

Spring 3-23-2018

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## Recommended Citation

Cox, Scott R. and Atkinson, Kirk, "Social Media and the Supply Chain: Improving Risk Detection, Risk Management, and Disruption Recovery" (2018). *SAIS 2018 Proceedings*. 8.

<https://aisel.aisnet.org/sais2018/8>

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# SOCIAL MEDIA AND THE SUPPLY CHAIN: IMPROVING RISK DETECTION, RISK MANAGEMENT, AND DISRUPTION RECOVERY

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## ABSTRACT

The introduction of social media has changed the methods in which many individuals, communities, and organizations communicate and interact (Kaplan and Haenlein, 2010). The increasing popularity of social media within a business context has forced executives to rethink how they operate their businesses (Ngai, Tao, and Moon, 2015). Chae (2015) observed that the field of supply chain management has been lagging in identifying the potential role and use of social media in both research and practice. Recently, greater attention is being given to social media and its potential uses within the supply chain. This paper investigates the potential use for social media as a technology to help with supply chain risk detection, risk management, and disruption recovery.

## Keywords

Supply chain management, social media, supply chain risk, supply chain disruption, risk detection, risk management, disruption recovery, information technology

## INTRODUCTION

Scholars note the emergence of the modern supply chain can be attributed to the revolutionary advances in information technology over the past three decades (Fawcett, Wallin, Allred, Fawcett and Magnan, 2011; Fawcett, Wallin, Allred and Magnan, 2009; Fawcett, Osterhaus, Mangan and Fawcett, 2008; Hult, Ketchen and Slater, 2004). Information technology (IT) has likely had the single greatest impact on the evolution of the modern supply chain and supply chain management (Thomas, Defee, Randall and Williams, 2011). Described as the integration of business processes that span the spectrum from raw material provider to the end user, supply chain management requires some level of coordination across organizational boundaries including the integration of business processes and functions within organizations and across the supply chain (Cooper, Lambert and Pagh, 1997). Businesses continue to employ advances in IT to share information, collaborate, integrate business processes and improve supply chain relationships (Klein, 2007; Wladawsky-Berger, 2000;) each of which are held as strong tenets of current supply chain thought and have been shown to improve supply chain performance (Fawcett et al., 2008; Klein, 2007; Li, Yang, Sun and Sohal, 2008). An emerging area of technology which holds much promise for improvement in supply chain management, including the mitigation of potential disruptions, is social media.

Social media is defined as collaborative online applications and technologies that enable participation, connectivity, user-generated content, the sharing of information, and collaboration amongst a community of users (Henderson and Bowley, 2010, p.239). The introduction of social media has changed the means in which many individuals, communities, and/or organizations communicate and interact (Kaplan and Haenlein, 2010). In a business context, social media has been used typically in a business-to-consumer (B2C) context to allow companies to promote their brands and market products to consumers (Howells, 2011). The field of supply chain management has been relatively slow in identifying the potential role and use of social media for research and practice (Chae, 2015). However, social media has numerous potential uses for supply chain management. It can provide for greater visibility, improve communication, increase control, and potentially reduce operational and labor costs. Social media allows supply chain participants to monitor supply chain events and transactions to keep everyone up-to-date with current situations, such as a delay in shipping or a carrier failed to pick-up a shipment. Social media can also provide companies with more timely and insightful information about risks and events, enabling organizations to make corrective action sooner and thus minimizing the impact of any supply chain disruption. It's this potential use for social media that leads to the following research questions (Rusch, 2014).

1. How can organizations use social media to adjust to changes in the supply chain environment?
2. Can the use of social media improve an organizations ability to sense potential disruptions?

## BACKGROUND

Supply chain risk is defined as the likelihood and impact of unexpected macro and/or micro events or conditions that adversely influence any part of a supply chain leading to operational, tactical, or strategic level failures or irregularities (Ho, Zheng, Yildiz and Talluri, 2015, p. 5035). Supply Chains are becoming larger, typically comprising of vast numbers of products or commodities that are sourced, manufactured, or stored in multiple locations throughout the world resulting in increased complexity (Chopra and Sodhi, 2014). Effective supply chain management in today's globalized environment presents a challenging task. Numerous events can occur that threaten to disrupt supply chain operations and jeopardize the ability to perform effectively and efficiently (Melnyk, Closs, Griffis, Zobel and Macdonald, 2015). Natural disasters, political instability, terrorist attacks, equipment failure and human error have all contributed to various supply chain disruptions at one time or another. Supply chain disruptions can be costly and if not properly managed, can result in significant supply chain delays resulting in an inability to meet customer demand and increased costs (Blackhurst, Craighead, Elkin, and Handfield, 2005). Supply chain managers and practitioners understand the necessity to protect their supply chains from costly disruptions, unfortunately few take necessary action (Chopra and Sodhi, 2014). The most obvious solutions; increasing capacity, boosting inventory levels and having multiple suppliers, can undermine efforts to improve supply chain cost efficiency (Chopra and Sodhi, 2014). As a result, supply chain risk management has emerged as a top priority for companies (Chopra and Sodhi, 2014). Supply chain risk management is defined as an inter-organizational collaborative endeavor utilizing quantitative and qualitative risk management methodologies to identify, evaluate, mitigate and monitor unexpected macro and micro level events or conditions, which might adversely impact any part of a supply chain (Ho, et al., 2015, p. 5036). An organization can substantially increase its resilience; that is the ability to resist disruptions and recover operations capability after disruptions occur, by improving its ability to detect and respond quickly to such events (Sheffi, 2015). Social media has emerged as a business tool that can play a vital role in supply chain risk management.

## SOCIAL MEDIA AND THE SUPPLY CHAIN

Social media is often referred to as the new "newswire." According to Fronetics (2015), digital content and marketing firm focused on the supply chain, social media has supplanted traditional news organizations such as the Associated Press and Bloomberg for breaking news. Major events such as the recent earthquake in China, the Boston Marathon bombing, the death of Osama bin Laden, and the engagement of Prince William to Kate Middleton were all stories that broke on the social media website Twitter. Twitter is a micro-blogging application allowing users to "tweet" a message of up to 140 characters. Because of the nature of its short and quick bursts of information, Twitter may be particularly useful where supply chain risk detection and disruption recovery is concerned. Quick detection is considered an essential element in the effort to mitigate the impact of most supply chain disruptions (Sheffi, 2015). For example, the United States Geological Survey currently monitors Twitter to detect earthquakes (Sheffi, 2015). "In some cases, it gives us a heads-up that it happened before it can be detected by seismic wave," according to Paul Earle, a seismologist with the US Geological Survey (Sheffi, 2015, p. 37).

Fronetics (2014) conducted a survey of individuals within the logistics and supply chain industries on the use of social media in logistics and supply chain management. Specifically, the survey sought to learn more about why companies within the logistics and supply chain industries are using social media, the benefits they have realized, and challenges they have encountered. The results indicated Twitter as the first preference social media tool for supply chain improvement (Fronetics, 2014). Social media can serve as a tool to facilitate intra- and inter-organizational activities (Ngai et al., 2015). According to O'Leary (2011) Twitter messages can be used to provide information about a broad range of supply chain events. Twitter messages can indicate the arrival or departure of a shipment from a particular warehouse, to communicate the need for shipments of a particular type, or to alert drivers to accidents and road closures. According to Rusch (2014), a few additional examples of the use of social media related to supply chain risk are:

- Information about accidents and road closures can be issued that affect delivery times and can be used to re-route deliveries
- Report weather conditions that might affect shipments
- Facilitate responses to supply chain disruptions via social media
- Share supply chain risk identification to uncover vulnerabilities and to mitigate risks in the supply chain

The case may be made that these examples fall within three general categories as defined by Hines (2016) using results from a survey of industry practitioners; Customer Engagement, Market Intelligence, and Business Intelligence. Involving customers, almost instantaneously, in the supply chain process mitigates risks of disruption. This might include something as simple as notifications related to local road closures that would delay truck deliveries to communications related to potential weather issues. Mining information across Twitter feeds, capturing that information, and applying analytic software tools

increases market intelligence and, when aggregating results with other strategic information sources strengthens overall business intelligence.

Alexander (2014) discussed the actual and potential use of social media in emergency, disaster, and crisis situations, noting that just-in-time information can be provided on how to cope with developing situations. The author documented how social media may be used in seven different ways within the emergencies field for disaster response, recovery, and risk reduction including; listening, monitoring, integration into planning and crisis management, collaborative development, creating cohesion, furthering causes, and enhancing research. Understanding the widespread adoption and use of social media, the Alexander further details the need for emergency managers to adapt organizational practices and embrace the use of social media in crisis management. Some of these principles are well suited to be adopted to supply chain risk management.

The Dynamic Capabilities Model (Teece, Pisano, and Shuen, 1997) [DCM] best explains the necessity for the use of social media platforms like Twitter to improve effectiveness and efficiency in supply chain management. This process-approach model accounts for missing elements in previous models that dealt with resource availability and allocation. Organizations find themselves resource constrained and are forced to take steps to manage key resources more effectively. In this model, the organization's need to innovate and integrate is critical, even when there is no guarantee of a sustained, competitive advantage (Wade and Hulland, 2004). Technologies, like e-business proved to have a dramatic impact and Zhu, Kraemer, and Hu (2006) examined this area from the technology diffusion perspective. Social media, likewise, is proving to provide both opportunities and challenges in a dynamically changing business environment. Traditionally, new technologies are introduced into the workplace and accepted and integrated at varying rates, depending upon numerous factors like need and competition (Winter, 2003). Social media platforms like Twitter are already pervasive allowing for little to no transition in organizations. In addition, even late adopters and laggards can appear in the marketplace with no apparent long-term effects. The DCM, originally proposed for information system resources (Wade and Hulland, 2004), is process based and assumes adaptation between an organizations resources and a dynamic business environment. Social media seems to be a natural fit into this sphere due to the almost instantaneous response capabilities and mobile nature of the mobile devices that are common.

## **METHODOLOGY**

Chae (2015) utilized Twitter Analytics using an innovative approach. In a similar fashion, this study will use industry data, either a publicly available or a purchased Twitter dataset, IBM's Watson Analytics® will be used to analyze the data. Watson Analytics is a tool that will process the data, provide a level of data quality by providing numeric score, and provide suggested areas of queries. Custom questions may also be constructed, and it is anticipated that this option will be needed to address the research questions proposed. The analysis conducted is intended to address the research questions, but a second purpose is intended. The process of using a tool like Watson to mine for potential trends is unlike the traditional statistical methods approach in that, trends not originally proposed may be uncovered. The Social Media extension in Watson Analytics will be utilized to create a dataset from available Twitter and other chat room streams. This dataset can be created using delimiters including data ranges and various hashtag descriptors. Data, that might be required to assist in the analysis, are also available from government sources but also from third-party, private ones like Kaggle, data-world, Data-Hub.

## **CONCLUSION**

When it comes to supply chain risk management, having information about what is happening in real time is essential. Whether it is learning about a natural disaster that happened near your manufacturing plant, information that may alter planned travel routes, or observing the path and intensity of an on-coming hurricane; real time information is critical and will enable an organization to make more informed and timely decisions on how to manage or mitigate risk. Alexander (2014) examines the use of social media in the mitigation of disaster risk and improving the management of crisis response. The concepts of a "listening function" and a "monitoring function" (p. 720) are discussed. This idea reinforces the possible uses of social media in supply chain management because of the democratization of information sharing. Constituents are provided a voice in situations revealing aspects of the events that was not possible before social media. Social media has the potential to be an invaluable tool for supply chain professionals attempting to collaborate with stakeholders, improve existing processes, increase efficiencies, mitigate risk and promote recovery following a supply chain disruption. Social media inevitably helps with the distribution of valuable information and continues to be a prominent and effective way for companies to quickly disseminate that information. When it comes to supply chain risk management communication, information is vital. Social media could be an effective tool to add to an organization's risk management toolkit.

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