Chapter 12

Cloud Computing in Supply Chain Management: An Overview

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ABSTRACT

In the modern world, companies are investigating state-of-the-art practices to optimize both the cost and operational efficiency of their supply chain. Cloud computing emerges as a meaningful technology that could contribute to this optimization by providing infrastructure, platform, and software solutions for the whole supply chain network via Internet. The utilization of cloud-based services in supply chain management leads to financial and operational benefits, while at the same time potential risks and limitations should be taken into account by all supply chain stakeholders. In this chapter, an overview of cloud-based supply chain management is addressed. At first, a brief introduction to cloud technology is provided. Then, the application of cloud computing on supply chain activities is presented, while positive and negative aspects of adapting this technology in modern supply chains are discussed. The case for Third-Party Logistics (3PL) service providers is specially addressed. Finally, conclusions and future research steps are presented.

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INTRODUCTION

According to the best known IT (Information Technology) consulting corporations, cloud computing emerges as a rapidly evolving technology that more and more companies are willing to adopt in order to improve their efficiency. More specifically, as stated by IDC (International Data Corporation), investments on new technologies such as cloud computing are increasing at a rate of approximately 18% per year, while it is estimated to reach at least 80% of IT expenditure until 2020 (Gens, 2011). Similarly, according to a recent study of IBM Corporation, the use of cloud computing is expected to more than double until 2014 (Berman et al., 2012). The survey revealed that 72% of the participating companies had already piloted, adopted or substantially implemented cloud technologies, while 90% of the respondents expected to follow the same direction in three years time. Meanwhile, although numerical estimations about the application of cloud computing in supply chain management have not been performed yet, the consulting company Accenture points out that cloud technology can induce a large-scale transformation in traditional supply chains driving companies that use cloud computing to innovative, more dynamic supply chains (Schramm et al., 2010).

Motivated by the aforementioned trends, the aim of this chapter it to provide an overview of implementing cloud computing in supply chain management, with a special focus on the case of 3PL (Third-Party Logistics) providers. Activities like planning and forecasting, sourcing and procurement, logistics, and service and spare parts management are considered to be the first to move to the cloud (Schramm et al., 2011). Employing cloud-based technology in supply chains could generate numerous advantages such as capital investment savings, simplified operations, scalability, real-time visibility, as well as sustainability. However, risks and limitations such as security of private information, as well as lack of companies’ awareness on state-of-the-art information sharing technologies, should be taken into consideration before applying cloud computing in modern supply chain networks. After all, well-known 3PL companies nowadays utilize cloud computing firstly in private and then in public level, in order to benefit from the competitive advantages of adopting cloud networking.

In order to address all the above issues, this chapter is structured as follows. At first, an introduction to cloud computing is provided. More specifically, cloud computing technology is defined and key cloud service models are presented, according to the existing state-of-the-art literature. In the next section, cloud-based supply chain management is addressed. Firstly, supply chain activities that have the potential to move to the cloud are described. Then, the positive impact of adapting cloud computing solutions in advanced supply chain management is discussed thoroughly, as well as the potential risks, challenges and limitations that all supply chain stakeholders have to confront when employing cloud-based systems. Following, the effect of cloud computing utilization specifically for the case of Third-Party Logistics (3PL) providers is presented, along with real-world cases from the global market. Finally, conclusions are presented and future research steps are proposed in the last section.

CLOUD COMPUTING

Prior to introducing the concept of cloud computing in supply chain management, a general description of cloud computing technology is provided following, including the definition of cloud computing and its classification in literature, as well as the presentation of three basic cloud service models.
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