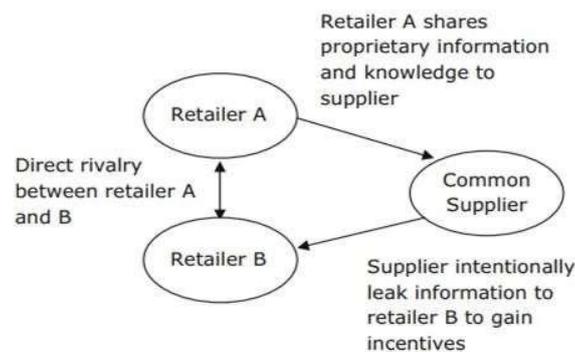

Fig. 1 Scenario illustrating information leakage in a supply chain (Tan et al., 2016)

Recent studies showed that companies which have leaked their proprietary and crucial information would have negative impact toward their performances. One of the studies has been conducted by (Chen et al., 2017) investigated the information value and find that the value of information works in chain directly, also in the competing chain indirectly. For example, the results prove that retailers are sometimes refusing to share their private information on the disrupted demand with their partners because of the information leakage risk. Meanwhile, the quality of performance of the entire chain may be affected and become worse if the information of disrupted demand is shared along the supply chain.

In academic papers, information leakage has been argued as a major issue for organizations, according to Hovana & Ginzy (2017) industry recognized the risks of information leakage because of the Snowden incident of 2013; Although most organizations have established policies regarding the sharing of information, based on (Hovav & Gnizy, 2017) the pursuing of these policies is a complex task for two reasons. First of all, once the information leaves the organization, it is practically impossible to control that information using traditional security mechanisms such as access control systems; secondly, some information exists in peoples' mind and can be leaked verbally intentionally or accidentally. For example, an engineer might leak the details of a new design for monetary benefits intentionally or a group of collaborators form various firms might discuss the market potential of a new technology and accidentally reveal starting of a new service based on that technology. While the last one is hard to control using a technical measure, organizations usually implement Enterprise Rights Management ERM systems in order to provide persistent controls for information assets. This system may increase confidentially but reduce flexibility and information sharing capabilities. (Kong et al., 2017) pointed that a supply chain participating members may have the right not to share information due to the probability of exploiting these information by the member (for example the manufacturer) with whom they share information with as well as leakage of information to their competitors, meanwhile one of the solution to the negative effects of information leakage can be mitigated by using appropriate contracts between supply chain members. Another approach to mitigate the leakage is the better selection of supplier (Zhang et al., 2012) based on some framework a company would be able to calculate the risk that the private parameter may be leaked to the supplier under a certain situation.

4. Conclusion

This paper has been elaborated the importance of integrating the information within supply chain entities. Sharing information could bring a significant amount of benefits to manufacturing, but on the other hand deliberately leaking of the information within retailers or suppliers may impact the performance negatively and arias concerns and fear as well as generate some barriers toward the process of sharing information.

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