

# Cloud Computing and its impact on Supply Chain Performance

Ali, Syed Imran

Computer Applications Department, King Fahd University of Petroleum & Minerals Dhahran, Saudi Arabia.  
[imran@dcc.kfupm.edu.sa](mailto:imran@dcc.kfupm.edu.sa)

## ABSTRACT

Nowadays business environment is characterized by pressure caused by stiff competition. Demand/ distribution uncertainty and limited visibility have been a long challenge to supply chain management. New emerging technology i.e. Cloud computing will provide a sustainable competitive advantage in reaching end customers and suppliers. The real time demand information and inventory visibility problem will be resolved. Most importantly goods and services are delivered quickly and reliably when and where there are needed. Therefore, the more integrated the flow of data between customers and supplier, the easier it becomes to balance supply and demand across the entire network. Eventually it reduces lead time and helps in defeating the bullwhip effect in manufacturing Industry and contributes to higher performance in supply chain. This research will focus primarily on adaptability of cloud computing in manufacturing Industry and secondly, its impacts on demand and distribution management to achieve sustainable supply chain performance. As both demand and distribution are related with customer, so this research will also explore the link of both for better supply chain performance.

The paper will start by general introduction with an overview about cloud computing and business agility. Then, it will discuss related work. In next section, the methodology overview will be described. Finally, the paper will close with a conclusion.

**Keywords:** Cloud Computing, Supply Chain Performance, Demand Management, Distribution Management Impact.

## 1. INTRODUCTION

The economic environment is dynamic and the only certainty about it is it will continue to change. This requires a relentless search of new enterprise value propositions in order to deliver relationship-driven customer value propositions (Badii & Sharif, 2003). At the same time, many companies now realize that in order to have a global reach and local responsiveness, the traditional vertically integrated business model requires reevaluation, with increased cooperation between partners (Edwards, Peters,& Sharman, 2001) and sharing greater information with customer and suppliers (Ellinger, Taylor,&Daugherty, 1999) in order to avoid interruptions in logistics flows (Svensson, 2001).

### A. Business Agility and New Technology

Cloud computing which is a new emerging technology provides a sound platform in this business agility. It helps in providing collaboration among companies, suppliers and customers. Certainly, collaborative companies are more successful than isolated companies (Daugherty et al., 2006). This buyer– supplier relationship is characterized by trust, commitment and long-term time horizons (Morris & Carter, 2005).

At the same time as companies are struggling to pursue a more accurate demand forecast, they are also becoming more flexible and agile in order to satisfy unexpected conditions (Gunasekaran, Lai, & Edwin Cheng, 2008; Stank & Traichal, 1998). The idea is to satisfy demand as it occurs rather than hold stockpiles based on forecast sales (Zhang, Vonderembse,&Lim, 2005). Companies should be demand-driven rather than forecast-driven (Christopher, 2000), and flexibility provides a more efficient, reliable and faster supply chain by means of a market-oriented strategy (Zhang et al., 2005). Flexibility can either be in terms of products, offering a wide product range for instance, or volume (Hayes, Pisano, Upton, &Wheelwright, 2005).

### B. Impact of Demand Management on Supply Chain

New SCM (Supply Chain Management) dimension that has become increasingly popular in industry, but has not yet been extensively analyzed in academic literature with respect to its impact on supply chain performance, is demand management (DeM). In its broadest sense,



DeM can be interpreted as the ability of a company to understand customer demand and requirements and balance them against the capabilities of the supply chain (Lambert, D.M., Cooper, M.C, 2000; Croxton et al., 2002). While traditionally, DeM has been understood as “demand forecasting”, a number of new practices have been identified that constitute the DeM dimension. Examples of such practices include customer and product segmentation as well as integrated sales and operations planning (S&OP) (Grimson and Pyke, 2007; Lapide, 2008). Evidence from industry demonstrates the tremendous impact that good DeM – or a lack of it – may have on company performance. Probably the most prominent case is network titan Cisco Systems, who in 2001s economic downturn failed to anticipate the decline in demand due to a lack of demand and inventory visibility. As a consequence, Cisco had to write off USD 2.2 billion inventory and cut staff by 18% (Byrne and Elgin, 2002).

### C. Impact of Distribution Management on Supply Chain

Despite the importance of DeM it should also be noted that establishing a link between a company’s internal (physical) operations and its customers was considered to be the major objective and integral task of distribution management (DiM) (Williamson et al., 1990). Previous research on customer-facing processes predominantly targeted DiM; numerous contributions provide evidence of the importance of this dimension for supply chain performance (Stewart, 1995; Gunasekaran et al., 2001).

## 2. THEORETICAL FRAMEWORK

Business environment is characterized by pressure caused by stiff competition. The most successful competitors today are those who link their customers and suppliers together into tightly integrated networks. It requires a relentless search of new enterprise value propositions in order to deliver relationship driven customer value propositions (Badii & Sharif, 2003). At the same time, many companies now realize that in order to have a global reach and local responsiveness, the traditional vertically integrated business model requires re-evaluation, with increased cooperation between partners (Edwards, Peters,& Sharman, 2001) and sharing greater information with customer and suppliers (Ellinger, Taylor,&Daugherty, 1999) in order to avoid interruptions in logistics flows (Svensson, 2001).

### A. New Technology

Cloud computing which is a new emerging technology provides a sound platform in this business agility. It helps in providing collaboration among companies, suppliers and customers. Certainly, collaborative companies are more successful than isolated companies (Daugherty et al., 2006). This buyer– supplier relationship is characterized by trust, commitment and long-term time horizons (Morris & Carter, 2005).

“Cloud” is derived from the idea of businesses and users being able to access applications from anywhere in the world on demand. Cloud computing is defined as a collection of disembodied services accessible from anywhere using any mobile device with an internet-based connection (Erdogmus, 2009; Gartner, 2009; Misra and Mondal, 2010; Sultan, 2010). Surveys were completed in 2009 by Gartner analysts on IT trends (especially cloud computing) to show that cloud computing is being used more in the areas of business when compared to other fields (Gartner, 2009). There is no doubt about the paramount potential of cloud computing; according to a recent Merrill Lynch research note, cloud computing is expected to be a “\$160-billion addressable market opportunity, including \$95 billion in acquired business and productivity applications, and another \$65 billion in online advertising” (Hamilton, 2008). There are three types of cloud deployment models.

A **public cloud** is characterized as being available from a third party service provider via the Internet, and is a cost-effective way to deploy IT solutions, especially for small or medium sized businesses. Google Apps is a prominent example of a public cloud that is used by many organizations of all sizes (Sean et. al.2011).

A **private cloud** offers many of the benefits of a public cloud computing environment, such as being elastic and service based, but is managed within an organization. Private clouds provide greater control over the cloud infrastructure, and are often suitable for larger installations. A private cloud can actually be handled by a third-party provider (Sean et. al.2011).

A **hybrid cloud** is a combination of a public and private cloud — typically, non-critical information is outsourced to the public cloud, while business-critical services and data are kept within the control of the organization (Sean et. al.2011).

### B. Demand Management

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include customer and product segmentation as well as integrated sales and operations planning (S&OP) (Grimson and Pyke, 2007; Lapide, 2008).

Evidence from industry demonstrates the tremendous impact that good DeM – or a lack of it – may have on company performance. Probably the most prominent case is network titan Cisco Systems, who in 2001's economic downturn failed to anticipate the decline in demand due to a lack of demand and inventory visibility. As a consequence, Cisco had to write off USD 2.2 billion inventory and cut staff by 18% (Byrne and Elgin, 2002).

### C. Distribution Management

Despite the importance of DeM it should also be noted that establishing a link between a company's internal (physical) operations and its customers was considered to be the major objective and integral task of distribution management (DiM) (Williamson et al., 1990). Previous research on customer-facing processes predominantly targeted DiM; numerous contributions provide evidence of the importance of this dimension for supply chain performance (Stewart, 1995; Gunasekaran et al., 2001).

However, the impact of DeM and DiM and their individual practices should not be studied in isolation since they both entail practices and customer-facing processes that are interrelated and may jointly determine supply chain performance.

### D. Relation of Demand and Distribution Management

Research examining the interface between a company's internal supply chain activities and its customers has predominantly focused on distribution. Stewart (1995), for instance, identifies distribution performance as the key element of SCM excellence that drives customer satisfaction. However, comparably little work has been conducted on demand management (DeM); contributions generally focus only on isolated aspects of DeM, such as forecasting or S&OP, and originate largely from practitioners (e.g., Lapide, 2006; Mentzer, 2006). Moreover, empirical evidence of any positive impact DeM as such might have on supply chain performance is generally scarce (e.g., Bower, 2006; Milliken, 2008). Croxton et al. argue that good DeM has a positive influence on distribution performance as well as overall supply chain performance; they do not, however, provide any empirical evidence for this claim.

A number of contributions have been made with respect to individual practices that can be added under the term DeM. Most of the practitioners emphasize the importance of customer and product segmentation for improving DeM and supply chain performance (e.g., Lapide, 2008; Mercier et al., 2010), this linkage has not yet been addressed in the academic literature.

Another particular stream of literature that is worth mentioning in a DeM context is dedicated to Sales and operations planning (S&OP), a formalized approach to internal integration with the primary objective to effectively balance supply and demand by aligning the different internal functions involved (Tohamy, 2008; Atkinson, 2009). Research on S&OP is again rather limited and foremost conceptual. One study worth mentioning is that of Grimson and Pyke (2007), who, based on a literature review and some company interviews, develop a conceptual framework for S&OP, which is split into the five dimensions: meetings and collaboration, organization, measurements, information technology, and plan integration. The academic SCM literature is lacking a comprehensive empirical examination of the relevant practices associated with a firm's DeM and its performance impact relative to that of other customer related SCM functions such as DiM.

## CONCLUSION

This paper has shown the author's viewpoint on the use of cloud computing in supply chains of industries to improve performance. Cloud computing is used as a technology which has created hype in the technology world. As the name indicated cloud computing so its created in the clouds without any boundaries and infrastructure. It is not just the ease of user to what extent he/she adopts it but to avail from the everlasting benefits of cloud computing. The salient points that emerged out of the viewpoint are summarized in the following:

- Keeping in view the above constraints this research shows that focus will be given on demand & distribution uncertainty and limited visibility that has been a long challenge to supply chain management and will try to show link of supply chain performance with DeM and DiM. Adoption of new technology that is cloud computing will be considered to achieve sustainable competitive advantage in reaching end customers and suppliers. The real time demand information and inventory visibility problem in DeM and DiM will be resolved by having cloud computing. Real-time information travels immediately backwards by cloud and inventory flows swiftly forward.
- Most importantly goods and services are delivered quickly and reliably when and where there are needed. Therefore, the more integrated the flow of data between customers and supplier, the easier it becomes to balance supply and demand across the entire network. Eventually it reduces lead time and helps in defeating the bullwhip effect in Industry and contributes to higher performance in supply chain.



- Information availability gap is a biggest problem. Cloud computing will help in having sustainable competitive advantage in achieving customers and suppliers which eventually increases supply chain performance.

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