

The Role of Supply Chain Integration on the Supply Chain Performance of Business Sectors

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Abstract

The main objective of this study is to evaluate the role of supply chain integration on the supply chain performance of the business sectors. The reviewer has used many studies specifically conducted on the effect of supply chain integration dimensions; internal integration, supplier integration and customer integration on which many studies are currently emphasized on. The published articles related to this topic have been searched and the best 12 were chosen on which deeper review has been made. Finally, it has been reached that internal integration; supplier integration and customer integration have all significant and positive effect on the performance of business sectors' supply chain. Limitations have been found in that the varying studies made have found somehow deviating findings in terms of the effect of the supply chain integration dimensions on the performance of business supply chain and the reviewer has recommended that such studies on the concept need to be extensively made and even the dimensions touched by the existing studies need to incorporate the important dimensions.

Key words: 1. supply chain integration, 2. Internal integration, 3. supplier integration and customer integration

1. Introduction

Supply chain performance of the business sectors is highly important issue being addressed at large these days. If a business can reach its customers with desired products on time, with the right quantity along with the demanded services then the business is performing well with its supply chain operations. (Nederland, 2008) Being the key to business, supply chain performance have been influenced by several factors of which this study has targeted on the integration of the chain elements internally and one another.

Supply chain integration (SCI) is understood as an important process whereby the chain participants create stronger collaboration with an intention of delivering desired products and services to the end users in an improved and competitive way. (Stank *et al.*, 2002; Alfalla-luquea, Medina-lopez and Dey, 2011; Al-Doori, 2019)

Supply chain integration has been seen from the perspectives of internal integration where each company in the chain is expected to have well integrated process flows internally and external integration where by each respective dealing companies are expected to collaborate one another explicitly with their suppliers (back ward integration) and with their respective customers (forward integration). Such integration have been studied and seen as the key for the success of any business supply chain performance since the last two decades in the field.

The purpose of this study is therefore, analysing the strategic role of supply chain integration dimensions in improving the supply chain performance of the business sectors. Previously there were varied ways of studying supply chain integration from the perspectives of process integration, material flow integration and information flow integration which were important but limited in viewing the strategic aspects of the integrating dimensions. (Alfalla-luquea, Medina-lopez and Dey, 2011)

Objectives

General objective

The main objective of this study is to evaluate the role of supply chain integration on the business sectors' supply chain performance.

Specific objectives

To reach on the main purpose of this study here the reviewer has tried to address the following specific objectives;

- ✓ To evaluate the effect of internal integration on the supply chain performance of the business sectors
- ✓ To assess the effect of supplier integration on the supply chain performance of the business sectors
- ✓ To investigate the effect of customer integration on the supply chain performance of the business sectors

2. Review Methodology

In order to reach on significant output for the specified objectives, the reviewer has used Systematic Literature Review (SLR) (Denyer and Tranfield, 2009; Pulsiri and Vatananan-Thesenvitz, 2018) considering the planning stage, conducting stage and analysis and synthesis stages as shown on Table 1 below

Table 1 Review Methodology

Stages	Actions	Description of Tasks by Reviewer
1. Planning Stage	Preparation	<ul style="list-style-type: none"> ✓ Reviewed related topics of interest/supply chain integration and supply chain performance ✓ Formulated objectives for the study(scope defined)
2. Conducting Stage	Search	The reviewer used 647 related publications using key terms for electronic searching like <ul style="list-style-type: none"> • Integration and supply chain performance • Supply chain integration/collaboration • Supply chain performance metrics • Factors of supply chain performance
	Select	The reviewer has selected 45 articles with inclusion criteria of objective relativity to the desired aspects
	Evaluate	Looking in depth towards the publications quality and problems formulations of the articles 33 articles were excluded and 12 chosen for final review
3. Analysis and Synthesis Stage	Analyse	The finally selected 12 articles were analyse for their direct relation of the objectives and findings were associated to the desired objectives
	Synthesis	Finally associations of findings of the chose articles have been made on which conclusions and recommendations were made on

Therefore the reviewer has targeted highly on the twelve closely related articles on the supply chain integration and its role on the supply chain performance of business sectors. As much as possible the findings of the respective articles were even reference from other general articles out of the nine. The authors and the concerned supply chain integration dimensions have been evaluated on the Table 2 below.

Table 2 Details of Articles Reviewed

Author/year	Samples	Supply chain integration dimension			
		Internal integration	Customer Integration	Supplier integration	Others
1. (Schoenherr and Swink, 2012)	403 sample firms	✓	✓	✓	
2. (Singh, 2014)	--	✓	✓	✓	
3. (Mose, 2015)	21 studies	✓	✓	✓	
4. (Stank et al., 2002)	306 respondents	✓	✓	✓	
5. (Ogutu, 2014)	Census	✓	✓	✓	
6. (Haddad, Nagy and Popp, 2019)	249 respondents	✓	✓	✓	
7. (Alam, 2017)	986 respondents	✓	✓	✓	
8. (Uwamahoro, 2018)	258 respondents	X	✓	✓	
9. (Kumar et al., 2017)	195 firms	✓	✓	✓	i. information/data integration ii. physical/materials flows integration
10. (Anyigba, 2019)	150 firms	✓	✓	✓	
11. (Abdallah, Obeidat and Aqqad, 2014)	104 companies	✓	✓	✓	
12. (Flynn, Huo and Zhao, 2010)	617 companies	✓	✓	✓	

3. Literature review

Supply chain performance of business has been an issue of success since the late 20th century where customers are identified to be the key factors of any business profitability. In order to address and satisfy customers one must have best performing supply chain which in turn needs to have control of certain factors including the integration of the chain participant (Reiner, 2006; Chang *et al.*, 2015; Abebe and Desalegn, 2019). Contrary to this, some researchers have argued that supply chain integration may not be the factor resulting in the improvement of the chain performance than providing little input (Fabbe-coste and Jahre, 2008). Here, this review will try to address the identified role of supply chain integration in improving the performance of business supply chain from the point of the chosen studies in the different parts of the world.

Supply chain performance is the capability of a chain in reaching customers with desired level product on the time require, with quantity ordered, being flexible to requirement along with the desired services to let customers be satisfied (Hausman, 2006; Series and Science, 2019). Companies, since the last decade have started considering the measurement and improvement means of supply chain performance with recognition of its effort in the business sector success and strive to review the whole factors affecting the chain performance including the information flow, material flow, and most importantly integration of the chain participants (Baral, 2014).

3.1. Supply chain performance

Supply chain performance of a business is an outcome of all the operations and strategic activities that are conducted for the achievement of the goal that is delivering the materials desired to the customers (Alam, 2017). It can be clearly stated as the characteristics of supply chain delivering the products requested in faster, the lowest possible cost, with the appropriate product and service features and the best overall value (Ndiba Kamau, 2014)

In recent years marketplace is shifting from single company performance to the whole supply chain performance which is the entire chain's ability to meet end-customer demand through product availability and responsive delivery. Supply chain performance encompasses both functional lines and company boundaries. Functional lines such as engineering, Research and Design (R&D) manufacturing, and marketing are all the instruments in designing, building, and selling products most efficiently for the supply chain, and traditional company boundaries are changing as companies discover new ways of working together to achieve the ultimate supply chain goal which is the ability to fill customer orders faster and more efficiently than the competitors. (Alam, 2017)

3.2. Dimensions of Supply Chain Integration

As supply chain is all about the flow of materials from the raw material suppliers to producers, whole sellers, retailer and other chain element to reach the final users, it needs stronger collaboration among the chain participants to speed up delivery of the desired items to the key business target, customers. This is supply chain integration recognized as strategic process management that can be instrumental for creating positional advantages associated with improved firm performance (Chang *et al.*, 2015).

Supply chain integration is distinguished by a situation where members along the supply chain collaborate and work together for improved performance and profitability along with meeting the demands of the customer. Businesses integrating their information and flow of material would lead to improved management of the supply chain (Kumar *et al.*, 2017)

Supply chain integration has been evaluated in many dimensions like facilitation of information flow among the chain element and material flow and other process integration elements (Kumar *et al.*, 2017). But the convincing and mostly recognized dimensions of supply chain integration are stated as internal integration, supplier integration and customer integration (Haddad, Nagy and Popp, 2019; Stank *et al.*, 2002; Ogutu, 2014; Singh, 2014; Chang *et al.*, 2015; Mose, 2015) on which this study has mostly emphasized on.

3.2.1. Internal integration

Independent of the external organizations that each company deals with, every organization must maintain stronger internal/process integration explained in terms of having stronger demand forecasting, processing, arranging the next flow / inbound and out bound logistics. Characteristics of this level include: integration of department level functional information to decrease inventory and improve efficiency, documented processes that are followed across the entire organisation; and collaboration throughout the organization to meet the next level demand in the chain (Reiner, 2006). Generally internal integration can be seen as a collaboration, coordination, communication and cooperation that brings functional areas together into a cohesive organization internally (Flynn, Huo and Zhao, 2010)

3.2.2. Supplier Integration

Most importantly, the raw material suppliers are the key for internal operation of the producers being the starting point of the whole chain product flow. The overall purpose of integration with suppliers is to exceed a single organization's limits so as to coordinate internal process by securing the inward flow of material inputs (Haddad, Nagy and Popp, 2019; Flynn, Huo and Zhao, 2010). Supplier integration is touted as an imperative strategy to improve firm performance and enhance a firm's competitive advantage in the marketplace as it helps the raw materials and parts supply to the operations internally (Taylor and Lin, 2010).

3.2.3. Customer Integration

In addition to the working tight internally having strong collaboration with suppliers, companies need to have integration with their customers to whom the products are delivered to. More specifically customer integration generates opportunities for leveraging the intelligence embedded in collaborative processes, it enables manufacturers to reduce costs, create greater value and detect demand changes more quickly (Flynn, Huo and Zhao, 2010).

4. Results and Discussion

Based on the best selected articles the reviewer has evaluated supply chain integration dimensions and their role in improving the performance of business supply chain. In order to do this, three basic hypotheses have been derived from the specific objectives formulated above.

- ✓ H1: Internal integration has positive effect on the supply chain performance of the business sectors
- ✓ H2: Supplier integration has positive effect on the supply chain performance of the business sectors
- ✓ H3: Customer integration has positive effect on the supply chain performance of the business sectors

Supply chain integration or sometimes known as relational integration have been studied since the evolution of supply chain management (National Academy of Sciences, 2000). Now days, companies have understood how much supply chain is important to their success and are requesting for researches in the area. Same way many researchers are taking part and have found so many important views of supply chain integration and its role in improving the performances of the business supply chain in the world.

The reviewer therefore, has aimed to evaluate the different researches and their views of the commonly understood supply chain integration dimensions and their effect on the supply chain performances of the sector. To do so, the reviewer has got varying view of the previously made and has tried to bring common and convincing conclusions on the topic. To start with here the reviewer has summarized the findings of the studies with respect to supply chain integration dimensions and their effect on supply chain performance as follows;

Table 3 The effect of SCI Dimensions on SCP

Authors/year	Supply chain integration Dimensions their Effect on Supply Chain Performance		
	Internal Integration	Supplier Integration	Customer Integration
1. (Alam, 2017)	Positive	Negative	Positive
2. (Schoenherr and Swink, 2012)	Positive	Negative	Positive
3. (Stank et al., 2002)	Positive	Negative	Positive
4. (Haddad, Nagy and Popp, 2019)	Positive	Positive	Inconsistent
5. (Anyigba, 2019)	Negative	Negative	Negative
6. (Abdallah, Obeidat and Aqqad, 2014)	Positive	Negative	Positive
7. (Singh, 2014)	Positive	Positive	Positive
8. (Mose, 2015)	Positive	Positive	Positive
9. (Ogutu, 2014)	Positive	Positive	Positive
10. (Flynn, Huo and Zhao, 2010)	Positive	Positive	Positive
11. (Uwamahoro, 2018)	Positive	Positive	Positive
12. (Kumar et al., 2017)	Positive	Positive	Positive

As it can be seen from the table.... Above almost all except (Anyigba, 2019) has proved that internal integration has significant and positive effect on the supply chain performance of the business sectors. Despite few (Stank *et al.*, 2002; Abdallah, Obeidat and Aqqad, 2014; Alam, 2017; Anyigba, 2019), those of (Flynn, Huo and Zhao, 2010; Ogutu, 2014; Singh, 2014; Mose, 2015; Kumar *et al.*, 2017; Uwamahoro, 2018; Haddad, Nagy and Popp, 2019) has confirmed that integration with suppliers have significant positive effect on supply chain performance of the business sectors. HossamHaddad has drawn a conclusion

on the customers integration that the effect of customer integration on the supply chain performance is not consistent in that it sometimes be positive o not. Finally, (Anyigba, 2019) has stated that supply chain integration elements have negative impact on the supply chain performance of the business sectors. His conclusions are unique and contrary to the findings of other researchers in the area who all stated the importance of the chain integration.

4.1. The Effect of internal integration on the supply chain performance of the business sectors

Internal integration is strategic process to be achieved with in an organization which must be achieved prior to dealing with the external integration(Alam, 2017). Internal integration has the capacity of synchronizing the whole internal process which in turn creates internal readiness for the external linkages to be achieved.

Having the ability to strengthen internal process, internal integration has been found to have significant positive effect on the business supply chain performances. This proves that having well integrated internal process can strengthen the external relations that the chain elements have(Haddad, Nagy and Popp, 2019; Reiner, 2006; Ogutu, 2014; Mose, 2015; Kumar *et al.*, 2017; Uwamahoro, 2018).

Contrary to many studies (Anyigba, 2019) has concluded that internal integration may result in positive effect on the first stages but it will result in declining role an finally he stated that it will be negative effect it could have on the supply chain performance of the business sectors.

Therefore, first hypothesis is true that internal integration that the chain elements maintain could lead to better performance of the business supply chain.

H1: Internal integration has positive effect on the supply chain performance of the business sectors

4.2. The Effect of Supplier Integration on the Supply Chain Performance of the Business Sectors

As supplier integration is an organizational process of buying firms and suppliers sharing and applying operational, financial, and strategic knowledge in order to generate mutual benefits it has been found to be the most important dimension of supply chain integration researched by many studies.(Haddad, Nagy and Popp, 2019)Hossam Haddad has underlined that Supplier integration seeks to achieve a smooth, efficient flow of materials within the supplier network, and prevent potential obstacles in the process of procurement and production.

These and many other researchers have identified the fact that supplier integration has significant and positive effect on the supply chain performance of business sectors while others,(Anyigba, 2019; Stank *et al.*, 2002; Schoenherr and Swink, 2012) argued that having sticky integration with the suppliers have significant negative effect that they assumed it blocks the opportunity sought to have many competitive suppliers that could arise than sticking with one or fewer supplier for a longer period of time.

After all, supplier integration have been proved to have significant positive effect on the performance of business sectors supply chain showing that the second hypothesis is true.

H2: Supplier integration has positive effect on the supply chain performance of the business sectors

4.3. The Effect of Customer integration on the Supply Chain Performance of Business Sectors

Customer integration is all about the strategic competencies and activities firms apply in providing optimum services with customers through relationship building with bigger intention of holding customer in their hands(Kumar *et al.*, 2017).Customer integration begins with a full assessment of a firm's strengths and weaknesses relative to the service requirements of its top customers. Successful integration depends upon thorough knowledge of the firm and its supply chain partners' capabilities as well as customer requirements and expectations(Stank *et al.*, 2002).

As customer integration could create long term linkage with customers providing open information from the customers to comment on what they desire and expect from the suppliers resulting efficient way of

satisfying customers, it has been proved by researchers that it has significant positive effect on the performance of supply chain in the business sectors(Ogutu, 2014).

Customer integration is argued to have negative effect on the supply chain performance of businesses(Haddad, Nagy and Popp, 2019; Koufteros, Verghese and Lucianetti, 2014) which is contrary to those studies stating that such integration with customers could help to identify customer desires and trend in demand. Such studies do not recommend having permanent customers than having open markets for any customer coming any time to the companies. To these studies expecting permanent line of customers is not as such profitable as opening market to all.

The whole view of the majority articles reviewed confirms that customer integration has significant positive effect on the supply chain performance of business sectors proving that the third hypothesis is true.

H3: Customer integration has positive effect on the supply chain performance of the business sectors

5. Conclusion

The results of the reviewed studies has proved that supply chain integration has been maintained as a significant tool of supply chain performance improvement in the last two decades being more studied and understood till recent days. It has been confirmed that supply chain integration, even though argued by very few researchers, plays a pivotal role in improving the supply chain performance of the business sectors by creating stronger readiness and operation internally and letting the companies be strongly tied one another in order to facilitate better delivery of customer desires.

Internal integration, being an internal process of developing stronger linkage among the work station in a company, has been proved to have significant and positive effect on the supply chain performance of business sectors. From the reviewed studies, almost all of them concluded that companies having stronger internal integration have the capability to have efficient supply chain that they trade in.

Supplier integration is where by the producer in the chain get raw material or parts needed for the processing of customer orders and the studies have confirmed that having stronger and well tied integration with the suppliers can have significant and positive effect on the supply chain performance of the business sectors. But still some studies have questioned the fact that the effect of having sticky and dependent sourcing of such inputs on fixed suppliers could provide positive role on the supply chain performance at the first stages but in the long run the effect declines and be negative at all. Therefore, we can conclude that supplier integration has significant and positive effect on the supply chain performance of the business sectors.

The other important dimension of supply chain integration reviewed is customer integration which is how the companies work with their customers in identifying their needs, getting feedback from, have long term contract and generally creating long lasting relation in general. Customer integration has also been identified as having significant positive effect on the supply chain performance of the business sectors. Companies having stronger integration with their customers have built a means of understanding the patterns of their customers demand and have better understanding of how to address their respective demands in turn helping the whole supply chain to be successful.

6. Limitations

As the science of supply chain management and supply chain integration is young relative to other fields, there are relatively fewer studies made which could limit deeper view of supply chain performance and integration dimensions viewed.

With regard to the reviewed articles, the reviewer has underlined that most of studies are case studies and very few related research reviews have been made on the supply chain integration dimensions and still lack to conclude on the main dimensions of supply chain integration. There are still varying views of researchers on the identified dimensions of supply chain integration and their role on the supply chain performance and this proves that the concept need to be more studied and be developed to theory level as it is becoming key fact influencing the world business.

The other difficulty faced was different articles have used different regression models and it was impossible to see the common specific effect of the identified integration dimensions on the performance of the business supply chain.

7. Future Research Directions

Supply chain integration has been investigated by many researchers being focussed on the three (internal integration, supplier integration and customer integration) dimensions only than considering other aspects like information sharing, joint planning, material flow and other dimensions. Therefore here the reviewer highly recommends the inclusion of other dimensions in addition to these for deeper understanding of the supply chain integration dimensions.

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