



(REVIEW ARTICLE)



The impact of social media, big data and IOT on the supply chain management performance

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Abstract

The development of Industry 4.0, a new digital industrial technology, has a favorable effect on how well the supply chain functions. Big Data, Social Media, and the Internet of Things (IoT) have all been proposed as ways to enhance supply chain performance. Although there has been limited exploratory research in this area, the favorable impact of the Internet of Things (IoT), Social Media, and Big Data on Supply Chain on supply chain and company performance has been empirically confirmed. How the logistics sector is being impacted by Big Data, IoT, and Social Media from a business and customer perspective? Can the Supply Chain be managed and controlled more effectively because of the integration of social media and ICT? Does Supply chain management get better with the incorporation of information and communication technology?

The initial goal of this study is to demonstrate the connection that already exists between supply chain management, social media, big data, and the internet of things. Second, we'll discuss how the integration of social media, big data, and the internet of things has affected the sustainability, efficiency, and various flows of supply chain management.

Keywords: Internet of Things (IoT); Social Media; Big Data; Supply chain Management; Performance

1 Introduction

The effectiveness of the supply chain directly influences how feasible most of the involved techniques are. In reality, the question is always whether to gain new market shares, cultivate customer loyalty, raise customer profitability, raise customer satisfaction, respect for delivery dates, increase chain flexibility, improve risk management, or enhance traceability. Beamon [1] divides various performance criteria into two groups: qualitative performance indicators (such as customer satisfaction, flexibility, integration of physical and information flow, financial risk management, etc.) and quantitative performance metrics (delivery delays, time to customer response, etc.)

In [2] Twitter, Facebook, YouTube, and Instagram are examples of the Web 2.0, or social media apps, that have grown rapidly in recent years. Web 2.0 is also known as social media.

Social media are described in [3] as internet-based applications built on the conceptual and technical underpinnings of Web 2.0.

According to [4], the process of examining and analyzing enormous amounts of data of different types to reach conclusions by revealing hidden patterns and correlations, trends, and other important business information and

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knowledge is known as big data. This process is done in order to increase business benefits, improve operational efficiency, and discover new markets and opportunities.

According to [5], it is widely acknowledged that the Internet of Things is a significant source of big data and that these two technologies should be developed together. On the one hand, the widespread adoption of IoT drives the high growth of data both in quantity and category, providing the opportunity for the application and development of big data; on the other hand, the application of big data technology to IoT also accelerates the development of big data.

Devaraj, Krajewski, and Wei [6] stated that ICT adoption in organizations like manufacturing SMEs should be incorporated in dynamic areas like the management of the supply chain since it enables better controls in the management of material resources, prevents production delays, and hence improves customer compliance.

Section 2 offers the paper's outline, which also includes a review of the literature. The formulation of the hypothesis is presented in section 3. The methodology of the investigation is presented in Section 4. Finally, Section 5 offers concluding observations and recommendations for future research.

2 Literature review

2.1 The impact of Social media on the SCM performance

When consumers began sharing their opinions on social media, the impact of social media on SCM performance became abundantly obvious. Social media data was used to help businesses understand what their current and potential customers thought about the products and services they were offering, which was simple to do because social media is seen as a quick and inexpensive way to gather opinions [7].

One of the most known impacts of the Social Media on the SCM is recruitment. Despite the advantages and simplicity of using social media for employment, firms have an opportunity. The information about an applicant for employment that has been put on social media, whether by the individual in question or by another person, is now frequently consulted by HR professionals [8].

If social media is integrated into the supply chain, it can acquire data from a variety of sources, including specialists and regular supply-chain participants [9]. Among the effects of social media on supply chain management (SCM), this author has mentioned are:

- Big data (information) collection from social media
- Customer relationship building
- Organizational Impact
- Loyalty
- Enhancing communication and trust throughout the supply chain
- Give transaction data a context.
- Increase the speed of enterprise information

The advantages of using social media for business management and finances were immediately recognized by the corporate sector. Some businesses have chosen to use them in order to involve their staff members, and occasionally consumers, in the operations of the firm. All businesses today interact with social networks, which provide them the ability to control their brand, grow financially, and enhance their online presence by taking advantage of previously unattainable chances.

2.2 Big Data's effect on SCM performance

Big Data Analytics (BDA) is particularly pertinent to the field of supply chain management (SCM), as it gives decision-makers the tools they need to make decisions in value networks that are becoming more and more global, volatile, and dynamic [10].

Big Data technologies may greatly improve distribution networks, lower inventory, and anticipate responses to erratic demand, just to name a few benefits to the supply chain. Big Data and supply chain are a wonderful match.

According to [11], the diverse effects of big data on the SCM are illustrated by the following examples: lowering operating costs, cutting delivery times, lowering inventory costs (shorter lead times and better throughput), raising consumer expectations, increasing demand, lowering complexity of supply chain, globalization, and improving customer service. Risk management, electronic data exchange, and resilience.

2.3 How the Internet of Things affects how well SCM works

There are a number of issues with traditional supply chain management systems, including overstocking, slow deliveries, and stock outs. These issues are related to a number of elements, including the complexity and unpredictability of actual supply chains. We must improve Supply Chain Management systems' intelligence in order to address these shortcomings. We therefore implemented IOT in SCM systems [12].

In fact, the authors of the study mentioned some of the effects of IoT on SCM, including: Improved inventory management; Real-time supply chain management; and Maximize logistical transparency.

According to [13], smart supply chains as a whole have the following six distinguishing qualities: they are instrumented, interconnected, intelligent, automated, integrated, and innovative.

The integrated supply chain networks may swiftly provide more high-quality information as they link data from consumers, products, company assets, and the operating environment. The goal of smart supply chains is to generate better information that has the following qualities:

- Information that adds value in the correct ways
- Better timing that is much earlier than before.
- Ease of access to the required information
- Better timing that is much sooner than before
- Speed real-time transmission via a network)
- Ease of acquiring the necessary information
- Controllability for information sharing and privacy protection

ICTs have the advantage of greater speed, greater reliability and storage capacity, greater transparency, lower transaction costs, and better global coverage because they have improved information exchange along the supply chain, which has in turn led to the development of integrated production and logistics management systems and improved the performance of the supply chain in many ways.

The formulation of the hypothesis is covered in the part that follows.

3 Hypothesis formulation

In their studies, we will summarize the research work according to the integration of Social Media, Big Data, and IoT in the Supply Chain Management.

Table 1 Classification of literature review

	Social media on SCM	Big Data on SCM	IoT on SCM
(Lancioni, Schau, & Smith, 2003)	X		
(Yan & Huang, 2009)			X
(Capo-Vicedo, Mula, & Capo, 2011)	X		
(O'Leary, 2011)	X		X
(O'Leary, 2012)	X		
(Chae, 2014)	X	X	
(Thoumrungroje, 2014)	X		
(Musa, Gunasekaran, & Yahaya, 2014)			X

(Brooks, Heffner, & Henderson, 2014)	X		
(Wamba, Akter, Andrew, & Geof, 2015)		X	
(Hofmann, 2015)		X	
(Chen, Preston, & Swink, 2015)		X	
(Gnimpieba, Nait, Durandb, & Fortin, 2015)		X	X
(Sanders, 2016)		X	
(Xua & Chena, 2016)			X
(Addo-Tenkorang & Helo, 2016)		X	X
(Dweekat & Park, 2016)			X
(Zhong, Newman, Huang, & Lan, 2016)		X	
(Lee, 2017)	X		
(Roß, Canzani, Gracht, & Hartmann, 2017)		X	
(Krotov, 2017)		X	X
(Haddud, DeSouza, Khare, & Lee, 2017)			X
(Tiwari, Wee, & Daryanto, 2017)		X	
(Grant & Preston, 2018)	X		
(Govindan, Cheng, Mish, & Shuklad, 2018)		X	X
(Cao, Ajjan, & Le, 2018)	X		
(Vass, Shee, & Miah, 2018)			X
(Ram, Pat, Niran, Ran, Moo, & Meh, 2018)		X	X
(Abdel, Manogaran, & Mohamed, 2018)			X
(Ly, Lai, Hsu, & Shih, 2018)			X

- 8 from 45 studies included more than 1 integration
 - 1 integrated the Social Media and IoT
 - 1 integrated Social Media and Big Data
 - 6 integrated the Big Data and the IoT
- None of the studies have integrated the three of Social Media, Big Data, and IoT.

Additionally, this examination of the literature has allowed us to emphasize the positive effects of social media, big data, the internet of things, and web 2.0 more generally on supply chain management, but not all at once.

Companies appear to have little choice but to adapt in order to improve their SCM in the face of the rise of New ICT. If they don't want to lose control of their SCM, it appears that they must incorporate all three into a framework of smart methods that account for all the unique characteristics of this new sort of relationship.

After studying the effects of Social Media, Big Data, and IoT on the SCM, as well as the relationship between Social Media, Big Data, and IoT, the aim of this research is to shed light on how Social Media, Big Data, and IoT contribute to the performance of the SCM and their influence. In fact, the presentation of the research model will gradually follow the formulation of the hypotheses.

According to [14], the financial regime's foundation was built on the Internet and other relevant digital technologies. Therefore, as stated [15], it is anticipated that ICT-based SCM systems will considerably contribute to both front-end and back-end improvements in financial performance.

Prioritization can be accomplished with the use of big data analysis. It can also help balance out each variable cost cut to ensure that other costs are not raised [7].

Big Data is the analysis of enormous amounts of unstructured data, which ICT systems like IoT and Social Media can now process. It is useful in many fields, including Supply Chain Management to have a set of concrete information and implications, such as financial implications: decreased long-term cost; increased ability to invest; improved understanding of cost drivers and impacts [16].

It is clear that IT capabilities in the transportation and distribution sectors save logistical expenses [17]. This confirms that Big Data technologies use Social Media and IoT to evaluate and quantify qualitative factors, establishing a ROI to increase the effectiveness of a company's sales process. Big Data is frequently referred to as the 21st century's gold mine.

Whereas, and from the earlier justifications, we suggest the following:

- H1: The interconnection of Social Media, Big Data, and IoT has an impact on the company's performance:
 - H1.1: The interconnection of Social Media, Big Data, and IoT impacts the financial performance of the SCM.

Social Media, Big Data, and the Internet of Things are booming and impacting many areas of our economy and daily lives.

Big Data usage improves goods and services while enabling businesses to recognize that new and unexpected competitors might emerge in any sector, whether traditional or not [18]. Big Data, specifically that big data powered by the current adoption of IoT, captures user experience with products through digital connectivity, turning into a new economic resource that can inspire business model innovation for enterprises [19]. Thus, the development of intellectual and financial resources in the digital economy can also be facilitated by technological advancements in the areas of the internet, IoT, and Big Data [20].

From where:

- H1.2: The interconnection of Social Media, Big Data, and IoT has an impact on the economic performance

The organizational performance of Social Media, Big Data, and IoT is undergoing a true digital transformation. This transformation aims to increase agility using cloud-hosted tools, standardize the technologies across the board, and ultimately maximize communication and teamwork among all employees.

In fact, many scholars contend that ICT, together with specialization and outsourcing, is a crucial prerequisite for the networking of businesses [21, 22], ICT advocates contend that supply chains are becoming less interconnected and more focused on the market.

In addition [7] observe how the integration of Big Data and Social Media into SCM may produce positive benefits for the company, allowing businesses to develop extremely creative solutions and hastening the implementation of these fundamental supply chain principles.

Due to these factors, we put out the following hypotheses:

- H1.3: The interconnection of Social Media, Big Data and IoT has an impact on the organizational performance

Twitter data has grown in popularity as one of the most widely used information sources for both practical applications and scholarly research in recent years [4], which affirm that social media is a significant information source. Additionally, all IoT devices have the potential to generate a data flood that is full of all types of important information. However, technical difficulties and difficulties handling big data and extracting relevant information have evolved in recent years [23]. As technology and communication solutions become more interconnected, the long-promised "internet of things" is beginning to materialize, impacting the entire supply chain and forcing it to adapt to the new information-centric production environment [16].

The data collected via e-commerce systems from the web are less structured and frequently contain substantial customer opinion and behavioral information, in contrast to typical transaction records obtained from various legacy systems of the 1980s [24].

Indeed, given that the Supply Chain's effectiveness depends heavily on information, Big Data Analytics seems to be effective when used in an SCM environment [25].

In doing so, ICT aids in streamlining company operations, which should ultimately result in improved organizational performance [26].

Fuchs and Otto [17], claimed that ICT has an impact on SCM as a whole and at all levels, including technology and innovation, product and service production and distribution, organizational structure, employee morale, and the economy and financial situation. In fact, supply chain and ICT managers in businesses with a constant flow of production should maintain or even expand ICT investments in SCM performance. Hence the following hypothesis:

- H2: The interconnection of Social Media, Big Data, and IoT has an impact on the management performance:
 - H2.1: The interconnection of Social Media, Big Data, and IoT impacts information usage and decision making.
 - H2.2: The interconnection of Social Media, Big Data, and IoT impacts productivity.
 - H2.3: The interconnection of Social Media, Big Data, and IoT impacts business growth.

Satish and Yusof [26] believe that big data is growing exponentially and that data is exploding. Big Data can uncover communication channels to boost customer happiness, which can result in stronger ties with and loyalty from our customers. Customer feedback can provide example data that will help businesses identify issues before they become major ones. Programs that use Big Data must consider more strategic approaches to maintain customers' loyalty and build long-lasting ties if they are to strengthen long-term partnerships.

The organization needs information from Big Data to generate pertinent information of all kinds. It serves as a differentiator for businesses, enabling them to gain competitive advantages. The Big Data tools' features will make it possible to store, handle, analyze, index, search, and explore the data. As data continues to develop, these technologies will aid the company's employees in understanding customer expectations and modifying their offers to better fulfill those expectations.

From where:

- H3: The interconnection of Social Media, Big Data and IoT has an impact on the marketing performance:
 - H3.1: The interconnection of Social Media, Big Data, and IoT impacts consumer behavior.
 - H3.2 The interconnection of Social Media, Big Data, and IoT impacts consumer satisfaction.

Companies appear to have little choice but to adapt in order to improve their SCM in the face of the rise of New ICT. If they don't want to lose control of their SCM, it appears that they must incorporate all three into a framework of smart methods that account for all the unique characteristics of this new sort of relationship. Therefore, after looking at multiple researchers' ideas that were all approved but focused on just one or two axes, we have found the following research suggestions.

From where:

- H4: The interconnection of Social Media, Big Data, and IoT impacts the SCM sustainability.

A conceptual model according to these hypotheses is illustrated below:



Figure 1 Conceptual model

4 Research methodology

We will start this part by presenting the methodology of the study conducted.

The next step in this part was above all to ask ourselves the questions below:

- What kind of study to conduct?
- Who should we interview?
- How to collect data?
- How do analyze them?
- Which tools to use?

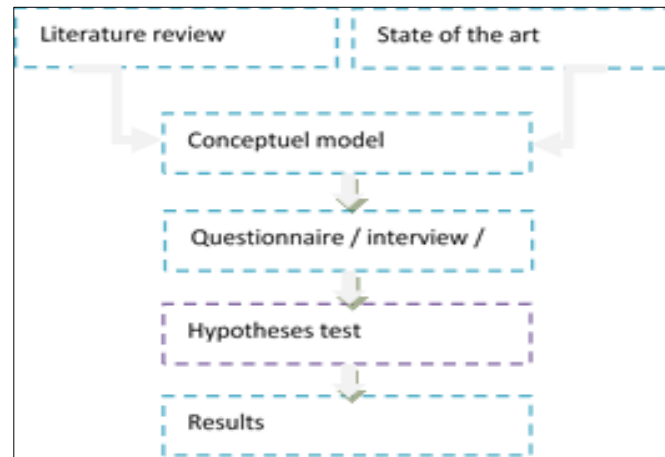


Figure 2 Research methodology

4.1 The measuring scale: Likert scale

One of the most prevalent measures in studies and questionnaires is the Likert scale. Latent characteristics are subjective factors. They cannot be seen or measured directly. Instead, they are quantifiable through emotions, actions, facial expressions, and individual beliefs, and information can be collected using a questionnaire. One of the most used tools for measuring these latent qualities is the Likert scale, which contains five scales for responses: least, less, moderate, more, and most, with corresponding scores of 1, 2, 3, 4, and 5.

The scientific literature was mined for the scales of measurements that operationalize the variables of this study. They were evaluated on a 5-point Likert scale.

4.2 Targeted population

We need to get in touch with businesses from various industries that already utilize or plan to employ the Big Data, social media, and IoT communication strategies. In our strategy, choosing an individual interview over a group interview—the latter being better suited to our problem—was simpler. Our issue also involves numerous actors/companies who utilize Social Media, Big Data, and IoT in their SCM.

4.3 Data collection

The information will be gathered by a survey based on a questionnaire from a sample of more than 100 KSA enterprises. Numerical codes must be connected to making input easier. Data collection will be followed by data input, processing, and analysis.

The statistical analysis program SPSS will be used for the data analysis (Statistical Package for the Social Sciences). Both a qualitative and a quantitative technique will be used to analyze the questionnaire's responses.

4.4 Methods of counting: SPSS

The SPSS (Statistical Package for Social Science) will be used to analyze the questionnaires for descriptive statistics and model estimates. Although SPSS is a statistical analysis tool that is frequently used by researchers [28], SPSS is also a software that does statistical analysis of a survey. It is capable of doing many standard hierarchical linear model studies. It enables the arrangement and display of the results in tables and graphs. Data is read, converted to SPSS format, transformed, and put through mathematical and statistical operations. Most important, It provides the tools to interpret the data and allows for its analysis.

5 Conclusion

Our interest in the integration process and the effects of Social Media, Big Data, and IoT on the performance and sustainability of SCM stems from the recognition that ICTs, particularly the Internet and the Social Web, are expanding and have a significant impact on practically all sectors. The formulation of a hypothesis is offered, and the study's

methodology is explained. In the future, we'll carry out an empirical investigation to confirm the various research theories that have been put out.

Compliance with ethical standards

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Disclosure of conflict of interest

The author declares no conflict of interest.

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