



The influence of learning orientation on corporate sustainability: Serial mediation of supply chain practices

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ABSTRACT

Based on the theory of organizational learning, supply chain practice view, and stakeholder theory, this paper presents an empirical analysis of the influence of learning orientation on corporate sustainability through supply chain relationships and supply chain agility. A learning orientation strengthens supply chain practices, potentially extending its impact beyond mere business transactions to enhance sustainability through knowledge transfer. Empirical results reveal the relationships among the constructs and serial mediation of supply chain relationship and supply chain agility. The empirical data were collected from organizations in the United Arab Emirates. The structural equation modeling approach is applied to validate the models in the study. Mediation analysis was performed to better understand the organizational and supply chain phenomenon. In addition, this study provides empirical support for serial mediation, with supply chain relationships and supply chain agility mediating the relationship between learning orientation and corporate sustainability. The study draws managers' attention to the importance of learning orientation as well as supply chain relationship and supply chain agility post-COVID-19. The findings may guide firms toward designing their sustainable supply chain strategies under organizational learning. This paper contributes to the sustainable supply chain management literature.

1. Introduction

Learning orientation is an important concept in operations and supply chain management (Braunscheidel & Suresh, 2009; Hult et al., 2003; Mello & Stank, 2005; Uzumeri & Nembhard, 1998). Learning orientation is an organizational approach that prioritizes and encourages continuous learning and development among employees and teams (Braunscheidel & Suresh, 2009). In a learning-oriented organization, learning is seen as a fundamental and integral aspect of operations, rather than just a one-time event or training program (Calantone et al., 2002). Learning orientation is an important part of exchanges and cooperation between organizations, and also a strategic resource in supply chain operations (Hult et al., 2003). From a knowledge transfer standpoint, embracing a learning orientation may enable a company to promote sustainability within its supply chain operations. Successful supply chain management often involves systemic and strategic integration and coordination across business functions within a company and across companies within the supply chain (Wiengarten et al., 2014).

According to the supply chain practice view (SCPV), supply chain practices spread both upstream and downstream through multiple tiers, and numerous supply chain practices are replicable and transferrable in supply chains (Carter et al., 2017). Furthermore, learning orientation may influence firm behavior and supply chain operations (Argote & Hora, 2017; Braunscheidel & Suresh, 2009; Hult et al., 2003); however, they are not well defined (Argote & Hora, 2017; Cadden et al., 2013; Carter et al., 2017; Mello & Stank, 2005), and very few empirical studies have been reported in the literature (Argote & Hora, 2017; Cadden et al., 2013). The relationships between learning orientation, supply chain practices including relationships and agility, and corporate sustainability may help both researchers and managers better understand the organizational and supply chain phenomena, mechanisms or processes that underlie the sustainability transitions and knowledge transfer mechanisms within a supply chain post-COVID-19 (Kiefer et al., 2019; Touboulic et al., 2014).

Sustainable supply chain management has become an important and popular topic in the literature (Jayaraman et al., 2007). All industries

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need to face sustainability transitions in their supply chains (Seuring & Gold, 2013; Wang et al., 2020). To build a sustainable supply chain, firms must understand the mechanism of learning orientation in supply chain practice and sustainability (Hong et al., 2022). However, the impact of learning orientation on corporate sustainability through supply chains has not yet been investigated adequately. The study set out to fill the void in the literature. Thus, the research question is *How can learning orientation influence corporate sustainability through supply chain practices?* Supply chain operations involve a broad range of stakeholders and activities (Wang et al., 2023). The study considers the supply chain relationship, which is closely associated with multiple stakeholders' sustainability and corporate social responsibility (Griffith et al., 2006; Liu et al., 2021) and supply chain agility, which is an important capability to make supply chains resilient and deal with the post-COVID "new normal" (Christopher & Towill, 2001; Cohen et al., 2022; Müller et al., 2022). Based on SCPV, supply chain members can learn practices from other supply chain partners (suppliers and/or buyers) (Carter et al., 2017). This study focuses on imitable and transferable practices.

To answer the research questions, based on the theory of organizational learning (Huber, 1991), SCPV (Carter et al., 2017), and stakeholder theory (Freeman et al., 2004), a theoretical model is developed to investigate the role of learning orientation in supply chain practices and sustainability. The research model centers on the concept of learning orientation, key supply chain practices such as supply chain agility and supply chain relationships, and the overarching theme of corporate sustainability.

This paper expands and enriches knowledge in the area of sustainable operations and supply chain management, as the study builds on existing studies, the theory of organizational learning, SCPV, and stakeholder theory to develop a theoretical framework and further investigate the relationships among learning orientation, supply chain practice, and corporate sustainability. Specifically, the theoretical framework explores the influence of learning orientation on corporate sustainability through supply chain practices, including supply chain agility and supply chain relationships.

The remainder of the paper is structured as follows. In the next two sections, relevant literature and theoretical background are presented, along with the constructs and hypotheses developed. In the following section, a description of the research methods is provided. Section 5 shows the data analysis and results. A discussion and implications are presented in the final section.

2. Theoretical background

2.1. Learning orientation

Learning orientation is an important organizational value and dimension of organizational culture, and a firm's culture is manifested in its learning orientation (Alerasoul et al., 2022; Braunscheidel & Suresh, 2009; Hofstede, 1998). Braunscheidel and Suresh (2009) stress that culture may refer to the underlying principles, beliefs, and values that serve as the foundation of a management system, and a set of management practices that reinforce those principles. Braunscheidel et al. (2010) define culture as widely shared and strongly held values. Schneider et al. (2013) view organizational culture as the basic assumptions about the world and the values that guide life in organizations. Hofstede (1998) argue that culture can be measured from the individual's behavior and aggregated to the company's level. A common belief in the management literature is that shared values play a key role in an organization's culture (Braunscheidel et al., 2010). The foundation for sustainable competitive advantage in an organization could lie in its ability to outpace its competitors in the learning process (Calantone et al., 2002). Argote and Hora (2017) argue that learning involves the activities of generating, preserving, and conveying knowledge, all of which bear significance for the operational effectiveness and competitive edge of organizations. A firm's learning may occur within a

company and across companies. Bouncken, Ratzmann, et al. (2023) stress that inter-firm learning can also take place through combining knowledge, with companies utilizing and modifying their arrangement of knowledge elements.

The learning orientation is important for the survival of a company; in addition, it leverages organizations' ability to achieve competitive advantage (Baker et al., 2022; Calantone et al., 2002). Kiefer et al. (2019) stress that organizational learning plays an important role in sustainable transitions. Feng et al. (2022) posit that supply chain integration has positive impacts on inter-organizational learning. Argote and Hora (2017) identify several factors influencing organizational learning in a supply chain, such as outsourcing, absorptive capacity, geographic distance, ownership, and returns to knowledge. Osei et al. (2023) highlight that the initial step toward achieving an enhanced sustainable supply chain performance involves cultivating a culture that prioritizes sustainability at both the organizational and supply chain levels. Bouncken, Ratzmann, et al. (2023) indicate that learning from a supply chain partner may positively influence product innovation. Carter et al. (2017) stress that supply chain members can learn/copy imitable and transferable practices within supply chains to impact relational performance.

Learning orientation can be viewed as an important aspect of organizational culture, which emphasizes a firm's learning capability (Huber, 1991). Crossan et al. (1999) argue that organizational learning is multi-level, and it contains intuiting, interpreting, integrating, and institutionalizing, which occur at individual, group, and organizational levels. The human factor is an important element of the operations and supply chains (Ahmad & Schroeder, 2003). Learning orientation may lead to developing a supply chain culture, as the learning orientation is based on the individual learning of the organizations that make up supply chains (Pereira et al., 2020; Uzumeri & Nembhard, 1998). The organizational learning process may involve knowledge transfer (Argote & Hora, 2017). Knowledge transfers and their creation often demonstrate sustainability (Bouncken, Aslam, et al., 2023). In addition, innovation is relevant to organizational learning, as organizational learning can generate insights and enable innovation to implement new ideas, processes, products, or services (Bouncken, Ratzmann, et al., 2023; Ghasemaghahi & Calic, 2019). Sinkula et al. (1997) suggest that learning orientation can be operationalized from aspects of shared vision, commitment to learning, and open-mindedness. Calantone et al. (2002) argue that learning orientation may contain a shared vision, commitment to learning, intra-organizational knowledge, and shared open-mindedness. Table 1 summarizes relevant studies.

2.2. Supply chain relationship

Based on SCPV and stakeholder theory, supply chain relationship is an important notion and practice in supply chain management (Ahmed et al., 2017; Carter et al., 2017; Wang et al., 2023). As the supply chain is a complex system, which contains both external and internal stakeholders and various operational processes, supply chain relationship plays an important role in integrating supply chains and deliver stakeholder value (Cheung et al., 2010; Griffith et al., 2006; Wang, Lee, & Chan, 2021). In the context of supply chains, the stakeholder theory emphasizes the importance of recognizing and managing the interests not only of shareholders but also of other stakeholders such as employees, suppliers, buyers, communities, environmental groups, and governmental bodies (Freeman et al., 2010; Wang et al., 2023). In addition, supply chain relationships are a source of competitive advantage (Dyer & Singh, 1998; Freeman et al., 2021), Dyer et al. (2018) argue that organizations that establish recurrent partnerships with the same company are anticipated to gain more substantial advantages from these collaborations. This is primarily attributed to the heightened level of trust and enhanced coordination resulting from investments in assets specific to the relationship and the exchange of knowledge routines.

Managing supply chain relationships is an important supply chain

Table 1

Relevant studies on the topics of learning orientation, supply chain, and performance.

Summary	Relevant Studies
The study investigates the relationships among learning orientation, firm innovativeness, and firm performance. Learning orientation is proposed to be an important antecedent of firm innovativeness, which in turn influences firm performance.	Calantone et al. (2002)
The study posits that learning orientation plays a vital role in supply management. The concept of learning orientation refers to the extent to which the individuals within the focal supply management units emphasize the value of learning for the long-term benefit of the supply management system.	Hult et al. (2003)
The study shows that a learning orientation demonstrates a robust and direct impact on the supply chain internal integration. This may be a contributing factor in supply chain agility.	Braunscheidel and Suresh (2009)
The study conceptualizes relationship learning as a joint activity in which buyers and suppliers strive to create more value together than they would individually.	Cheung et al. (2010)
The study investigates the impact of supply chain organizational learning on supply chain ambidexterity and performance.	Ojha et al. (2018)
The study suggests that the learning orientation of 3 PL firms, along with their trust in and commitment to key customers, can serve as a competitive advantage that enhances overall performance.	Yuan et al. (2018)
The study deepens comprehension of the role of learning orientation and supply chain partnership resources in developing lean capability and the resulting effects on operational performance.	Iyer et al. (2019)
The study introduces operational and supply chain mechanisms within the context of learning orientation, to enhance the performance of innovation within manufacturing firms.	Kumar et al. (2020)
The study indicates that strategic orientation learning can promote supply chain agility and supply chain agility mediates the effect of learning orientation on business performance.	Zhu and Gao (2021)
The paper reviews learning orientation and competitive advantage. Learning orientation is viewed as a firm's strategic orientation, it is linked to innovation and ultimately, performance.	Baker et al. (2022)
The study investigates the moderating role of learning orientation in supply chain partnerships. The authors also stress that learning mechanisms ingrained within supply chains characterized by a learning orientation act as guiding forces for the development and evolution of dynamic capabilities.	Srivastava et al. (2023)

practice with competitive implications for firms (Ahmed et al., 2017). Carter et al. (2017) argue that firms should focus on the imitable practices that supply chain members can employ to influence relational performance. Collaborative supply chain relationships allow firms to achieve efficiencies, and flexibility in supply chains (Nyaga et al., 2010; Wang, Wu, et al., 2021). Companies should embrace multiple stakeholders' interests in corporate sustainability through supply chain relationships. Managers can leverage their supply chain relationships to establish social networks that may facilitate the generation and seamless transfer of knowledge (Argote & Hora, 2017). Successful supply chain performance also requires effective interfirm relationships (Ambrose et al., 2010; Cheung et al., 2010), which can help firms to improve information flows (Cheung et al., 2010; Klein & Rai, 2009), build trust and commitment (Kwon & Suh, 2004) against uncertainty and risk (Tukamuhabwa et al., 2015), promote relationship learning (Cheung et al., 2010), enable knowledge transfer (Argote & Hora, 2017), and create business value (Wang, Lee, & Chan, 2021; Zhu et al., 2018). Nyaga et al. (2010) emphasize that firms in long-term relationships rely on relational exchanges to maximize profits over a series of transactions.

In this paper, the supply chain relationship is conceptualized from the following aspects: interpersonal relationships, interfirm

relationships, and long-term relationships. Interpersonal relationships play a vital role in business supply chain management. Personal relationships between managers from different companies can influence their interfirm relationships and may be used to influence decision-making to gain a competitive edge (Chen et al., 2010; Yen & Abosag, 2016). The interfirm relationship does not only refer to buyer-seller relationships (Ambrose et al., 2010) but also implies relationship learning and value co-creation (Cheung et al., 2010). Bouncken, Ratzmann, and Covin (2023) argue that relationship intensity has a positive relationship to product innovation. In addition, long-term relationships may provide benefits to organizations, such as increased relational behavior, increased satisfaction, and decreased conflict (Griffith et al., 2006). Companies also search for long-term relationships with customers and suppliers to secure a better position and valued resources and strengths (Liu et al., 2021), and long-term relationships become critical for achieving sustainability and gaining competitive advantage (Griffith et al., 2006; Nyaga et al., 2010). A long-term business relationship is a stable relationship that can eliminate the additional costs of establishing a new business partnership and offer a host of efficiencies (Griffith et al., 2006; Wang, Lee, & Chan, 2021). Supply chain participants should join in long-term relationships to deliver a competitive advantage (Argote & Hora, 2017; Cadden et al., 2013).

2.3. Supply chain agility

An agile system enables flexibility, but a flexible system may be not agile (Swafford et al., 2006). Supply chain agility is an important concept and practice in operations and supply chain management (Girod et al., 2023; Müller et al., 2022; Wang et al., 2024), and it is one of the fundamental characteristics of an effective supply chain against environmental turbulence (Gligor & Holcomb, 2012). In addition, supply chain agility is recognized as a critical supply chain capability for business operations post-COVID-19 (Müller et al., 2022; Patrucco & Kähkönen, 2021; Wang et al., 2024). It is often viewed as the firm's ability to respond efficiently to uncertain situations and volatile markets (Braunscheidel & Suresh, 2009; Narasimhan et al., 2006; Swafford et al., 2006; Teece et al., 2016). Further, supply chain agility can address supply chain uncertainties and risks and stabilize supply chains (Hill et al., 2012; Teece et al., 2016; Wang & Wang, 2023).

According to contingency theory, companies must find a suitable way to resolve supply chain risks/problems in internal and external situations (Grötsch et al., 2013; Wang et al., 2018). Further, supply chain agility not only relates to customers but also should respond to suppliers' requests and solve problems adequately (Wang et al., 2024). This requires a certain degree of knowledge transfer and the exchange of information among partners within the supply chain. Supply chain agility may involve multiple types of flexibility and includes the ability to respond to unforeseen changes in market demands (Braunscheidel & Suresh, 2009; Narasimhan et al., 2006; Wang et al., 2024). Firms must persist in acquiring knowledge from their business partners and the external environment (Bouncken, Ratzmann, & Covin, 2023).

Braunscheidel and Suresh (2009) conceptualized supply chain agility as a construct that includes four factors joint planning, demand response, visibility, and customer responsiveness. Gligor et al. (2015) defined supply chain agility as a firm's capability to alter its supply chain operations including production and/or service capacity. In the paper, supply chain agility is viewed as a firm level's capability to quickly respond and adjust to both external and internal changes in the supply chains. This also allows companies to achieve sustainable development and mitigate supply chain risks and uncertainties, which often cause problems in supply chains (Braunscheidel & Suresh, 2009; Christopher, 2000; Wang, 2018).

2.4. Corporate sustainability

Sustainability has become a major thoroughfare for future corporates

and supply chain development (Seuring & Gold, 2013). A fast-growing number of firms need to address sustainability in their business operations (Khan et al., 2023; Searcy, 2012). Moreover, corporate sustainability has become an integral part of business across all industries. Conventional business performance measurements focus on the business's financial performance, such as profit and customer satisfaction (Neely, 1999). According to the triple-bottom-line approach, financial performance alone is not sufficient for measuring the overall performance of corporate sustainability. Dyllick and Hockerts (2002) defined corporate sustainability as meeting a firm's stakeholders' needs, without compromising its ability to meet future stakeholders' needs. More specifically, Dyllick and Hockerts (2002) stress that corporate stakeholders may include employees, customers, shareholders, communities, pressure groups, and so on. Corporate sustainability should encompass a wide range of stakeholder interests including society, the environment, and the economy (Seuring & Müller, 2008; Villena & Dhanorkar, 2020). In addition, corporate sustainability is intricately connected to supply chain processes; for example, a supplier's performance may influence the buyer's corporate sustainability. It can be viewed as relational performance. SCPV emphasizes relational performance. According to Carter et al. (2017), relational performance benefits are outcomes that arise through collaborative efforts between two or more organizations and cannot be achieved by any single organization in isolation. Nowadays, firms need to work with multiple stakeholders to attain sustainability.

In this study, corporate sustainability refers to firm-level sustainability performance containing economic, social, and environmental dimensions (Elkington, 1998). Companies should work simultaneously on social, environmental, and profit goals and must develop a corporate culture to embrace sustainability to achieve sustainable development from multiple stakeholders' perspectives. We considered wider stakeholders' interests in corporate sustainability performance, which is an important area for both researchers and managers (Lintukangas et al., 2019; Searcy, 2012). Brulhart et al. (2019) stress that corporate sustainability initiatives are positively associated with financial performance, and non-responsible or even illegal corporate action is costly.

Drawing from stakeholder theory and SCPV, this study focuses on both internal and external stakeholders within a supply chain. Internal stakeholders have a direct relationship with the company, such as employees, investors, shareholders, and managers (Freeman et al., 2007; Wang et al., 2022). The employee is an important internal stakeholder and the most valuable asset in companies, and may directly influence customer satisfaction and service quality (Yee et al., 2008). Companies that actively demonstrate corporate social responsibility are seen to reduce employee turnover (Galbreath, 2010). Profitability is a traditional corporate performance measure (Anderson et al., 1994; Brulhart et al., 2019; Neely, 1999). Profitability may refer to economic and corporate financial performance (Brulhart et al., 2019; Choi & Wang, 2009). Profitability and employee job satisfaction mainly reflect the internal stakeholders' interests. Companies often have various external stakeholders, such as customers, suppliers, competitors, the government, and wider communities (Freeman et al., 2010). Customer satisfaction directly reflects the customers' interests, and it is an emotional response to their experiences (Yee et al., 2008). Buysse and Verbeke (2003) argue that corporations should address social and environmental responsibility and regulatory compliance in modern stakeholder management. Sustainability activities are seen as a way to build strategic resources (Brulhart et al., 2019). To drive sustainable development, companies must grasp and adopt a learning-oriented approach.

3. Research hypotheses development

Organizational learning plays a vital role in organizational performance (Flores et al., 2012; Yilmaz et al., 2005). It is consistently associated with performance improvement (Baker et al., 2022). In this research, organizational culture is demonstrated through a learning orientation, while corporate sustainability pertains to a form of

sustainable organizational performance. Learning orientation provides the capacity to generate and share new knowledge within a supply chain (Argote & Hora, 2017). This ability to acquire and disseminate valuable insights continuously fosters adaptability and innovation, leading to enhanced performance and competitiveness across the supply chain (Bouncken, Ratzmann, & Covin, 2023). Flores et al. (2012) argue that organizational learning is significant to a firm's capability for renewal and continuous change. Moreover, organizational learning is a key to sustainable competitive advantage (Baker et al., 2022). Osei et al. (2023) argue that organizational culture has positive impacts on sustainable supply chain performance. Knowledge is a source of competitive advantage for organizations; learning orientation has implications for the ease of transferring knowledge (Argote & Hora, 2017). Bouncken, Aslam, et al. (2023) stress that knowledge transfer and creation are associated with sustainability. This may help organizations to achieve corporate sustainability. Thus, the following hypothesis is proposed:

H1. Learning orientation is positively related to corporate sustainability.

Supply chain relationships encompass stakeholder connections that are directly associated with corporate sustainability, as sustainable relationships are a key source of sustainable competitive advantage (Dyer et al., 2018; Freeman et al., 2021). Furthermore, a supply chain relationship may generate shared norms and potentially affect its supply chain partners' orientations and activities (Carter et al., 2017; Liu et al., 2021). For example, companies can influence their suppliers' corporate sustainability through supply chain relationships; they can also be affected. Govindan et al. (2014) argue that supply chain management practices significantly impact sustainability. Osei et al. (2023) highlight the potential to achieve better sustainability outcomes through enhanced integration and cooperation among supply chain partners.

According to the theory of knowledge transfer, learning orientation may reinforce supply chain relationships, as learning orientation creates an atmosphere of communication and cooperation between supply chain partners. This also may strengthen organizational learning on corporate sustainability through innovation (Bouncken, Ratzmann, & Covin, 2023). Meanwhile, supply chain relationships promote integration, collaboration, trust, and joint planning (Ahmed et al., 2017; Bhardwaj & Ketokivi, 2021; Delbufalo, 2012). In addition, supply chain relationships enable knowledge transfer, which allows companies to share information, abilities, and ideas across the supply chain (Argote & Hora, 2017). Furthermore, collaborative learning environments that promote knowledge sharing, feedback, and mutual support enable individuals to learn and grow together, fostering a collective understanding and partnerships within the supply chain (Feng et al., 2022). This interdependence within the supply chain relationship or network enhances overall learning and contributes to the development of a more knowledgeable and sustainable supply chain community. Thus, the following hypothesis is proposed:

H2. The supply chain relationship mediates the relationship between learning orientation and corporate sustainability. Fig. 1 indicates the research framework in the study.

From a firm's perspective, learning orientation is needed to sense these diversities in the supply chain environment, and the learning orientation promotes organizational and supply chain practices (Bouncken, Ratzmann, et al., 2023; Braunscheidel & Suresh, 2009; Sinkula et al., 1997). Gligor and Holcomb (2012) argue that supply chain agility is a dynamic capability that can reconfigure firm-level and supply-chain-level resources. Blome et al. (2013) posit that supply chain agility is central to an organization's competitive strategy in an uncertain environment. Organizations characterized by elevated levels of supply chain agility possess the ability to adapt and respond swiftly to changing circumstances within their operational environments. This may maintain corporate sustainability. Further, when these agile

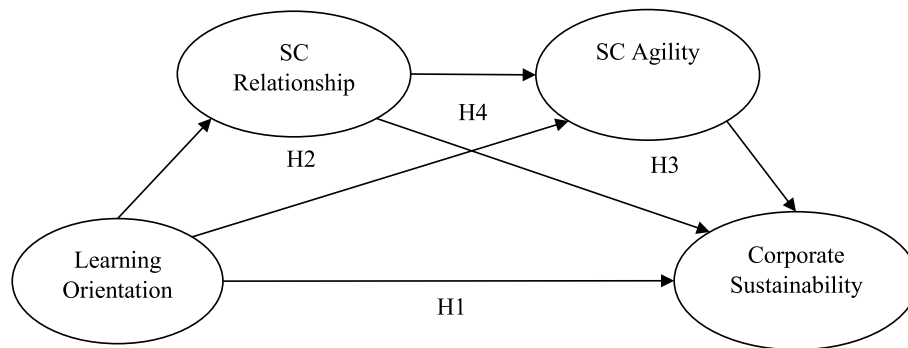


Fig. 1. Research framework.

practices are integrated with the principles of corporate sustainability, such as responsible resource management, ethical business practices, and environmental stewardship, the organization's operations become inherently more resilient and aligned with sustainable goals. The continuous acquisition of knowledge and insights enables better anticipation of market changes, customer demands, and disruptions. Consequently, supply chains can respond quickly to evolving circumstances, making them more adaptable, efficient, and capable of maintaining a competitive edge in the dynamic business landscape (Sinkula et al., 1997). Thus, the following hypothesis is proposed:

H3. Supply chain agility mediates the relationship between learning orientation and corporate sustainability.

Learning orientation may refer to an organization's or individual's tendency to foster a culture of continuous learning and adaptability. It involves valuing the acquisition of new knowledge, skills, and insights as a means to improve performance and achieve long-term success. Based on the relational view, Wieland and Wallenburg (2013) argue that supply chain relationships have a positive effect on supply chain practices and capabilities, as integrated systems such as supply chains are relation-specific assets that make the interchange of information and knowledge faster, which, in turn, accelerates processes. Supply chain relationships play a crucial role in promoting supply chain agility by fostering collaboration, knowledge transfer/information sharing, and responsiveness among supply chain partners. Dyer et al. (2018) indicated the importance of relationships and collaborations between firms in creating and sustaining a competitive advantage. This may posit that the way firms manage and leverage their relationships to build supply chain agility with stakeholders can be a significant source of value creation among supply chain members. Learning orientation influences the adoption of organizational and supply chain practices (Braunscheidel & Suresh, 2009; Sinkula et al., 1997). Supply chain relationships and supply chain agility improve the integration and collaboration between supply chain members (Braunscheidel & Suresh, 2009; Subramani, 2004). Based on SCPV, supply chain relationships and supply chain agility are important underlying practices in sustainability transitions. Thus, the study proposes the following hypothesis:

H4. Supply chain relationship and supply chain agility serially mediate the relationship between learning orientation and corporate sustainability.

4. Research methodology

The study is carried out in multiple phases – instrument development, data collection, and factor analysis, including exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural model analysis. Mediation analysis is conducted to test the research hypotheses in the study. These steps are presented in Sections 4 and 5.

4.1. Instrument development

To operationalize the constructs in the study, we have adopted and developed measurement items from several previous studies. All constructs were measured through multiple items on a 7-point Likert scale; they are both practically and conceptually correlated. Table 2 summarizes the variables and items in the survey. Learning orientation is an exogenous variable. Supply chain agility and supply chain relationships represent supply chain practices and capability to build an agile supply chain and cope with changes and supply chain vulnerability in the post-COVID-19 era. Corporate sustainability is an endogenous variable. The corporate sustainability measurement remains under-examined (Lintukangas et al., 2019; Searcy, 2012). The stakeholder theory (Freeman, 2010) is used as a theoretical lens to develop the measurements of corporate sustainability in the study. The measurement items capture the expectations and interests of a wide variety of stakeholders, including customers, employees, shareholders/investors, business partners/competitors, government, and the wider community (Buysse & Verbeke, 2003; Freeman et al., 2010).

The preliminary assessments were conducted to ensure content validity. We invited UAE supply chain and procurement practitioners and academics to review the questionnaire. We asked them to check and provide comments/suggestions for the measures and survey questions. Some measurement items were slightly rephrased to ensure that the items were understandable and relevant to practices in the UAE. Then a pilot study was used to verify the reliability of scales before carrying out a large-scale study to collect the data in the UAE.

The Likert scale was designed for the survey. The common response format 7-point Likert extent scale (1 = strongly disagree, 7 = strongly agree), which includes the level of agreement references with the neutral option, is used to measure the agreement with statements (Joshi et al., 2015). This allows the respondent to be neutral in the answer by choosing the middle score “neutral” and provides respondents with enough freedom to select their best choice from “strongly disagree” to “strongly agree” (Joshi et al., 2015). Appendix A presents the questionnaire items.

4.2. Data collection

The empirical data were collected online through Qualtrics, which is a popular and powerful survey tool for data collection (Boas et al., 2020). Data collection was performed in the UAE in collaboration with the Chartered Institute of Procurement and Supply (CIPS) during the summer of 2021. We invited management personnel to complete our survey. This study focuses on a company-level analysis. Only one participant per organization was invited in the UAE. A total of 890 organizations were invited to this research survey. Online questionnaires with cover letters were sent to the potential respondents. We received phone calls and emails from participants to confirm that they completed the questionnaires. After a couple of weeks, reminder emails were sent

Table 2
The variables and items in the study.

Variable	Definition	Item	Ref.
Learning Orientation	An organizational culture/values that influence the propensity of a firm to create and use knowledge.	Commitment to learning Shared vision Open-mindedness	Calantone et al. (2002); Sinkula et al. (1997)
Supply Chain Agility	An important firm capability to quickly respond and adjust to internal and external supply chain changes. This also allows companies to achieve sustainable development and mitigate supply chain risks and uncertainties, which often cause problems in supply chains.	Joint planning/collaboration Rapid response Flexibility Problem solving Mutual satisfaction	Braunscheidel and Suresh (2009); Christopher (2000)
Supply Chain Relationship	Based on SCPV, this is a supply chain management practice. It is an inclusive set of relationships employed in an organization to enhance supply chain performance.	Interpersonal relationship Interfirm relationship Long-term relationship	Carter et al. (2017); Chen et al. (2010); Wang, Lee, and Chan (2021)
Corporate Sustainability	Firm-level performance based on the triple-bottom-line approach (Elkington, 1998); it contains economic, social, and environmental dimensions from multiple stakeholders' perspectives.	Customer satisfaction Profitability Employee job satisfaction Reputation Social responsibility Environmental responsibility	Elkington (1998); Freeman et al. (2010)

out to encourage participants to complete the survey. There is no limit to industry in this research project, as organizational phenomena including learning orientation, supply chain practices, and corporate sustainability are not defined or constrained by a specific industry or sector.

After data cleaning, a total of 206 valid responses were used in the data analysis, implying a response rate of 23 %. This response to the survey is reasonable. Sheehan (2001) suggests that response rates have indeed declined since the introduction of online surveys. Most of the participants are members of the CIPS, and they were working in various industries across the seven emirates: Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain, Ras Al Khaimah, and Fujairah. Table 3 shows information about sample industrial sectors. Classification of companies from the UAE Ministry of Economy is used to distinguish between micro, small, medium, and large companies. Table 4 shows that the sample companies include 19.4 % organizations with annual revenues of less than AED 3 million that are classified as micro companies; 27.2 % organizations with annual revenues of less than AED 50 million that fall into the category of small size companies; 22.8 % organizations with revenues of less than AED 250 million that are medium size companies; and 30.6 % large size companies with annual revenues of more than AED 250 million. Of the participants, 67.5 % held managerial positions in their organizations, and more than 23 % of the participants were CEOs of the firms. In addition, 75 % of the participants had been working for more than two years in their current organizations. We are confident in the data quality of the study.

A non-response bias test and common method variance test were

Table 3
Sample industrial sectors (n = 206).

Industrial sector	Frequency	Per cent
Oil and gas	28	13.6
Construction	14	6.8
Manufacturing	18	8.7
Trading	22	10.7
Tourism and hospitality	13	6.3
Educational services	13	6.3
Healthcare and pharmaceuticals	10	4.9
Transportation and warehousing	14	6.8
Finance and insurance	13	6.3
Public administration	2	1.0
Other services	59	28.6
Total	206	100.0

Table 4
The sizes of sample companies (n = 206).

Revenues	Number	Percentage
Revenues below AED 3 million	40	19.4
Revenues between AED 3 million and AED 50 million	56	27.2
Revenues between AED 50 million and AED 250 million	47	22.8
Revenues above AED 250 million	63	30.6
Total	206	100.0

performed before data analysis. We compared different groups with a t-test (Armstrong & Overton, 1977). The results indicate no significant difference between early and late responses. Common method bias was detected by applying Harmon's single-factor test in exploratory factor analysis (EFA). The results show that the first factor explained 33 % of the total variance, which is below 50 % (Podsakoff et al., 2003). This is acceptable for the common method bias test. We have also incorporated the marker variable technique to identify and address potential CMB (Lindell & Whitney, 2001). This approach involves comparing pairwise correlations among the main variables within the dataset. In this technique, a "marker variable" is defined as a variable that is theoretically unrelated to at least one variable in the study. We used several variables as a proxy for CMB. There is no evident basis to suspect significant CMB in the study.

5. Data analysis

We have employed a two-step structural equation model (SEM) approach; the measurement and structural models are tested separately. All analyses were performed on a covariance matrix using maximum likelihood (ML) estimation (Anderson & Gerbing, 1988). The SEM was applied to validate the confirmatory measurement models and test research hypotheses in the structural model. In the final model, the latent construct of learning orientation and supply chain relationship was measured by three observed variables. The latent construct of supply chain agility and corporate sustainability was assessed through six observed variables. Fig. 2 shows the measurement and structural model.

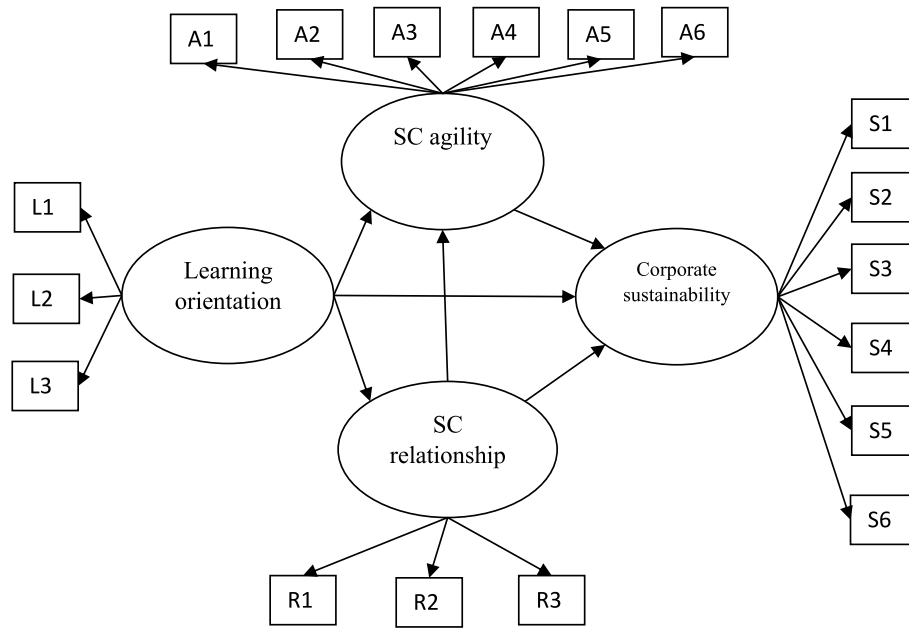


Fig. 2. Measurement and structural model.

5.1. Measurement model

Before the factor analysis, we conducted Bartlett’s test for homogeneity of variances to assess the equality of variance in different samples. The results indicate that all the variables pass Bartlett’s test (P value < 0.001; Hair, 2010). The factor analysis was performed to validate the measurements in IBM SPSS Statistics and Amos 27. We removed the poor factor loading items. Table 5 shows scale item statistics.

Confirmatory factor analysis (CFA) is used when the underlying factor structure is known (Hair et al., 2020). The measurement model evaluation is performed using CFA. Reliability for each construct was established by Cronbach’s α and composite reliability (CR). The reliability values for all constructs range from 0.81 to 0.91, above a

threshold of 0.7. The standardized factor loadings are significant, $p < 0.001$. Construct validity was demonstrated by average variance extracted (AVE). The results show that CRs for the four latent variables were above a threshold of 0.7, and the estimates of AVE were higher than a threshold of 0.5. Convergent validity was assessed by examining the significance of individual item loadings through t -tests. The model fit was found to be adequate ($\chi^2 = 355.97$, $df = 129$, $\chi/df = 2.75$, $p < 0.001$, CFI = 0.91, SRMR = 0.49, RMSEA = 0.08, AIC = 439.97). These results provide sufficient evidence for convergent validity.

Discriminant validity was assessed by the Fornell–Larcker criterion. We compared the square root of the AVE with the absolute value of the correlation coefficients from the other latent variables (Fornell & Larcker, 1981). The comparison showed that the square root of the AVE

Table 5
Scale items statistics ($n = 206$).

Scale	Mean	SD	Loadings	t-value	α	AVE	CR
Learning Orientation							
L1 Managers agree that our organization’s ability to learn is the key to our competitive advantage	5.47	1.49	0.89	14.61	0.86	0.79	0.92
L2 All employees are committed to the goals of this organization	5.39	1.49	0.77	12.30			
L3 Managers encourage employees to innovate, “think outside of the box”	5.20	1.74	0.83	a			
Supply Chain Agility							
A1 Our company is capable of joint planning with suppliers in purchasing, production, and logistics.	5.29	1.41	0.75	a	0.91	0.80	0.92
A2 Our company is capable of responding to suppliers’ and customers’ requests at a fast speed	5.42	1.38	0.83	11.96			
A3 Our company is capable of adjusting production/service capacity/capability	5.37	1.31	0.82	11.96			
A4 When an unexpected situation arises, our company and the supplier will solve problems adequately.	5.42	1.27	0.78	11.35			
A5 When an unexpected situation arises, our company is capable of reconfiguring operations process to adapt to the changes	5.39	1.31	0.85	12.60			
A6 When a disagreement arises in the transaction process, our company and the supplier re-evaluate the ongoing situation to achieve a mutually satisfactory solution.	5.33	1.32	0.79	11.47			
Supply Chain Relationships							
R1 In our company, we believe interpersonal relationships are very important in doing business	5.73	1.46	0.73	9.72	0.81	0.73	0.89
R2 In our company, we believe interfirm relationships are very important in doing business	5.84	1.27	0.81	10.58			
R3 In our company, we believe long-term relationships are very important in doing business	6.02	1.37	0.76	a			
Corporate Sustainability							
S1 Our company has a high level of customer satisfaction	5.58	1.28	0.76	a	0.88	0.61	0.91
S2 Our company has strong profitability	5.25	1.40	0.70	10.01			
S3 Our company has a high level of employee job satisfaction	4.77	1.58	0.76	11.07			
S4 Our company has a reputation in the industry	5.70	1.45	0.74	10.74			
S5 Our company is a socially responsible business	5.41	1.43	0.79	11.56			
S6 Our company is an environmentally friendly business	5.27	1.56	0.73	10.57			

Note: Model fit indices: $\chi^2 = 355.97$, $df = 129$, $\chi^2/df = 2.75$, $p < 0.001$, CFI = 0.91, SRMR = 0.49, RMSEA = 0.08, AIC = 439.97.

^a Indicates a parameter fixed at 1.0 in the original solution.

for each construct is larger than its correlations with all other constructs (Table 6). This evidence of discriminant validity satisfied the criteria. Table 6 provides correlations among the constructs demonstrating adequate discriminant validity of the constructs.

5.2. Structural model

The overall structural model fit was verified using various fit criteria such as χ^2 and χ^2/df , its ratio to the model degrees of freedom, comparative fit index (CFI), standardized RMR (SRMR), Akaike information criterion (AIC), and root mean squared error of approximation (RMSEA). These indices are widely used for model fit evaluation (Bentler & Bonett, 1980). An AIC value is closer to the saturated model than to the independence model (Ogasawara, 2016). The results suggest an adequate model fit to the empirical data with the following fit indices: $\chi^2 = 355.97$ with 129 df, $\chi^2/df = 2.75$, $p < 0.001$, CFI = 0.91, SRMR = 0.49, RMSEA = 0.08, and AIC = 439.97. The *t*-values of the individual structural coefficients are used to test the direct relationship individually. The results of the direct relationship are presented in Table 7. The findings support the research hypotheses in the study.

5.3. Mediation analysis

Mediation analysis was carried out to test the research hypotheses. Two mediators, supply chain relationship and supply chain agility, were simultaneously tested in the bootstrapping test of mediation (Hayes, 2018). The learning orientation had a significant impact on corporate sustainability ($b = 0.22$, $t = 3.354$, $p < 0.001$), supply chain relationship was found to have a significant impact on corporate sustainability ($b = 0.17$, $t = 2.30$, $p = 0.022$), and supply chain agility was also found to have a significant impact on corporate sustainability ($b = 0.39$, $t = 3.901$, $p < 0.001$). Table 8 reveals the results of the mediation analysis. A significant indirect effect of learning orientation on corporate sustainability through supply chain relationships and supply chain agility was found in this study. Furthermore, the direct effect of learning orientation on corporate sustainability in the presence of the mediators was also found significant. Hence, there is partial serial mediation by supply chain relationships and supply chain agility in the relationship between learning orientation and corporate sustainability.

6. Discussion

The study investigates for the first time sustainable operations and supply chain practices management in the UAE's organizations to improve corporate sustainability and enhance sustainable development post-COVID-19. According to the UAE Vision 2030, sustainable development is an important part of the emirate's national development plan (Linda, 2012; SDG, 2017). Corporations play a significant role in carrying out the government's sustainable development plan, with the triple bottom line of economic, social, and environmental performance (Elkington, 1998). Corporate sustainability is a major driver of the emirate's national development plan (SDG, 2017). The study examines the influence of learning orientation on corporate sustainability through supply chain relationships and supply chain agility. Our findings suggest a positive association between learning orientation and corporate sustainability. Specifically, we found that supply chain relationships and

Table 6
Correlation matrix.

SCA	SCA	LO	SCR	CS
	0.89^a			
LO	0.62	0.88^a		
SCR	0.54	0.51	0.85^a	
CS	0.68	0.67	0.54	0.79^a

^a The square roots of the AVEs.

Table 7
Results of direct relationships.

Relationship	Parameter estimate	Standard error	<i>t</i> value	<i>p</i>
Learning orientation → corporate sustainability	0.22	0.06	3.35	<0.001
Learning orientation → supply chain agility	0.43	0.06	7.04	<0.001
Learning orientation → supply chain relationships	0.43	0.06	7.04	<0.001
Supply chain relationship → supply chain agility	0.31	0.78	3.99	<0.001
Supply chain agility → corporate sustainability	0.39	0.10	3.90	<0.001
Supply chain relationship → corporate sustainability	0.17	0.07	2.30	<0.05

supply chain agility serve as mediating factors, individually mediating the relationship between learning orientation and corporate sustainability. Furthermore, our results indicate that these mediating effects occur in a serial manner, with supply chain relationships and supply chain agility acting as sequential mediators in the relationship between learning orientation and corporate sustainability. This reveals the relationships and the underlying mechanisms of these constructs through a serial multiple mediation model.

This paper contributes to the sustainable operations and supply chain management literature by investigating the relationships among learning orientation, supply chain relationships, supply chain agility, and corporate sustainability from the vantage point of knowledge transfer. The results highlight the importance of a learning orientation in enhancing sustainability within supply chains. Our study shows that both supply chain practices mediate the relationship between learning orientation and corporate sustainability. Organizations that prioritize mutual learning and knowledge exchange with their stakeholders tend to establish more resilient supply chains and enduring relationships. In addition, organizations can build resilient and responsible supply chains that contribute to both their success and the broader goal of sustainability post-COVID.

6.1. Theoretical implications

Our study validates the research framework, which extends the SCPV in organization learning. This may indicate that organizational learning plays a crucial role in shaping supply chain practices under SCPV and stakeholder theory, ensuring corporate sustainability in the aftermath of the COVID-19 pandemic. Learning orientation promotes supply chain practices. For example, this leads to conduct in supply chain relationships and then they affect corporate sustainability. The results are consistent with previous studies (Iyer et al., 2019; Khan et al., 2023; Kumar et al., 2020). As businesses face new challenges and uncertainties, building a learning culture and implementing effective strategies become vital for maintaining resilient and sustainable business operations (Khan et al., 2023). Furthermore, supply chain orientation is one of the important resilience and sustainability drivers (Khan et al., 2023; Yang et al., 2021). Supply chain relationships affect supply chain agility positively. We found that both supply chain agility and relationships had significant impacts on corporate sustainability. These findings align with the outcomes observed in prior research Such as Braunscheidel and Suresh (2009); Geyi et al. (2020); Nath and Agrawal (2020); Touboulic et al. (2014); and Wieland and Wallenburg (2013). This learning-oriented approach may foster supply chain practices in sustainable ways, lead to joint problem-solving and inter-organizational learning, and contribute to long-term supply chain sustainability by aligning goals and stakeholder values across the network.

Learning is viewed as an important organizational orientation, and it has a significant impact on supply chain operations (Braunscheidel & Suresh, 2009). We incorporate the theory of organizational learning

Table 8
Mediation analysis results.

Paths	Direct effect	Indirect effect	Lower	Upper	p-value	Result
LO→SCA→CS	0.325**	0.166 *	0.086	0.269	0.003	Partial mediation
LO→SCR→CS		0.073	0.005	0.188	0.084	
LO→SCR→SCA→CS		0.052*	0.017	0.122	0.002	

Notes: **p-value <0.001; *p-value <0.05.

(Huber, 1991), SCPV (Carter et al., 2017), and stakeholder theory (Freeman et al., 2004) into the research model. Our results may imply that building an organizational learning orientation may influence other stakeholders (suppliers, buyers, etc.), and the organizational orientation may aid in forming collaborative alliances, enabling knowledge transfer and mutual learning among partners within the supply chains (Pesch et al., 2021). The findings are supported by recent studies (Bouncken, Ratzmann, & Covin, 2023; Bouncken, Ratzmann, & Covin, 2023; Khan et al., 2023). The study emphasizes that both supply chain relationships and supply chain agility itself are pivotal in elucidating the mechanisms that connect organizational orientation with corporate sustainability based on a knowledge transfer perspective.

6.2. Managerial implications

The study draws managers' attention to the importance of learning orientation as well as supply chain relationships and supply chain agility in supply chains post-COVID-19. It also provides valuable insight into sustainability transformation post-COVID-19. Based on SCPV, supply chain practices are imitable and transferable: managers can learn/copy the myriad practices across companies. The study demonstrates partial serial mediation by supply chain relationships and supply chain agility of the relationship between learning orientation and corporate sustainability. This suggests that investments in learning orientation, supply chain relationships, and supply chain agility may yield internal benefits by enhancing a firm's ability to advance its sustainability efforts. For example, managers may prioritize the cultivation of supply chain relationships and supply chain agility as strategies for fostering corporate sustainability through the utilization of existing supply chain practices, resources, and knowledge shared among supply chain partners. Managers should actively seek opportunities and establish external connections to encourage knowledge transfer and information sharing through interpersonal and interfirm relationships with suppliers and/or buyers. Managers may conduct environmental collaboration with external parties to establish more sustainable operations and gain access to new markets and technologies beyond their boundaries (Khan et al., 2023). Managers may think about applying formalization in supply chain operations. Pesch et al. (2021) argue that formalization involves transforming tacit and ambiguous knowledge related to digital technologies into a clear and explicit form, presented in a structured manner, the process supports learning and the development of better and shared understanding. This may help organizations cope with future uncertainty and enhance sustainability, and this is also in alignment with the values and practices found in Arabic culture (Khakhar & Rammal, 2013). Furthermore, supply chain relationship enhances agility (Wieland & Wallenburg, 2013), cooperation (Griffith et al., 2006), innovation (Bouncken, Ratzmann, & Covin, 2023), Bouncken, Ratzmann, & Covin, 2023 and learning (Cheung et al., 2010); this may go beyond business transactions and sustainability transitions. The findings may guide firms toward designing their sustainable and resilient supply chain strategies under organizational learning post-COVID-19.

6.3. Limitations and future research

This study has several limitations. First, the data collection was completed during the COVID-19 pandemic through online Qualtrics; this may limit two-way interaction between researcher and respondent.

Second, the study did not focus on a specific industry or sector, and the survey was done from a single perspective. Third, the empirical evidence was collected in the UAE; this may limit the generalizability of research findings to different countries. Fourth, learning orientation represents a part of corporate culture; other organizational cultures may remain uncovered and are little discussed in this study. Nevertheless, these constraints pave the way for valuable avenues of future research. We suggest validating the models across diverse contexts and conducting sustainability studies from the perspectives of multiple stakeholders, such as customers, competitors, and community. The models can be scrutinized by incorporating various organizational orientations and exploring different supply chain practices/concepts. This approach aims to provide a more comprehensive understanding of the mechanisms or processes underlying sustainability transitions. Additional research can delve deeper into understanding learning relationships and knowledge transfer, particularly by concentrating on specific parties and stakeholders involved in supply chain practices (e.g., dyadic or triadic perspectives).

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Appendix A. Supplementary data

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