

Critical Success Factors of Analytics and Digital Technologies Adoption in Supply Chain

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INTRODUCTION

The digital economy has brought into focus the importance of Supply chain as a competitive advantage. (Li et al, 2006). Competition has evolved from firm vs firm to supply chain vs supply chain (Ketchen & Hult, 2007). This has encouraged firm to adopt analytics to improve supply chain performance. Impact of analytics, on supply chain performance, is an important topic of research (Kohavi et al. 2002).

The supply chain is a bidirectional flow of information products and money between the initial suppliers and final customers through different firms. Supply chain management includes planning, implementing and controlling this flow. Management scholars and practitioners' agree that analytics has the potential of working on all areas of supply chain management to provide insights thereby improving supply chain performance. As demand and supply volatility has increased, the need for data and analytics has grown. A holistic analytics strategy may be the answer to many of the pains ailing the supply chain today (Cecere, 2016).

At a firm level, it is of interest to the Chief Executive Officer and Chief Supply Chain Officer, supported by the Chief Information Officer to explore what are the strategies to improve effectiveness of analytics in the supply chain. Research need to explore the effect of analytics on individual firm performance, an important factor that all firms are concerned about (Maskey et al. 2015). Harrington and Gooley (2017) opined that it is important to demonstrate the business benefits of analytics in supply chain initiatives to firms' leadership.

Acceptance and use of technology by an individual or a firm is one of the most mature stream of information system research (Benbasat & Barki, 2005; Venkatesh et al., 2007; Venkatesh et al., 2012). Better means for predicting and explaining information system acceptance and use have great practical value (Davis, 1989). Identifying the facilitators to improve adoption of analytics in supply chain, using validated framework of acceptance and use of information technology, has both practical and theoretical value.

The Research questions are:

- What are the facilitating factors for adoption of analytics in supply chain?
- What are the perceived benefits of use of analytics on supply chain?

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BACKGROUND: LITERATURE SURVEY

The existing research frameworks were perused for their applicability in this research and have been presented.

Technology Adoption model: Various theoretical models of Technology adoption have been proposed by researchers (Fishbein & Ajzen, 1975; Bandura, 1986; Compeau, 1999; Davis, 1989; Ajzen, 1991; Moore & Benbasat, 1991; Venkatesh & Davis, 2000) that specifies factors which influence technology adoption. The constructs of Technology adoption have been specified as performance expectancy i.e. perceived benefits on adopting the technology, effort expectancy or ease of use of adopting the technology, *social influence* to adopt or not adopt the technology, facilitating conditions, which positively or negatively influence adoption and behavioral intention to adopt the technology (Venkatesh et al., 2003).

SCOR model: SCOR model provides a systematic approach to identifying, evaluating and monitoring supply chain performance, covering the four core supply chain processes of Plan, Source, Make and Deliver (Jamehshooran et al, 2015; Stephens, 2001). In Plan, data is analysed to forecast the market trends for the products and services (Azvine et al, 2005). In Source, agent based information systems are studied that include evaluation, search, selection and price negotiation (Lee et al, 2009; Trkman et al, 2007). In Make, factors that facilitate production to be within specification and on time are perused (Ranjan, 2008). In Deliver, analytics used in logistics management to reach products on time are investigated (Reyes, 2005). Trkman et al, (2010) used the SCOR model to study Supply chain performance and introduced Process Orientation and Information Systems as moderators.

Literature survey on use of Analytics and Big Data in supply chain- Hahn & Packowski (2015) described four types of use cases of analytics in supply chain (i) monitor and navigate (ii) sense and respond (iii) predict and act (iv) plan and optimize. Business analytics may help in increasing organization efficiency, using different analytical methods to forecast market trends, reduce the operating cost and increase the profits by using mature supply chain systems (Hoole, 2005; Hedgebeth, 2007). Analytics may produce breakthrough insights that can help supply chains reduce costs and risks whilst improving operational agility and service quality (Deloitte & MHI, 2014).

Fawcett & Wallet (2013) found an increase in Big data in Supply Chain. Garmaki et al (2016) found that Big data analytics is being used to create actionable insights for sustained competitive advantage. There is increased demand of Volume of data from Sales (details of price, quantity, time of day, date), Consumer (more details of purchasing behaviour, browsing history, frequency, value, timing), Inventory (perpetual inventory at more locations with more details e.g. style/color/size), Location and time (sensor data to detect location in stores/distribution center / transit). They also found that the Velocity of data is increasing from monthly / weekly to hourly, from consumer card usage to click history. The Variety of data is also increasing, from firms' sale to competitors sales, international sales, consumers identification to eye tracking, emotion detection, sentiment based on tweets and likes, inventory in warehouses to that with online retailer, location of product to who is moving it, nearby locations, path being taken etc.

Studies on the benefits of analytics on Supply chain- As Kwan (1999) found that information technologies allow firms to quickly and accurately share demand data, sales projections and production schedules, which provides adopting firms greater flexibility and responsiveness in the face of a constantly changing environment. Luu et al. (2017), in the Annual Forrester Data Analytics survey, found that digitising the supply chain enables firms to integrate, embed intelligence and visualise all supply chain processes from supplier to customer. This opens the door to live inventory management that provides true transparency on inventory flows. Manufacturing costs are reduced as detailed planning and scheduling enables agility within the supply chain and optimises the efficient use of capacity. Gstettner et al (2016) referred a

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