Effects of Supply Chain Management Practices on Organizational Supply Chain Performance: A Mediated Moderated Model

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ABSTRACT

The primary objective of this research is to empirically investigate the influence of supply chain collaboration, supply chain leadership, and supply chain management practices on the performance of supply chains within companies situated in Saudi Arabia. Additionally, the study aims to explore the moderating effect of supply chain flexibility, as well as the mediating role played by supply chain integration and supply chain capabilities. Quantitative data were gathered from a sample of 380 supply chain managers employing a convenient sampling technique. The research design adopted a cross-sectional approach, and data analysis was conducted using Partial Least Squares (PLS) Structural Equation Modelling (SEM) methodology. The results of the analysis reveal that supply chain collaboration, supply chain leadership, and supply chain management practices exhibit positive and statistically significant effects on supply chain performance, supply chain capabilities, and supply chain integration. Furthermore, the indirect effects, considering both moderating and mediating influences, demonstrate significant and positive impacts of all exogenous variables on endogenous variables. The favourable and significant outcomes of this study, particularly within the context of a moderated mediated model, contribute substantially to both theoretical understanding and practical applications. This research offers valuable insights for researchers, policymakers, and supply chain managers aiming to enhance supply chain performance through a targeted focus on the variables examined in the study.

KEYWORDS: Supply Chain Collaboration, Supply Chain Leadership, Supply Chain Performance, Supply Chain Flexibility, Saudi Arabia.

1. INTRODUCTION

In the contemporary competitive landscape, the performance of supply chains (SCP) stands as a critical determinant of competitiveness and success within the prevailing global milieu (Yousefi & Tosarkani, 2023). As organizations endeavour to satisfy consumer demands amidst intricate supply chain networks, comprehending the factors influencing SCP assumes paramount significance (Karmaker et al., 2023). Among these determinants, supply chain capabilities (SCC) and supply chain integration (SCI) emerge as pivotal elements in shaping SCP (Ruzo-Sanmartín et al., 2023). SCC encompasses a spectrum of competencies such as responsiveness, flexibility, and innovation, which aid companies in adapting to market changes (Khan, 2024). Similarly, SCI entails the involvement of diverse entities across the supply chain

processes, thereby enhancing communication and operational efficiency (Khan, 2024), ultimately contributing to the enhancement of SCP.

Furthermore, SCC and SCI can be enhanced through various factors, including supply chain management practices (SCMP), supply chain ethical leadership (SCEL), and supply chain collaboration (SSC), which contribute to the improvement of SCP. Among these determinants, SSC fosters knowledge sharing and collaborative problem-solving, thereby facilitating integration endeavours and bolstering overall performance (Oubrahim et al., 2023). SCEL, within supply chains, establishes an organizational ethos of integrity and transparency, not only fortifying collaboration but also fostering an environment conducive to innovation and capability enhancement (Wang & Feng, 2023). Additionally, SCMP plays a pivotal role in streamlining operations and augmenting SCC and SCI (Cahyono et al., 2023; Saragih et al., 2020), thereby contributing to the enhancement of SCP.

Hence, SSC, SCEL, SCMP, SCC, and SCI are pivotal components contributing to SCP. Conversely, the significance of supply chain flexibility (SCF) concerning SCI and SCC cannot be disregarded in enhancing SCP. SCF facilitates organizational adaptation to market fluctuations, supplier disruptions, and unforeseen events, thereby bolstering SCP (Bag & Rahman, 2023). Embracing a culture of adaptability and responsiveness, SCF empowers organizations to effectively harness collaborative initiatives, ethical leadership, and management practices to augment integration and capabilities. For instance, SCF enables more facile adjustment of production schedules, modification of distribution channels, and adoption of new technologies, thereby enhancing operational efficiency and performance outcomes (Bhatti et al., 2022). Thus, integrating SCF into the strategic framework enables organizations to fortify their capabilities and integration endeavours, thereby potentially elevating their SCP.

Despite the burgeoning literature on supply chain management, significant gaps persist in comprehending the interrelationships among the aforementioned variables, particularly regarding inconsistent findings, moderating effects, and mediating effects. Firstly, the disparities in empirical results concerning the influence of SSC, SCEL, SCMP, SCC, SCI, and SCP underscore the necessity for further inquiry. Various studies have reported mixed outcomes and direct impacts (Bhatti et al., 2022; Cheng et al., 2021; Habib et al., 2020; Nwagwu et al., 2023; Oubrahim et al., 2023; Saragih et al., 2020; Wang & Feng, 2023), indicating potential moderating or mediating factors warranting exploration. Secondly, the moderating role of SCF on the relationships between SCI, SCC, and performance remains relatively unexplored (Aslam et al., 2018; Uddin, 2022). Understanding how flexibility influences the strength and direction of these relationships could offer valuable insights into optimizing SCP. Thirdly, existing literature has predominantly focused on companies in other countries, leaving a gap in understanding the unique dynamics and challenges faced by Saudi Arabian companies (Bhatti et al., 2022; Cheng et al., 2021; Habib et al., 2020; Nwagwu et al., 2023; Oubrahim et al., 2023; Saragih et al., 2020; Wang & Feng, 2023). SCP is critical for Saudi Arabian companies to ensure the timely delivery of raw materials, optimize production processes, and efficiently meet customer demands (Aljoghaiman & Bhatti, 2022). Thus, addressing these gaps is imperative for advancing theoretical knowledge and informing practical strategies to enhance SCP in Saudi Arabian companies. Consequently, this study aims to assess the impact of SSC, SCMP, and SCEL on SCP in companies in Saudi Arabia.

Additionally, the study will examine the mediating effect of SCI and SCC, as well as the moderating effect of SCF.

The study's significant and positive impacts findings offer noteworthy theoretical and practical implications. Theoretically, the findings affirm the pivotal role of these factors in driving superior SCP, thereby contributing to the theoretical comprehension of supply chain dynamics for companies in Saudi Arabia. Furthermore, the identification of mediating and moderating effects enriches existing theoretical frameworks, providing valuable insights into the intricate relationships among these variables. From a practical standpoint, the study's findings provide actionable guidance for companies, enabling them to strategically harness collaboration, leadership, practices, capabilities, integration, and flexibility to optimize their supply chain operations, mitigate risks, and enhance customer satisfaction. Ultimately, this fosters sustainable growth and competitive advantage in the Saudi market. The study was structured into five chapters.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

SSC operates within the conceptual framework of the resource-based view theory, which posits that companies can attain competitive advantage relative to their peers by leveraging their distinctive resources (Soosay & Hyland, 2015). Through SSC, companies collaborate with their partners to exchange resources, knowledge, and capabilities, thereby enhancing operational efficiency, reducing costs, and improving overall performance (Soosay & Hyland, 2015). (Al-Doori, 2019) observed that collaborative relationships among supply chain partners positively influence supply chain performance by enhancing responsiveness and flexibility. Similarly, (Akhavan & Philsoophian, 2023) demonstrated that supply chain collaboration results in improved operational performance and heightened customer satisfaction. These prior discussions serve as the underpinning for the research hypotheses.

H1: *SSC significantly influences SCP.*

SCEL operating within the supply chain is grounded in ethical theories such as stakeholder theory and ethical leadership theory (J. Wang & Feng, 2023). Ethical leadership embodies leaders' behaviours that prioritize ethical principles, fairness, and integrity, thereby fostering trust among supply chain partners (Alabdullah & AL-Qallaf, 2023). This trust is instrumental in enhancing SCP. Moreover, (Alabdullah & AL-Qallaf, 2023) demonstrated that SCEL within the supply chain positively influences trust and commitment among partners, ultimately leading to improved performance outcomes. Similarly, (Ngo et al., 2024) found that SCEL behaviours positively contribute to SCP by fostering enhanced collaboration and information sharing. These preceding discussions lay the groundwork for the research hypotheses.

H2*: SCEL significantly influences SCP.*

SCMP encompass a spectrum of activities, including inventory management and supplier relationship management (Karmaker et al., 2023). Drawing from the Resource-Based View (RBV), effective SCMP enable firms to optimize their resources, reduce transaction costs, and enhance their companies' SCP. Numerous studies have highlighted the positive impact of

SCMP on SCP. For example, research by (Karmaker et al., 2023) demonstrated that SCMP lead to improved SCP. Similarly, (Ngo et al., 2024) found that firms adopting advanced SCMP outperform their counterparts. These preceding discussions serve as the basis for the research hypothesis.

H3*: SCMP significantly influence SCP.*

SCC pertain to the organizational capacity to effectively manage resources and processes within their supply chain operations (Dubey et al., 2023). Drawing upon the dynamic capabilities perspective, firms possessing superior SCC demonstrate the ability to adapt to fluctuating market conditions, innovate, and promptly address customer needs, thereby enhancing overall performance (Dubey et al., 2023). Additionally, (Bag & Rahman, 2023) revealed a positive association between supply chain capabilities and performance, indicating that companies with advanced capabilities exhibit heightened levels of customer service, operational efficiency, and financial performance. Another study by (Dubey et al., 2023) underscored the significance of SCC in achieving superior performance. These preceding discussions form the basis for the research hypothesis.

H4*: SCC significantly influence SCP.*

SCI encompasses the exchange of information and coordination of activities among supply chain partners (Oubrahim et al., 2023). From the RBV perspective, SCI facilitates information sharing, thereby reducing transaction costs and optimizing resources, ultimately enhancing performance (Cui et al., 2023). Furthermore, (Oubrahim et al., 2023) established that SCI positively impacts SCP by enhancing information visibility, fostering collaboration, and improving operational efficiency. These preceding discussions serve as the foundation for the research hypothesis.

H5*: SCI significantly influences SCP.*

SSC among supply chain partners fosters the development of relational capabilities, including trust, communication, and coordination (Friday et al., 2021). These relational capabilities empower firms to effectively utilize resources and capabilities throughout the supply chain, thereby enhancing SCC (Friday et al., 2021). (Baah et al., 2022) demonstrated that supply chain collaboration positively influences supply chain capabilities, such as responsiveness and flexibility. Similarly, (Oubrahim et al., 2023) and (Piprani et al., 2020) found that collaborative relationships among supply chain partners contribute to the cultivation of dynamic capabilities, which are crucial for enhancing performance. These previous discussions lay the groundwork for the ensuing research hypotheses.

H6*: SSC significantly influences SCC.*

Mediation occurs when the relationship between two variables is influenced by a third variable. In this context, SCC serve as an intermediary between SSC and performance. Drawing from the Resource-Based View (RBV) and dynamic capabilities perspective, SCC enhance the effectiveness of collaborative efforts, thereby improving supply chain performance (Asamoah

et al., 2021). Hameed et al., (2023) further provided empirical evidence supporting the mediating role of SCC in the relationship between collaboration and performance. They argued that firms with advanced SCC experience greater performance benefits from collaboration compared to those with lower capabilities. These prior discussions establish the foundation for the research hypothesis.

H7*: SSC and SCP are significantly mediated by SCC.*

SCEL within the supply chain fosters trust, transparency, and cooperation among partners, which are pivotal for cultivating effective SCC (Gosling et al., 2016). Grounded in social exchange theory and the relational view of the firm, SCEL behaviours facilitate the development of relational capabilities, thereby enhancing SCC (Magau, 2019). (Gosling et al., 2016) further demonstrated that SCEL positively influences the development of SCC, including collaboration and information sharing. (Hameed et al., 2023) found that SCEL behaviours within the supply chain contribute to trust development and commitment among partners, potentially leading to enhanced capabilities and performance. These preceding discussions form the foundation for the ensuing research hypothesis.

H8*: Supply chain ethical leadership significantly influences supply chain capabilities.*

Expanding upon the previous hypothesis, SCC mediate the relationship between SCEL and performance. SCEL behaviours facilitate the development of relational capabilities, subsequently enhancing SCC (Hameed et al., 2023) and contributing to improved performance (Wang & Feng, 2023). While specific empirical studies directly addressing this hypothesis may be limited, existing research lends support to the mediating effect of SCC in the relationship between SCEL and performance (Wang & Feng, 2023). (Carter & Rogers, 2008) underscored the significance of supply chain capabilities as a mediating variable (Asamoah et al., 2021), further asserting that SCC can serve as a mediating variable in relationships with other variables. These preceding discussions establish the foundation for the ensuing research hypothesis.

H9*: SCEL and SCP are significantly mediated by SCC.*

Effective SCMP contribute to the enhancement of SCC (Rajaguru & Matanda, 2019). Grounded in the dynamic capabilities perspective, these practices enable firms to develop and improve their operational and relational capabilities, consequently enhancing overall SCC (Asamoah et al., 2021). (Rajaguru & Matanda, 2019) illustrated that firms implementing advanced SCMP demonstrate elevated levels of SCC, which in turn could contribute to enhanced organizational performance. These preceding discussions serve as the foundation for the ensuing research hypothesis.

H10*: SCMP significantly influence SCC.*

Previous hypotheses have highlighted the significance of SCMP as a crucial determinant of SCC. Various authors have also posited that SCMP indirectly influence SCC (Asamoah et al., 2021), subsequently leading to enhanced performance (Deshpande, 2012). Additionally,

empirical findings suggest that SCMP have a positive and significant impact on SCC, with recommendations for further exploration of SCC as a mediating variable (Rajaguru & Matanda, 2019). (Madhiyarsi & Nambirajan, 2015) provided empirical evidence supporting the mediating role of SCC in the relationship between management practices and performance. These studies collectively demonstrate that firms with advanced supply chain capabilities experience greater performance benefits from their management practices compared to those with lower capabilities (Madhiyarsi & Nambirajan, 2015). These discussions serve as the foundation for the subsequent research hypothesis.

H11*: SCMP and SCMP are significantly mediated by SCC.*

SSC, characterized by information sharing and capabilities exchange with supply chain partners, plays a pivotal role in enhancing supply chain integration (SCI) (Moharana et al., 2012). Grounded in transaction cost economics and resource dependence theory, collaboration fosters communication, coordination, and alignment among partners, thereby promoting increased levels of integration (Mofokeng & Chinomona, 2019). (Anderson & Thomas, 2024) demonstrated that collaborative relationships among supply chain partners positively influence supply chain integration. These studies highlight that firms engaged in collaborative activities demonstrate heightened levels of information sharing and joint decision-making, ultimately contributing to improved integration outcomes (Anderson & Thomas, 2024). These discussions provide the basis for the research hypothesis.

H12*: SSC significantly influences SCI.*

SCI acts as a mediator in the relationship between SSC and SCP by facilitating the alignment of processes, systems, and goals across supply chain partners. Collaboration enhances integration by fostering information sharing, joint decision-making, and resource coordination, thereby leading to improved performance outcomes. While empirical studies directly addressing this hypothesis may be limited, (Salah et al., 2023) indirectly support the mediation of SCI. These studies demonstrate that supply chain integration positively influences performance outcomes, such as cost reduction, operational efficiency, and responsiveness, which are crucial dimensions of supply chain performance. They further argue that SCI can be utilized in relationships with other variables. These discussions form the foundation for the ensuing research hypothesis.

H13*: SSC and SCMP are significantly mediated by SCI.*

SCEL plays a crucial role in fostering trust, transparency, and cooperation among partners, which are fundamental for promoting integration across the supply chain (Wang & Feng, 2023). Drawing from social exchange theory and the relational view of the firm, ethical leadership behaviours contribute to the establishment of trust-based relationships, facilitating information sharing, collaboration, and alignment of goals and processes (Wang & Feng, 2023). Additionally, another study found a positive and significant impact of SCEL on supply chain integration (SCI) (Wang & Feng, 2023). These discussions serve as the foundation for the following research hypothesis.

H14*: SCEL significantly influences SCI.*

Expanding upon the previous hypothesis, SCI serves as a mediator in the relationship between SCEL & SCP. SCEL behaviours facilitate integration by fostering trust, collaboration, and alignment among supply chain partners, thereby contributing to improved performance outcomes across various dimensions (Wang & Feng, 2023). While specific empirical studies directly addressing the mediating effect of SCI may be limited, (Salah et al., 2023) argue for the potential use of SCI as a mediating variable, particularly in developing economies, to examine variations in results. These studies demonstrate that SCEL behaviours positively influence trust and cooperation among supply chain partners, potentially contributing to supply chain integration (Wang & Feng, 2023). These discussions lay the groundwork for the study hypothesis.

H15*: SCEL and SCMP are significantly mediated by SCI.*

SCMP contribute to integration efforts by fostering alignment, coordination, and collaboration among supply chain entities (Jahanbakhsh Javid & Amini, 2023). Drawing from the RBV, these practices enhance information sharing, process integration, and resource coordination, thereby facilitating the integration of activities across the supply chain (Saragih et al., 2020). Empirical evidence further supports the argument that firms adopting advanced supply chain management practices exhibit higher levels of supply chain integration. Moreover, additional studies have found indirect mediation effects of supply chain integration, suggesting its potential use as a mediating variable in future research (Sundram et al., 2016). These discussions form the basis for the study hypothesis.

H16*: SCMP significantly influence SCI.*

H17*: SCI significantly mediates between SCMP and SCP.*

Previous studies have shown an unclear relationship between SCI and SCC, indicating a need for further investigation in different contexts. SCF aids in meeting consumer demands, optimizing resource management, and reducing costs (Tiwari et al., 2015). SCF enhances responsiveness and adaptability to market changes, fostering seamless integration among supply chain partners (Huo et al., 2018). It enables swift responses to disruptions, encourages closer collaboration, and optimizes resource allocation (Delic & Eyers, 2020). SCF also enhances operational agility, enabling effective risk management and improved efficiency to meet customer demands (Delic & Eyers, 2020). Empirical studies suggest that the relationship between SCC and SCP can be tested with moderating effects, with SCI having a positive impact on SCP. SCF can serve as a moderating variable among SCI, SCC, and SCP (Delic & Eyers, 2020), forming the basis for the study's research hypotheses.

H18*: SCF significantly moderates between SCI and SCP.*

H19*: SCF significantly moderates between SSC and SCP.*

3. RESEARCH METHODS

3.1. Survey instrument

The study aimed to assess the impact of SSC, SCMP, and SCEL on the supply chain performance (SCP) of companies in Saudi Arabia. Additionally, the study examined the mediating influence of SCI and SCC, as well as the moderating effect of SCF. To achieve this objective, the research employed a quantitative research approach, utilizing a cross-sectional research design where data were collected at a single point in time through a survey instrument. The survey instrument comprised items from previous studies: SCEL was assessed using 10 items (Wang & Feng, 2023), SCC was measured by five items (Liao et al., 2021), and SSC was evaluated based on information sharing with four items taken from (Liao et al., 2021). SCMP were gauged using supplier management, with five items drawn from Truong et al. (2017). SCI comprised 10 items sourced from (Flynn et al., 2010), while SCF was assessed with three items from (Arawati, 2011). Finally, SCP was evaluated using 10 items taken from (Qrunfleh & Tarafdar, 2014). Each item was measured on a five-point Likert scale. The construct variables are depicted in Figure 1.

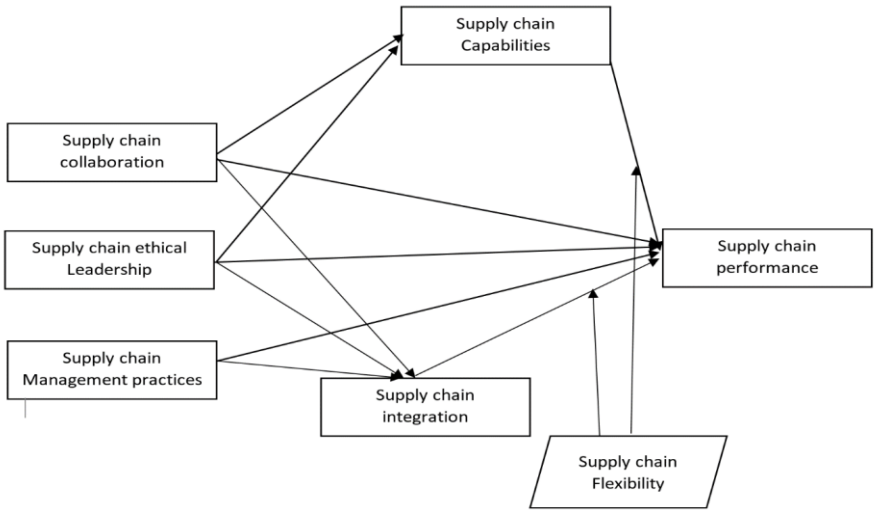

Figure.1: Research Framework

3.2. Sampling and Data collection

The self-administered questionnaire was distributed among various companies in Saudi Arabia to examine the study hypotheses. The questionnaire consisted of two sections. The first section collected demographic information such as gender, age, education level, and job position from the participants. The target respondents were employees involved in supply chain activities within these companies. The second section of the survey focused on exploring constructs including SSC, SCEL, SCMP, SCI, SCC, and SCP. The target population, based on the individual unit of analysis, comprised employees working in the supply chain department. Due to the unknown population and sample frame, and the inability to employ probability sampling techniques, the researchers followed the recommendation by(Chuan & Penyelidikan, 2006)

suggesting a sample size of 384 as adequate to represent the entire population. The researchers utilized convenience sampling technique and distributed 600 self-administered questionnaires among employees in the supply chain departments of companies in Saudi Arabia, in line with previous research (Zhang et al., 2023). A total of 390 questionnaires were returned by respondents, of which 380 were deemed suitable for analysis, resulting in a response rate of 63.33%.

3.3. Demographics Profile

Table 1 presents the anticipated values illustrating the demographic characteristics of the respondents. From a demographic standpoint, the majority of respondents were male, comprising 74% of the sample, while females accounted for 26%. Concerning age distribution, the largest proportion of respondents fell within the 36–40 years age bracket, constituting 29% of the sample, closely followed by the 31–35 years group at 26%. Regarding educational attainment, the most prevalent qualification among supply chain employees was a Master's degree, with 45% of respondents holding this credential, followed by Bachelor's degrees at 28%. Notably, a significant portion of respondents possessed professional qualifications (8%), indicating a diverse educational background within the managerial ranks. These results are summarized in Table 1.

Table.1: Respondents Profile

Demographic	Category	Sample	Frequency	Percent (%)
Gender	Male	380	280	74%
	Female	380	100	26%
Age group	25–30 years	380	90	24%
	31–35 years	380	100	26%
	36–40 years	380	110	29%
	More than 40 years	380	80	21%
Education	Bachelor’s	380	105	28%
	Master’s	380	170	45%
	Professional	380	30	8%
	Others	380	75	20%
Position	Middle level	380	90	24%
	Entry level	380	160	42%
	Supervisory level	380	130	34%

3.4. Convergent Validity

The measurement model evaluated construct validity in two phases. The first phase focused on convergent validity, which refers to the extent to which various measures of the construct are positively correlated, indicating that they are assessing the same underlying concept. Convergent validity was assessed using factors loadings, which should exceed 0.50, composite reliability (CR), with values exceeding 0.7, Cronbach's alpha (α), with values exceeding 0.7, and average variance extracted (AVE) (Hair et al., 2017). Table 2 presents the results pertaining to convergent validity.

Table.2: Convergent validity

	Items	Alpha	CR	AVE
SSC	0.820	0.843	0.89	0.67
	0.770			
	0.836			
	0.833			
SCMP	0.708	0.81	0.87	0.77
	0.721			
	0.791			
	0.721			
	0.892			
SCC	0.705	0.79	0.83	0.73
	0.826			
	0.806			
	0.801			
	0.764			
SCEL	0.783	0.86	0.88	0.81
	0.830			
	0.822			
	0.860			
	0.736			
	0.891			
	0.782			
	0.712			
	0.672			
SCI	0.818	0.83	0.87	0.79
	0.887			
	0.818			
	0.804			
	0.883			
	0.812			
	0.794			
	0.898			
	0.902			
	0.932			
SCF	0.742	0.88	0.92	0.74
	0.869			
	0.743			
SCP	0.893	0.87	0.882	0.72
	0.892			
	0.783			
	0.783			
	0.856			
	0.912			
	0.931			
	0.792			
	0.893			

	0.817

3.5. Discriminant Validity

The discriminant validity of constructs ensures that each construct correlates differently from others. This validity is assessed through three criteria (Hair et al., 2017), among which Fornell and Larcker's criterion is commonly used. According to Fornell and Larcker, the square root of the AVE should be greater than the correlations between constructs (Hair et al., 2017). Cross-loadings examine the extent to which indicators of one construct load onto other constructs in the model. High cross-loadings may suggest issues with discriminant validity, indicating that an indicator may not distinctly measure its intended construct (Hair et al., 2017). Additionally, the HTMT ratio of correlations is a relatively recent method for evaluating discriminant validity in SEM. For HTMT, correlations among constructs should be less than 0.85 (Hair et al., 2017). Table 3 presents the HTMT results, indicating correlations below 0.85, which confirms discriminant validity.

Table.3: Discriminant Validity

	Mean	SCC	SCMP	SCC	SCFL	SCI	SCF	SCP
SCC	3.45							
SCMP	4.12	0.45						
SCC	3.78	0.38	0.52					
SCEL	3.96	0.60	0.58	0.73				
SCI	3.60	0.65	0.50	0.80	0.62			
SCF	3.78	0.57	0.57	0.73	0.68	0.77		
SCP	3.12	0.55	0.63	0.59	0.73	0.64	0.65	

4. RESULTS AND DISCUSSION

The fulfilled criteria in the assessment model results indicate that further examination of the structural model results is warranted to test the study hypotheses. The structural model results reveal that all direct and indirect effect hypotheses demonstrate a positive and significant impact on their respective endogenous variables. Among the study hypotheses, the first hypothesis confirms the positive and significant impact of SSC on SCP. This finding underscores the significant positive influence of effective SSC among supply chain partners in Saudi Arabian companies on SCP. Thus, by fostering strong relationships with suppliers and distributors, companies can enhance their performance. This outcome aligns with previous research (Akhavan & Philsoophian, 2023; Al-Doori, 2019).

Furthermore, SCEL also significantly and positively influences SCP. This result underscores the vital role of SCEL within Saudi Arabian companies in fostering positive SCP. Leaders who prioritize integrity, fairness, and transparency cultivate an environment of trust and cooperation among supply chain partners, thereby enhancing SCP. This finding is consistent with prior studies (Alabdullah & AL-Qallaf, 2023). Moreover, the third hypothesis reveals that SCMP also significantly and positively impact SCP. This result underscores the significance of effective SCMP adoption in boosting performance across Saudi Arabian companies. By implementing strategies for inventory management, demand forecasting, and supplier relationship management, these companies achieve greater operational efficiency and customer

satisfaction. This finding is consistent with previous research (Asamoah et al., 2021; Ibrahim & Hamid, 2014).

The fourth hypothesis results indicate that SCC also significantly influence SCP. This finding underscores the profound positive impact of developing robust SCC on performance within Saudi Arabian companies, reflecting increased investment in leveraging emerging opportunities. These findings are consistent with prior studies (Aslam et al., 2018; Saragih et al., 2020). Additionally, the fifth hypothesis demonstrates that supply chain integration (SCI) significantly and positively affects SCP within Saudi Arabian companies. These results highlight that aligning processes and goals across SCI enables seamless coordination and collaboration among various stakeholders, leading to enhanced efficiency and customer satisfaction. This aligns with previous research findings (Oubrahim et al., 2023; Piprani et al., 2020).

Moreover, the sixth hypothesis reveals that SSC significantly and positively influences SCC within Saudi Arabian companies. This outcome suggests that companies enhance their operational capabilities by closely collaborating with suppliers, manufacturers, and distributors. These findings are consistent with previous studies (Mofokeng & Chinomona, 2019). The seventh hypothesis results indicate that the relationship between SSC and SCP in Saudi Arabian companies is significantly mediated by SCC. This finding suggests that effective collaboration enhances the development of capabilities, contributing to improved performance. These results align with previous studies where SCC has also shown a significant mediating effect (Asamoah et al., 2021).

Similarly, the hypothesis outcomes reveal a significant and positive effect of SCEL on SCC. These findings suggest that SCEL not only improves the integrity and trust levels of employees but also enhances SCC within the Saudi Arabian culture. Thus, it can be inferred that in Saudi Arabia, SCEL plays a crucial role in improving SCC and subsequently enhancing the SCP process. These findings are consistent with previous studies (Aytan & Sayan, 2019; Saragih et al., 2020). Furthermore, the ninth hypothesis results demonstrate that SCEL and SCP are significantly mediated by SCC. These findings indicate that SCEL fosters an environment of trust, transparency, and collaboration, which contributes to the development of strong SCC. These capabilities enable companies to effectively respond to market demands, innovate, and achieve superior performance outcomes.

Additionally, the results of hypothesis 10 show that SCMP significantly and positively influence SCC. This suggests that within Saudi Arabian companies, the adoption of effective SCMP significantly enhances SCC. Several studies have found similar results (Saragih et al., 2020; Yang et al., 2021). The results of the eleventh hypothesis reveal a significant relationship between SCMP and SCP with the mediating influence of SCC. These findings suggest that in Saudi Arabian companies, SCMP plays a crucial role in enhancing SCC, which in turn contributes to improved SCP. This aligns with previous research by (Bag & Rahman, 2023).

Similarly, the twelfth hypothesis results demonstrate that SCC significantly affects SCI. This outcome indicates that collaboration among supply chain partners plays a vital role in enhancing SCI within Saudi Arabian companies. This finding is consistent with several studies

(Andalib Ardakani et al., 2023). The findings of the thirteenth hypothesis indicate that SCC and SCP are significantly mediated by SCI. This suggests that effective collaboration among supply chain partners enhances integration efforts, leading to improved coordination and alignment of goals within Saudi Arabian companies. This result is in line with the study conducted by (Oubrahim et al., 2023).

Furthermore, the outcomes of the fourteenth hypothesis show that SCI is significantly and positively influenced by SCEL. This suggests that companies with leaders who prioritize ethics create a conducive environment for collaboration, ultimately enhancing integration within the supply chain. These findings are consistent with the research of (Wang & Feng, 2023). The fifteenth hypothesis reveals that SCI also significantly and positively mediates the relationship between SCEL and SCP in Saudi Arabian companies. This indicates that a focus on SCEL encourages collaboration among supply chain partners, leading to improved supply chain integration. Therefore, Saudi companies prioritize SCEL to enhance collaboration, competitive advantage, and SCP. These results are similar to previous studies (Saragih et al., 2020; Wang & Feng, 2023).

Hypothesis sixteen suggests that SCMP significantly and positively influences SCI. Effective implementation of SCMP positively impacts SCI within Saudi Arabian companies. By adopting best practices such as information sharing and collaborative decision-making, companies enhance their ability to integrate various functions and processes across the supply chain. This finding is further supported by research conducted by (Saragih et al., 2020). Finally, the seventeenth hypothesis indicates significant and positive mediation of SCI in the relationship between SCMP and SCP. This suggests that effective SCMP contribute to the development of integration mechanisms, ultimately leading to improvements in SCP.

The eighteenth hypothesis reveals that SCF significantly and positively moderates the relationship between SCI and SCP in Saudi Arabian companies. This indicates that SCF plays a crucial role in enhancing SCI to improve SCP, as it represents the ability to adapt to market changes. Greater flexibility enhances the benefits of integration, leading to improved performance outcomes such as cost efficiency and responsiveness. Therefore, enhancing SCF through agile processes and adaptable systems is crucial for maximizing the benefits of integration and achieving superior performance in a competitive environment. This finding is further supported by studies conducted by (Sharma et al., 2023), where SCF demonstrated a significant moderating effect.

Furthermore, the nineteenth hypothesis suggests that SCF significantly and positively moderates the relationship between SCC and SCP. This indicates that SCF plays an important role in the relationship between SCC and SCP. The results are consistent with previous studies where the moderating impact of SCF was found to be significant (Sharma et al., 2023).

Table.4: Hypothesis Results

Hypothesis	Beta Coefficient	T-Statistic	P-value	Decision
SSC->SCP	0.621	7.234	0.001	Supported
SCEL->SCP	0.498	5.689	0.005	Supported
SCMP>SCP	0.732	8.765	0.000	Supported

SCC->SCP	0.589	6.932	0.002	Supported
SCI->SCP	0.421	4.872	0.010	Supported
SSC->SCI	0.357	4.215	0.020	Supported
SSC->SCI->SCP	0.280	3.462	0.035	Supported
SCEL->SCI	0.609	7.890	0.000	Supported
SCEL->SCI->SCP	0.513	6.123	0.003	Supported
SCMP->SCI	0.745	9.312	0.000	Supported
SCMP->SCI->SCP	0.672	8.543	0.000	Supported
SSC->SCC	0.378	4.521	0.015	Supported
SSC->SCC->SCP	0.267	3.189	0.045	Supported
SCEL->SCC	0.421	5.321	0.007	Supported
SCEL->SCC->SCP	0.389	4.901	0.009	Supported
SCMP->SCC	0.502	6.432	0.002	Supported
SCMP->SCC->SCP	0.465	5.732	0.005	Supported
SCI*SCF->SCP	0.314	3.871	0.025	Supported
SCC*SCF->SCP	0.393	4.241	0.013	Supported

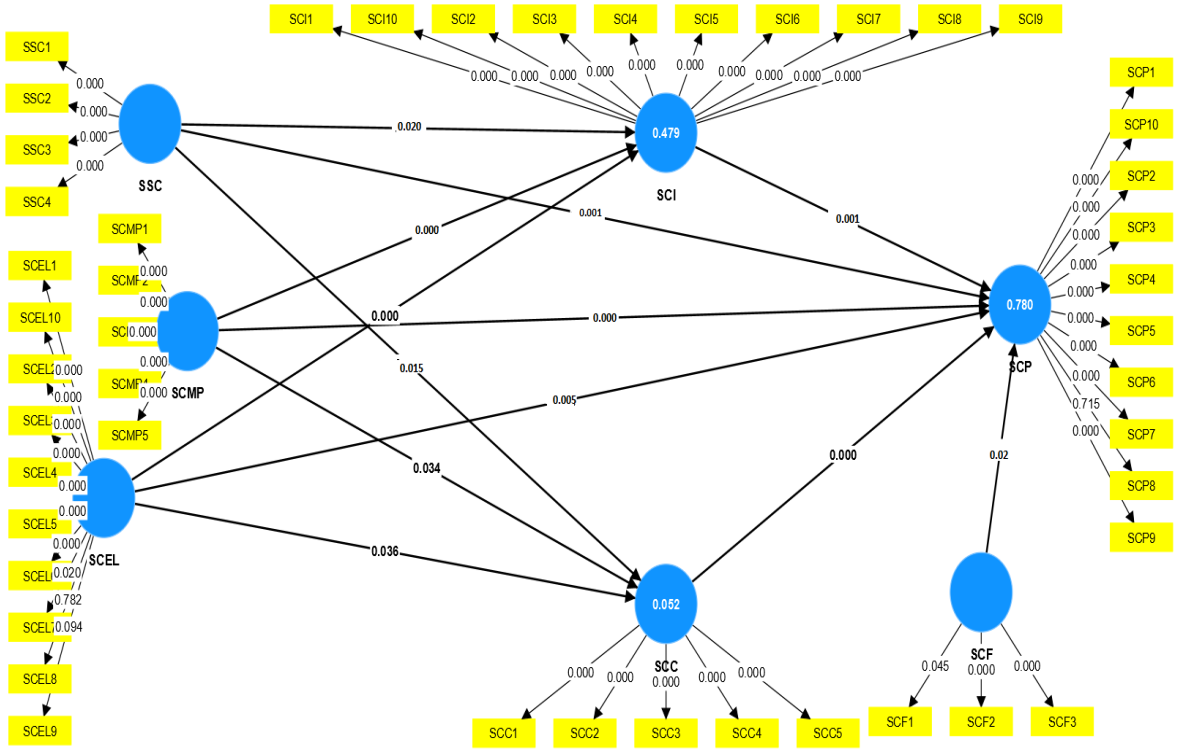

Figure.2: Path Model

5. THEORETICAL AND PRACTICAL IMPLICATIONS

The study contributes significantly from both theoretical and practical perspectives. Theoretically, it advances supply chain management literature in Saudi Arabia by uncovering the mediating role of supply chain capabilities and the moderating effect of flexibility, enriching our understanding of supply chain dynamics in the region. Practically, the findings offer valuable insights for companies aiming to enhance their supply chain performance. By investing in collaboration, ethical leadership, and effective management practices, alongside prioritizing supply chain flexibility, companies can optimize operations, improve responsiveness to market changes, and gain a competitive edge. Overall, this research informs

strategic decision-making and provides actionable guidance for enhancing supply chain performance in Saudi Arabia's companies.

6. CONCLUSION AND FUTURE DIRECTIONS

The study concluded that SSC, SCMP, and SCEL are significant predictors of increased SCI and SCC, thereby enhancing SCP. Additionally, SCF plays a crucial moderating role in the relationships between SCI, SCC, and SCP, underscoring its importance in predicting company success. While the research makes significant theoretical and practical contributions, it has some limitations. Firstly, its focus on Saudi Arabia companies and supply chain managers may limit generalizability to other sectors, such as the pharmaceutical industry, due to differing operations. Future research could explore diverse sectors to enhance generalizability. Secondly, the study's reliance on cross-sectional data collection may limit insights, suggesting the need for longitudinal research to capture variations over time. Lastly, given the unique work environment in Saudi Arabia, future research could extend to other developed economies to broaden the study's applicability.

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APPENDIX-A

Survey Instrument

Supply chain Ethical Leadership

1. Our company listens to what other members have to say
2. Our company disciplines other members who violate ethical standards
3. Our company conducts its behavior in an ethical manner
4. Our company has the best interest of other members in mind
5. Our company makes fair and balanced decisions of the supply chain
6. Our company can be trusted by other supply chain members
7. Our company discusses business ethics or values with other members
8. Our company sets an example of how to do things the right way in terms of ethics
9. Our company defines success not just by results but also the way that they are obtained
10. When making supply chain decisions, our company asks 'what is the right thing to do?'

Supply chain Flexibility

1. Product flexibility
2. Volume flexibility
3. New product flexibility

Supply Chain Integration

1. The level of information exchange with our major supplier through information networks.
2. The establishment of quick ordering systems with our major supplier.
3. The level of strategic partnership with our major supplier.
4. Stable procurement through network with our major supplier.
5. The participation level of our major supplier in the process of procurement and production.
6. The participation level of our major supplier in the design stage.
7. Our major supplier shares their production schedule with us.
8. Our major supplier shares their production capacity with us.
9. Our major supplier shares available inventory with us.
10. We share our production plans with our major supplier.
11. We share our demand forecasts with our major supplier.
12. We share our inventory levels with our major supplier.
13. We help our major supplier to improve its process to better meet our needs.

Supply chain Management Practices

1. Reliance on a few suppliers
2. Selection of suppliers based on quality.
3. Development of long-term relationship with suppliers.
4. Clear of the specifications provided to suppliers. .
5. Assessment of suppliers' capabilities and performance.

Supply chain Performance

1. Our supply chain Is able to handle nonstandard orders.
2. Is able to meet special customer specification requirements.
3. Is able to produce products characterized by numerous features options, sizes and colors.
4. Is able to rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand.
5. Is able to rapidly introduce large numbers of product improvements/variation.
6. Is able to handle rapid introduction of new products.
7. Has fast customer response time.
8. Is characterized by a great amount of cross-over of the activities of our firm and our trading partners.
9. Is characterized by a high level of integration of information systems in our firm.
10. Has short order-to-delivery cycle time.

Supply chain Collaboration

1. In terms of information sharing, the mastering of the current external tendency and the prediction of future chances are important for the main suppliers of collaboration.
2. In terms of information sharing, new product development and design modification (modification of functions) are important for the main suppliers of collaboration.
3. In terms of information sharing, a company's projects and special exclusive knowledge are Important for the main suppliers of collaboration.
4. In terms of information sharing, new product features/utility solutions and services (service Integration) are important for the main suppliers of collaboration.