

## Social Media: A Catalyst to Environmental Sensing for Supply Chain Management

Dr. Muhammad Naeem Khan

Assistant Professor, School of Management Sciences

Beaconhouse National University, Lahore

naeem.khan@bnu.edu.pk

Sayda Uzma Tahira

Senior Lecturer, UCP Business School, University of Central Punjab Lahore

uzma.tahira@ucp.edu.pk

&

Shizra Khan

Lecturer, Faculty of Management Sciences, NUML, Islamabad

shizrakhan17@gmail.com

### Abstract

*In today's dynamic business environment organizations are competing in volatile marketplaces and to stay competitive they need to explore new market opportunities and develop innovative ideas and flexibility to respond to fluctuations in the business environment. The purpose of this research is to explore how the use of social media improves sensing capability of organizations for a better supply chain management. Following an interpretive research paradigm, this study employed a post priory inductive research approach and a qualitative research methodology to explore the perspectives of supply chain professionals and academics on the use of social media in supply chain management (SCM). Primary data was collected through semi-structured interviews. Thematic analysis was used to derive insights from the interviews with supply chain professionals and academics. Results from 10 supply chain professionals suggest that turbulent environments increase a firm's scanning activities on supply market, while intense competition increases the firm's scanning on both supply and customer markets via social media. We can expect infusion of social media enabled sensing techniques in upstream as well as downstream of the supply chain. From Environmental sensing point of view, we propose that how companies can implement the social media in supply chain management and what benefits from social media they can get. While this study provides valuable insights, it has several limitations. The qualitative nature of the research, with a limited sample size of ten interviewees, may not fully capture the diverse experiences and perspectives within the industry. The focus on Pakistani companies may limit the generalizability of the findings to other regions with different technological advancements and cultural contexts. Additionally, the relatively recent adoption of social media in SCM means that long-term effects and trends were not fully explored. The study primarily relied on self-reported data, which may be subject to bias. Environmental sensing is a pre requisite for effective reconfiguration and seizing of new opportunities in the business environment. Information technology and different market intelligence tools facilitate in environmental sensing thus having a transformational role in supply chain management. Similarly, internet and social media also play important role particularly in transforming digital supply chains. The information available on use of social media in supply chain management for improving sensing capability is sparse. Therefore, the significance of this research is twofold. First it aims to contribute in the existing theory and literature by exploring a relatively scarcely researched phenomenon of social media enabled environmental sensing for supply chain management. Secondly it aims to develop new courses of actions for practitioners and policy makers for active integration of social media technology and platforms for improving supply chain management.*

**Keywords:** Social media, environment sensing, supply chain management, networking

### Introduction

In today's dynamic business environment organizations are competing in volatile marketplaces and to stay competitive they need to explore new market opportunities and develop innovative ideas and flexibility to respond to fluctuations in the business environment (Dubey et al., 2018; Teece, 2019; Wu, Tseng, Chiu, & Lim, 2017). It

fujbe@fui.edu.pk

has become essential for supply chain managers to augment their ability to proactively sense and respond to changes in the environment using different social media platforms. An industry report conducted by *Supply Chain Management World* highlighted that supply chain professionals observe improved customer feedback, better demand sensing and a deeper insight on supply chain risk and disruptions (Song et al., 2022). Aslam, Blome, Roscoe, and Azhar (2018) confirmed in their study that environmental sensing is a pre requisite for effective reconfiguration and seizing of new opportunities in the business environment. Few other studies have also reported the importance of sensing capability for improving the business performance (Balogun et al., 2024; Pu, Qiao, & Feng, 2023; Torres, Sidorova, & Jones, 2018). Based on this notion this study aims to explore the importance of environmental sensing and scanning for supply chain management. The strategic importance and potential of environmental sensing for supply chain management leads to our first research question (RQ 1).

Research on social media enabled environmental sensing and supply chain management support the fact that sensing changes and turbulence in supply chain environment using social media platforms and technologies may resolve information delays, and early information on upcoming changes in the business environment (Guechtouli & Purvis, 2024; Li, Yang, Sun, & Sohal, 2009; Song et al., 2022). A study on a multinational fashion brand indicates that the company integrates historical demand projections with social media enabled market intelligence involving trending keywords and sentimental indicators that facilitate in early prediction of regional and seasonal demand. This information is instrumental in fast fashion designing and early introduction of products in the market (Osborn, 2015). New technology, social media and market analytics are instrumental in improving sensing capability for supply chain management (Melnik & Stanton, 2017). The information available on use of social media in supply chain management for improving sensing capability is sparse and is in infancy thus leading to our second research question (RQ 2)

Information technology and different market intelligence tools facilitate in environmental sensing thus having a transformational role in supply chain management (Fabbe-Costes, Roussat, Taylor, & Taylor, 2014). Similarly, internet and social media also play important role particularly in transforming digital supply chains. We can expect infusion of social media enabled sensing techniques in upstream as well as downstream of the supply chain (Song et al., 2022). Companies can improve product development process by using customer generated content on social media (Rathore, Ilavarasan, & Dwivedi, 2016). Suppliers and buyers can explore their external environment by using social media enabled initiatives (Rapp, Beitelspacher, Grewal, & Hughes, 2013). International retail chains like *Best Buy* and *Costco* use social media to have customer opinions and other semantics for better supply chain decision making. Similarly, they use supply market intelligence to monitor their supply base (Smith, 2017). A study on pharmaceutical industry in Thailand indicates that social media plays an important role for creating demand for products and creates a link among different industries and stakeholders (Kerdpitak, Kerdpitak, Heuer, Li, & Chantranon, 2024). A study of Jordanian telecommunication firms underscores the application and importance of social media for improving agility, responsiveness, collaboration and informed decision making (Mansour, Harahsheh, Wazani, & AlTaher, 2024). The strategic importance of use of social media in in supply and demand side of supply chain leads to third research dimension of our study (RQ 3).

Despite the importance of social media enabled environmental sensing and supply chain management many organizations are not actively using it for improving their supply chain management process. A survey revealed that most of the companies are using social media for marketing and service but not actively using it for supply chain management (O'leary, 2011). Therefore, are study aims to explore why firms are exploiting social media for managing their supply chains thus leading to our fourth research question (RQ 4). Therefore, this study aims to explore

**RQ1.** *Why environmental sensing and scanning is important for supply chain management?*

**RQ2.** *How can firms implement social media in their supply chain management to sense the uncertain business environment?*

**RQ3.** *How social media can affect supply chain activities in both supplier and customer market?*

**RQ4.** *Why firms are not using social media, in their supply chain management?*

The significance of this research is twofold. First it aims to contribute in the existing theory and literature by exploring a relatively scarcely researched phenomenon of social media enabled environmental sensing for supply chain management. Secondly it aims to develop new courses of actions for practitioners and policy makers for active integration of social media technology and platforms for improving supply chain management.

The paper is divided into four sections. The first part explains the background of research and key research questions to be explored. The second part highlights literature and theoretical foundations to explore social media as catalysts to environmental sensing and supply chain management. The third section explains methodology and analysis of the empirical material and the fourth and last section highlights discussion and conclusion with future research dimensions.

## **Literature Review**

### ***Theoretical Foundations***

Literature on social media use for improving sensing capability and supply chain management of the firms, highlights following theories that support this research.

### ***Resource Based View***

Customer based resources that are a subset of market resources are a major source of competitive advantage for organizations. Information processing capabilities are important resources embedded in organizations' processes that are used for processing customer related information (Barney, 2000; Varadarajan, 2020). An outside in approach to resource based view theory highlights three adaptive capabilities that can help organizations adapt with the changes in their business environment including vigilant market learning, experimentation for continuous learning and building relationships by means of networking technologies. Firms by using market sensing, customer engaging and partner linking capabilities can improve product development (Day, 2011; Mu, Bao, Sekhon, Qi, & Love, 2018)..

### ***Dynamic Capability Framework***

Dynamic capability interpretation of the resource based view explains that organizations ability to sense and seize valuable information to exploit market opportunities is an important source of competitiveness (Teece, 2007; Zabel, O'Brien, & Natzel, 2023). In supply chain management process dynamic capabilities emerge through effective communication among stake holders and supply chain partners (Handfield, Cousins, Lawson, & Petersen, 2015). Social media enables development of customer focused supply chains. The information gathered through social media can be converted to valuable knowledge to realize competitive advantage (Agnihotri, Kalra, Chen, & Daugherty, 2022).

### ***Integration Theory***

Social media platforms facilitate two-way communication between organizations and their customers (Madakam & Tripathi, 2021). According to integration theory social media platforms effectively provide a connection between exposure, feedback and sharing of information (Alomayri, 2016; Sinclair & Vogus, 2011).

### ***Value Co Creation Theory***

Organizations build social capital by establishing interaction with their customers through social networks. Social media enables customer-firm value co creation through knowledge exchange (Vargo, Maglio, & Akaka, 2008; Zhang, Gupta, Sun, & Zou, 2020). Social media enabled cognitive, structural and relational linkages enable value co creation thus improving organizations performance and new product development (Zhang et al., 2020).

### ***Role of Environmental Sensing in Supply Chain Management***

Environmental sensing is concerned with generating information about the business environment for identifying potential opportunities and threats (Winter, 2018). Organizations are operating in dynamic and complex customer markets where not only the product demand is volatile but quality expectations also change frequently. Social media monitoring and analytics provides organizations with a better demand sensing capability (Balogun et al., 2024; Lee, 2018; Pu et al., 2023). Organizations become more agile through improved market sensing capability

as they have a better understanding of their supply chain partners and they can proactively response supply chain uncertainty (Ngai, Chau, & Chan, 2011). Supply chain agility requires supply chain adaptability and market sensing capability creates supply chain adaptability that is the pre requisite for building efficiency and flexibility in supply chain design to meet uncertainty (Christopher & Holweg, 2011; Day, 2014; Schoenherr & Swink, 2015). Environmental sensing helps in supply chain decisions like production planning, managing lead times, allocation of logistics resources and managing inventory cost (Kembro, Näslund, & Olhager, 2017; Winter, 2018). Sensing is one of the important constructs in operations and supply chain management literature but has got limited attention in prior research (Vanpoucke, Vereecke, & Wetzels, 2014). Sensing is an important component of dynamic organizational capabilities required to seize and reconfigure opportunities from external business environment, managing the demand volatility and sustaining competitiveness (Teece, Peteraf, & Leih, 2016). Therefore, it is among the top priority organizations to sense opportunities and relevant information from their business environment (Endres, Endres, & Berg, 2018). Sensing involves process large volume of information within limited timeframe. Infusion and integration of information technology and analytical tools aids in real time information sharing, and accelerating information scanning and monitoring process (Mikalef & Pateli, 2017).

### ***Social Media Enabled Environmental Sensing Capability***

The competitive global business environment requires supply chain managers to understand the importance of social media for transforming traditional supply chain management process into customer driven responsive supply chains (Agnihotri et al., 2022). It has been highlighted by the prior research that leveraging IT for environmental scanning develops dynamic sensing capability of supply chains. In the past managers used direct interaction with key stakeholders and internet browsing as a source of environmental scanning that involved more complexity and significant amount of time and effort (Zsidisin, Hartley, Bernardes, & Saunders, 2015). Social media along with business intelligence tools and simplified methods of environmental scanning improved supply chain competitiveness and timely strategic decisions. For instance, automotive industry observed better quality management by exploiting customer complaints data available through online automobile customer network (Abrahams, Jiao, Wang, & Fan, 2012; Lau, Liao, Wong, & Chiu, 2012). Social media enables effective and efficient communication between organizations and their supply chains (Chua & Banerjee, 2013). Smallest variations in customer demand are amplified in various segments of supply chain resulting in bullwhip effect. Social media enables monitoring and tracking changes in customer base thus facilitating in managing uncertainty in customer demand (Bilovodska, Syhyda, & Saher, 2018; Hanafi, Amrozi, & Syafrizal, 2022). Social media adoption is critical for supply chain digitalization. It is an excellent source of large volume of information about customers and suppliers and facilitates in improving integration across the chain through enhanced communication (Huang, Potter, & Eyers, 2020; Sanders, Boone, Ganeshan, & Wood, 2019). Social media provides discussion platforms thus improving quality of knowledge base and sharing of useful knowledge among supply networks (Cheng & Krumwiede, 2018; Ozlen, 2021).

### ***Use of Social Media Platforms for Supply Chain Management***

Social media has been recognized among the significant digital tools used for supply chain management activities including sourcing and supplier selection, forecasting, inventory management, product development, logistics, sales management, risk management, customer relationship management and managing connections with key supply chain partners (Banerjee, Ries, & Wiertz, 2020; Chae, McHaney, & Sheu, 2020; Devi & Ganguly, 2021; Huang et al., 2020).





**Source:** *An overview of the impact of social media in supply chain and customer in Bangladesh* (Islam, Ruksana, Raihan, Zahin, & Afrin, 2022)

Literature highlights the application of following social media platforms as a catalyst to environmental sensing and supply chain management.

**Facebook:** Boldt et al. (2016) explain the use of Facebook data for generating forecast for different categories of products at Nike. By using Social Data Analytics Tool (SODATO) they collect data from ten of the most active Facebook pages of Nike. Number of likes on each page have been taken as an indicator of Nike's Facebook presence and product portfolio. A study combined sales and advertising information of an online retailer with social media information from Facebook. The results indicated an improved sales forecast accuracy that can have a positive influence on other supply chain functions including purchasing and inventory management (Cui, Gallino, Moreno, & Zhang, 2018). Another study analyzed the customer messages from Costco and Walmart's Facebook pages and highlighted the value co creation in terms of communication with the stores, communication with other customers, expressing emotions and sharing experiences with stores 'employees (Peeroo, Samy, & Jones, 2017). Sarma, Das, and Bera (2020) propose the use of Facebook disaster map for evaluating efficient and low cost transportation plan in humanitarian logistics management.

**Instagram:** A study of Australian SMEs reveals Instagram to be among the most important social media platforms for improving customer engagement and customer relationship management (Nguyen, Sukunesan, & Huynh, 2021). Manufacturing companies like textile and apparel can use customer opinion and feedback from Instagram for improving sustainable practices and supply chain transparency (Modi & Zhao, 2018).

**Twitter:** Janjua, Nawaz, and Prior (2023) proposed a methodology for identification of supply chain disruptions using Twitter feeds in real time. E retail logistics firms use Twitter for sharing information related to online ordering, delivery dates, location and order tracking. They are also able to promptly respond to customer queries (Bhattacharjya, Ellison, & Tripathi, 2016). A study of beef supply chain highlights the use of Twitter data of customers' feedback regarding different products to back track supply chain and waste management (Mishra & Singh, 2018). Messages from twitter can facilitate in different supply chain events including notification of arrival and departure of shipments from warehouse, coordinating shipment handling and transportation management (Akundi et al., 2018; O'leary, 2011)

**LinkedIn:** Food retail chains act as intermediaries between customers and different supply chain partners and have a potential to promote sustainable production and consumption using social media platforms like LinkedIn (Sadeghi-Esfahlani & Bitsch, 2023). LinkedIn can be used as an active tool for B2B sales and demand generation (Dasanayake, 2022).

**TikTok:** Prior research has highlighted the growth of e-commerce live streaming industry. A study of food retailers analyzes the use of TikTok cloud warehouse system to minimize operational cost (Bao, Liu, & Zhang, 2024).

**WhatsApp:** Social networking platforms can be used for real-time communication and information sharing and can facilitate in monitoring and evaluation in value chains (Chesoli, Mutiso, & Wamalwa, 2020). WhatsApp like other social media platforms can be used for active collaboration and communication with suppliers and customers (Tungande, Meyer, & Niemann, 2020).

**YouTube:** The current academic research highlights the importance of using YouTube for B2B communication and developing social ties with key stakeholders (Klein, 2022).

**Table-1:**  
**Use of Social Media Platforms for Supply Chain Management**

Social Media Platforms	Application	Reference
<b>Facebook</b>	<ul style="list-style-type: none"> <li>• Forecasting,</li> <li>• Improved purchasing and inventory management</li> <li>• Humanitarian logistics and transportation management,</li> <li>• Value co-creation for retail stores and logistics firms</li> </ul>	<ul style="list-style-type: none"> <li>• (Boldt et al., 2016)</li> <li>• (Cui et al., 2018)</li> <li>• (Sarma et al., 2020)</li> <li>• (Peeroo et al., 2017)</li> <li>• (Belal, Nordin, Hasan, &amp; Kosaka, 2020)</li> </ul>
<b>Instagram</b>	<ul style="list-style-type: none"> <li>• CRM</li> <li>• Improving supply chain sustainability and transparency through customer feedback</li> </ul>	<ul style="list-style-type: none"> <li>• (Nguyen et al., 2021)</li> <li>• (Modi &amp; Zhao, 2018)</li> </ul>
<b>Twitter</b>	<ul style="list-style-type: none"> <li>• Identifying supply chain disruptions</li> <li>• E-retail logistics services (ordering, location, tracking, customer complaints management)</li> <li>• Waste minimization</li> <li>• Knowledge exchange</li> <li>• Transportation Management</li> <li>• Coordinating shipments from warehouse</li> <li>• Information about arrival and departure of shipment from warehouse</li> </ul>	<ul style="list-style-type: none"> <li>• (Janjua et al., 2023)</li> <li>• (Bhattacharjya et al., 2016)</li> <li>• (Mishra &amp; Singh, 2018)</li> <li>• (Mills, Reed, Skaalsveen, &amp; Ingram, 2019)</li> <li>• (Akundi et al., 2018; O'leary, 2011)</li> </ul>
<b>LinkedIn</b>	<ul style="list-style-type: none"> <li>• Promoting social responsibility in retail operations (sustainable production and consumption)</li> <li>• B2B sales generation</li> </ul>	<ul style="list-style-type: none"> <li>• (Sadeghi-Esfahlani &amp; Bitsch, 2023)</li> <li>• (Dasanayake, 2022)</li> </ul>

<b>TikTok</b>	<ul style="list-style-type: none"> <li>• Cloud Warehousing system to manage operational cost</li> </ul>	<ul style="list-style-type: none"> <li>• (Bao et al., 2024)</li> </ul>
<b>WhatsApp</b>	<ul style="list-style-type: none"> <li>• Monitoring and evaluation</li> <li>• Collaborative communication with customers and suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• (Chesoli et al., 2020)</li> <li>• (Tungande et al., 2020)</li> </ul>
<b>YouTube</b>	<ul style="list-style-type: none"> <li>• Social communication and building social connections</li> </ul>	<ul style="list-style-type: none"> <li>• (Klein, 2022)</li> </ul>

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**Source:** *Literature Review on Application of Social Media for Supply Chain Management*

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### ***Social Media for Improving Upstream Supply Chain Activities***

Suppliers and related organizations in any supply chain can generate real time content through social media platforms that can be a useful supply market data source for buying organizations. Buyers can have quick access to suppliers, distribution schedules, process innovations and other relevant information that facilitate in timely matching the supplies with manufacturing process. Social media also facilitate in frequent communication among supply chain partners thus resulting in proactive and timely decision making (Chae, 2015). In their research Banerjee et al. (2020) explain that social media platforms can facilitate in supplier selection through electronic word of mouth and using feedback ratings. Social media allows manufacturers and suppliers to observe customer response effectively and at the same time helps customers to understand the contribution of different supply chain partners (Devereux, Grimmer, & Grimmer, 2020). Social media enables supplier involvement in product development process and improves financial and market performance by improving innovativeness (Cheng & Krumwiede, 2018). Another study reveals the use of social media for green supplier selection (Lin, Hung, Lin, & Hsieh, 2017).

### ***Social Media for Improving Downstream Supply Chain Activities***

Social media applications enable organizations to have better insights about their customer base that facilitate in improving customer related functions such as key account management (Lacoste, 2016). Some organizations are using data from Twitter to do sentiment analysis that facilitates in correct identification and understanding of customer demand (Chae, 2015). In packaged goods industry information from social media enables identification of trends and responses that guide in marketing and fulfillment decisions (Sherman & Chauhan, 2016). Similarly, customer relationship management staff can have direct interaction with customers through social media platforms that not only helps in rectifying product quality issues but also guides in adjusting production accordingly (Song et al., 2022). Customers reviews and feedback on different products and services helps retailers to improve their operations and marketing strategies and improving overall customer brand related experience (Ramanathan, Subramanian, & Parrott, 2017). Customers being last stage of supply chain use social media searching product information, generating a word of mouth and their own content that facilitates other users while searching and purchasing products (Jermisittiparsert, Sutduean, & Sriyakul, 2018).

**Table 2:**  
**Application of Social Media in B2C Supply Chain Management**

Supply Chain Areas	Application of SM	Reference
Logistics Management	Shipment arrival, departure timetables	(O'leary, 2011)
Demand and Sales Management	Information about new products, promotions, and sales	(Lindsey-Mullikin & Borin, 2017)
Matching Supply and Demand	Customer sentiment analysis and forecasting future demand	(Cui et al., 2018)
Developing Innovative Products	Customer feedback on new and potential products and services	(Chae et al., 2020)
Stakeholder Engagement	Sharing user manuals, tutorials CSR reports and success stories	(Reilly & Hynan, 2014)

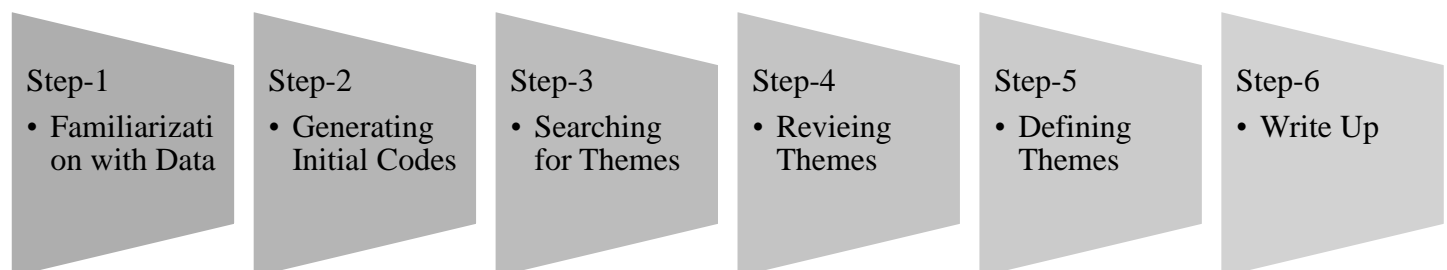
**Source:** *Exploring Social Media Use in B2B Supply Chain Operations* (Chae et al., 2020)

***Reluctance in Using Social Media Enabled Environmental Sensing for Supply Chain Management.***

Irrespective of the importance and benefits of using social media, limited organizations are utilizing the intelligence of social media in their supply chains (Ariffin, Ab Yajid, & Azam, 2020). The firms have not yet capitalized on the benefits expected through the active use of social media and only three percent organizations are actively using social media to have insight about their customer base (Alicke, Glatzel, Hoberg, & Karlsson, 2017). A study on container shipping industry highlights the use of social media by analyzing Facebook messages. The study reveals that most of the companies in this industry are not using social media technologies actively and have limited knowledge about the application of social media strategies (Bitiktas & Tuna, 2020). Unlimited content sharing by customers through social media platforms is one of the challenges for organizations to use social media actively in their supply chain management activities (Tungande et al., 2020). Despite the importance of social media usage in improving supply chain management process limited empirical investigation has been made to understand how the use of social media in supply chain can realistically help organizations to improve efficiency. The contribution of social media to operations and supply chain management is still not clear (Cui et al., 2018).

**Methodology**

Following an interpretive research paradigm, this study employed a qualitative research methodology to explore the perspectives of supply chain professionals and academics on the use of social media in supply chain management (SCM). Qualitative research is well-suited for this purpose as it allows for in-depth exploration of participants' experiences within their historical and social contexts (Cresswell, 2013). The study utilized an exploratory research design with a post priori inductive research strategy, which is effective for identifying common patterns or themes from empirical data and deriving general principles through thematic analysis. Six phase method of thematic analysis has been used explained by (Braun & Clarke, 2006).





### *Data Collection*

Primary data was collected through semi-structured interviews, chosen for their flexibility and ability to elicit detailed responses. Semi-structured interviews, as defined by (Bryman & Cassell, 2006), involve a series of open-ended questions that can be varied in sequence, allowing interviewers to probe further based on participants' significant replies. This approach ensured that rich, nuanced data was gathered, capturing the complexities of social media use in SCM (Adeoye-Olatunde & Olenik, 2021; Shoozan & Mohamad, 2024).

### *Respondents Profile*

The study included a total of ten interviewees, divided equally between industry professionals and academics to provide a balanced perspective. The profiles of the respondents are as follows:

#### 1. Industry Professionals:

- **Respondent 1:** Senior Supply Chain Manager at a leading FMCG company.
- **Respondent 2:** Logistics Coordinator at an international manufacturing firm.
- **Respondent 3:** Procurement Officer at a major retail chain.
- **Respondent 4:** Operations Manager at a logistics company.
- **Respondent 5:** Supply Chain Analyst at a tech startup.

#### 2. Academics:

- **Respondent 6:** Professor of Supply Chain Management at a renowned university.
- **Respondent 7:** Associate Professor specializing in Logistics and Operations.
- **Respondent 8:** Senior Lecturer in Business Analytics.
- **Respondent 9:** Research Fellow with a focus on Digital Supply Chains.
- **Respondent 10:** Lecturer in Information Systems and SCM.

### *Interview Process*

The interviews were conducted face-to-face, with appointments scheduled via email five days in advance. Each interview followed a prepared guide of descriptive open-ended questions, allowing respondents to share their experiences and insights freely. The flexibility of semi-structured interviews enabled researchers to delve deeper into specific areas of interest as they arose during the conversations.

### *Data Analysis*

After conducting the interviews, the researchers transcribed the discussions and developed initial codes based on the responses. These codes were then grouped into broader themes, which were reviewed and refined to ensure they accurately represented the data. The thematic analysis involved defining and naming each theme, supported by direct quotes from the respondents to illustrate key points. This methodology provided a robust framework for understanding the role of social media in SCM, capturing the nuanced perspectives of both industry professionals and academics. The findings and comprehensive summary of the developed themes are presented in the next chapter.

## **Analysis of Empirical Material**

We conducted a thematic analysis to derive insights from the interviews with supply chain professionals and academics. This involved familiarizing ourselves with the transcripts, coding significant data, grouping these codes into broader themes, and refining these themes for accuracy and coherence. For this purpose, open, axial and selective coding was made. The final themes were defined and illustrated with direct quotes, forming a cohesive narrative that highlights the role of social media in enhancing supply chain management practices in Pakistan.

### *Theme 1: Social Media Penetration in Pakistan*

This theme explores the extent and nature of social media usage in Pakistan, particularly focusing on its penetration and impact on daily activities.

Respondents emphasized the rapid increase in social media usage due to the proliferation of 3G and 4G networks. According to Respondent No. 3, "The number of internet users has increased by 30% since last year, primarily due to faster internet services." This sentiment was echoed by Respondent No. 7, who noted that "84% of internet users in major cities access social media daily, predominantly through mobile devices."

The interviewees highlighted that the primary demographic engaging with social media comprises individuals aged 21 to 35, mainly university students. This age group heavily relies on social media for information and interaction, making it a critical channel for companies to engage with their audience. Respondent No. 1 pointed out, "With the increased accessibility and affordability of mobile data, social media usage is expected to grow even further."

This widespread use has led companies to view social media as a valuable tool for sensing the market environment. Respondent No. 4 mentioned, "Social media acts as a strong medium to influence consumer behavior, where people freely express their opinions about products and services." Thus, companies have a unique opportunity to harness this data for better demand sensing and market analysis.

### ***Theme 2: Demand Sensing through Social Media***

This theme delves into how companies can use social media to understand and respond to consumer demand. Respondents No. 2, 5, 6, and 8 all agreed that social media platforms are crucial for capturing real-time consumer insights. Respondent No. 2 elaborated, "Consumers today act as brand ambassadors, sharing their experiences and opinions freely on social media. This information is invaluable for companies to adjust their strategies swiftly."

For instance, Respondent No. 5 noted, "When a customer is considering buying an electronic device, they often search social media for reviews and comments. Positive feedback increases the likelihood of purchase, thus highlighting the importance of social media in shaping demand."

The consensus among the respondents was that social media provides a dynamic and immediate source of feedback that can help companies detect changes in consumer preferences more quickly than traditional methods. Respondent No. 6 emphasized, "Demand sensing through social media allows companies to stay ahead of trends and shape their demand-shaping processes more effectively."

### ***Theme 3: Improving Forecast Reliability***

This theme addresses how social media can enhance the accuracy of demand forecasting in the face of market uncertainty. Respondents No. 1, 3, 4, and 7 all highlighted the challenges of forecasting demand in an uncertain market environment like Pakistan. Respondent No. 1 stated, "The unpredictable nature of the market makes it difficult to predict future demand accurately, which is a major challenge for supply chains."

In this context, social media offers a valuable solution. Respondent No. 3 explained, "By analyzing social media data, companies can gain insights into customer preferences and trends, which can help improve the accuracy of demand forecasts." For example, tracking mentions of product colors or styles can provide early indicators of consumer interest, as noted by Respondent No. 4.

Respondent No. 7 pointed out that "Social media not only helps in predicting demand but also in planning and inventory management by providing real-time insights into consumer preferences." This enables companies to maintain optimal stock levels and reduce the risk of overproduction or stockouts.

### ***Theme 4: Real-Time Information***

This theme explores how social media facilitates the exchange of real-time information between companies and consumers. Respondents No. 1, 2, 4, and 9 all agreed that social media has revolutionized the way companies gather and disseminate information. Respondent No. 1 remarked, "In the past, companies relied on emails and phone calls, which were slow and limited in scope. Social media allows for real-time feedback and interaction."

Respondent No. 2 highlighted the immediacy of social media, stating, "Consumers can post their opinions about a product instantly, and companies can monitor these posts to gather real-time data." This continuous flow of information enables companies to respond quickly to consumer feedback and make necessary adjustments.

Respondent No. 4 added, "Social media also facilitates informal interactions, where consumers can express their views candidly. This helps companies understand the true sentiments of their customers." This transparency and immediacy of information sharing enhance the overall responsiveness and adaptability of supply chains.

#### ***Theme 5: Building Trust Between Companies and Customers***

This theme examines how social media can help build and strengthen trust between companies and their customers. Respondents No. 3, 5, 7, and 10 emphasized the role of social media in fostering trust and transparency. Respondent No. 3 noted, "Social media allows companies to interact directly with their customers, addressing their concerns and queries promptly." This direct communication helps build a sense of trust and reliability.

Respondent No. 5 pointed out, "Customers appreciate when companies are responsive and transparent on social media. It makes them feel valued and heard." This sentiment was echoed by Respondent No. 7, who mentioned, "Building trust through social media is essential for maintaining long-term customer relationships."

Moreover, social media analytics provide companies with deep insights into customer demographics, preferences, and behaviors. Respondent No. 10 stated, "Understanding these insights helps companies tailor their products and services to meet customer needs more effectively, further strengthening trust."

#### ***Theme 6: Demand Insight and Communication***

This theme explores how social media can provide detailed demand insights and improve communication between companies and their customers. Respondents No. 2, 4, 6, and 9 all highlighted the importance of demand insights derived from social media. Respondent No. 2 explained, "Social media platforms offer a wealth of data that companies can analyze to understand consumer demand patterns."

Respondent No. 4 emphasized the role of effective communication, stating, "By engaging with customers on social media, companies can gain valuable feedback and insights that help them improve their products and services." This continuous interaction helps companies stay aligned with consumer expectations.

Respondent No. 6 added, "Social media allows for real-time communication, which is crucial for addressing customer issues promptly and maintaining a positive brand image." This dynamic interaction enhances customer satisfaction and loyalty.

Respondent No. 9 concluded, "Overall, social media provides a powerful platform for companies to gather demand insights and communicate effectively with their customers, leading to improved demand management and customer service."

#### ***Theme 7: Creation of Learning Curve***

This theme discusses how social media contributes to the continuous learning and improvement of supply chain processes. Respondents No. 1, 3, 5, and 8 all recognized the role of social media in facilitating a learning environment. Respondent No. 1 noted, "Social media enables companies to gather feedback quickly and implement changes based on consumer responses, creating a continuous learning loop."

Respondent No. 3 pointed out, "By monitoring social media trends and feedback, companies can identify areas for improvement and innovation." This helps companies stay ahead of the competition and continuously enhance their processes.

Respondent No. 5 highlighted the collaborative aspect of social media, stating, "Social media fosters collaboration among supply chain partners, allowing for the exchange of ideas and best practices." This collective learning leads to improved efficiency and effectiveness.

Respondent No. 8 concluded, "Social media not only helps in detecting new innovations but also in understanding product attributes and pricing trends. This comprehensive insight drives continuous improvement and business growth."

***Theme 8: Barriers to Social Media Adoption***

This theme identifies the challenges and barriers that prevent companies from adopting social media in their supply chain management. Respondents No. 2, 4, 6, and 7 all discussed various barriers to social media adoption. Respondent No. 2 explained, "One major barrier is the traditional hierarchical structure of organizations, which impedes the integration of social media tools."

Respondent No. 4 noted, "Many companies perceive social media as a platform for socializing rather than a business tool. This misconception limits its adoption in SCM." This viewpoint was supported by Respondent No. 6, who mentioned, "Some companies even ban social media usage during work hours, fearing it will distract employees."

Respondent No. 7 highlighted the issue of information security, stating, "Companies are afraid that critical information might be leaked through social media, affecting their overall supply chain." These barriers need to be addressed through education and awareness programs to realize the full potential of social media in SCM.

***Theme 9: Change Management***

This theme explores the resistance to change and the importance of managing change effectively when implementing social media in supply chain management. Respondents No. 1, 3, 5, and 10 all emphasized the challenges associated with change management. Respondent No. 1 stated, "Implementing social media requires a cultural shift within the organization, which is often met with resistance from employees."

Respondent No. 3 noted, "Employees may perceive the implementation of social media as an additional workload, especially if they are not well-versed in using these platforms." This sentiment was echoed by Respondent No. 5, who mentioned, "Training programs are essential to help employees understand the benefits and proper use of social media in SCM."

Respondent No. 10 concluded, "Effective change management involves clear communication, training, and support systems to ensure a smooth transition and acceptance of social media tools within the organization."

***Theme 10: Clear Policies and Training***

This theme discusses the need for clear policies and comprehensive training programs to support the successful implementation of social media in supply chain management. Respondents No. 2, 4, 6, and 9 all highlighted the importance of establishing clear policies and providing adequate training. Respondent No. 2 explained, "Clear policies and guidelines on social media usage are crucial to avoid any misuse and ensure effective implementation."

Respondent No. 4 noted, "Training programs should be conducted to educate employees on social media etiquette, brand reputation management, and online crisis management." This sentiment was supported by Respondent No. 6, who mentioned, "Employees need to be aware of what constitutes acceptable usage and the potential penalties for leaking critical information."

Respondent No. 9 concluded, "Comprehensive training and clear policies will help employees understand the objectives of using social media in SCM and how to leverage it effectively to achieve those goals."

***Theme 11: Roles and Responsibilities***

This theme emphasizes the need for clearly defined roles and responsibilities to ensure efficient use of social media tools in supply chain management. Respondents No. 1, 3, 5, and 8 all discussed the importance of defining roles and responsibilities. Respondent No. 1 stated, "Clearly defined roles and responsibilities ensure that everyone understands their tasks and avoids any overlap or confusion."

Respondent No. 3 noted, "Assigning specific roles for managing social media channels helps in maintaining accountability and ensures that the platforms are used effectively." This viewpoint was supported by Respondent No. 5, who mentioned, "A support system should be established to assist employees in navigating social media challenges and provide immediate help when needed."

Respondent No. 8 concluded, "Defined roles and responsibilities, along with a strong support system, will enhance the utilization and effectiveness of social media tools in SCM."

### ***Theme 12: Instruction and Ground Rules***

This theme highlights the need for detailed instructions and ground rules to guide the use of social media in supply chain management. Respondents No. 2, 4, 6, and 9 all emphasized the importance of providing detailed guidelines. Respondent No. 2 explained, "A comprehensive document covering responsibilities, rationale, and guidelines on social media usage should be provided to all employees."

Respondent No. 4 noted, "Employees should be informed about what kind of information they can share on social media and the potential penalties for leaking critical information." This sentiment was supported by Respondent No. 6, who mentioned, "Transparency in communication and posting accurate information is essential to maintain trust and avoid misinformation."

Respondent No. 9 concluded, "Detailed instructions and ground rules will help employees use social media responsibly and effectively, enhancing the overall SCM process."

### ***Theme 13: Regulation Considerations in SCM***

This theme explores the regulatory considerations and best practices for implementing social media strategies in supply chain management. Respondents No. 1, 3, 5, and 8 all discussed the importance of regulatory considerations. Respondent No. 1 stated, "Listening to and understanding the information obtained from social media is crucial for improving SCM strategies."

Respondent No. 3 noted, "Interacting with users and supply chain partners through social media channels helps in building a strong brand image and engaging with the audience effectively." This viewpoint was supported by Respondent No. 5, who mentioned, "Ensuring consistency across different social media platforms is important to avoid confusing customers and maintain a cohesive brand image."

Respondent No. 8 concluded, "Supply chain professionals must be transparent and honest when updating information and correcting errors promptly to maintain trust and build long-term relationships with supply chain partners."

## **Discussion**

This study explored the transformative role of social media in supply chain management (SCM) within the context of Pakistan, addressing four key research questions.

Environmental sensing and scanning are crucial for SCM as they enable organizations to stay agile and responsive to market changes. The findings underscore the significance of social media as a powerful tool for environmental sensing, offering real-time insights into consumer behavior and market trends. This allows companies to proactively identify opportunities and mitigate risks, thereby enhancing their competitive edge. These findings are consistent with the research findings of (Aslam et al., 2018; Song et al., 2022; Winter, 2018; Zabel et al., 2023).

The study revealed practical ways firms can integrate social media into their SCM practices. Clear policies, comprehensive training, and defined roles and responsibilities are essential for effective implementation. Social media platforms like Facebook, Twitter, and LinkedIn provide valuable data for demand sensing, forecasting, and real-time communication, which are pivotal in navigating the uncertainties of the business environment as explained by different research scholars (Guechtouli & Purvis, 2024; Kerdpitak et al., 2024; Mansour et al., 2024).

Social media significantly impacts both supplier and customer markets by facilitating better communication and collaboration. It enables companies to gather and analyze consumer feedback, leading to improved product development and customer service. On the supplier side, social media helps in monitoring supplier performance and managing relationships, thereby streamlining supply chain operations (Agnihotri et al., 2022; Dasanayake, 2022; Devi & Ganguly, 2021).



Despite its benefits, many firms hesitate to use social media in SCM due to misconceptions, hierarchical barriers, and concerns over information security. The study highlighted the need for change management to overcome these barriers, emphasizing the importance of educating employees about the strategic value of social media in SCM (O'leary, 2011).

## Limitations

While this study provides valuable insights, it has several limitations. The qualitative nature of the research, with a limited sample size of ten interviewees, may not fully capture the diverse experiences and perspectives within the industry. The focus on Pakistani companies may limit the generalizability of the findings to other regions with different technological advancements and cultural contexts. Additionally, the relatively recent adoption of social media in SCM means that long-term effects and trends were not fully explored. The study primarily relied on self-reported data, which may be subject to bias. Despite these limitations, the findings offer a foundational understanding and highlight the potential of social media in enhancing supply chain management, paving the way for more extensive future research.

## Future Directions & Conclusion

This study opens several avenues for future research in the field of social media and supply chain management. Future studies could expand the sample size to include a broader range of industries and geographic locations, offering a more comprehensive understanding of social media's impact across different contexts. Investigating specific social media platforms and their unique contributions to SCM could yield deeper insights into platform-specific strategies. Additionally, quantitative studies could complement our qualitative findings by statistically validating the benefits and challenges identified. Exploring the role of emerging technologies, such as artificial intelligence and machine learning, in enhancing social media analytics for SCM could further enrich the understanding of this dynamic field. Finally, longitudinal studies tracking the long-term effects of social media integration in SCM could provide valuable insights into its sustainability and evolving impact.

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