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The Impact of Behavioral Factors Affecting Supply Chain Performance a Conceptual Model

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Abstract:

During the last few decades different Supply chain (SC) has been developed and became very complicated, approaches appeared, SC managers have to deal with much more partners from different backgrounds, the main goal of any SC manager became how to improve the SC effectiveness and efficiency, through increasing integration and information sharing. Through time authors and managers focused on the effect of technology in improving SC integration, and they ignored the effect of behavioral factors. The main aim of this research is so high light Behavioral SC, and different behavioral factors affect SC integration.

Keywords: Supply chain, Commitment, Trust, SC integration, Information Sharing, SC performance, Organizational culture

1. Introduction

The concept of Supply Chain Management "SCM" has appeared several decades ago, since the authors paid more attention for this concept due to its importance and the changing conditions specially in the past 50 years. In order to cope with these changes, many trends in SCM have raised, like Lean, Agile, Global and recently Behavioral SCM. The main aim of these trends is to improve performance, through reducing cost or increasing flexibility.

Because of changes in the business environment and products as they became more complicated, according to (Anderson, J.C., & Gerbing, 2008) producing a simple product may require a complicated supply chain, companies nowadays need to manage their relation with their second tier Supplier "suppliers of supplier" and monitor their distribution channels till the final customer.

SC performance is an accumulation of different parts of the SC, includes suppliers and distributors. A shortage or surplus in the capacity any part of SC will cause what is called Bullwhip effect. According to Chen, Drezner, and Ryan (2010), the BWE occurs when the demand variability increases as it advances in the levels of the SC, from retailer to supplier. The BWE causes numerous negative effects and significant inefficiencies in supply chains, but the main one is the excessive investment in inventories throughout the SC members who compose it and need to prevent themselves from fluctuations in demand.

In order to face such BWE SC managers started to use technological solutions like "ERP systems" to coordinate and connect between the SC partners, to assure the smooth flow of material and information. Others focus on legal contracts and put restricted conditions to transfer the shortage risk to their supplier: Hedging Contracts".

Authors started to re-evaluate criteria used in supplier selection, managers used to select suppliers and distributors mainly according to their technological, and productive capacity, their reputation and their experience in the market. Authors like (Chen, H., Daugherty, P.J., & Roath, 2010) stated to pay more attention for the effect of behavioral factors like (Trust, Commitment, Mutuality and reciprocity, organizational culture, Nation culture, ...)

On SC performance and they argued that these behavioral factors can provide high efficiency in improving performance and avoiding BWE.

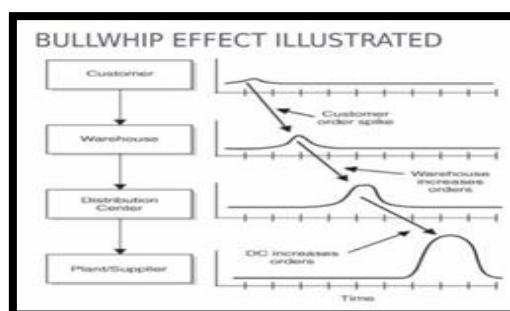


Figure 1: Bullwhip Effect

2. Literature Review

2.1. Theoretical Foundation

There are five main theories that explain the different mechanisms that govern and control the relation between different business partners, Transaction Cost Economics (TCE), Relational Exchange Theory (RET), Resource-Based View (RBV), Resource Dependence Theory (RDT) and Social Exchange Theory (SET). (Christos, S., Konstantinos, G., & Alan, 2015)

Behavioral Supply Chain Management “BSCM” as approach that focus on taking behavioral antecedences into consideration when designing SC and selecting SC partners, is outcome of different theories. Tsanos(2014) claimed that BSCM is out come of seven different theories “Resources Based View, Normative Theory, Cognitive Theory, Relational Exchange Theory, Transaction cost economics TCE, Resources Dependence theory, Social Exchange Theory”.

2.2. Conceptual Framework and Hypotheses

2.2.1. Behavioral Factors

2.2.1.1. Trust

Trust is defined as the willingness to rely on an exchange partner in whom one has confidence due to the ability of that partner to provide expertise, dependability, and direction (Christine, Rohit, & Gerald, 1993). However, Moorman et al., (1993) claimed that Trust is considered as multi dimensions concept (characteristic-based trust, calculation-based trust, and institutional-based trust). Characteristic-based trust relies on credibility, trustworthiness, integrity, decency and consistency of another partner. Calculation-based trust relies on cost benefit analysis, dynamic capabilities and the level of technology adopted by other partners. Institutional -Trust is related to legal control methods of relationship. Building a Trust based relation between SC partners should rely on the three dimensions. In traditional SC, partners are obligated by contracts, each partner will expect exactly what is mentioned in this contract like delivery date, payment conditions, installments, ... but later on managers started to look for more than these direct benefits of contracts like advice, hidden information, accumulated knowledge and experience, that's why authors like (Liu, 2012) conducted a research to examine why would managers look for that, they found that mangers usually ask two questions:

- If the surrounding circumstances changed, suppliers will be able to assist and offer support?
- Can the decision maker rely on the personal judgment and accumulated knowledge?

Ha et al. (2016) classified trust in to two main concepts affective trust which is related to the dimensions of emotion and personality, often developed in a long-term relationship; effective trust, directly the information sharing. The second concept is trust in competence is considered as the second phase trust in which suppliers share decision makers in decision making and strategic planning. According to Ha et al. [2016] Affective trust is measure by different factors like “Respect, Honesty, Credibility and Mutual Understanding” while trust in competence include “Knowledge/technique for performance, Commitment in the relationship”.

2.2.1.2. Commitment

(Herbert, 2015) defined commitment as, Herbert (2015) examined the relation between commitment and SC performance through comparing between companies that rely on commitment and long-term relationship with SC partners and those that rely more on legal contract conditions. Moreover according (Tian, 2019) dimensions of commitment between SC partners are continuity, communication and power. Continuity is defined according to (Heide and John, 1990) as “the perception of bilateral expectation of future interaction”. The second dimension Communication (both informal and/or formal) is defined as “The sharing of meaningful and timely information between firms it's also defined as the “key to vitality” of a partnership “(James & Marc, 2018) while Power is the ability of one individual or group to get another unit to do something, (Dahl, 2007).

According to (Carlos, Daniel, Marqués, & María, 2016), commitment is a multi-faceted construct and should be viewed from three aspects:

- Affective Commitment
- Normative Commitment
- Continuance Commitment

Affective Commitment refers to the feeling of belonging and the sense of attachment to the organization; Continuance commitment referred to the perceived cost, both the financial and non-financial, of leaving the organization, and is perceived to be caused by a lack of alternatives. Employee who's mainly attached to the organization based on continuance commitment remains because they need to do so. (Morgan, 2001); Normative commitment is concerned with the obligation that members feel to remain with an organization and build on generalized cultural expectations. Brown et al. (2005)

2.2.1.3. Mutuality & Reciprocity

2.2.1.3.1. Mutuality

Spark et al., (2011) defined Mutuality as “belief about the inherent value of cooperating for mutual gain. Strong expectations of mutuality of interest will lead to cooperation required for maintaining a long-term relationship, especially

in relationships where transfer of property rights among legally equal and free parties is involved". from the empirical point of view of Rousseau & Guillermo, (2004) mutuality can be reasoned to the existence of "Idiosyncratic" investment that makes the supplier feel as a part of the focal company not only as a partner. On the other hand, it will reduce the flexibility in many situations and the ability to shift to new product.

2.2.1.3.2. Reciprocity

Reciprocity is defined as the degree to which manager or decision maker expect cooperative action (as opposed to forced interaction) within a relationship and constitute a major factor in the formation of interorganizational relationships (Christos S. Tanos, 2014). Reciprocal relation will overcome the disadvantages of mutuality "inflexibility" as in reciprocal relation we assume that no partner will try to control the relation and will guarantee balance and equity.

2.2.1.4. Top Management Support

Authors like "Burgess (1998), Carter, Kale and Grimm (2000), Zhu and Sarkis, (2004), Simpson et al. (2007) "considered integrated or integration in general as culture, however adopting any culture or new strategy require both: managerial capabilities and support. BSCM as a concept required certain level of harmony between SC partners, although such harmony will have many advantages but managing it successfully requires more effort and talent that many managers consider it as extra burden and go for the traditional way of SCM. (Christos,, S., Konstantinos, G., & Alan, 2015)also claimed that managers must be aware with the expected profit that can be gained from implementing BSCM and that's it not only an extra cost. This awareness with the expected benefit will guarantee management support and will encourage top management to allocate extra resources to successfully implement BSCMM.

One of the main reasons that some decision maker may reject the concept of BSCM, is that it requires cross functional team to manage the integration among the focal organization and the whole SC. managing such teams require some special managerial skills that not all managers must have (Su, Q., & Shi, 2008)

2.2.1.5. National Culture

Professor Greet Hofstede conducted one of the most important studies about the effect of culture "National/Organizational" on organizational performance. Hofstede examined the effect of values of national culture through defining six dimensions for culture.

2.2.1.5.1. Power Distance Index (PDI)

This dimension expresses to which extend the less powerful members of a society accept and expect that power is distributed unequally. The main idea behind this dimension is how a society handles inequalities among people. People in countries with large degree of power distance are more likely to accept hierarchal orders with no need for more justification.

2.2.1.5.2. Individualism versus Collectivism (IDV)

This dimension represents to which extend each individual care only for themselves and their immediate families. Collectivism means has un questioning loyalty toward their society.

2.2.1.5.3. Masculinity versus Femininity (MAS)

The Masculinity sides of this dimension represents to which extend members of the society prefer or focus on achievement, heroism, assertiveness, and material rewards for success. Society at large is more competitive. Its opposite, Femininity side represents the extent to which society members prefer cooperating with each other, care for weak people and quality of life

2.2.1.5.4. Uncertainty Avoidance Index (UAI)

This measures the degree to which society members feel uncomfortable with uncertainty. it related to which extent society members believe that they can control future or they just need to deal with it. Societies with strong UAI usually reject what's is called "Unorthodox" behaviors, and ideas...they reject change ...while those with weak UAI are usually described as more relaxed societies in which practice counts more than principles.

2.2.1.5.5. Long Term Orientation versus Short Term Normative Orientation (LTO)

This dimension measures to which extent society members are keen to keep links with its own past while facing the challenges of the present and the future. "In the business context, this dimension is referred to as "(short-term) normative versus (long-term) pragmatic" (PRA). In the academic environment, the terminology Monumentalism versus Flex humility is sometimes also used." (Chin & L, 2009)

2.2.1.5.6. Indulgence versus Restraint (IVR)

Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms.

2.2.2. SC Integration

Supply chain integration (SCI) is one of the most widely discussed topics in SCM research, this can be rooted to the fact of global environment, wide range of suppliers as no SC can be considered now as closed system. And no organization can survive alone. (Éverton & Elton, 2014)SCI can be defined as “the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organization processes” (Flynn, Huo, & Zhao, 2010). SCI comprises two areas, internal and external integration. The latter involves integration with suppliers and integration with customers (Flynn et al., 2010).

According to (Mei & Qingyu, 2011) SCI is considered as multidimensional construct, as it can be classified into two main groups: relationship focus and process focus. Moreover, other scholars refer to integration dimensions as functional, operational, and relational. Furthermore, SCI practices could be classified into two categories, product-based and market-based (Ram & Soo, 2012).

In order to attain a successful SCI, the focal company must build a long-term relation with its partners (Supplier/Distributor), furthermore this relation should extend to second level (Supplier/Distributor). Daniel & Handfield,(2007) SCI includes different activities like Scheduling, integrating processes, shared information, shared technology, long-term contracts, reinforced quality improvements, improved supplier's overall capabilities, and shared risks and rewards, mainly they can be divided into two main dimensions Information sharing, SC coordination (Enchelt, Wyntra, & Welee, 2008)

2.2.2.1. Information Sharing

Information sharing includes two main aspects, the breadth and the quality of information sharing (kim, lee, & Gosain , 2005) identified Breadth of Information as “the range of disseminating each firm's private information among the supply chain members. The breadth of information sharing depends on the coordination of the level of collaboration, and can be of three types: order information, partial information, and strategic information (ESmape, Lamouri, & Paris, 2013) mentioned that information is considered as a sensitive source of power for some managers that they prefer to hoard, and this may be one of SCI failure in man situations.

The Quality of information shared relies on the timeliness, speed, accuracy and appropriateness of information shared. Chin & L (2009) claimed that information is like any other physical product that will be expired after certain time and it will be useless after that time, they also claimed that information quality is affected mainly by the mutual trust between supply chain. Advanced technologies of information technology (IT), makes it possible to share information on different levels from operational to strategic level in no time in what we call on time information sharing.

2.2.2.2. SC Coordination

Deshmukh et.al., (2008) claimed that SC coordination is composed of risk, cost and gain sharing, sharing ideas and institutional culture, sharing decision making and sharing skills. According to this definition coordination includes set of activities like procurement, inventory management, distribution and SC relationship management. Through his study Deshmukh et.al., (2008) proposed three dimensions frame work for coordination: Internal integration, Forward integration (with customers) and backward integration (with suppliers). The first biller includes functions and activities to be integrated (Inventory management, Logistics, Forecasting, Procurement and product designing). The second is the mechanisms that will be used to manage and ensure the dependencies and coordination between SC partners like (contracts, information technology, information sharing agreements and joint decision making). The third biller is “Identification and solution of conflict” formal contracts or informal agreements.

2.2.3. SC Performance

SC performance management is widely discussed topic during the last few decades. One of the leading studies in this area is the study of McGaughey et.al.,(2004). McGaughey et.al.,(2004) developed a measurement frame work for a four echelon SC (Supply, Manufacturing, Distribution and consumers) this model considers three categories of measures reflecting performance dimensions required for success, resource measures, output measures and flexibility measures. Resource measures include: inventory levels, personnel requirements, equipment utilization, energy usage, and cost, output measures include customer responsiveness, quality, and the quantity of final product produced and flexibility measures include volume flexibility, delivery flexibility, mix flexibility and new product flexibility.

There are different murices to measure performance, the researcher selected the appropriate metrics through taking into consideration some criteria like: i) the metrics should represent performance across the supply chain, ii) respondents can utilize objective data for assessing them (even if the data cannot be revealed) and iii) the data for the selected metrics can be provided by the focal firm as proxy for the supply chain. Among the different matrices author selected SC effectiveness and efficiency due to reasons presented previously.

Dimensions	Metrics	Definitions
Efficiency	Supply chain cycle efficiency	Ratio of time in which inventory (i.e., raw materials / WIP / finished products) is active/moving in the supply chain over total time spent in the supply chain
	Supply chain flexibility	Average time required for the supply chain to respond to an unplanned 20% increase in demand without service or cost penalty
Effectiveness	Order fulfilment lead-time	Average time between order entry and time of order delivery
	Perfect order fulfilment	Ratio of orders delivered i) complete, ii) on the date requested by the customer, iii) in perfect condition, iv) with the correct documentation over total number of orders

Table 1: Supply Chain Performance Measurement

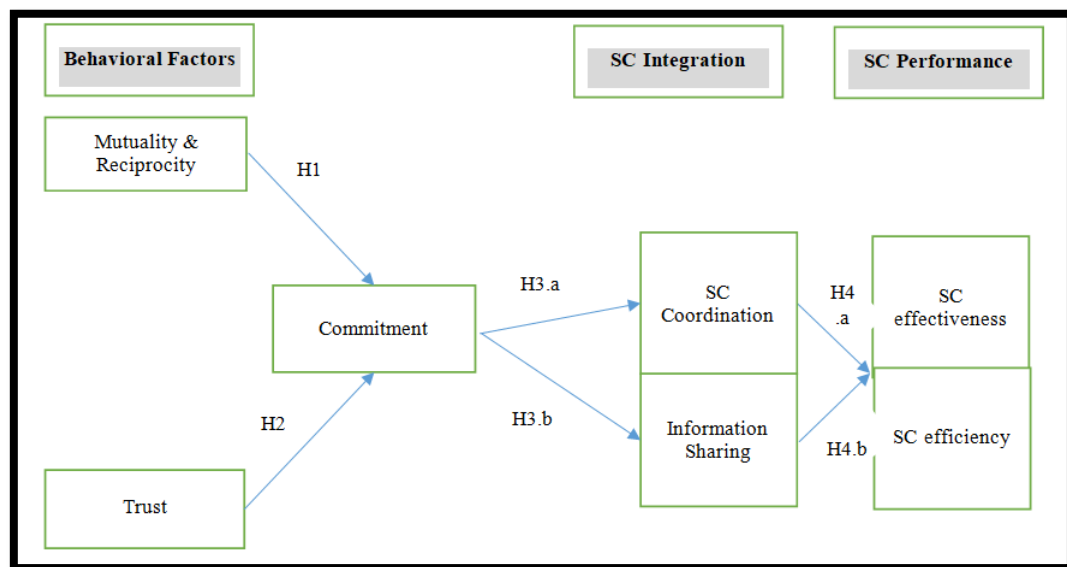


Figure 2: Proposed Model

Based on previous researches like “ (Chin & L, 2009); (Su, Q., & Shi, 2008); (kim, lee, & Gosain , 2005); (kim, lee, & Gosain , 2005)” researcher constructed a model to explain the effect of behavioral factors on SC integration and how it will be reflected over SC performance. The proposed model is constructed out of the following propositions:

- Proposition 1: Mutuality & Reciprocity has a significant positive effect on the Commitment between SC partners.
- Proposition 2: Trust has a significant positive effect on the Commitment between SC partners.
- Proposition 3: Commitment has a significant positive effect on SC Integration.
- Proposition 4: SC integration has a significant positive effect on SC Performance.

3. Conclusion

SC integration became a formidable target for all organization for survival among strong competition. That is why focal companies spend large portions of their budgets to develop their information sharing technology like ERP” enterprise Resources Planning”, and as a result companies raised their supplier selection standard also distributors to assure that they can fit with their system. On the other hand, some decision makers found that focusing on such strategy is not enough to reach the required level of information and tended to go for building SC relations based on trust and commitment. Research in BSCM is not less important than what’s mentioned as authors should examine more behavioral antecedence in different contexts as the effect of these factors differ from context to another.

4. Research Limitation

There is limitation for this research concerning the no. of factors included in the research, as researcher selected two factors only according to findings of previous researches and due to research limitations. According to previous research it is recommended to use Organization culture as moderating variable that controls the effect of behavioral factors, but it was avoided due to research complications. Results can’t be generalized as according to (Debbie L. Hahs-Vaughn, 2016) the effect of behavioral factors is very sensitive to the context “organization / industry and nation” level. Data sample may not represent the whole SC, e.g. In mobile industry in Egypt most SC located in Egypt is downstream level “distribution” as most of purchasing and procurement and even manufacturing is centralized in the mother country.

5. Research Implications

From a theoretical perspective, the proposed model in this paper provides significant evidence for the development of supply chain relationships characterized by behavioral factors as a means of achieving superior supply chain performance. The proposed model is planned to strengthen the relational and social exchange aspect of supply chain relationships. The relational viewpoint will also be examined by the model showing that supply chain integration based on collaborative relationships (rather than market-based transactions) positively affects performance.

From a managerial perspective, decision-makers still struggle to gain the performance benefits of developing collaborated relationships with SC partners and few firms have succeeded to collaborate in an effective and efficient way that leads to a distinctive advantage (Fawcett et al, 2015). This research is proposed to raise the question is technology is the main dominator of SC integration successful implementation or not.

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