

Business micro- environment Challenges of Supply chain network integration: case study Jordan Industrial Estate Corporation

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Abstract

The purpose this of the study was to identify the challenges which Supply Chain network integration face in its implementation on both domestic and international firms, Classifying these Challenges depending on their effect, And finding relation between these classes in Jordan Industrial Estate Corporation. The Questionnaires were sent to 140 employees working in the company. Only (124) were returned. The overall response rate for this study was 92%. This is regarded as relatively high, since the respondents are managers and they were supposed to be too busy to answer Questionnaire, Stratified random sampling was used for the research method: Beta , R , T-value .

Keywords: supply chain network integration , challenges supply chain network,

Introduction

ERP stands for Enterprise Resource Planning. ERP is a way to integrate the data and processes of an organization into one single system. Usually ERP systems will have many components including hardware and software, in order to achieve integration, most ERP systems use a unified database to store data for various functions found throughout the organization. The term ERP originally referred to how a large organization planned to use organizational wide resources. In the past, ERP systems were used in larger more industrial types of companies. In fact, ERP systems are used in almost any type of organization large or small. ERP's usually accomplish integration by creating one single database that employs multiple software modules providing different areas of an organization with various business functions (Heinrich, 2005). To succeed in the digital economy, organizations must manage the integration of business, technology, people, and processes not only within the enterprise but also across extended enterprises .Whereas an Enterprise Resource Planning (ERP) or enterprise system focuses on intra-enterprise business processes, a Supply Chain Management (SCM) system facilitates inter-enterprise cooperation and collaboration with suppliers, customers, and business partners. Although both of these systems can bring benefits and competitive advantage to organizations, the management and implementation of these systems pose significant challenges to organizations. Process integration and redesign is

an important component of ERP and SCM implementations. Integration involves not only implementing ERP systems and ensuring they communicate or interface with legacy systems, but it also involves integrating ERP and SCM systems with Customer Relationship Management (CRM), Product Lifecycle Management (PLM), and e-procurement and e-marketplaces, as well as making them available over the Web to foster cooperation and collaboration across the entire value chain. companies (Kaushik et. al., 2000).

Supply chain management is an integrating function with primary responsibility for linking Major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistic management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance, and information technology. Organizations increasingly find that they must rely on effective supply chains, or networks, to successfully compete in the global market and networked economy. In management's new paradigms, this concept of business relationships extends beyond traditional enterprise boundaries and seeks to organize entire business processes throughout a value chain of multiple. In the 21st century, there have been a few changes in business environment that have contributed to the development of supply chain networks. First, as an outcome of globalization and the proliferation of multi-national companies, joint ventures, strategic alliances and business partnerships, there were found to be significant success factors, following the earlier "Just-In-Time", "Lean Management" and "Agile Manufacturing" practices (Haag et. al., 2006). Second, technological changes, particularly the dramatic fall in information communication costs, which are a paramount component of transaction costs, have led to changes in coordination among the members of the supply chain network (Chopra et. al., 2001). These factors effect on integrated of supply chain network .

Importance of study

This study is an attempt to find out the reasons why global and domestic some companies are successful in the integration of supply chain networks. The research is designed to identify the challenges of those global and domestic firms faced during their journey to achieve the integration in their networks. Most importantly, is their relation between those challenges?

Objectives of study The study aims at creating a new orientation to find and explore the challenges which Supply Chain network integration face in its implementation on both domestic and international firms, Classifying these Challenges depending on their effect, And finding relation between these classes. the study tries to find a classification to the challenges of supply chain integration. And to find relation between those challenges in a way to help the researcher in build a model to describe all the purpose of the study.

Question of study

- What are the key challenges of Supply Chain Network integration?
- What are the relations between those challenges?

Literature Review

These many of studies focused on definition SCM as

The definition of SCM as developed by members of Global SCM forum 1998, "Supply chain management in the integration of key business processes from end user through original supplier that provide product, services, and information that add value for customer and other stakeholders" (Haag et. all., 2006). The American professional association defined the SCM, "Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers (CSCMP, 1984). The Supply Chain management covers the flow of goods from suppliers through manufacturing and distribution chain to end-user by (Oliver and Webber 1982). also , SCM techniques deal with the planning and control of total materials flow from suppliers through end-users (Jones and Riley 1987) .An integrative approach to dealing with the planning and control of the materials flow from suppliers to end-users(Ellram ,1991). Also, the SCM is the management of network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities hand of the ultimate consumer (Christopher, 1992). SCM is the integration of business processes from end-user through original suppliers that provides products services and information that add value for customers International center for competitive excellence (1994) SCM is defined as the management of the flow goods and services to end customers to satisfy their requirements (Harland 1994). An integration philosophy to manage the total flow of a distribution channel for suppliers to ultimate customer (Cooper et al. (1997).The supply chain encompasses all activates associated with the flow and transformation of goods from the raw materials stage (extraction), through to the end user, as well as associated information flow. Material and information flow both up and down the SC. SCM is the integration of these activities through improved SC relationships to achieve sustainable competitive advantage (Handfield and Nichols 1999).SCM is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations and at right time, in order to minimize system-wide cost while satisfying service level requirement. (Simchi-Levi et. al., 2000). SCM is the design, maintenance, and operation of supply chain process for satisfaction of end user (Ayers 2001).Throughout the 1980's and 1990's the concepts of customer and supplier integrative relationships gained renewed attention (Larsen, 2003). Starting develop a relationships in business between selected clients, strategic customers, and with suppliers. This trend with increased collaboration throughout the SC could be explained as a result of three factors (Brown, 1998):

- Manufacturing takes place in a global context where local markets are Subject to global standards
- Manufacturing systems are required to develop and operate Environmentally benign products and processes
- The business and organizational structures, within which manufacturing operates, are under increasing stress

Lee (2000) defines integration as, "The quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment". Another research has classified integration in a supply chain context in six different types. These are customer integration, internal integration, material and service supplier integration, technology and planning integration, measurement integration and relationship integration (Brown, 1998)

Mintzberg (1994), identified four stages of supply chain integration, where stage I represented the fragmented operations within the individual local and international company. Stage II focused on

limited integration between adjacent functions, e.g. purchasing and materials control. Stage III required the internal integration of the end-to-end planning in the individual local and international company and stage IV represented the true supply chain integration including upstream to suppliers and downstream to customers. According to Larsen (2003) the three major components of a SC are: Activities, organizations and processes. The activities can be seen as the foundations of the SC. The entire process of product flow involves a series of actions and activities that add value and change the characteristics of the product flow. Organizational units, both internal and external, perform activities. These organizations thus become a pool of resources for the SC and take responsibility for the performance of these actions. All operations and processes linked and managed to be coordinated. SC integration has already been identified as one of the core competencies. However, this competency belongs to the over all company in Supply chain. Consequently, today's competition for market leadership is among supply chains. For example, Ford's supply chain (including all the parties from suppliers to dealers) competes with Toyota's supply chain parties. Also, there are many studies focus on supply chain integration challenges such as Phillip and Ropert (2009), Pender (2001), Tom (2009), Peter (2000), Jaffer and Khatib (2004), Karkkainen and Ala-risku (2003), Kelly (2007), Hewlett-Packard (2004), McDermott and Chan (1996), Boxall (1991), Craft (2006), Lesley (2007), McGuffog and Wadsley (1999), Gunasekaran et al. (2004), Bass et al. (2003), Hussain and Mohammad (2010a), second researches try to enumerate and classify the challenges such as Stanley et al. (2005), Kussman (2005), Paigude (2005), Macpherson (2001) and Deep (2005), all studies center on three perspective :

- Technical perspective
- Managerial perspective
- Relationships perspective

According to the pervious literature, the study tries to classify the pervious challenges to serve the aims of the study.

Business environment	Micro-Challenge of SCM
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Business micro-environment challenges:

first classification of the challenges is the Business micro-environment challenges that the firms face it from inside the organization, which is classifying to Transaction Cost, Strategy and Planning, Customer Order Management, Logistic Management, Manage Operation Flexibility, Measure SC Benefits, Enterprise Integration, Setting Standard of Trade, Procurement Management

1- Transaction cost

Study Allan (2001) focus on four challenges (transaction cost, strategy, culture and change, and suppliers competence requirement) that the organization must face it when they apply the integration of Supply chain. Transaction cost and strategy will consider as a kind of business micro-environment challenges. This lead to the hypothesis:

H1.1 There is a direct significant relationship between transaction cost and the business micro environment supply chain network integration challenges

2- Strategy and planning

SCM is an essential component of long-term business competitiveness, so it is sensible to consider how SCM relates to strategy theory and concepts (Steve, 2009) This lead to the hypothesis:

H1.2 There is a direct significant relationship between strategy and planning (strategic flexibility management and strategic planning management) and the business micro environment supply chain network integration challenges

3- Customer order management

Customers are becoming more demanding; their expectations are evolving toward greater levels of service and response with higher degrees of product and service customization (IBM, 2008). Value chain partners (suppliers, and service providers) integrated to provide differentiated customer segment product/service bundling and superior customer service levels. Increased profitability is the top driver of customer order management performance. This centred attention on profitability is probably resulting from the economic market conditions of the past few years, but may be a short-term view. Customer responsiveness leads to customer retention and revenue growth. In the longer term view, concentration on customer-facing initiatives and improvements will be significant to profitability achievement (Boxall, 1991).

This lead to the hypothesis:

H1.3 There is a direct significant relationship between customer order management and the business micro environment supply chain network integration challenges.

4-Logistic management

The supply chain logistics problems facing multi-site companies can be complex, involving multiple stakeholders and constraints across the entire enterprise. The more complex the supply chain, the more difficult it becomes for companies to answer basic questions, such as which crude should they purchase and how should they transport it?

Which facilities should process it? What will the best product slate be? Which components should they buy and which should they make? In many cases, different departments or divisions within a company trade, supply chain planning, operations and blending to name a few have a hand in these decisions, but communication among these entities is not always clear or consistent, and each may optimise to their own objectives without regard for others. The results can drastically affect profitability (Craft, 2006).This lead to the hypothesis:

H1.4 There is a direct significant relationship between logistic management and the business micro environment supply chain network integration challenges.

5- Manage operation flexibility

A firm gains flexibility to quickly realign the supply/demand mix to satisfy changing global demand. Switching costs and coordination costs are a barrier to operating flexibility. Switching costs can be reduced if all SC partners standardising their products and processes globally which is seams to be challenge. Coordination costs can be significant for global integration of cross-functional supply chain processes. A well-structured global demand forecasting and planning process is an important mechanism for global coordination across functions. Regional representation to ensure all relevant input is considered important (Walfried et al., 2009). A globally integrated process with regional representation requires costly resources, information infrastructure, and travel. Globally integrated information systems are critical to reduce the cost of communications and to make relevant information readily accessible or to reduce coordination costs (Lesley, 2007). This lead to the hypothesis:

H1.5 There is a direct significant relationship between operation flexibility and the business microenvironment supply chain network integration challenges.

6- Measure SC benefits

Another problem is that the companies often tend to optimise their own performance, while doing this; companies disregarding the benefits of the SC as a whole (local instead of global optimisation). The maximum efficiency of each chain however does not necessarily lead to global optimisation (Gunasekaran, 2004). In addition, human factors should also be taken into consideration since the decision-makers at various points along the SC do not usually have a whole view to the SC due to the lack of information or their personal hindrances (McGuffog and Wadsley, 1999). This lead to the hypothesis:

H1.6 There is a direct significant relationship between measure of SC benefits and the business micro environment supply chain network integration challenge

7-Setting up standards of trade

For small and medium enterprises (SME) and their suppliers, the high cost of technology is exacerbated by the lack of a widely accepted international electronic information standards governing the financial supply chain. The solution is a standard mechanism for communications protocols, rather than many standards. Several organisations have made some headway towards creating such standards, but there are no comprehensive and internally consistent open standards now, which is why automating the supply chain is so costly (Bass et al., 2003). This lead to the hypothesis:

H1.7 There is a direct significant relationship between standard of trade and the business micro environment supply chain network integration challenges.

8-Procurement management

A typical manufacturing company needs to procure thousands of products from hundreds of suppliers; the challenge here is how to manage the complexity of the procurement process, and establishing a strong procurement infrastructure to execute on strategic supply initiatives, using an

empowered organisation structure, fully integrated to the stakeholder and finance organisation. Moreover, people training and development was the key challenge for procurement organizations, includes skill development; the right recruiting and retention practices, and career paths in other functions outside of procurement. That is, how to set up and how to manage global sourcing offices (Gunasekaran, 2004). This lead to the hypothesis:

H1.8 There is a direct significant relationship between procurement management and the business micro environment supply chain network integration challenges.

9- Enterprise integration

Enterprise integration does not happen naturally, it needs to be planned, yet the planning cannot be precise, as business processes and facilitating technologies will change, creating different needs and different potential solutions (David, 2009). The reference architecture efforts mentioned define methodologies for building integrated architectures. The problem of integration is exacerbated by the limits of human cognition, by behavioral issues, by the difficulty of aligning the goals of individuals with organizational units, and by the relentless need for faster changes (Jaffer and Khatib, 2004). This lead to the hypothesis:

H1.9 There is a direct significant relationship between enterprise integration and the business micro environment supply chain network integration challenges.

Model of study

In this section, we try to validate the relations between the challenges classes; using the following hypothesis:

This lead to the hypothesis:

1 There is a direct significant relationship between business micro environment and Supply chain network integration challenges.

Methodologies of study

The researcher has designed a questionnaire and distributes it to the population of the study which is Jordan industrial Estate corporation(JIEC) . The researcher selected 140 employees in all companies as a sample of the study, and then the internal consistency coefficient of the questionnaire has been extracted using the Cronbach's alpha equation. The stability coefficient reached 89% in order to assure the validity of the questionnaire. The researcher divided the questionnaire into ten main sections containing a set of questions related to the measurement of business macro environment challenges on the Supply chain network integration that the firms face it from in side the organization, which is classifying to Transaction Cost, Strategy and Planning, Customer Order Management, Logistic Management, Manage Operation Flexibility, Measure SC Benefits, Enterprise Integration, Setting Standard of Trade, Procurement

Management. The research site was Jordan Industrial Estate Corporation (JIEC), it was selected by the researcher because it had the long history in Jordanian industry and it is the primary and most popular crowd of corporation in the Jordan. This industrial area had recently applied its supply chain network and had faced a great deal of criticism for doing so. According to the purposes of the study and the circumstances of the distribution of the questionnaire, it was impossible to apply a systematic type of sampling method. The researcher had requested that the employee questionnaire be distributed among 200 companies. However, only 140 completed questionnaires were returned at the end of the two week period. As participation was voluntary, it was not possible to get more responses, especially as there was no direct contact between the researcher and the employee respondents. Therefore, convenience sampling was used. The final corporations sample population consisted of 140 of the industrials' companies and they belonged to various industry groups. The final group of local senior and middle managers and professionals' workers (engineers and technical who are not hold as managers) sample consist 140 respondents, In other words, both sample populations were varied. The data collection method was questionnaires because; like Creswell (2003) explains, questionnaires allow the researcher to collect a large volume of information on a limited budget and in a shorttime. It should be noted that the questionnaires were handed to the HR department at the JIEC. The HR department then sent the questionnaires to its branches and corporations, later forwarding the results to the researcher by hand. In this study, we applied a set of statistical methods; we applied correlation analysis on the answers of the questionnaire which was a vital first step that ensured that each of the questions actually had a relationship amongst them. Another useful statistical method that was performed during this study was the factor analysis. The factor analysis showed us, with minor deviations that if the selection of the one key rations; business macro environment challenges that consist of nine items will seem to be appropriate components for describing the questions. We feel that the most important statistical method used to analysis the survey data in this study was in fact the PLS regression analysis.

Hypothesis testing

Business Micro Environment Challenges Hypothesis (Measurement Model):

To assess the robustness and reliability of the relation between business micro environment challenges construct and their indicators we calculate through Smart PLS software the ratio of AVE, Composite reliability, cronbach Alpha, and communality.

Table 1.2: measurement model results

	Average Variance Extracted	Composite Reliability	Cronbach Alpha	Communality Business Micro
Business Micro environment challenges	0.79	0.95	0.96	0.79

AVE involving the percentage error variance, 0.79 is the value of consistency in this measurement model. and each indicator describe 0.95 of the business micro environment challenges construct, all of the indicators explain 0.96 of the construct, 0.79 is the capacity of the indicator to describe the construct. The results from this reliability test showed us that all score were well above or just around the suggested thresholds. See table 1.2.

Convergent validity

The measurement model for validity through analysis of convergent validity. Convergent validity assess whether each proposed indicator to construct relationship was valid see below

Table 1.3: test of convergent validity, factor beta and t- Value

business micro environment challenges	Beta	t-value
Transaction cost	0.90	0.41
Strategy and planning	0.91	0.39
<i>Customer order management</i>	0.94	0.41
<i>Logistic management</i>	0.93	0.40
<i>Manage operation flexibility</i>	0.93	0.56
<i>Measure SC benefits</i>	0.92	0.38
<i>Setting up standards of trade</i>	0.91	0.41
<i>Procurement management</i>	0.90	0.37
<i>Enterprise integration</i>	0.92	0.52

In our analysis of convergent validity, table 1.3, we have seen that all of the indicators (questions) load on their own latent constructs with a value that exceeds 0.50, which is the threshold recommended by Trochim, (2006). In addition, each question load higher on their own latent constructs than on the others. The analysis of convergent validity shown that each indicator is well

correlated with the construct it is connected to. The results are shown in table 1.3. that t-value for all indicators are upper than tabling t on 0.01 significant level. We conclude that the measurement model is robust and reliable as was suggested by Enskog, (2006). Moreover the validity of the measurement model is strengthened through these results as the number of respondents of the survey has increased dramatically since the previous results were presented.

Results:

There are a number of ways that the set of statistical methods presented in this research, as Beta, T-value which can be beneficially used by researches and organizations. The business micro environment challenges of the SC integration, include transaction cost, strategic flexibility management, strategic planning management, customer order management, logistic management, operation flexibility, measure of SC benefits, standard of trade, procurement management, and the enterprise integration challenges. This classification supported by statistical measurements that every sub challenge related to its class. According to the PLS results, we see that the beta results in the measurement model represent the hypothesis of the research. We statistically prove that all sub-challenges under the business micro environment as categorised are related to this class, this had been proved statistically through the path coefficient (beta result) of this class. Path coefficient summarised the results of the survey answered for section one of the questionnaire, these results harmonies with the opinions of Morten (2003), Mohammady (2004), Hewlett-Packard (2004), Steve (2007), Lesley (2007), McGuffog and Wadsley (1999), Jaffer and Khatib (2004). As a result of what we extracted from the literatures and from the statistical test of path coefficient, we see that the hypothesis of business micro environment challenges are proved. Which mean that all of these challenges related to the class statistically.

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