International Journal of Innovative Research and Scientific Studies, 8(3) 2025, pages: 1068-1084

IJIRSS
International Journal of Innovative Research & Scientific Studies

ISSN: 2617-6548

URL: www.ijirss.com

The impact of supply chain management practices in the healthcare domain on customer satisfaction in Saudi Arabia

Saleh Alnahdi

Healthcare Ethics, Vice Dean, Collage of Business, University of Jeddah, Saudi Arabia.

(*Email: Saaalnahdi@uj.edu.sa*)

Abstract

This study investigates the impact of supply chain management practices (SCMP) on customer satisfaction (CS) within Saudi Arabia's healthcare sector, focusing on strategic supplier partnerships, information sharing, and internal lean practices. Using a quantitative research design, data were collected from 316 participants across various healthcare institutions in Saudi Arabia and analyzed through correlation, regression, and ANOVA techniques. The findings reveal a significant positive relationship between SCMP and CS, with key factors such as supplier partnerships, information sharing, and lean practices emerging as critical determinants of patient satisfaction. The study underscores the importance of strengthening SCMP to improve healthcare quality and operational efficiency, offering practical insights for healthcare managers and policymakers. By optimizing inventory management, fostering vendor partnerships, and adhering to international standards, healthcare organizations can enhance service delivery, reduce costs, and align with global benchmarks, ultimately achieving long-term sustainability in Saudi Arabia's healthcare system. These results contribute both theoretical and practical knowledge, addressing existing gaps in the literature while highlighting the unique challenges and opportunities within the Saudi context.

Keywords: Customer satisfaction, healthcare domain, information sharing, internal lean practices, strategic partnerships, supply chain management practices.

DOI: 10.53894/ijirss.v8i3.6754
Funding: This study received no specific financial support.
History: Received: 12 March 2025 / **Revised:** 14 April 2025 / **Accepted:** 16 April 2025 / **Published:** 06 May 2025

Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.
Transparency: The author confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Publisher: Innovative Research Publishing

1. Introduction

In an era where globalization has reached every sector, the healthcare industry is no exception. The growing interconnectedness of markets and technologies has significantly increased the demand for high-quality goods and services [1-3]. Customers, now equipped with an array of choices, expect organizations to not only meet but exceed their expectations in terms of quality, affordability, and accessibility [4]. In this highly competitive environment, businesses that

prioritize customer satisfaction stand a better chance of thriving [5, 6]. Customer satisfaction, which hinges on the ability to deliver the right product at the right time and price, has become a cornerstone for organizations aiming for sustainable success [7]. Amid this backdrop, supply chain management (SCM) emerges as a critical operational strategy that aligns with these demands [8-10]. People widely recognize SCM as the central management of the flow of products and services, encompassing every stage from the procurement of raw materials to the delivery of the final output [11]. This definition highlights SCM's dual role in optimizing internal processes and ensuring customer-centric outcomes. Moreover, effective SCM practices enable organizations to streamline activities, eliminate waste, and deliver value to customers while maintaining a competitive edge in the marketplace [10, 12].

In the healthcare domain, the importance of SCM practices is even more pronounced. The timely availability of medical equipment, supplies, and services directly affects patient care and satisfaction [13]. Strategic supplier partnerships, lean processes, and information sharing are now considered essential components in delivering high-quality care. These practices not only ensure operational efficiency but also align with modern healthcare goals of affordability and reliability. As a result, SCM practices have garnered increasing attention as a means to address the complexities of customer satisfaction in healthcare settings. Despite the well-documented literature on SCM, examination of its application in the healthcare sector still leaves significant gaps. One notable limitation is the lack of focused studies on how SCM practices contribute to customer satisfaction, particularly in specific regional contexts such as the Kingdom of Saudi Arabia (KSA). Despite KSA's ambitious vision to elevate its healthcare standards and meet rising patient demands, the optimization of supply chain processes within the country remains underexplored.

Furthermore, geographical gaps are evident as most existing research predominantly focuses on developed economies, leaving developing regions, including Saudi Arabia, underrepresented in the discourse. This neglect leaves a gap in our understanding of how to tailor SCM practices to the unique challenges and opportunities in these settings. Methodologically, most of the studies that have come before have used qualitative or theoretical approaches. There isn't a lot of direct evidence that shows how well SCM practices keep customers happy in healthcare institutions. Additionally, theoretical gaps persist in identifying specific practices that have the greatest impact on healthcare outcomes. Although broad constructs such as inventory management, vendor partnerships, and quality control are often discussed, their nuanced application and effectiveness within KSA's healthcare sector remain ambiguous. These gaps present an opportunity for research to provide a comprehensive understanding of how SCM practices can address customer satisfaction in healthcare, particularly in contexts characterized by rapid growth and transformation. Given these gaps, the primary aim of this study is to investigate the role of supply chain management practices in enhancing customer satisfaction within the Saudi healthcare sector. Specifically, the research seeks to explore how key practices such as inventory management, vendor partnerships, and quality control contribute to the availability, quality, and affordability of medical services. By addressing these dimensions, the study aims to offer a holistic view of SCM's impact on healthcare outcomes.

To guide this investigation, the study will answer the following key research questions.

1. How do SCM practices impact customer satisfaction in the Saudi healthcare context?
2. What specific SCM practices are most effective in achieving operational efficiency and trust in healthcare institutions?
3. How can these practices align with Saudi Arabia's broader healthcare development goals?

By addressing these questions, the study intends to bridge the identified gaps in the literature and provide actionable insights for both academics and practitioners. The overarching objective is to highlight the importance of robust SCM practices as a strategic tool to meet rising healthcare demands and achieve customer satisfaction. The contributions of this study are both theoretical and practical. From a theoretical perspective, the research expands the existing body of knowledge on SCM by focusing on its application within the healthcare sector. Unlike previous studies that take a generalist approach, this study delves into the specific practices that are most impactful in healthcare, particularly in the context of KSA. By doing so, it addresses both geographical and theoretical gaps, offering new insights into the role of SCM in customer satisfaction. Moreover, the study contributes to the methodological discourse by incorporating empirical evidence to validate the impact of SCM practices. By analyzing real-world data from Saudi healthcare institutions, it provides concrete evidence of how SCM practices influence key outcomes such as patient trust, service quality, and operational efficiency. This empirical approach not only enhances the study's reliability but also sets a foundation for future research in similar contexts.

Practically, the findings of this study have significant implications for healthcare managers and policymakers in Saudi Arabia. By identifying best practices in supply chain management, the research offers a roadmap for improving healthcare services in the country. For instance, optimizing inventory management can ensure the timely availability of medical supplies, while fostering strong vendor partnerships can enhance the reliability and quality of medical equipment [14]. Additionally, adherence to international standards and rigorous quality control practices can instill greater trust among patients and align the healthcare sector with global benchmarks. Finally, the study underscores the potential of SCM practices to reduce costs while maintaining high service quality. In a competitive healthcare system, this dual benefit is critical for meeting patient needs without imposing additional financial burdens [13]. By demonstrating how SCM practices can achieve this balance, the research provides a practical framework for enhancing customer satisfaction and achieving long-term sustainability in the Saudi healthcare system. This study positions itself as a vital contribution to the understanding of supply chain management practices in healthcare. By addressing existing gaps, articulating clear research objectives, and emphasizing practical implications, the research aims to advance knowledge and provide actionable solutions for improving customer satisfaction in Saudi Arabia's healthcare sector. Through its findings, the study hopes to

inspire further exploration of SCM practices in similar contexts, ultimately contributing to the global discourse on healthcare management.

2. Review of Literature

2.1. Supply Chain Management Practices

Supply Chain Management (SCM) is deeply rooted in foundational theories and frameworks that provide a structured understanding of its principles and applications. One seminal framework is the Resource-Based View (RBV), which emphasizes leveraging internal resources, such as SCM practices, to achieve competitive advantage. In the context of SCM, RBV highlights the importance of integrating supply chain partners to maximize the use of tangible and intangible assets. Additionally, Transaction Cost Economics (TCE), as articulated by Williamson [15], underscores the significance of minimizing transaction costs across supply chain processes, which aligns with the goal of fostering collaboration and efficiency among stakeholders. The systems theory further informs SCM by viewing supply chains as interconnected systems that require alignment and optimization for seamless operations. This theory aligns with modern SCM practices that focus on information sharing, customer relationships, and lean practices. Contemporary scholars, such as Haddouch et al. [16], extend these theories to emphasize the evolving nature of SCM in response to global market demands, shorter product life cycles, and increasing consumer expectations. Collectively, these theoretical foundations offer a robust platform to explore the effectiveness of Supply Chain Management Practices (SCMPs) in enhancing organizational and supply chain performance [8, 17].

Recent studies have shed light on the dynamic role of SCM in contemporary business environments. Haddouch et al. [18] identify SCM as a cornerstone of organizational growth, particularly in industries grappling with complex strategies and fluctuating consumer demands. Kosasih et al. [19] elaborate on the challenges posed by reduced product life cycles and the need for adaptable SCM practices. Furthermore, Chiang et al. [20] describe SCM as a cohesive network managing the flow of funds, materials, and information across the supply chain, emphasizing its role in maintaining competitive advantage. Research by Nagariya et al. [21] highlights the strategic importance of SCM in creating value chains and evaluating organizational performance. Specific SCMPs, such as strategic supplier partnerships (SSP) and information sharing (IS), have been found to enhance integration among supply chain partners, ultimately improving both supply chain and organizational performance [22]. Recent literature also stresses the significance of customer relationships (CR) and internal lean practices (ILP) in achieving operational efficiency and addressing customer needs [10]. Collectively, these studies establish SCMPs as integral to achieving supply chain performance (SCP) and organizational goals in a competitive global marketplace.

Despite the significant contributions of recent research, several inconsistencies and limitations persist. For instance, while Amorim Dos Santos et al. [22] highlight the importance of SCMPs in fostering supply chain integration, their findings lack empirical validation, relying heavily on theoretical models. Similarly, Haddouch et al. [18] focus on SCM's role in organizational growth but fail to address how specific practices, such as postponement (PP) and lean practices, directly impact customer satisfaction. Moreover, methodological weaknesses are evident in studies that prioritize cross-sectional designs, limiting the ability to capture long-term impacts of SCMPs on supply chain performance. Reklitis et al. [23] provide valuable insights into global SCM trends but overlook regional variations, particularly in developing economies. These gaps in methodological rigor and contextual specificity hinder the generalizability of findings. Nevertheless, the strengths of existing studies lie in their comprehensive identification of key SCMPs, such as SSP, CR, and IS, as critical determinants of SCP.

The literature review reveals several gaps requiring further exploration. First, there is limited empirical evidence on the specific contributions of SCMPs, such as SSP, IS, and ILP, to organizational performance and customer satisfaction. Most studies, including those by Amorim Dos Santos et al. [22] and Hani [10], focus on theoretical models without substantiating their claims through quantitative analyses. Second, while global SCM trends are well-documented, the application of SCMPs in developing economies remains underexplored, as noted by Kosasih et al. [19]. Another critical gap lies in understanding the interplay between SCMPs and the evolving characteristics of consumer demands in dynamic market environments. While previous research acknowledges these challenges, it does not provide actionable insights into how SCM practices can adapt to such fluctuations. Addressing these gaps is essential to advancing both theoretical and practical understanding of SCM. This study aims to fill these voids by providing empirical validation of SCMPs and exploring their specific impacts on organizational performance and customer satisfaction in diverse contexts.

A synthesis of existing studies highlights the interconnections between dependent variables, such as supply chain and organizational performance, and independent variables, including SCMPs like SSP, CR, IS, PP, and ILP. Amorim Dos Santos et al. [22] emphasize the role of SSP in building trust and collaboration among supply chain partners, thereby enhancing SCP. Similarly, Hani [10] identifies CR and IS as pivotal in aligning supply and demand patterns to meet customer needs effectively. These findings suggest a coherent narrative wherein SCMPs serve as facilitators of integration, coordination, and efficiency across supply chains. Nagariya et al. [21] further highlight how lean practices contribute to waste reduction and cost efficiency, aligning with organizational goals of profitability and customer satisfaction. By synthesizing these insights, the study establishes a comprehensive framework for understanding how SCMPs influence multiple dimensions of supply chain performance. This integration also underscores the need for empirical validation to test the relationships and interactions among these variables.

The identified research gaps and synthesized concepts directly inform the study's objectives and hypotheses. Specifically, the study aims to empirically evaluate the impact of SCMPs, such as SSP, CR, IS, PP, and ILP, on organizational performance and customer satisfaction. By addressing methodological weaknesses and contextual gaps in

existing research, the study seeks to provide actionable insights into the role of SCM in dynamic business environments. This research also aligns with broader goals of enhancing SCM practices to navigate the challenges posed by globalization, reduced product life cycles, and fluctuating consumer demands. By linking the literature to the study's objectives, the research aims to advance theoretical understanding and offer practical solutions for improving SCM practices. In doing so, it addresses critical gaps and contributes to the growing discourse on SCM's role in fostering organizational and supply chain performance.

2.2. Customer Satisfaction

Customer satisfaction is a cornerstone of organizational performance and sustainability, deeply rooted in stakeholder theory. This framework emphasizes that businesses must consider the interests of all stakeholders, with customers being pivotal to their survival and growth [24]. Theories of trust, commitment, and communication underpin customer satisfaction, highlighting that building robust customer relationships is fundamental. Trust theory posits that customers' confidence in an organization fosters loyalty and long-term engagement Khan et al. [25], while commitment theory stresses the role of emotional and rational ties in strengthening customer relationships [26]. Communication theories underscore the importance of transparency and clarity in aligning business practices with customer expectations, further enhancing satisfaction levels [20]. Together, these frameworks lay the foundation for understanding the critical role of Supply Chain Management Practices (SCMPs) in achieving customer satisfaction.

Recent studies have extensively examined the role of SCMPs in enhancing customer satisfaction across diverse industries. Alahmad [27] demonstrated a significant positive relationship between SCMPs and customer satisfaction within manufacturing firms, emphasizing the importance of strategic supplier partnerships and efficient logistics. Similarly, research by Waiyawuththanapoom et al. [28] in the pharmaceutical sector corroborates these findings, highlighting the critical role of SCMPs in addressing industry-specific challenges. Ahmed [29] expanded this investigation to supermarkets, discovering that efficient supply chain integration significantly enhances customer satisfaction. Saad et al. [30] affirmed these conclusions, showcasing the strong positive correlation between SCMPs and customer satisfaction within small and medium-sized enterprises (SMEs) in manufacturing. These studies collectively underline the pivotal role of SCMPs in fostering customer-centric organizational practices. While existing research consistently demonstrates a positive correlation between SCMPs and customer satisfaction, several limitations and inconsistencies emerge. Most studies focus on specific sectors, such as manufacturing, pharmaceuticals, and retail, Ahmed [29] and Waiyawuththanapoom et al. [28], limiting the generalizability of findings across diverse industries. Methodological weaknesses, such as reliance on cross-sectional data, restrict the ability to capture dynamic changes in customer satisfaction over time [30]. Furthermore, while studies emphasize SCMPs' impact, they often overlook critical mediating variables, such as trust, commitment, and communication, that influence the strength and nature of this relationship [25, 26]. Addressing these limitations is crucial to advancing the understanding of how SCMPs drive customer satisfaction.

A significant gap exists in exploring the mediating effects of trust, commitment, and communication within the SCMP-customer satisfaction relationship. Current research predominantly focuses on direct correlations, neglecting how these factors might amplify or mitigate the impact of SCMPs on customer satisfaction. Furthermore, the intersection of SCMPs and customer satisfaction in rapidly evolving industries and globalized markets has received limited attention. This study aims to address these gaps by examining the mediating variables and broadening the scope to include diverse organizational contexts, thereby contributing to a more comprehensive understanding of the mechanisms underpinning this relationship. Synthesizing findings from the literature, it becomes evident that SCMPs, including strategic supplier partnerships, customer relationship management, and efficient logistics, directly enhance customer satisfaction [27, 30]. Trust, commitment, and communication emerge as critical mediators in this relationship, aligning the goals of SCMPs with customer-centric outcomes [25, 26]. By integrating these elements, this study seeks to establish a cohesive framework that links SCMPs with customer satisfaction through key relational factors. The current study aims to fill the identified research gaps by investigating the mediating effects of trust, commitment, and communication in the relationship between SCMPs and customer satisfaction. By addressing these gaps, the study contributes to a more nuanced understanding of how organizations can strategically leverage SCMPs to foster customer loyalty and improve performance. This alignment with existing literature ensures that the study builds on a strong theoretical foundation while addressing areas requiring further exploration.

2.3. Research Gap

A critical gap in the existing literature is the insufficient exploration of the relationship between Supply Chain Management Practices (SCMP) and Customer Satisfaction (CS) within the healthcare sector in Saudi Arabia. Various industries and regions have widely studied SCMP and CS, yet the healthcare sector remains underrepresented in this discourse. This is particularly significant given the unique challenges and operational complexities associated with healthcare supply chains, such as the need for timely delivery, inventory management, and ensuring high-quality patient care. Furthermore, existing studies often overlook the nuanced interactions between specific SCMP determinants and CS outcomes in healthcare settings, especially in emerging markets like Saudi Arabia. Addressing these gaps is essential to enhance understanding and develop targeted strategies for improving healthcare supply chains, which are critical to patient satisfaction and operational efficiency. The Vision 2030 framework's growing emphasis on improving healthcare services in Saudi Arabia further underscores the pressing need for empirical research in this domain. A focused investigation into how specific SCMP factors influence CS can provide actionable insights for healthcare providers, policymakers, and

supply chain managers. Therefore, its potential to contribute to both academic understanding and practical applications in healthcare management justifies this study.

Existing research identifies SCMP as a critical driver of operational efficiency and customer satisfaction. Key SCMP determinants, such as strategic supplier partnerships, customer relationship management, information sharing, postponement, and internal lean practices, are widely acknowledged as integral to effective supply chain operations. Similar to how trust, commitment, and communication shape customer perceptions and satisfaction levels, they also influence CS. Integrating these perspectives, this study proposes a framework where SCMP serves as the independent variable, and CS functions as the dependent variable, mediated by relational factors such as trust, commitment, and communication. In the context of Saudi Arabia's healthcare sector, the relationships between these variables are particularly relevant. For instance, strategic supplier partnerships can enhance the availability of medical supplies, thereby improving trust and satisfaction among patients. Effective information sharing can facilitate better communication and coordination, leading to higher service quality and patient commitment. By synthesizing these findings, the study aims to establish a coherent narrative that connects SCMP determinants with CS outcomes in the healthcare industry.

The primary objective of this study is to address the identified gaps by investigating the impact of SCMP determinants on CS within the Saudi healthcare sector. Specifically, the study will explore the mediating roles of trust, commitment, and communication in this relationship. These objectives align with the broader goal of enhancing healthcare service delivery by optimizing supply chain operations. By addressing the deficiencies in existing research, this study not only contributes to the academic discourse on SCMP and CS but also provides practical insights for healthcare stakeholders in Saudi Arabia. The findings are expected to inform strategies for improving supply chain efficiency and patient satisfaction, ultimately supporting the country's healthcare development initiatives under Vision 2030.

3. Research Methodology

3.1. Conceptual Framework

The current body of literature concerning supply chain management practices (SCMP), customer satisfaction (CS), and their various influencing factors provides a robust foundation for the development of the conceptual model in this research. However, the lack of detailed exploration into the healthcare sector, especially within the context of Saudi Arabia, necessitates a focused approach to contextualize these constructs for more specific insights. The model presents supply chain management practices as an independent variable, evaluating five components through five constructs: strategic supplier partnership (SSP), customer relationships (CR), information sharing (IS), postponement (PP), and internal lean practices (ILP). In contrast, customer satisfaction is defined as a dependent variable, assessed through three constructs: communication (CMN), trust (TR), and commitment (CMT) (to provide a clearer operationalization of CS determinants). These constructs are integral to understanding the dynamic relationship between SCMP and CS in the healthcare sector (see Figure 1).

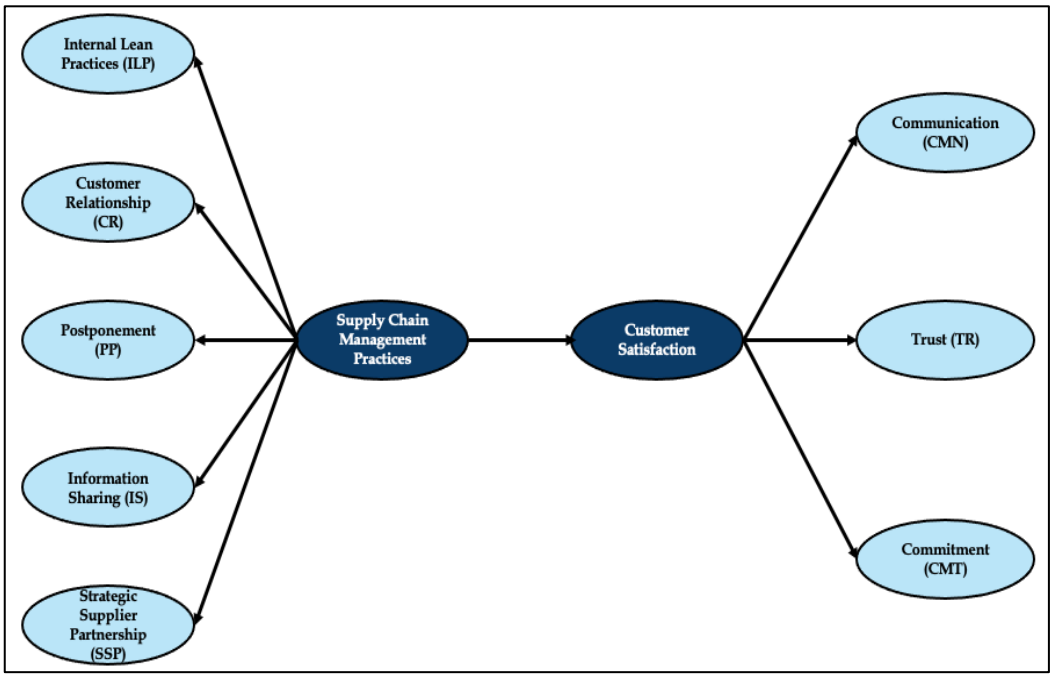

Figure 1.
Proposed Research Model.

The equation serves as the foundation for the proposed research framework.

CS = *f*(SCMP).

Here, SCMP represents Supply Chain Management Practices, while CS denotes Customer Satisfaction. The equation suggests that the supply chain management practices impact customer satisfaction. Explicitly identifying mediating

variables such as trust, communication, and commitment enhances the model's contribution and strengthens the causal link between SCMP and CS, in line with existing research. Furthermore, previous studies inform the inclusion of both SCMP and CS components; however, this research goes further by integrating them within the context of Saudi Arabia's healthcare sector, where operational efficiencies and patient satisfaction are paramount. This focus addresses a significant gap in the literature, ensuring the model is both relevant and applicable. The framework provides a structured approach to evaluate the impact of supply chain management practices on customer satisfaction, with a specific emphasis on factors critical to healthcare operations. By anchoring the model in these constructs, the study not only builds on existing theoretical foundations but also strengthens its practical applicability to address current challenges in the sector. This integrated approach ensures a more comprehensive understanding of the SCMP-CS relationship, offering actionable insights for improving service delivery and patient outcomes in Saudi Arabia's healthcare system.

3.2. Research Objectives

The current study aims to: (1) examine the influence of supply chain management practices (SCMP) on customer satisfaction (CS) within the healthcare sector of the Kingdom of Saudi Arabia (KSA) and (2) propose actionable recommendations for enhancing SCMP to elevate CS. These objectives address a critical gap in the existing literature, particularly the lack of focused research on how SCMP influences CS in the healthcare industry, a sector where customer satisfaction directly impacts service quality and patient outcomes. The study enhances our understanding of how to optimize operational practices to meet and surpass customer expectations by examining this relationship. The healthcare sector in KSA was chosen as the focus of this study for several compelling reasons. First, healthcare is a cornerstone of Vision 2030, a strategic framework aimed at diversifying the Kingdom’s economy and improving public services. The emphasis on healthcare reform within this vision underscores the importance of identifying and implementing effective supply chain practices to meet the growing demand for high-quality healthcare services. Second, the sector represents a critical area where customer satisfaction is not merely a metric of organizational success but a determinant of patient well-being and trust in the healthcare system. The unique challenges faced by the healthcare sector in KSA, including rapid population growth, increasing demand for advanced medical services, and the need to integrate technology into supply chain operations, justify the selection of this sample. These factors make the healthcare sector an ideal case for investigating the intricate dynamics between SCMP and CS, allowing for a contextualized understanding that can inform both theory and practice. By focusing on KSA's healthcare industry, this study ensures that its findings are relevant, actionable, and aligned with national priorities, providing a roadmap for enhancing supply chain effectiveness and patient satisfaction.

3.3. Research Design

The current study adopts a descriptive research approach to explore the various factors influencing supply chain management practices (SCMP) and customer satisfaction (CS) within the healthcare sector of the Kingdom of Saudi Arabia (KSA). This research design is well suited for the study's objectives, as it enables a thorough examination of the relationship between SCMP and CS. Given the complexity of these variables and the need to explore their interactions in the KSA context, the descriptive approach allows for the identification of patterns and trends while simultaneously facilitating a comprehensive analysis of the factors at play. This study, both exploratory and primary in nature, aims to bridge the existing knowledge gap on the impact of SCMPs on CS, particularly in the healthcare sector, a crucial sector for the national economy and public well-being.

To gather relevant data, a structured questionnaire was administered to professionals working in the healthcare sector of KSA, encompassing both temporary and permanent employees. This broad participant base was intentionally chosen to ensure a diverse and representative sample, thus allowing the research to capture a wide range of perspectives and insights from various roles within the healthcare sector. Consequently, this approach guarantees the generalizability of the findings across various healthcare settings in KSA. A total of 500 surveys were distributed through both offline and online channels, with Google Forms being used for ease of access and efficient data collection. Data was gathered between September 19, 2023, and March 2, 2024. Of the 500 surveys distributed, 389 responses were initially collected. However, after eliminating incomplete or invalid responses, we reduced the number of valid responses to 316, indicating a completion rate of approximately 63.2%. This response rate is considered sufficient for generating meaningful statistical insights and reflects a solid level of engagement from the target sample.

Subsequently, the data analysis was carried out using quantitative techniques, including descriptive statistics, correlation analysis, regression analysis, and structural equation modeling (SEM), using SPSS 23.0 and AMOS. These techniques were carefully selected as they not only provide descriptive insights but also allow for testing the more complex relationships between SCMPs and CS. By employing these advanced statistical methods, the study ensures that the results are both robust and reliable, thereby contributing valuable knowledge to the academic literature and offering practical recommendations for improving supply chain practices in the healthcare sector. The selection of this sample is particularly significant, given the crucial role of the healthcare sector within KSA, especially in light of the country’s Vision 2030 reforms, which prioritize improvements in healthcare services. As the healthcare industry directly impacts public health and service delivery, it presents an ideal context for assessing how effective supply chain management practices can enhance customer satisfaction. Therefore, we carefully chose this sample to provide rich, context-specific insights into how SCMPs influence CS within one of the country's most critical and rapidly evolving sectors.

4. Data Analysis and Interpretation

As previously mentioned, the primary objective of this study is to examine the impact of supply chain management practices on customer satisfaction within the Saudi healthcare sector. To achieve this, the study utilized SPSS and AMOS software to conduct correlation and regression analyses, enabling a comprehensive understanding of the relationships between the key variables. These analytical tools were chosen for their ability to handle complex data sets and provide robust insights into the influence of supply chain practices on customer satisfaction.

4.1. Reliability Analysis

In SPSS, reliability analysis serves as a crucial statistical method to evaluate the internal consistency and stability of a set of measurement scales or items. This analysis calculates the Cronbach's Alpha coefficient, which indicates the degree of interrelatedness among the items in a group. Higher values of Cronbach's Alpha signify stronger internal consistency and reliability [31]. As presented in Table 1, the reliability statistics show a Cronbach's Alpha value of .971 for the 40 items used in the study. This exceptionally high value demonstrates a substantial internal consistency among the items, as Cronbach's Alpha values typically range from 0 to 1, with values closer to 1 indicating a higher degree of interrelatedness [32].

Table 1.
Reliability Statistics.

Cronbach's Alpha	N of Items
0.971	40

The value of .971 indicates a high level of reliability for the measurement items used to assess the specified constructs [33]. This result suggests that the items consistently measure the same underlying constructs, ensuring the reliability and dependability of the data. Furthermore, the table reveals a total of 40 items, reflecting the comprehensive nature of the measurement tool employed in this study. The extensive set of items measures a wide range of construct-related aspects, thereby enhancing the robustness of the study's findings. The reliability statistics confirm the strength and validity of the research instrument, demonstrating that the items used in this study are consistent and dependable. These findings support the reliability of the data and reinforce the credibility of the conclusions drawn from the analysis [34].

4.2. Descriptive Statistics

The measurement of the statements employed a Likert scale ranging from 1 to 5, where 1 represented strong disagreement and 5 represented strong agreement. Descriptive statistics were then derived from the mean values of the practices in supply chain management and the dimensions of customer satisfaction. Table 2 presents the descriptive statistics for the constructs used in this study, including the means and standard deviations for each item. Reviewing the descriptive statistics in Table 2, we can conclude that the respondents, with a mean of 3.041 (M = 3.041) and a standard deviation of 1.301 (SD = 1.301), generally expressed a satisfactory level of contentment regarding both their supply chain management practices and customer satisfaction. This indicates a moderate to favorable perception of the supply chain practices and satisfaction levels among participants. Furthermore, the table illustrates the distribution of responses for each construct, with each variable assessed through multiple items. This provides a detailed overview of the variability and distribution of responses, offering valuable insights into the overall data characteristics and the diversity of opinions captured during the data collection process [35].

Table 2.
Descriptive Statistics.

Item	N	Mean	Std. Deviation
IS1	316	3.10	1.251
IS2	316	3.09	1.299
IS3	316	3.10	1.248
IS4	316	3.16	1.252
IS5	316	3.09	1.289
SSP1	316	3.16	1.294
SSP2	316	3.16	1.312
SSP3	316	3.15	1.297
SSP4	316	3.14	1.329
SSP5	316	3.09	1.273
PP1	316	3.10	1.308
PP2	316	3.09	1.324
PP3	316	3.16	1.321
PP4	316	3.14	1.371
PP5	316	3.00	1.317
ILP1	316	2.95	1.344
ILP2	316	3.04	1.333
ILP3	316	2.91	1.376

ILP4	316	2.95	1.333
ILP5	316	3.03	1.352
CR1	316	3.04	1.296
CR2	316	2.97	1.271
CR3	316	2.94	1.322
CR4	316	3.00	1.337
CR5	316	3.02	1.308
CMT1	316	2.94	1.290
CMT2	316	2.97	1.359
CMT3	316	2.91	1.310
CMT4	316	2.91	1.213
CMT5	316	2.97	1.281
TR1	316	3.06	1.274
TR2	316	2.98	1.278
TR3	316	3.06	1.316
TR4	316	2.99	1.275
TR5	316	3.10	1.282
CMN1	316	3.04	1.284
CMN2	316	3.07	1.332
CMN3	316	2.98	1.259
CMN4	316	3.06	1.271
CMN5	316	3.03	1.297
Valid N (listwise)	316		

“

The descriptive statistics show that while respondents have more positive views on some dimensions, like Strategic Supplier Partnership (SSP) and Postponement (PP) (mean values between 3.09 and 3.16), they also have more negative views on others, like Internal Lean Practices (ILP) and Customer Commitment (CMT), which means there is more room for improvement in those areas. These insights can help identify the areas where supply chain management practices and customer satisfaction require enhancement [36]. The descriptive statistics suggest a generally positive but moderately varied response regarding the constructs of supply chain management practices and customer satisfaction, providing a solid foundation for further statistical analysis and exploration. These findings highlight the importance of understanding the distribution and variability in the data to better target improvements in the Saudi healthcare sector's supply chain management practices and customer satisfaction strategies.

4.3. Correlation Analysis

Table 3 presents the correlation matrix for the variables analyzed in this study, offering a comprehensive overview of the interrelationships between supply chain management practices and customer satisfaction dimensions. Each cell in the table displays the Pearson correlation coefficient between pairs of variables, accompanied by the corresponding p-value. The Pearson correlation coefficient (r) ranges from -1 to 1, where a value of 1 signifies a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 represents no correlation [37]. A notable observation from Table 3 is the exceptionally positive correlation between Information Sharing (IS) and Strategic Supplier Partnership (SSP), with a Pearson correlation coefficient of 0.903. This indicates that as information sharing increases, there is a corresponding increase in the strength of the strategic partnership between suppliers, suggesting a significant interdependence between these two practices. Similarly, the correlation between IS and Customer Relationships (CR) is 0.648, demonstrating a moderate to strong positive relationship. This implies that improved information sharing within the supply chain is associated with better customer relationship management. Additionally, the very strong positive correlation of 0.904 between Trust (TR) and Communication (CMN) indicates a clear interdependence between these two dimensions, with an increase in trust correlating with improved communication within the supply chain.

Table 3.
Pearson Correlation Matrix.

		IS	SSP	PP	ILP	CR	CMT	TR	CMN
IS	Pearson Correlation	1	0.903**	0.891**	0.638**	0.648**	0.666**	0.570**	0.567**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	316	316	316	316	316	316	316	316
SSP	Pearson Correlation	0.903**	1	0.885**	0.606**	0.628**	0.640**	0.559**	0.561**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000	0.000
	N	316	316	316	316	316	316	316	316
PP	Pearson Correlation	0.891**	0.885**	1	0.714**	0.709**	0.722**	0.536**	0.545**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000	0.000
	N	316	316	316	316	316	316	316	316
ILP	Pearson Correlation	0.638**	0.606**	0.714**	1	0.896**	0.856**	0.450**	0.448**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000	0.000
	N	316	316	316	316	316	316	316	316
CR	Pearson Correlation	0.648**	0.628**	0.709**	0.896**	1	0.854**	0.460**	0.477**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000	0.000	0.000
	N	316	316	316	316	316	316	316	316
CMT	Pearson Correlation	0.666**	0.640**	0.722**	0.856**	0.854**	1	0.613**	0.623**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		0.000	0.000
	N	316	316	316	316	316	316	316	316
TR	Pearson Correlation	0.570**	0.559**	0.536**	0.450**	0.460**	0.613**	1	0.904**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000		0.000
	N	316	316	316	316	316	316	316	316
CMN	Pearson Correlation	0.567**	0.561**	0.545**	0.448**	0.477**	0.623**	0.904**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	N	316	316	316	316	316	316	316	316

**. Correlation is significant at the 0.01 level (2-tailed).

“

These findings provide valuable insights into the interconnectedness of various supply chain management practices and customer satisfaction dimensions. Specifically, the data suggest that enhancements in supply chain practices, such as better information sharing, stronger supplier partnerships, and improved trust and communication, are likely to foster higher levels of customer satisfaction [38]. This pattern reinforces the central hypothesis that well-executed supply chain management practices positively influence customer satisfaction outcomes [39]. The sample of 316 respondents was chosen to ensure a robust representation of individuals familiar with or directly involved in supply chain management within the Saudi healthcare sector. The large sample size enhances the statistical power of the analysis, increasing the reliability and generalizability of the results to the broader population. Additionally, the sample size aligns with recommendations for achieving sufficient power in correlation analyses, thus ensuring the validity of the observed relationships**.**

Table 4.
Correlations Matrix.

		SCMP	CS
SCMP	Pearson Correlation	1	0.735**
	Sig. (2-tailed)		0.000
	N	316	316
CS	Pearson Correlation	0.735**	1
	Sig. (2-tailed)	0.000	
	N	316	316

Table 4 above presents the correlation matrix between Supply Chain Management Practices (SCMP) and Customer Satisfaction (CS) in the context of the study. The Pearson correlation coefficient of 0.735 indicates a strong positive correlation between SCMP and CS, suggesting that improvements in supply chain management practices are associated with a significant increase in customer satisfaction. The significance level, with a p-value of less than 0.001, further strengthens the conclusion that this correlation is statistically significant [40]. This finding underscores the importance of effective supply chain management in enhancing customer satisfaction within the healthcare sector in Saudi Arabia [41]. Given the healthcare industry's increasing demand for efficiency and quality of service, these results suggest that optimizing supply chain operations could be a key strategy for improving customer experiences [27]. By enhancing SCMP, healthcare organizations can significantly impact customer satisfaction, thereby strengthening the relationship between supply chain operations and customer experiences in healthcare environments.

4.4. Regression Analysis

Table 5 presents the model summary for examining the relationship between Supply Chain Management Practices (SCMP) and Customer Satisfaction (CS). The R-squared value of 0.540 indicates that 54% of the variation in Customer Satisfaction can be explained by the variations in Supply Chain Management Practices [42]. This moderate explanatory power suggests that SCMP plays a substantial role in influencing customer satisfaction, while acknowledging that other factors may also contribute to CS. The adjusted R-squared value of 0.539 reflects the model's ability to explain this variance while accounting for the number of predictors used, reinforcing the model's good fit.

The standard error of the estimate (0.63321) indicates the average deviation between the observed and predicted values of Customer Satisfaction, providing insight into the accuracy of the model's predictions. Furthermore, the significant R-value of 0.735 highlights a strong positive correlation between SCMP and CS, confirming the robustness of the relationship [43]. Collectively, these findings demonstrate that Supply Chain Management Practices significantly influence Customer Satisfaction within the healthcare sector in Saudi Arabia, showcasing the model's explanatory power and statistical significance [44].

Table 5.
Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.735[a]	0.540	0.539	0.63321

Note: a. Predictors: (Constant), SCMP.
b. Dependent Variable: CS.

Table 6 presents the results of the analysis of variance (ANOVA) conducted on the regression model investigating the relationship between Supply Chain Management Practices (SCMP) and Customer Satisfaction (CS). The regression sums of squares, amounting to 147.822, represents the portion of the variability in CS explained by the model, while the residual sum of squares (125.899) indicates the unexplained variability. The F-statistic of 368.678 shows how important the model is as a whole, and the p-value (Sig.) of less than 0.001 shows that the regression model is very important statistically. This result suggests that the observed relationship between SCMP and CS is unlikely to have occurred by chance and strongly supports the validity of the model. The high F-statistic and significant p-value further validate the model's explanatory power, indicating that SCMP is a statistically significant predictor of CS. This strengthens the argument that the quality and efficiency of supply chain practices play a pivotal role in shaping customer satisfaction in the healthcare sector. Therefore, the ANOVA results strongly support the idea that good SCMP has a big effect on CS. This shows how important it is to use efficient supply chain methods to make things better for patients in healthcare settings [29].

Table 6.
ANOVA[a].

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	147.822	1	147.822	368.678	0.000[b]
	Residual	125.899	314	0.401		
	Total	273.721	315			

Note: a. Dependent Variable: CS
b. Predictors: (Constant), SCMP

Table 7 presents the coefficients derived from the regression model examining the relationship between Supply Chain Management Practices (SCMP) and Customer Satisfaction (CS). The unstandardized coefficient (B) for SCMP is 0.709, which means that a one-unit increase in SCMP corresponds to a 0.709-unit increase in CS, indicating a strong and positive impact of SCMP on customer satisfaction. The standardized coefficient (Beta) of 0.735 further emphasizes this robust relationship, signifying that SCMP has a significant and powerful influence on CS when considering other variables in the model. The t-value of 19.201 and the corresponding p-value (Sig.) of less than 0.001 confirm the statistical significance of the SCMP coefficient. These results are crucial as they offer strong empirical evidence for the hypothesis that improvements in SCMP positively impact CS within the healthcare sector of Saudi Arabia. The high t-value indicates that the coefficient for SCMP is not only significant but also substantial in magnitude, reinforcing the critical role of effective supply chain management in fostering customer satisfaction [45]. Overall, these findings underscore the importance of optimizing supply chain management practices to enhance customer satisfaction in healthcare, suggesting that healthcare organizations should prioritize SCMP improvements to drive better customer outcomes [46].

Table 7.
Coefficients[a].

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			Std. Error	Beta		
	Constant)	0.834	0.119		7.035	0.000
	CMP	0.709	0.037	0.735	19.201	0.000

Note: a. Dependent Variable: CS.

4.5. Plots for the Study

Figure 2 presents the histogram with a fitted distribution line, which shows a clear alignment between the heights of the bars and the shape of the line. This strong correspondence suggests that the data closely follows the expected distribution, supporting the normality of the data. The bars in the histogram closely adhere to the fitted distribution line, indicating a well-fitted model for the residuals. Furthermore, the normal probability plot of the residuals is constructed by plotting the sample percentiles of the residuals on the y-axis against the theoretical percentiles of the normal distribution on the x-axis [47]. The plot displays an approximately linear pattern, which is crucial as it reinforces the assumption that the error terms follow a normal distribution [48]. The linear alignment observed in the plot suggests that the residuals do not deviate significantly from the normal distribution, validating the use of parametric statistical methods in the analysis.

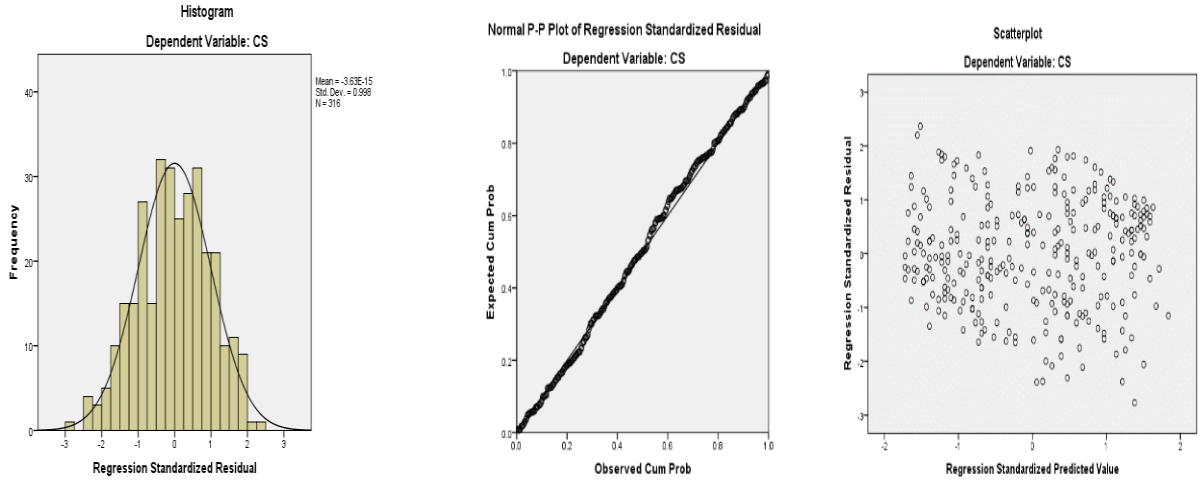

Figure 2.
Charts of the Study.

4.6. SEM Model

Singh et al. [49] used a more advanced method of analysis called structural equation modeling (SEM) with AMOS software to check if the conceptual model was good enough. Figure 3 presents the results, including the fitting indices and regression analysis, derived from data collected and analyzed using AMOS software. These fitting indices are critical in evaluating the goodness-of-fit of the model, ensuring that the conceptual framework accurately reflects the relationships between the variables under investigation. Structural Equation Modeling (SEM) was used to investigate the relationship between supply chain management practices and customer satisfaction. The significance threshold was set at $\alpha = 0.01$, a level that ensures robust statistical validation of the model [48]. The study appropriates this threshold because it upholds a strict level of confidence in the results and reduces the risk of Type I errors, which could lead to the incorrect assumption of significant relationships.

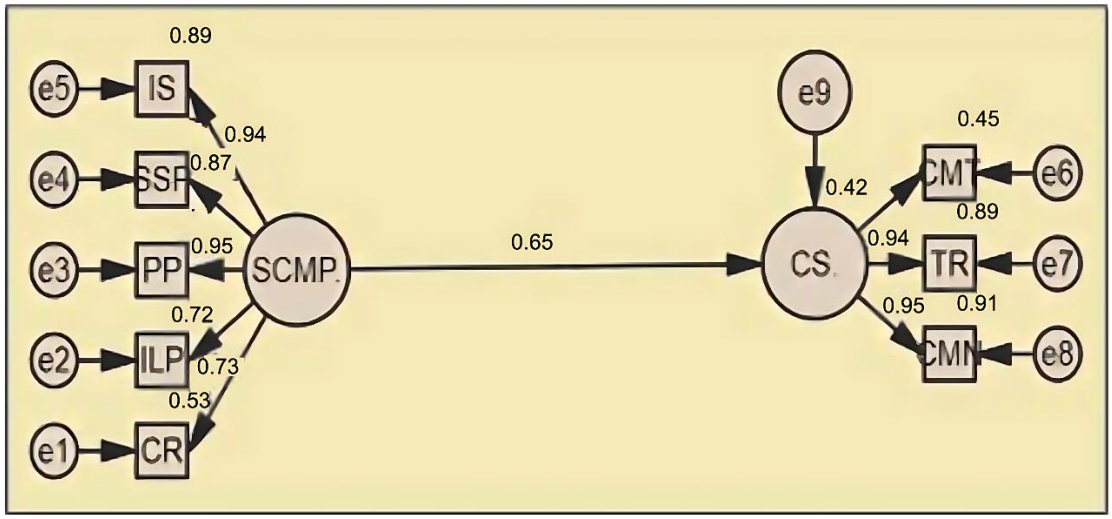

Figure 3.
SEM Model.

Table 8 displays the regression weights for the baseline model. This model looks at the connections between Supply Chain Management Practices (SCMP) and Customer Satisfaction (CS), along with its five main parts: Information Sharing (IS), Postponement (PP), Customer Relationships (CR), and Internal Lean Practices (ILP). The findings indicate that SCMP has a significant and strong positive influence on each of the constituent elements of CS. As an example, a one-unit increase in SCMP causes rises of 1.030, 1.271, 1.279, and 1.243 units in ILP, PP, SSP, and IS, in that order. All of these increases are statistically significant, with critical ratio (C.R.) values higher than the significance threshold (***). These results highlight the crucial role of SCMP in enhancing various dimensions of CS, particularly within the healthcare sector of Saudi Arabia, where the implementation of robust supply chain practices can lead to tangible improvements in customer satisfaction. This model emphasizes the importance of adopting integrated supply chain strategies that align with the operational needs of healthcare organizations. Additionally, Trust (TR) and Communication (CMN), two of CS's components, significantly influence it, with significant regression weights of 1.469 and 1.470, respectively. This finding underscores the importance of relational dynamics and effective communication within the supply chain in fostering overall customer satisfaction. The results also suggest that organizations focusing on enhancing trust and communication within their supply chain networks will likely see higher customer satisfaction levels.

Table 8.
Regression Weights: (Group number 1 - Default model).

			Estimate	S.E.	C.R.	P	Label
CS.	<---	SCMP.	0.553	0.060	9.206	***	Significant
CR	<---	SCMP.	1.000				
ILP	<---	SCMP.	1.030	0.079	13.042	***	Significant
PP	<---	SCMP.	1.271	0.073	17.516	***	Significant
SSP	<---	SCMP.	1.279	0.074	17.207	***	Significant
IS	<---	SCMP.	1.243	0.071	17.397	***	Significant
CMT	<---	CS.	1.000				
TR	<---	CS.	1.469	0.100	14.727	***	Significant
CMN	<---	CS.	1.470	0.100	14.757	***	Significant

The standardized regression weights for the default model are shown in Table 9. These show the strength and direction of the relationships between Supply Chain Management Practices (SCMP) and Customer Satisfaction (CS), as well as their different parts. The estimates represent the extent of change in standard deviations of the dependent variable corresponding to a one standard deviation change in the independent variable [50]. For instance, the standardized regression weights for SCMP range from 0.724 to 0.949 when compared to the CS components of Customer Relationships (CR), Internal Lean Practices (ILP), Postponement (PP), Strategic Supplier Partnership (SSP), and Information Sharing (IS). It shows that a one-standard-deviation rise in SCMP causes a proportional rise in the CS components. The biggest effects were seen in Postponement (PP) and Information Sharing (IS), where the regression weights are 0.949 and 0.943, respectively. These components are particularly significant because they represent key elements in enhancing operational responsiveness and the exchange of critical information, which are vital in the healthcare industry. The relatively high regression weight of Postponement (PP) suggests that delays in final product customization or services, tailored to patient needs, have a major influence on customer satisfaction, particularly in healthcare settings where responsiveness is paramount. Similarly, the strong effect of Information Sharing (IS) highlights the importance of communication and transparency in the supply chain, facilitating better coordination and decision-making that enhances the overall customer experience. This finding is in line with existing literature, such as Singh et al. [49], which indicates that well-established information flows within the supply chain contribute directly to improved service delivery and customer satisfaction.

On the other hand, the components of customer satisfaction (trust (TR), communication (CMN), and commitment (CMT)) exhibit standardized regression weights ranging from 0.671 to 0.951. These values demonstrate their individual contributions to overall customer satisfaction. Trust (TR), with a standardized regression weight of 0.945, has a particularly strong effect on customer satisfaction, underscoring its role in fostering long-term relationships between healthcare providers and patients. Communication (CMN), with a standardized regression weight of 0.951, shows the most robust contribution, emphasizing that effective communication is one of the most critical factors in determining customer satisfaction. The relatively lower weight for Commitment (CMT) at 0.671 suggests that while commitment is important, its influence on overall satisfaction in this context is somewhat less pronounced compared to trust and communication. These standardized regression weights offer valuable insights into the significance of each variable in shaping customer satisfaction within the healthcare sector in Saudi Arabia [32]. By quantifying the relationship between SCMP and CS, the results provide healthcare organizations with specific areas to focus on in order to enhance customer satisfaction. In particular, a strong emphasis on improving information sharing and postponement strategies within the supply chain may yield substantial improvements in patient satisfaction, ultimately leading to better patient care outcomes.

Table 9.
Standardized Regression Weights: (Group number 1 - Default model).

			Estimate
CS.	<---	SCMP.	0.648
CR	<---	SCMP.	0.731
ILP	<---	SCMP.	0.724
PP	<---	SCMP.	0.949
SSP	<---	SCMP.	0.933
IS	<---	SCMP.	0.943
CMT	<---	CS.	0.671
TR	<---	CS.	0.945
CMN	<---	CS.	0.951

5. Discussions

The study demonstrates a strong, positive relationship between SCMP and customer satisfaction, consistent with the findings of previous studies [29, 51]. By confirming the significant role of SCMP in healthcare supply chains, this research contributes to existing literature by expanding the understanding of how lean practices, strategic partnerships, and information sharing positively influence customer satisfaction [14, 27]. The consistency of these findings with earlier studies supports the argument that well-structured supply chains enhance performance in service-based industries, especially in healthcare contexts where efficiency and quality are paramount. The findings presented in Table 8 reveal significant and consistent relationships between Supply Chain Management Practices (SCMP) and various aspects of customer satisfaction (CS) within the healthcare sector of Saudi Arabia. These results reflect the importance of strategic supply chain management in improving customer satisfaction and its key elements, such as trust, communication, and internal processes. The most noteworthy outcome is the strong positive association between SCMP and the specific elements of customer satisfaction, including customer relationships (CR), internal lean practices (ILP), postponement (PP), strategic supplier partnership (SSP), and information sharing (IS). Each of these components of CS shows statistically significant regression weights, with critical ratios well above the threshold for significance (typically 1.96 for a 95% confidence level). This indicates that effective supply chain management practices directly contribute to improvements in customer satisfaction dimensions in healthcare settings.

A regression estimate of 1.000 represents the direct link between SCMP and Customer Relationships (CR), highlighting the crucial role supply chain practices play in cultivating robust and positive customer relationships. Trust and effective service delivery often center on customer relationships in a healthcare context. The big impact of SCMP on CR is in line with what other studies have found, like Agarwal and Narayana [51], which shows that good communication and relationship dynamics, which are important parts of SCMP, can make buyers and sellers happier and improve the quality of their relationships overall. Thus, by investing in robust supply chain practices, healthcare organizations can enhance their relationships with both patients and suppliers, which ultimately leads to higher levels of satisfaction.

Each of these variables ILP, PP, SSP, and IS, is integral to an organization's ability to streamline its supply chain operations. Regression estimates for these variables (1.030, 1.271, 1.279, and 1.243, respectively) indicate that a well-managed supply chain enhances operational efficiency, ensures timely delivery, and improves information flow, all of which directly impact customer satisfaction. Internal Lean Practices (ILP), with their high regression weight, suggest that reducing waste and optimizing internal processes can significantly boost operational efficiency, which, in turn, results in improved service delivery and higher satisfaction levels among customers. Similarly, postponement (PP) the practice of delaying final product customization until the customer’s needs are clear directly impacts customer satisfaction by enhancing responsiveness to patient demands. These results resonate with research by Alahmad [27], which indicates that lean practices and postponement strategies significantly enhance supply chain performance in Saudi organizations, contributing to better customer outcomes. Strategic Supplier Partnership (SSP) plays a pivotal role in ensuring the timely and reliable delivery of resources, which directly impacts patient care in healthcare settings. The significant impact of SSP on CS in this study aligns with the work of Almutairi et al. [14], who highlighted that strong supplier partnerships foster reliability and quality in service delivery. Furthermore, information sharing (IS), another important aspect of SCMP, facilitates transparency and collaboration, leading to better decision-making and increased satisfaction by ensuring that all stakeholders are informed and aligned.

The model also reveals that SCMP significantly impacts Trust (TR) and Communication (CMN), two essential components of customer satisfaction. The regression estimates for these two components (1.469 and 1.470, respectively) reflect the centrality of trust and effective communication in building and maintaining positive relationships with healthcare customers. This finding aligns with the work of Bhalla et al. [37], who argue that trust and clear communication within supply chains are crucial for fostering long-term relationships and improving overall satisfaction. The significant influence of SCMP on TR and CMN is critical in healthcare environments, where patient care often depends on the reliability of information and the trust patients place in healthcare providers. As such, the findings suggest that a more streamlined and transparent supply chain not only enhances operational efficiency but also builds stronger, more trusting relationships with customers, thereby improving satisfaction.

The results of this study resonate with previous research in supply chain management, particularly studies focusing on healthcare systems. For instance, Betcheva et al. [52] emphasized that integrated supply chain practices, including lean management and information sharing, can significantly enhance operational performance and customer satisfaction in the healthcare sector. Similarly, the significant roles of strategic supplier partnerships and lean practices observed in this study are consistent with the findings of Almutairi et al. [14], who showed that lean practices and collaboration with suppliers are crucial for improving patient outcomes and satisfaction in Saudi healthcare organizations. While the results generally align with previous studies, this research contributes a nuanced understanding of the specific mechanisms through which SCMP influences customer satisfaction in healthcare. By examining a comprehensive set of SCMP practices and their effects on multiple dimensions of customer satisfaction, this study offers a more detailed insight into the complex relationships between supply chain practices and customer satisfaction in healthcare contexts.

From a theoretical standpoint, these findings contribute to the body of knowledge in supply chain management and customer satisfaction by providing empirical evidence of the critical role that SCMP plays in enhancing service quality and customer relationships. The study expands on established models of supply chain management by integrating customer satisfaction as a central outcome variable. This perspective emphasizes the need for healthcare organizations to view supply chain practices not just as operational tools but as strategic levers for improving overall service delivery and patient satisfaction. Practically, these findings offer several actionable insights for healthcare organizations in Saudi Arabia and beyond. Healthcare providers looking to enhance patient satisfaction should focus on strengthening their supply chain management practices. In particular, investing in lean practices, fostering strong supplier relationships, and ensuring transparent communication are all strategies that can lead to significant improvements in customer satisfaction. Policymakers should also consider encouraging healthcare organizations to adopt these practices as part of broader healthcare reforms aimed at improving service quality and patient outcomes.

While the study provides valuable insights, several limitations should be considered. The research focuses on healthcare organizations in Saudi Arabia, and as such, the findings may not be directly applicable to other sectors or countries. Future research could explore the generalizability of these results across different industries and geographical contexts. Additionally, the cross-sectional nature of the study limits the ability to draw causal inferences, so future studies could adopt longitudinal designs to better understand the long-term effects of supply chain management practices (SCMP) on customer satisfaction. This study underscores the importance of supply chain management practices in enhancing customer satisfaction in the healthcare sector. The results suggest that healthcare providers can significantly improve patient satisfaction by optimizing their supply chain operations, particularly through internal lean practices, strategic supplier partnerships, and effective information sharing. By focusing on these practices, organizations can create more efficient and responsive supply chains that ultimately lead to better service delivery and stronger relationships with customers.

6. Conclusions

This study examined the relationship between supply chain management practices (SCMP) and customer satisfaction (CS) in the healthcare sector of Saudi Arabia. The key findings indicate a strong positive relationship between SCMP and CS, confirming that effective supply chain strategies significantly enhance patient satisfaction. Specifically, it was found that strategic partnerships with suppliers, effective information sharing, and the adoption of lean internal practices were identified as key drivers of customer satisfaction. These findings, therefore, align with the research hypothesis, which posited that SCMP directly influences CS in healthcare organizations, reinforcing the notion that well-executed supply chain practices are essential to improving patient experiences.

The study offers several important theoretical and practical implications. From a theoretical standpoint, the research expands the existing body of knowledge on the application of supply chain management principles within healthcare, particularly within the Saudi Arabian context. It provides compelling evidence that efficient supply chain operations lead to better service delivery and, consequently, higher levels of patient satisfaction, contributing to a deeper understanding of operational efficiency in healthcare systems. On the practical side, healthcare organizations can leverage these findings to implement targeted strategies. Specifically, they can focus on fostering stronger supplier relationships, improving information systems, and adopting lean practices to enhance service quality and operational efficiency. Additionally, policymakers in Saudi Arabia can utilize these insights to introduce legislation or provide incentives that promote the adoption of best practices in supply chain management, thereby improving healthcare service delivery on a broader scale.

This study makes several unique contributions to the field of supply chain management and healthcare operations. First, it offers new insights into how SCMP directly impacts customer satisfaction in the healthcare sector, with a particular emphasis on the Saudi Arabian context. By highlighting the importance of specific SCMP elements—such as supplier collaboration and lean practices the study provides actionable insights for healthcare administrators and policymakers to enhance service quality. Furthermore, the study challenges some existing literature by underscoring the complex interdependencies within the healthcare supply chain. It stresses the need for strategic coordination among stakeholders to ensure patient satisfaction, thus filling a gap in understanding the specific impact of supply chain practices on customer satisfaction in non-Western healthcare systems. These findings, therefore, not only support but also extend existing research by focusing on a different geographical and cultural setting.

The study acknowledges several limitations despite its valuable contributions. One major constraint is the cross-sectional nature of the research, which limits the ability to assess the long-term effects of SCMP on customer satisfaction and patient outcomes. Furthermore, the study's focus on Saudi Arabia may affect the generalizability of the results to healthcare systems in other regions or countries with different socio-economic contexts. The sample size, though

representative, was limited to specific healthcare organizations, and a broader, more diverse sample could have provided more robust insights. In addition, the research primarily relied on quantitative data, which, while useful, may not fully capture the complexities of the factors influencing customer satisfaction. To address these limitations, future studies could employ a mixed-methods approach, which would offer a more comprehensive understanding of the relationship between SCMP and CS.

Building on the insights from this study, future research could explore several unresolved questions and new areas that have emerged. For instance, longitudinal studies could evaluate the long-term effects of SCMP on customer satisfaction and patient outcomes, thus providing a deeper understanding of how sustained improvements in supply chain management affect the healthcare experience over time. Additionally, qualitative research techniques, such as interviews or focus groups with healthcare providers, patients, and supply chain professionals, could reveal the underlying mechanisms and contextual factors influencing the relationship between SCMP and CS. Moreover, conducting comparative studies across different healthcare environments or regions within Saudi Arabia could help identify best practices and highlight regional differences. Finally, incorporating patient feedback systems and integrating patient preferences into the decision-making processes of the supply chain could provide more relevant and effective strategies for improving customer satisfaction in healthcare.

This study underscores the critical role of supply chain management in enhancing customer satisfaction within the healthcare sector of Saudi Arabia. Addressing the research gap regarding the relationship between SCMP and CS, it provides valuable insights for both healthcare administrators and policymakers. The findings emphasize the importance of adopting strategic supply chain practices, such as supplier collaboration and lean methodologies, to improve service quality and patient outcomes. Ultimately, this research has the potential to inform future healthcare policy and management practices, contributing to the continuous improvement of the healthcare system in Saudi Arabia. By implementing these strategies, healthcare organizations can elevate service delivery and patient satisfaction, making a significant contribution to the overall well-being of society.

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