

Chapter 10

The Impact of ICT on Supply Chain Agility and Human Performance

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ABSTRACT

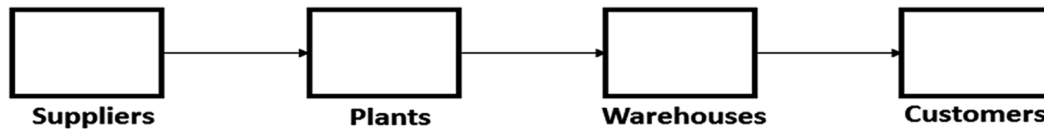
Supply Chain (SC) has become a key element for companies to increase their productivity and competitiveness. However, the use of information and communication technologies (ICT) has also played an important role in the performance of these companies. Therefore, this chapter analyzes three latent variables in order to know the importance of ICT in both supply chain agility and the performance of human resources. Information was obtained from a questionnaire administered in the maquiladora industry in Ciudad Juárez, Chihuahua, Mexico. A structural equation model is generated to understand the relationships among latent variables, and three hypotheses are raised based on such interactions. Finally, results indicate that supply chain agility and the performance of human resources are directly linked to the use of information and communication technologies.

INTRODUCTION

According to Liu et al. (2013), a supply chain is a network integrated by suppliers, producers, warehouses, distributors, and retailers who are responsible for coordinating their plans and activities in order to transform raw materials into finished products. Commonly, this series of activities can be represented by a complex network that resembles reality. In such a network, each node is a key element in the process, since all members interact with one another, and there is not an exclusive interaction. However, in order to be studied, and to provide a better understanding of how it works, the supply chain process is usually presented in a linear sequence (Snyder & Shen, 2011) as depicted in Figure 1.

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Figure 1. Linear representation of a supply chain network
Snyder & Shen, 2011.



All these materials or products involved in the supply chain must be provided to customers in the right quantities, with the highest quality, at the requested time, and, clearly, at the lowest possible cost. Therefore, the most important processes within a supply chain are raw materials procurement, product development and manufacturing, physical product distribution, customer relationships, and performance measurement (Marinagi et al., 2014).

However, to ensure the continuous flow of materials, a supply chain does not merely need the correct flow of information among its members but also economic resources (Madenas et al., 2014). A supply chain starts with an order from the manufacturer to the supplier. After a payment commitment, such a supplier sends the raw material that will be processed in the facilities of the manufacturing company. Unfortunately, the material flow is often interrupted due to an incorrect order, or because such an order does not meet the requirements specified by the manufacturer. As a result, all subsequent processes in the supply chain fall behind. Similarly, the flow of economic resources is interrupted (K. Chen & Xiao, 2015; Vahid Nooraie & Parast, 2016).

An inadequate flow of information along the supply chain, however, can be improved with information and communication technologies (ICT), since they provide more visibility of the material flow (Mensah et al., 2015). As a result, errors can be quickly resolved, because ICT facilitate decision making and the integration of all supply members when making decisions. Therefore, adjustments in orders and materials are agilely made and finished products can be delivered on time (Caridi et al., 2014).

Information and Communication Technologies (ICT)

ICT refer to those electronic devices for capturing, processing, storage, and dissemination of data and information that may be in different forms, such as images, text, and sounds, among others (Ulmanis & Deniņš, 2012). The use and application of ICT are widely reported in several fields such as education, management, and the industrial sector. However, this chapter will merely focus on the latter.

In recent years, ICT have become an important element inside and outside of organizations, because they help improve operations and are essential for innovation. In fact, ICT increase the performance of companies and allow them to expand in both their current and new markets (Díaz et al., 2015), since they can help reduce some risks (Candell et al., 2009).

More specifically, ICT have gained popularity in supply chains due to the large number of benefits that they bring. Some of these benefits include:

- ICT facilitate quicker decision making processes in which all members of the supply chain participate. Therefore, since decisions are made jointly, in a consensual manner, and in real time (Ali & Kumar, 2011; Tsolakis et al., 2014), errors in the production lines can be corrected in a timely manner, so they do not affect the remaining members.

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