



Original Article

Review of Supply Chain–Integrated CRM Systems for Business Agility

Jenitha Pilli¹, Prathik Kumar Jannu², Javed Ali Mohammad³, Sri Harsha Panchali⁴, Usha Mohani kavirayani⁵, Krishna Bhardwaj Mylavarapu⁶

¹MS in Computer Science, University of Louisiana at Lafayette.

²Computer Science Engineering, JNTU Hyderabad.

³Masters in telecommunications, Middlesex University.

⁴Information Systems Engineer, CrowdStrike Inc.

⁵Kent State University, MS in Computer Science.

⁶MS in Computer Science, University of Illinois Springfield.

Abstract - Customer relationship management (CRM) that is built in supply chains has become a key component in the realization of business agility in very dynamic and competitive markets. The objective of the review is to investigate how well the processes of supply chains integration with the CRM systems can be used to achieve the responsiveness, effectiveness and customer-focus and to explain the major obstacles which restrict the wide implementation of the strategy. This research reviews in a systematic manner peer-reviewed articles that were written after 2015 and those that discuss the nexus between the supply chain management and CRM. The thematic synthesis was used to analyze integration, enabling technology, and business outcomes. According to the review, SC-CRM goes with enhancing collaboration between different stakeholders, better demand forecasting, real-time decision making and customer loyalty due to a more person-centric approach. Other challenges that are identified to hinder simple adoption because of the interoperability, data silos and non-standard are also discussed. The review offers a synthesizing view of supply chain and CRM as opposed to the existing literature on the subject which attempts to isolate the two concepts because the two concepts are conjoined in achieving resiliency and flexibility in the organization. It still indicates that Blockchain, Cutting-edge technology includes artificial intelligence and big data analytics, that are disruptive to the development of next-generation SC-CRM systems.

Keywords - Supply Chain, Customer Relationship Management, Business Agility, Integration, Interoperability, Digital Transformation.

1. Introduction

Supply chain management (SCM) as a field has acquired a new customer-focused and digitalized connotation over the past few decades in response to the dynamics of globalization, sustainability, and evolving customer behavior and expectations [1]. It is also seen that companies are starting to view supply chains as mobile ecosystems, with the efficiency, resilience, and customer responsiveness of the business equally important, rather than as a support system for operations [2]. In this regard, Customer Relationship Management (CRM) has come in as a support field since appropriate affiliation to customers is realized through examination and alteration of customer characteristics, purchasing patterns and changing expectations [3]. They are dynamic in nature feature and they need organizations to be in a position to be able to project high levels of business agility i.e. respond to changes in the market place, technological shock and changing customer demands very quickly and effectively.

The combination of Supply chain analytics and the CRM system is now regarded as one of the most significant competitive strategies for achieving a competitive advantage and operational excellence. [4] It is a paradigm shift: not only is it a convergence of two functionality-wise entirely different functions, but also a re-invention of how firms think about, connect and serve customers and in the process it streamlines internal operations [5]. The processes of aligning SCM with the efficiency-oriented and CRM with the customer-oriented priorities can be modified to enable the companies to develop a more integrated and flexible ecosystem that can be responsive. Customer satisfaction is now viewed as a result of the integration, supply chain agility in digital era that is rapidly changing.

The recent changes in digital technologies have multiplied the pace at which the supply chain integration with CRM systems is achieved many times. Cloud computing, blockchain, artificial intelligence (AI), and big data analytics make it possible to share data in real-time at patient touchpoints and supply chain nodes and take preventative measures [6]. To put it in more tangible terms, the supply chain responsiveness can be enhanced with the help of AI and other advanced analytics that enable organizations to anticipate the fluctuations in customer demand, react to the disruptions in a timely fashion and simplify the logistics solutions [7]. These abilities not only raise the level of efficiency of the operations, but also customer confidence and loyalty, which is the secret of long-term competitiveness.

The Technical complexity, high implementation cost, interoperability and organizational resistance to integration should be overcome through the process of integration to achieve the needed business agility. As the recent studies on the subject indicate, there are several enabling factors, which are: powerful integration processes, customer focus strategies, adoption of digital technologies, and the changing models of logistics [8]. However, implementation cannot be successful without technological innovation alone, but it needs cultural and structural change in organizations. The most effective way to enhance the full potential of SC-CRM integration is to introduce cross-functional collaboration to firms, spend money on staff training and use change management techniques.

1.1. Structure of the Paper

This paper is organized as follows: Section II follows the development of Supply Chain-Integrated CRM systems, comparing them with the traditional systems and the current trends. Section III identifies the advantages of SC-CRM in improving the agility of business. Section IV discusses the issues related to implementation, such as interoperability and security problems, as well as considers the further directions of the AI-motivated development. Section V includes a literature review which summarizes recent models, framework and case studies. The memorable insights and implications to research and practice are summarized in the section VI.

2. Evolution of Supply Chain Integrated Crm Systems

The analysis of the Supply Chain Integrated Customer Relationship Management (SC-CRM) systems has revealed the need to replace the current rule-based CRM with more modern, integrated systems that link customer data to operational supply chain assets. The previous CRM systems were knowledge that was systemically immobile and data-intensive. The integrated CRM systems in the current times are based on real-time behavioral analytics, where the multi-channel contacts and the aspects of enterprise resource planning (ERP) are used to provide real-time customer response and make informed decisions [9]. This congruence is what views business in a variety of sectors as not only gazing at the future, but also gazing at the past, in a synthesis in which there is increasingly greater efficiency, even greater customization and responsiveness [10]. The SC-CRM systems are systems that integrate the workflow functions of the organization in line with customer engagement planning strategies in order to generate competitive advantage, higher joint effort between the two study disciplines and finally the business practice more flexible in the dynamic markets.

2.1. From Traditional CRM to Integrated Platforms

Traditional CRM systems are pre-programmed and fixed and rely on prior customer segments and past information to direct endeavors. CRM systems offer quality information to an organization to make decisions as well as improve customer satisfaction. Nonetheless, it is a fact that most CRM systems are encountering enormous problems in integrating and processing customer data. ERP systems are developed to integrate the key business processes and CRM systems are developed to handle customer relationships [11]. These systems can be combined, and as a result, the flow of information inside the different departments of the organization smooth, can improve decision-making, organizational efficiency, and, ultimately, consumer happiness. CRM and ERP that help businesses create a more efficient, responsive, and customized customer experience. This meta-analysis's goal is to examine the approaches, results, and environmental factors that affect the relationship between ERP and CRM integration and business performance. See Figure 1 for an illustration of how the ERP and CRM systems are integrated:

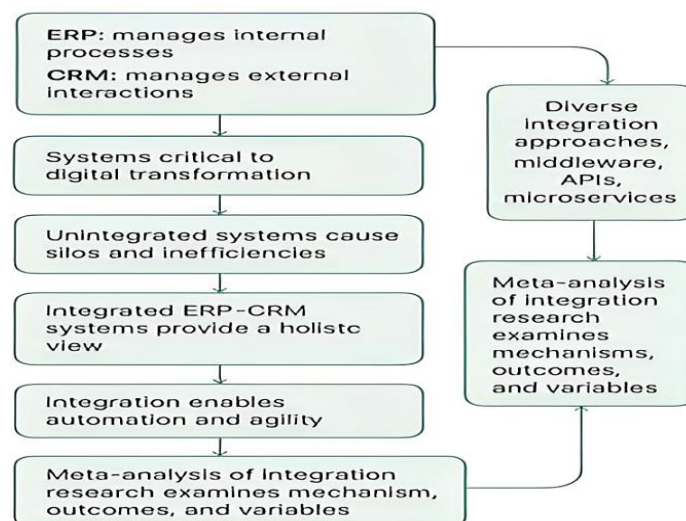


Fig 1: Integration of ERP and CRM Systems

2.2. Drivers of Integration with Supply Chain

In order to provide consumers with the highest value, supply chain management encompasses all of an organization's internal and external operations. Therefore, it is imperative that internal and external actions be subject to checks and balances set up by the organization's administration. A business's effectiveness can be substantially improved by implementing the principles of SCM [12]. Key drivers of supply chain performance management include logistics, transportation, pricing, sourcing, information distribution, facilities, and inventory management. A company's performance can be enhanced by improving how these operations are managed. Through the implementation of resource and energy efficiency measures, Mitigate environmental impacts throughout the whole supply chain. Implementing environmental management strategies across the board is critical for a greener SC and maintaining competitive advantage [13].

"Combining environmental considerations with supply chain management (SCM), which encompasses post-consumer product management, manufacturing procedures, product design, material procurement and selection, and final product delivery to customers." Green supply chain management is referred to as GSCM. Figure 2 shows the factors affecting supply chain digital integration. The following are some of those factors [14]:

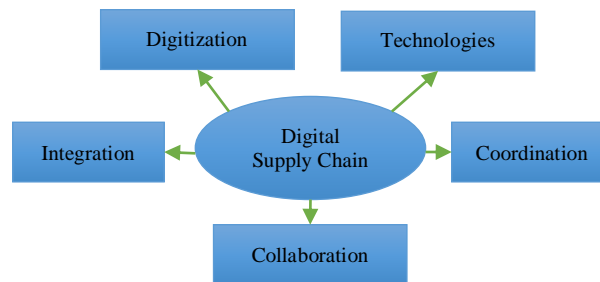


Fig 2: Drivers Of The Digital Supply Chain

2.3. Current Trends in SC-CRM Development

SC-CRM has evolved greatly, especially throughout the past decade. Over the years, supply chain management has made great strides, which have revolutionized the way goods are sourced, transported, and delivered [15]. CRM has become more complicated and more efficient due to the proliferation of digital technologies, such as the internet, big data, and AI, and technical advances, increased consumer needs, and process enhancement, among others. These are the most significant developments in SCM this year:

- Green Supply Chain Management: Green supply chain management seeks to reduce waste and the environmental effects of supply chain manufacturing and delivery. GSCM mandates that the supply chain be environmentally sustainable to mitigate the effects of climate change.
- Globalization: Globalization has reshaped the supply chain management concept by availing to organizations the chance to transact business on different international borders, procure at low-cost locations and locate rare resources and expertise. This international connectivity saves money and increases flexibility, competitiveness, and capabilities in dynamic markets.
- Artificial Intelligence and Automation: The trends that are changing the business world include automation and AI. The opportunities of reducing the cost, inefficiencies and human risks are being added to by supplies chain management with the use of AI and automation [16]. The implementation of AI and automation on the supply chain may occur in numerous aspects, which may include sales forecasting and optimization, manufacturing, delivery, intelligent manufacturing.
- Big Data Analytics: Big data helps organizations to make better decisions that give them competitive edge, or it helps them to do the best they can. Big supply chain analytics is a relatively recent term used to denote the use of big data analytics in supply chain processes by innovative enterprises.

3. Benefits of Sc-Crm Systems for Business Agility

Customer Relationship Management (CRM) systems are currently seen as closely coupled with a supply chain as a means of providing business agility in a competitive and customer-driven world. Such systems are based on customer information and supply chain management to guarantee that a business can respond instantly to emerging demands without losing any efficiency. The consequences of SC-CRM are not just on the positive side of individualization of interaction, but it is also accompanied by intensification of interaction between the sides, openness and mutual agreement of operations. Furthermore, it is possible to incorporate big data analytics, which might help enterprises make informed real-time decisions that can be used to strengthen responsiveness and resilience [17]. The combination of these capabilities enables SC-CRM to be a worthy implementer of flexibility, customer satisfaction, and sustainable competitiveness.

3.1. Enhanced Customer Responsiveness

Customer is the most valuable resource in an organization in this competitive market. It should not be a surprise that organizations are resorting to CRM in order to accommodate more or less various types of customers. The fact that it is possible to customize client experiences in real-time based on the data collected by numerous sources will ensure that the latter is always dynamic and responsive. Adaptive content delivery, personalized product recommendations, and personalized promotion offer are some of the methods that use real-time information.

For customers, personalized experiences can make them feel understood and valued, leading to increased satisfaction and engagement. Customers are more likely to make purchases and continue doing business with companies that provide relevant and tailored experiences.

To the customers, individualized experiences may make them feel that they are understood and appreciated, and therefore become more engaged and satisfied. Personalized and relevant customer experiences increase sales and loyalty. CRM automation improves customer experience in service delivery, based on a real-world case of Store My Goods Private Limited, where actual service data was gathered from Zoho CRM software. CRM automation offers tangible benefits such as:

- Better customer retention.
- Increased operational efficiency.
- Decision-making that is improved by using real-time data.
- Improved service quality and responsiveness.
- Integration across departments for unified service delivery.

Automated booking systems, status updates, and follow-up reminders are example of automation solutions that can improve operational efficiency, customer happiness, and retention.

3.2. Improved Collaboration Across Stakeholders

Suppliers, manufacturers, distributors, retailers, and In today's competitive business world, consumers must collaborate successfully. Supply Chain-Integrated Customer Relationship Management (SC-CRM) systems offer a unified platform that enhances communication, transparency, and trust among all parties in the supply chain. These systems enable firms to align production planning, inventory management, and distribution operations with changing customer demands by connecting customer insights and supply chain operations [18]. This integration, in addition to reduction of the number of bottlenecks and delays, strengthens relationship in the long run since there is a similarity in goal and creation of value. The Major Building Blocks of Effective Cooperation among the stakeholders are:

- **Trust and Relationship Building:** Trust introduces collaboration, which allows partners to share information sensitive to them that motivates them to invest in them and utilize each other knowhow without fear of exploitation by their partners. It is prepared following the openness, uniformity and constant contact.
- **Effective Communication:** Specific platforms and structured communication channels support timely information exchange. The check-in and performance review frequency assist in ensuring that there is alignment and to enable issues to be proactively resolved.
- **Joint Planning and Strategy Development:** Forecasting and demand planning helps to reduced uncertainty and improve accuracy, coordinate objectives and goals, eliminate conflict and establish a coherent process in responsiveness to the market.

3.3. Data-Driven Decision Making

The integration of big data and customer relationship management is bringing a new dawn in customer relationship management. It floods businesses with data of every kind and it may help to understand what consumers like or dislike, their behaviors and emotions. CRM is a business strategy in accordance to which the contacts and formation of the relationships with existing and prospective consumers are controlled. It brings together three important aspects i.e. Process, Technology, people and its aim is to learn and manage customer relations in an excellent manner. Therefore, the deployment of the big data analytics in CRM systems is becoming a strategic necessity as it enables organizations to gain insights and forecast customer needs in bulk.

CRM is efficient not only in the context of the contemporary business. It has become a strategic instrument that renders it feasible to employ information in order to decide throughout the organization [19]. By combining CRM with other business systems, firms can develop more success and consistent strategies because the customer is viewed as a single picture (CRM) with other business systems: enterprise resource planning (ERP) systems and marketing automation systems. It is crucial in the delivery of internalized and personalized customer experiences in every stage of interactions with the customer, which ultimately result in a higher engagement and retention.

4. Challenges and Future Directions of Sc-Crm Implementation

The SC-CRM (Supply Chain Integrated Customer Relationship Management) systems have a high potential business opportunity and there are issues that need to be considered as critical when utilizing the SC-CRM systems. The fact that integration and interoperability are a problem (i.e. data silos, technical complexity, organizational resistance) are problems that can slow down the process of the smooth adoption of SC-CRM systems. Such challenges are compounded by security and privacy-related issues, as well, as cloud-based CRM systems are experiencing an avalanche of breaches, and compliance regulations [20]. But with all its agile and sturdy potential, the future of AI automation, predictive analytics, and sustainable supply chain creation is brighter. Finally, the proponents of SC-CRM resolve issues that influence the future effectiveness of SC-CRM systems.

4.1. Integration and Interoperability Issues

The process of implementing CRM starts with an organization's strategic choice to change or alter its business processes and put money into a better information system. But, with the benefits being quite high, numerous challenges and issues that businesses need to resolve to integrate the supply chain analytics and CRM are present [21]. They are the fact that there are data silos, lack of interoperability between different systems, confidentiality of customer information, and only qualified talent has access to sophisticated analytics tools. Additionally, opposition to adoption and implementation of such integration because of the cultural factors in the organizations, opposition to change and high cost of adoption and implementation of such integration could act as a barrier to effective implementation and adoption of such integration. To tackle these issues and take advantage of the opportunity that the combination of supply chain analytics and CRM creates, organizations have to be not only tactical but also strategic. This does not only include a commitment to cutting edge technology but also a culture of team work within the organization, a focus on the use of data to make decisions, to coordinate all organizational functions and a culture of continuous innovation. In addition, the companies should put proper governance and data management practices in order to secure, protect and use customer data ethically throughout the lifecycle.

4.2. Security and Privacy Concerns

Cloud CRM solutions may be more flexible and less costly than any other product available in the market. This allows businesses to become better at the way they operate and the way they can related to customers. The growing rate of cyber-attacks and other security related issues, however, complicates the problem and raises the question of the level of security of these systems, other than them [22]. The consequences of losing control over such information in the hands of an unauthorized individual can be disastrous, including the loss of finances, ruined reputations and fines. Businesses are concerned about data privacy and security when deploying a CRM system such as Dynamics CRM. These issues may be divided into a few main areas:

- **Data Breaches and Cyber Attacks:** It is also possible that hackers take a significant financial and reputational toll when they gain unauthorized access to sensitive customer information.
- **Data Integrity:** It is crucial to maintain the integrity and correctness of the data stored in the CRM system. A breach in data integrity could lead to incorrect conclusions and actions.
- **Compliance with Regulations:** The United States' California Customer Privacy Act (CCPA) and the European Union's General Data Protection Regulation (GDPR) are two of the many laws that impose strict guidelines for the use of consumer data.
- **Access Controls:** Sensitive information is not supposed to be accessed by other people.
- **Data Storage and Transfer:** Data storage and transfer, particularly when using cloud-based CRM systems, is also a key concern that needs to be addressed in a secure manner.

4.3. Future Outlook: Towards AI-Driven, Agile Ecosystems

Artificial intelligence (AI) is transforming the supply chain management since it can bring a new dimension to an old problem. With the assistance of AI, the supply chain networks can automate and streamline their activities, which positively affect their effectiveness and reactivity. The optimization of platforms, which are driven by artificial intelligence, also assist the supply chain to identify the most cost-effective paths to deliveries as well as reducing the number of delivery times to the minimum. Moreover, supply chain networks can interact in real time using natural language processing (NLP), which allows them to collaborate and be more visible.

The force behind contemporary logistics and supply chain management (LSCM) is the digitization of data. Strong, efficient and resilient procedures should be prioritized and included in the process of creating the supply chain. As with the help of AI, improved decision-making opportunities, automated processes might be converted into autonomous processes and, therefore, become more valuable and more resilient. Future-oriented trends and techniques described below underscore the fact that implementation of SC-CRM, in collaboration with AI and sustainability programs, can make companies more responsive, more resilient, and better prepared to meet future challenges:

- **Transportation Infrastructure Investment:** It is also improving transport, particularly through the expansion of markets such as Southeast Asia, by improving ports, railways, and roadways.

- 3D Printing: Every day, 3D printing is finding applications in multiple industries, including aerospace and the production of medical gadgets.
- Circular Supply Chains: Recycling and reusing materials in an effort to create new goods is central to the concept of circular supply chains.
- Carbon Dioxide Emissions Trading: The nations that have higher amounts of carbon discharged can then buy carbon dioxide credits from other nations that have lower carbon discharge in order to produce more CO₂.

5. Literature Review

This Section presents a literature review on the supply chain integrated CRM systems, which deals with integration, consumer-centric strategies, adoption of ERP and CRM, and omni-channel logistics development.

Kumari (2019) is the meta-analysis of empirical studies that aim at systematic investigation of the relationship between CRM systems and sales performance. The research will involve a comprehensive analysis of the past researches, considering several variables including organizational context, characteristics of CRM system and implementation methods. The results show that there is a positive relationship between adoption and growth of sales performance of CRM systems. In addition, the results suggest that such factors as corporate culture, employee development, and upper management support are essential in regards to successful implementation of CRM. This meta-analysis contributes to the existing knowledge about CRM systems by providing evidence-based information that could assist businesses in maximizing their CRM schemes to increase sales [23].

Samal (2019) discovers the literature that explains the importance of integration and how business processes can prove to be handy when conducting significant logistical operations within the framework of a supply chain. This conceptual paper explains why the concept of integration is important in the management of supply chain (SCM) by linking the logistical tasks in relation to the key business processes. Business processes are often formulated on strategic level and they are rarely properly identified in SCM or logistics. Strategy Logistics and supply chain management (SCM) have no direct relationship with strategic business operations such as demand management, customer relationship management (CRM), supplier relationship management (SRM) and customer service management (CSM) [24].

Oncioiu et al. (2019) centered on supply-chain management and how big data analytics may help Romanian supply-chain companies assess their professional expertise, experience, and big data implementation tactics. It also evaluates the tools required to accomplish these objectives, including implementation outcomes and performance achievement based on them. The quantitative study employed a sample survey as its research methodology, with a questionnaire serving as the instrument for gathering data. There were closed-ended questions with both nominal and ordinal scales. For this study, 205 managers in all supplied comprehensive and helpful responses [25].

Al-Jnabi and Awad Kareem (2018) The aim of this study is to examine the effects of the Transaction Processing System (TPS) on supply chain customer relationship management through empirical analysis. For the study, 47 managers from certain Baghdadi banks that are renowned for employing TPS as decision-makers inside the organizations or for their collection and transaction storage were consulted. It demonstrated a link between TPS and efficient customer relationship management, with the exception of interned data [26].

Gawankar, Kamble and Raut (2017) to examine the relationship between two key constructs, which establishes the necessity of using a comprehensive empirical approach to validate the instrument scale for evaluating the efficacy and efficiency of retail supply chain management as well as the validity and reliability of the discovered constructs. Additionally, the study examines the relationship between SCMP and supply chain performance measures using structural equation modeling (SEM). The data was supplied by 213 operations and supply chain (SC) heads from leading Indian retail enterprises. Confirmatory factor analysis was used to assess the validity of the proposed measuring scale, and SEM was employed to investigate the relationship [27].

Wali, Uduma and Wright (2016) investigated business-to-business (B2B) marketing companies' experiences with customer relationship management (CRM) in the resource-based view and a qualitative focus group approach in the mobile telecom sector. Two focus groups with ten employees from B2B mobile telecommunications companies were conducted using the qualitative focus group method. The interview data was analyzed using Nvivo 10 software, which employed content analysis and a theme framework, respectively. The study revealed four primary themes: B2B service customization, product knowledge development, customer orientation behavior, and resource commitment. The topics explain the CRM experiences of B2B marketing companies in the mobile telecom industry [28].

Table I provides an overview of the key research on Supply Chain Integrated CRM systems, including its areas of focus, methods used, key findings, issues, and proposed directions for future research

Table 1: Comparative Review of Recent Studies on Supply Chain–Integrated CRM Systems

Reference	Study On	Approach	Key Findings	Challenges	Future Direction
Kumari et.al. (2019)	Relationship between CRM systems and sales performance	Meta-analysis of empirical studies; evaluation of CRM features, implementation practices, and organizational factors	Adoption of CRM is positively correlated with increased sales performance; top management support, staff training, and organizational culture are necessary for CRM to be effective	Variation in CRM adoption across industries; organizational resistance to change	More cross-industry studies on CRM implementation success factors; evaluate emerging CRM technologies (AI, automation)
Samal et.al. (2019)	Importance of integration and strategic business processes in SCM	Conceptual paper reviewing SCM literature; linking CRM, SRM, CSM, and demand management with logistics functions	Highlights the need for stronger integration between strategic business processes and logistics; identifies misalignment in current SCM practice	Lack of clear frameworks linking strategy to logistics; limited empirical validation	Develop empirical models linking business processes to logistics outcomes; explore integration technologies (IoT, AI)
Oncioiu et al. (2019)	Supply chain firms in Romania are implementing big data analytics	Quantitative survey; questionnaire with nominal/ordinal scales; sample of 205 managers	Big data analytics enhances strategic decision-making and performance in supply-chain firms; highlights tools and capabilities needed for successful adoption	Lack of big-data expertise; limited technological readiness	Develop industry-specific big-data frameworks; training programs for managers; explore AI-driven analytics in SCM
Al-Jnabi et.al. (2018)	Role of Transaction Processing Systems (TPS) in CRM within supply chains (banking sector)	Empirical analysis based on responses from 47 bank managers in Baghdad	TPS has a strong correlation with efficient CRM usage, except when data input errors occur	Dependence on accurate data entry; technology limitations	Improve data validation mechanisms; integrate TPS with advanced CRM analytics
Gawankar, et.al. (2017)	SC Management Practices (SCMP) and supply chain performance in the retail sector	Empirical study using CFA and SEM; data from 213 SC heads in Indian retail stores	Validated measurement scale for SCMP; SCMP positively influences supply chain performance	Data reliability and subjective self-reporting; limited to retail sector	Extend model to other industries; integrate digital supply-chain technologies in SCMP evaluation
Wali, et.al. (2016)	CRM experiences of mobile telecoms B2B companies	Qualitative focus groups (2 groups, 10 staff each); thematic and content analysis using Nvivo	Four CRM themes surfaced: service personalization, customer orientation behavior, product knowledge development, and resource commitment.	Small sample size; limited generalizability; subjective interpretations	Broader multi-country qualitative and quantitative studies; examine digital CRM tools in B2B contexts

6. Conclusion and Future Work

Organizational resiliency cannot be achieved through isolated customer approaches but requires integration of customer engagement with supply chain efficiency. In the competitive and unpredictable market, companies require systems that integrate operational flexibility with relationship intelligence, which is backed by emerging technologies and changing customer demands. Supply Chain-Integrated CRM (SC-CRM) is a systemic enabler of corporate responsiveness, which extends conventional CRM to end-to-end supply chain visibility, interoperability, and responsiveness. Contrary to other studies, which merely point out the individual CRM advantages, SC-CRM focuses on real-time cooperation, predictive personalization and sustainability. This synthesis demonstrates that SC-CRM helps to improve the demand forecasting, supplier coordination and customer satisfaction at the same time. Moreover, agility is a strategic approach and a technology tool in the current corporate performance.

The future of SC-CRM should include predictive analytics based on the AI, transparency provided by blockchain, and real-time nature of the IoT data streams. Also, evaluation will be reinforced by investigating the quantitative results of quantitative agility, including the response speed, cost-effectiveness, and customer retention. Cross-industry comparisons and sustainability-based applications should also be implemented in the future research. Finally, SC-CRM is a necessary base to integrate supply chain and customer relationship management approaches enabling the business to react swiftly and remain competitive in the rapidly evolving markets.

References

- [1] M. Daneshvar Kakhki and V. B. Gargeya, "Information systems for supply chain management: a systematic literature analysis," *Int. J. Prod. Res.*, vol. 57, no. 15–16, pp. 5318–5339, Aug. 2019, doi: 10.1080/00207543.2019.1570376.
- [2] C. Huiping, "An Integration Framework of ERM, SCM, CRM," in 2009 International Conference on Management and Service Science, IEEE, Sep. 2009, pp. 1–4. doi: 10.1109/ICMSS.2009.5301692.
- [3] R. Rajaguru and M. J. Matanda, "Effects of inter-organizational compatibility on supply chain capabilities: Exploring the mediating role of inter-organizational information systems (IOIS) integration," *Ind. Mark. Manag.*, vol. 42, no. 4, pp. 620–632, May 2013, doi: 10.1016/j.indmarman.2012.09.002.
- [4] M. O. Basaez, D. A. Aranda, R. Djundubaev, and F. S. Montesinos, "The Role of <scp>CRM-SRM</scp> Bolt-ons in Enterprise Resource Planning System: Toward a Customer-Oriented Supply Chain," *Strateg. Chang.*, vol. 23, no. 5–6, pp. 389–400, Aug. 2014, doi: 10.1002/jsc.1984.
- [5] S. Gupta, N. Agrawal, and S. Gupta, "A Review on Search Engine Optimization: Basics," *Int. J. Hybrid Inf. Technol.*, vol. 9, no. 5, pp. 381–390, May 2016, doi: 10.14257/ijhit.2016.9.5.32.
- [6] N. González-Gallego, F.-J. Molina-Castillo, P. Soto-Acosta, J. Varajao, and A. Trigo, "Using integrated information systems in supply chain management," *Enterp. Inf. Syst.*, vol. 9, no. 2, pp. 210–232, Feb. 2015, doi: 10.1080/17517575.2013.879209.
- [7] S. Garg, "Predictive Analytics and Auto Remediation using Artificial Intelligence and Machine learning in Cloud Computing Operations," *Int. J. Innov. Res. Eng. Multidiscip. Phys. Sci.*, vol. 7, no. 2, 2019, doi: 10.5281/zenodo.15362327.
- [8] B. Wang, Y. Kang, P. Childerhouse, and B. Huo, "Service supply chain integration: the role of interpersonal relationships," *Ind. Manag. Data Syst.*, vol. 118, no. 4, pp. 828–849, May 2018, doi: 10.1108/IMDS-02-2017-0062.
- [9] S. Chatterjee, S. K. Ghosh, R. Chaudhuri, and B. Nguyen, "Are CRM systems ready for AI integration?: A conceptual framework of organizational readiness for effective AI-CRM integration," *Bottom Line*, vol. 32, no. 2, pp. 144–157, 2019, doi: 10.1108/BL-02-2019-0069.
- [10] M. Giannakis, K. Spanaki, and R. Dubey, "A cloud-based supply chain management system: effects on supply chain responsiveness," *J. Enterp. Inf. Manag.*, vol. 32, no. 4, pp. 585–607, Jul. 2019, doi: 10.1108/JEIM-05-2018-0106.
- [11] D. Näslund and H. Hulthen, "Supply chain management integration: a critical analysis," *Benchmarking An Int. J.*, vol. 19, no. 4/5, pp. 481–501, Jul. 2012, doi: 10.1108/14635771211257963.
- [12] M. A. Saeed and W. Kersten, "Drivers of Sustainable Supply Chain Management: Identification and Classification," *Sustainability*, vol. 11, no. 4, p. 1137, Feb. 2019, doi: 10.3390/su11041137.
- [13] K. Dashore and N. Sohani, "Green Supply Chain Management - Barriers & Drivers: A Review," *Int. J. Eng. Res. Technol.*, vol. 2, no. 4, pp. 2021–2030, 2013.
- [14] F. Iddris, "Digital Supply Chain: Survey of the Literature," 2018.
- [15] F. Olayah, "Integration of Social Media Platform in Their Customer Relationship Management Process (CRMP) and Its Impact on Performance of SMEs," *Indian J. Sci. Technol.*, vol. 12, no. 47, pp. 1–9, Dec. 2019, doi: 10.17485/ijst/2019/v12i47/148899.
- [16] R. Alt and O. Reinhold, "Social Customer Relationship Management (Social CRM)," *Bus. Inf. Syst. Eng.*, vol. 4, no. 5, pp. 287–291, Oct. 2012, doi: 10.1007/s12599-012-0225-5.
- [17] F. N. Adlin, R. Ferdiana, and S. Fauziati, "Current Trend and Literature on Electronic CRM Adoption Review," *J. Phys. Conf. Ser.*, vol. 1201, no. 1, p. 012058, May 2019, doi: 10.1088/1742-6596/1201/1/012058.
- [18] M. K. Shukla and P. N. Pattnaik, "Managing Customer Relations in a Modern Business Environment: Towards an Ecosystem-Based Sustainable CRM Model," *J. Relatsh. Mark.*, vol. 18, no. 1, pp. 17–33, Jan. 2019, doi: 10.1080/15332667.2018.1534057.
- [19] S. Achouche, U. B. Yalamanchi, and N. Raveendran, "Method, apparatus, and computer-readable medium for performing a data exchange on a data exchange framework," 2019.
- [20] B. R. Cherukuri, "Future of cloud computing: Innovations in multi-cloud and hybrid architectures," *World J. Adv. Res. Rev.*, vol. 1, no. 1, pp. 068–081, Feb. 2019, doi: 10.30574/wjarr.2019.1.1.0002.
- [21] T. Wareewanich, K. Sukpasjaroen, T. Chankoson, N. Ruaengmaneeya, and N. Raviyan, "Customer Relationship Management (CRM) and logistic customer satisfaction," *Int. J. Supply Chain Manag.*, vol. 8, no. 2, pp. 211–221, 2019.
- [22] A. Kushwaha, P. Pathak, and S. Gupta, "Review of optimize load balancing algorithms in cloud," *Int. J. Distrib. Cloud Comput.*, vol. 4, no. 2, pp. 1–9, 2016.
- [23] S. Kumari, "Investigating The Impact Of CRM Systems On Sales Performance: A Meta-Analysis Of Empirical Studies," *Int. J. Curr. Sci.*, vol. 9, no. 1, pp. 2250–1770, 2019.

- [24] S. K. Samal, "Logistics and supply chain management," *Int. J. Psychosoc. Rehabil.*, vol. 23, no. 6, pp. 361–366, 2019, doi: 10.37200/IJPR/V23I6/PR190779.
- [25] I. Oncioiu et al., "The Impact of Big Data Analytics on Company Performance in Supply Chain Management," *Sustainability*, vol. 11, no. 18, p. 4864, Sep. 2019, doi: 10.3390/su11184864.
- [26] S. A. M. Al-Jnabi and S. A. Awad Kareem, "The supply chain role of transaction processing system in customer relationship management," *Int. J. Supply Chain Manag.*, vol. 7, no. 5, pp. 824–839, 2018.
- [27] S. Gawankar, S. Kamble, and R. Raut, "An investigation of the relationship between supply chain management practices (SCMP) on supply chain performance measurement (SCPM) of Indian retail chain using SEM," *Benchmarking An Int. J.*, vol. 24, no. 1, pp. 257–295, Feb. 2017, doi: 10.1108/BIJ-12-2015-0123.
- [28] A. F. Wali, I. A. Uduma, and L. T. Wright, "Customer relationship management (CRM) experiences of Business-to-Business (B2B) marketing firms: A qualitative study," *Cogent Bus. Manag.*, vol. 3, no. 1, p. 1183555, Dec. 2016, doi: 10.1080/23311975.2016.1183555.
- [29] Polu, A. R., Buddula, D. V. K. R., Narra, B., Gupta, A., Vattikonda, N., & Patchipulusu, H. (2021). Evolution of AI in Software Development and Cybersecurity: Unifying Automation, Innovation, and Protection in the Digital Age. Available at SSRN 5266517.
- [30] Padur, S. K. R. (2020). From centralized control to democratized insights: Migrating enterprise reporting from IBM Cognos to Microsoft Power BI. *Int. J. Sci. Res. Comput. Sci. Eng. Inf. Technol.*, 6(1), 218-225.
- [31] Bitkuri, V., Kendyala, R., Kurma, J., Mamidala, V., Enokkaren, S. J., & Attipalli, A. (2021). Systematic Review of Artificial Intelligence Techniques for Enhancing Financial Reporting and Regulatory Compliance. *International Journal of Emerging Trends in Computer Science and Information Technology*, 2(4), 73-80.
- [32] Padur, S. K. R. (2019). Machine learning for predictive capacity planning: Evolution from analytical modeling to autonomous infrastructure. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, 5(5), 285-293.
- [33] Attipalli, A., Enokkaren, S., BITKURI, V., Kendyala, R., KURMA, J., & Mamidala, J. V. (2021). Enhancing Cloud Infrastructure Security Through AI-Powered Big Data Anomaly Detection. Available at SSRN 5741305.
- [34] Singh, A. A. S., Tamilmani, V., Maniar, V., Kothamaram, R. R., Rajendran, D., & Namburi, V. D. (2021). Predictive Modeling for Classification of SMS Spam Using NLP and ML Techniques. *International Journal of Artificial Intelligence, Data Science, and Machine Learning*, 2(4), 60-69.
- [35] Padur, S. K. R. (2020). AI augmented disaster recovery simulations: From chaos engineering to autonomous resilience orchestration. *International Journal of Scientific Research in Science, Engineering and Technology*, 7(6), 367-378.
- [36] Reddy Padur, S. K. (2021). From Scripts to Platforms-as-Code: The Role of Terraform and Ansible in Declarative Infrastructure Rollouts. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, 621-628.
- [37] Kothamaram, R. R., Rajendran, D., Namburi, V. D., Singh, A. A. S., Tamilmani, V., & Maniar, V. (2021). A Survey of Adoption Challenges and Barriers in Implementing Digital Payroll Management Systems in Across Organizations. *International Journal of Emerging Research in Engineering and Technology*, 2(2), 64-72.
- [38] Padur, S. K. R. (2018). Autonomous cloud economics: AI driven right sizing and cost optimization in hybrid infrastructures. *International Journal of Scientific Research in Science and Technology*, 4(5), 2090-2097.
- [39] Rajendran, D., Namburi, V. D., Singh, A. A. S., Tamilmani, V., Maniar, V., & Kothamaram, R. R. (2021). Anomaly Identification in IoT-Networks Using Artificial Intelligence-Based Data-Driven Techniques in Cloud Environmen. *International Journal of Emerging Trends in Computer Science and Information Technology*, 2(2), 83-91.
- [40] Padur, S. K. R. (2021). Bridging Human, System, and Cloud Integration through RESTful Automation and Governance. *the International Journal of Science, Engineering and Technology*, 9(6).
- [41] Attipalli, A., BITKURI, V., KURMA, J., Enokkaren, S., Kendyala, R., & Mamidala, J. V. (2021). A Survey of Artificial Intelligence Methods in Liquidity Risk Management: Challenges and Future Directions. Available at SSRN 5741342.
- [42] Padur, S. K. R. (2021). From Control to Code: Governance Models for Multi-Cloud ERP Modernization. *International Journal of Scientific Research & Engineering Trends*, 7(3).
- [43] Routhu, K. K. (2021). Harnessing AI Dashboards in Oracle Cloud HCM: Advancing Predictive Workforce Intelligence and Managerial Agility. *International Journal of Scientific Research & Engineering Trends*, 7(6).
- [44] Padur, S. K. R. (2021). Deep learning and process mining for ERP anomaly detection: Toward predictive and self-monitoring enterprise platforms. Available at SSRN 5605531.