Uncertain Supply Chain Management 10 (2022) 1037–1040

Contents lists available at GrowingScience

Uncertain Supply Chain Management

homepage: www.GrowingScience.com/uscm

Factors affecting supply chain integration and customer satisfaction

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A B S T R A C T

The objective of this paper is to investigate the influence of supply chain integration (SCI) on customer satisfaction in the potash supply chain in Jordan. 320 samples are collected after completing the sample checking process. The research study uses partial least squares for processing of data. Study outcomes show a connection among the integration of supply chain and customer satisfaction. In addition, the study shows that enterprise resource planning (ERP) system, business strategy, and suppliers have impacts on the integration of supply chain and customer satisfaction.

Article history:
Received December 1, 2021
Received in revised format December 18, 2021
Accepted February 15 2022
Available online February 15 2022

Keywords:
SCI
Business strategy
Customer satisfaction
Enterprise Resource Planning

1. Introduction

Firms understood the benefits of supply chain integration to operate business processes within complex supply chain networks (Li et al., 2015). Developing the supply chain collaboration with other components gives the firm more ability to use resources with the economic expansion (Lazzarini, 2001). having highly qualified partners can reduce costs more than operating the organization alone without having effective partners, and the productivity of the organization has increased because business networks are becoming more unified which effect on better managing businesses supply chain networks, decreasing overall costs, and enhancing customer satisfaction (Sodhi et al., 2012; Shou et al., 2018). For that, many researchers argued that competition starts today between businesses' supply chains more than between firms (Osarenkhoe, 2010).

Managing business supply chain represents the integration between supply chain main components starts from resources, suppliers, firms, distributors, and customers, this integration allows the transfer of information, services, and products between all components of the supply chain, which increase the added values for customers and supply chain networks' firms (Schoenherr & Swink, 2012). Possessing more competitive advantages in a complex competition market between supply chain networks needs an effective management capable of managing the transfer of raw materials, information, and products from sources to end customers (Schoenherr & Swink, 2012).

Several studies and researchers have examined the issue of supply chain integration in terms of developing the integration between its main components such as sources, suppliers, distributors, and customers (Flynn et al., 2010). The researchers attributed that the study of supply chain integration is due to the changing environment of competition to become more complex due to global pressures from globalization and entering the knowledge economy (Fan et al., 2017). Other researchers have studied the issue of consolidation depending on the level of relationship and proximity between the components of the supply chain as an external constraint, and the readiness of the internal work environment as an internal constraint (Kauppi et al., 2016).

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doi: 10.5267/j.uscm.2022.2.008

2. Literature review

2.1 Enterprise Resource Planning (ERP)

Supply chain integration management needs advanced technological systems to link the transfer of data and information from sources to customers, one of the most important advanced technology is the enterprise resource planning, which has proven its ability to influence the increase the customer requests and demands, the efficiency in performing business operations, functions, and methods, and enhancing the relationship with distributors and customers (Neil s., 2018). Some studies have proven that applying enterprise resource planning has a positive impact on raising work performance, but there is a difficulty of including all the operations of the manufacturing department main and sub processes within ERP system due to the different mismatch of production methods for products (Carr j., 2018). Some other studies have proven that applying ERP system depends in general on the strength and readiness of the organization's technological infrastructure, whether equipment, software and users (Schwartz J. et al., 2018). However, the application of ERP systems and its impact on increasing customer satisfaction through the integration of supply chains needs several additional details capable of explaining the nature of the relationship and the nature of the impact.

2.2 Business Strategy

Developing the firms' infrastructure, functions, and relationship with others' supply chain components lies on the alignment between business strategy and supply chain integration (Beckmann et al., 2014). Most researchers supported the idea that business strategy is the main motivating force for business development and improvement of the end product offered to customers (Meckenstock et al., 2016). Defining the best business strategy capable of changing the structure, nature, and functions of the business and how it affects the final business outcomes is a topic that needs several further studies. In other words, determining the best strategy that has a greater impact on the supply chain integration process remains the problem that needs to be explained in more details.

2.3 Suppliers

The integration of supply chains largely includes studying the impact and relationship of the company with suppliers, which constitutes a major problem for most companies, due to the fact that having long-term contracts with suppliers can positively affect customer satisfaction through the processing and transportation of products in the required time (Flynn et al., 2010). On the contrary, the bad relationship between the company and suppliers can affect customer satisfaction through delaying the processing and transportation of products to the final customer (Liu & Lee, 2018). Measuring the impact of suppliers on building business strategy, job performance, effective forecasting and planning, designing processes and products, and managing effective operations in general remains a topic that needs further studies and illustrative details.

2.4 Supply chain integration

The term supply chain integration appeared as a solution to meet the increased complexity in the work environment, and to reduce the risks facing organizations (Yang & Yang, 2010). The organizations realized that the integration with the external environment represented by suppliers and customers is the most appropriate solution to build a business strategy capable of sustainability in giving customers products and services at low cost, and reasonable quality (Li et al., 2015). Literary studies have shown that the integration of supply chains between organizations and the external environment contributes to sharing the risks that occur, which contributes to raising work performance, increasing Productivity, and meeting the customers' needs and demands (Kauppi et al., 2016; Fan et al., 2017). Therefore, organizations need to support the process of supply chain integration to link the organization's internal environment with the external environment to make the business environment more efficient and flexible to face challenges and risks.

The following research hypotheses are based on past studies and reviews:

H_1: *ERP has a positive effect on supply chain integration.*
H_2: *ERP has a positive effect on customer satisfaction.*
H_3: *Business strategy has a positive effect on supply chain integration.*
H_4: *Business strategy has a positive effect on customer satisfaction.*
H_5: *suppliers have a positive effect on supply chain integration.*
H_6: *suppliers have a positive effect on customer satisfaction.*
H_7: *Supply chain integration has a positive effect on customer satisfaction.*

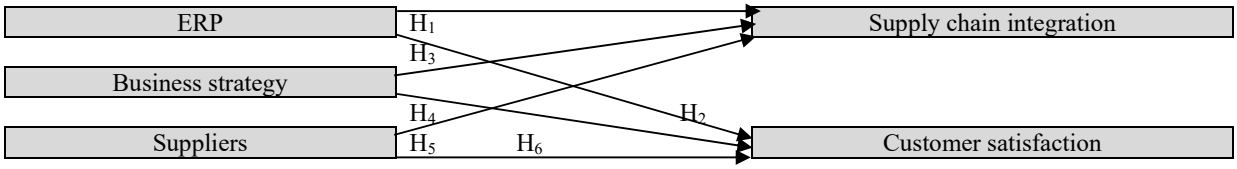

Fig. 1. The proposed method

3. Research methodology

Based on the need of measuring the research constructs, the researcher used Google drive to design, create, and distribute online research survey, by using a five-point Likert scale (1 = Strongly Disagree; 2 = Disagree; 3 = neutral; 4 = Agree; and 5 = Strongly Agree). For discussing research hypotheses statistically, the researcher used the PLS approach. 475 respondents had been received, and after checking and filtering all the collected data 320 respondents accepted for analysis and discussion research hypotheses. Gefen et al. (2011) proposed a rule of thumb which states that the sample collected should be 10 times greater than the number of predictors.

4. Research results

The table below shows the reliability test through using composite reliability, average variable extracted values, and Cronbach alpha values which should be more or equal to 0.50 (Hair et al., 2014).

Table 1
Reliability and validity of the results

Code	Variable	Factor's Loading	VIF
Enterprise Resource Planning (ERP)	(Cronbach's Alpha: 0.690 , CR: 0.824:, AVE: 0.587)		
ERP1	Utility	0.637	1.372
ERP2	Modules	0.700	2.223
ERP3	Implementation Effectiveness	0.735	1.399
Business Strategy	(Cronbach's Alpha: 0.764 , CR: 0.825, AVE: 0.706)		
BS1	Business low-cost Strategy	0.697	1.832
BS2	Business Differentiation Strategy	0.818	1.242
BS3	Business Mixed Strategy	0.778	1.387
Suppliers	(Cronbach's Alpha: 0.651, CR: 0.780, AVE: 0.721)		
S1	Quality Related Certification	0.766	2.821
S2	Rejection Rate	0.51	1.254
S3	Performance History	0.679	1.458
Supply Chain Integration	(Cronbach's Alpha:0.739 , CR: 0.876, AVE: 0.675)		
SCI1	Enterprise System	0.815	1.321
SCI2	Internal Integration	0.678	1.793
SCI3	Integration with Suppliers	0.754	2.467
SCI4	Full Integration	0.710	2.241
Customer Satisfaction	(Cronbach's Alpha: 0.720 , CR: 0.854, AVE: 0.763)		
CS1	Loyalty	0.709	1.597
CS2	Complaints	0.700	1.321
CS3	Warranty Claims	0.752	1.976

Based on the previous table which showed that the research model assessment was good, we can now continue discussing the research hypotheses.

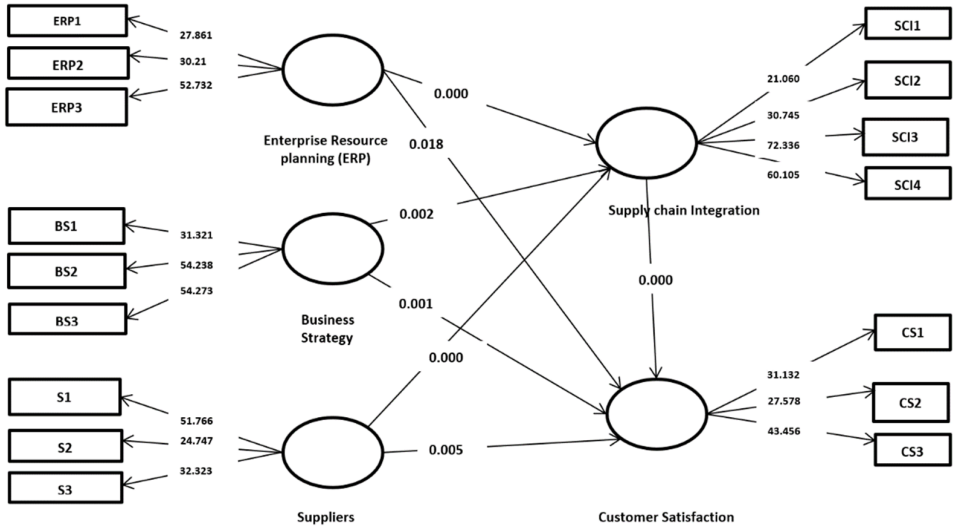

Fig. 2. The results of testing the hypotheses of the survey

Table 2 above shows the direct impact of relationships between research variables, the table shows that the research hypotheses are fully accepted.

5. Conclusion and implications

The results of this research show that ERP systems have a positive direct impact on the integration of the supply chain, including utility, modules, and implementation effectiveness. This result is matching with previous research studies' results. Additionally, the results of this research show that aligning the business strategy with the supply chain positively affects the supply chain integration process, including low-cost strategy, differentiation strategy, and mixed strategy. This result is matching with previous research studies' results. Furthermore, the results of this research show that suppliers quality related certification, rejection rate, and performance history. This result is matching with previous research studies' results. Additionally important note, the results of the study showed that the results were inconsistent with any of the previous studies that showed no effect of the variables on the process of supply chain integration and customer satisfaction. Finally, the results of this research show that the integration of supply chain through applying ERP system (Enterprise System), taking support from business strategy (Internal Integration), and having a strong relationship with suppliers (integration with suppliers) positively affects customer satisfaction (Full Integration) which is matching with previous research studies' results.

Acknowledgement

The authors would like to greet Applied Science Private University for giving them all support for the success of this work.

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