Chapter 11
Information and Communication Technology Impact on Supply Chain Integration, Flexibility, and Performance

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ABSTRACT

In this chapter, four latent variables will be analyzed to measure the impact of Information and Communications Technology (ICT) on the integration, flexibility and performance of Supply Chain (SC). The aim of the exposition is to provide greater understanding for those responsible of the supply chain, and focus efforts on clear objectives. These clear objectives should help those responsible for the supply chain achieve a better performance within organizations. The information analyzed was obtained from a questionnaire provided to 284 managers in companies located in Ciudad Juarez, Mexico. The results were used to generate a structural equation model in order to learn the relationships between variables. We have postulated six hypotheses regarding the direct, indirect and total effects. The results indicate that there is no direct relationship between ICT integration and SC performance, but an indirect relationship through mediating variables as SC Integration and Flexibility exists.

INTRODUCTION

Supply Chains

The Supply Chain study has taken an important role within companies, because it is formed by all the institutions and processes that are involved in meeting the customer needs; starting from the extraction of raw materials to finished product and delivery to the end costumer. Efficient administration of supply chains can provide significant competitive advantage and increase organizational performance.

Supply Chain management is defined as the integration of key business processes from end customer until original suppliers that provide products, services and information, which add value for customers and stakeholders of the company (Lambert, Cooper, & Pagh, 1998; Themistocleous, Irani, & Love, 2004; Yu, Suojapelto, Hallikas, & Tang, 2008).

The main elements of a supply chain are: customers, retailers, distributors, manufacturers and suppliers and along this chain there is a two-way flow of materials, products, services, payment and information. In Figure 1, these elements are shown linearly; however in practice it is a network of companies connected.

In supply chain management, some factors can affect performance, including working capital, proximity to suppliers and customers, stability of government policies, structure of the supply chain, among others (Acar & Uzunlar, 2014; Capaldo & Giannoccaro, 2015; C. Marinagi, Trivellas, & Reklitis, 2015; Vlachos, 2014). Another critical factor is region infrastructure, both physical and technological, in this sense, ICTs have proven to be an important support in the Supply Chain performance (Acar & Uzunlar, 2014; Catherine Marinagi, Trivellas, & Sakas, 2014; Singh & Teng, 2016).

ICTs and Its Integration into Supply Chains

The term information and communications technology (ICT) includes the set of techniques and devices used for the processing and transmission of data. The ICT concept encompasses all information exchange services, telecommunications networks that support the data exchange and terminals used to access to services (Altés, 2013).

The integration of information and communications technology has proved been indispensable not only in the modern world, but also in the business environment, due to companies established offices and branches in any location regardless of distance, focusing on the benefits that site represents, maintaining trade relations with partners in these points and speeding the material flow. Thus, it is important to maintain communication between departments and branches around the world, this can be achieved by integrating information and communication technology, as well as keeping in touch in an effective and virtual way to all of the different functions and partners in the supply chain (Li, Lin, Wang, & Yan, 2006; Ngai, Chau, & Chan, 2011).

Figure 1. Components of supply chain

Supplier   Manufacturer   Distribution   Costumer
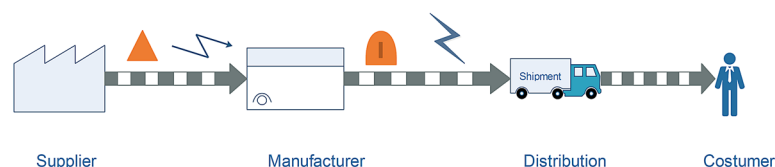
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