Supply Chain Coordination and Supply Chain Cooperation Towards Supply Chain Performance: Mediating Role of Supply Chain Ambidexterity in the Kingdom of Saudi Arabia

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Abstract

The most vital energy resources for modern society are oil and natural gas. These two fundamental factors might have a considerable impact in the development of international relations due to their strategic importance in global economic and political situation. Hence, this research designs a model to enhance the supply chain performance in the oil and gas companies in the kingdom of Saudi Arabia (KSA). The recent study aimed to examine the impact of the SC coordination and SC cooperation on the SC performance with the mediating effect of the SC ambidexterity in the oil and gas companies in KSA. A total of 300 questionnaires selected of the oil and gas companies in KSA using convenience sampling method. The study used SEM with SMART-PLS 4 to analyze the data collected. The measurement model applied to analyze the validity and reliability of the model, the path coefficient in the structural equation model used to test the study hypotheses. The results of this study support all of five direct effect hypotheses and two mediation hypotheses. The result of the study finds that SC collaboration has a significant impact on the SC performance and SC ambidexterity, and SC cooperation has a significant impact on the SC performance and SC ambidexterity. Also, the result of the study found significant impact of the SC ambidexterity on SC performance in the oil and gas companies KSA. Moreover, the result of the study confirms the mediating role of the SC ambidexterity on the impact of the SC collaboration and SC cooperation on SC performance. The study provides very important implications to the managers of the KSA to improve their supply chain performance to gain competitive advantage by applying model of SC collaboration, SC cooperation and SC ambidexterity in oil and gas industry.

Key words:

SC coordination, SC cooperation, SC ambidexterity, SC performance, Oil and Gas companies.

1. Study Background

The Saudi Arabian Kingdom (KSA) is a major player in the global oil market. In the end of year 2020, Saudi Arabia accounted for 12.5% of global oil output and held 17.2% of proved global oil reserves and 3.2% of proven global gas reserves (British Petroleum, 2021). In 2020, GDP was estimated at 2.5 trillion riyals, or $675.04 billion. In 2020, there were an estimated 34,8 million people living in the world. About 61.7% of Saudi Arabia's population consists of native-born Saudis. Between 2000 and 2019, oil revenue as a percentage of overall government revenue averaged 81.5%. Meanwhile, oil rent accounts for 98.8% of the total natural resources in KSA, contributing to an average ratio of natural resources rent to GDP of around 39.7% within the same period. This data show that the oil industry is crucial to the Kingdom of Saudi Arabia's economy (Sweidan & Elbargathi, 2022).

Since the mid-1950s, oil and gas have been the world's main energy source, making them critical to the global economy and one of the most significant raw materials. Reengineering the oil sector is needed because new technology, consumer needs, and other variables affect companies' competitive advantages (Lisitsa et al., 2019). Oil and gas supply chain is fast- moving complex supply chains linked to the customers' needs of essential goods and services. (Ahmad et al., 2017; Saad, 2018). The oil supply chain has three divisions: upstream, midstream, and downstream. Moreover, the exploration and production portion of the upstream oil supply chain finds new crude oil reservoirs. Midstream oil supply chain tasks include receiving, storing, and delivering crude oil to downstream processors. The downstream refinery adds value to diesel, gasoline, heating oil, jet fuel, furnace oil, kerosene, and lubricants, making it as essential company. The oil and gas supply chain links coordinate goods, money, and data exchange. This procedure requires a holistic supply-chain strategy of collaboration and cooperation to address challenges and improve complex supply chain network architectures (Aslam et al., 2021).

In recent years, supply networks have gotten increasingly worldwide and complex. Companies today must cooperation with vendors and wholesalers in a variety of locations and nations as a result of the ever-changing nature of the marketplace (Lund et al., 2020). The oil and gas industry regarded as an integral part of the worldwide distribution network, from exploration to production to

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distribution to refineries. Increased globalization is contributing to rising levels of uncertainty in the oil and gas business. Political instability, economic crises, piracy, terrorism, and conflicts are just some of the hazards the sector faces as a result. Supply chain integrity is a major concern for the oil and gas industry, which has led to increased calls for action from regulators and stakeholders to work together to avoid these challenges (Gardas et al., 2019; Alfaqiri et al., 2019).

Members of the supply chain may act as a unified system and coordinate together to boost the supply chain's overall performance. Therefore, the term "coordination" becomes central and important in the context of the supply chain especially in the oil and gas supply chain. There is a common deficiency in managerial competence observed in effectively organizing and integrating the complicated system of business connections among actors within the supply chain (Zhang & Yousaf, 2020). The effective communication, information sharing, partnership, and performance monitoring are some of the characteristics of the inter-firm coordination processes (Li et al., 2019). According to the study of Arshinder et al., (2011) and study of Vosooghidizaji et al., (2020), supply chain coordination is the process of managing dependencies between entities and the collaborative effort of entities working together to achieve mutually specified goals. Supply chain coordination (SC) places emphasis on collaborative efforts, corresponding to coordination in more general terms. Furthermore, it is necessary to conduct an examination of supply chain collaboration. According to Oyedijo et al. (2022), organizations that strategically emphasize supply chain collaboration are more likely to achieve future success by focusing on new revenue streams, enhancing operational efficiency, and fostering customer loyalty. Supply chain collaboration (SC collaboration) is an integral part of supply chain management (SCM) that involves two or more companies working together and cooperating to plan, manage, and execute supply chain activities in order to improve performance and create value for end customers and stakeholders (Simatupang & Sridharan, 2005; Mahadevan et al., 2023) in the supply chain.

Besides the SC collaboration and SC cooperation, numerous research examined the function of ambidexterity in the supply chain toward SC performance. However, it is unclear from the available literature exactly which mechanisms enable ambidexterity to improve supply chain performance. Since SC

ambidexterity enables the deployment of collaboration and coordination based on SC ambidexterity via its components efficiency (exploitation) and innovation (exploration) it improves SC performance (Aslam et al., 2020). Therefore, the purpose of this research is to examine the role of ambidexterity in SC as a mediator in the impact of SC collaboration and SC cooperation on SC performance. Since SC performance is a significant tool for obtaining competitive advantage, knowing the antecedents that boost SC performance is crucial, especially in highly competitive and uncertain markets (Baah et al., 2022). A company's SC performance is not only an exploitable capability, but also has a strategic function (Saragih et al., 2020).

2. Problem Statement

Many studies have examined the impact of ambidexterity in the SC performance in addition to SC collaboration and SC cooperation. However, it is unclear from the existing literature what specific procedures enable ambidexterity to improve supply chain survival and performance. Since SC ambidexterity allows the deployment of collaboration and coordination based on SC ambidexterity via its components, efficacy (exploitation) and invention (exploration), it boosts SC performance (Aslam et al., 2020). Thus, this study will try to empirically examine the impact of SC ambidexterity as mediation between SC collaboration, SC cooperation, and SC performance. Since SC performance is a significant tool for obtaining competitive advantage, knowing the antecedents that boost SC performance is crucial, especially in highly competitive and uncertain markets (Baah et al., 2022). Study of Saragih et al. (2020) assert that the performance of a company's supply chain not only serves as an economic capability but also fulfills a strategic role. Based on the researcher knowledge, there is no study yet examine the mediating role of the SC ambidexterity as mediator on the impact of the SC collaboration and SC cooperation on the SC performance in the oil and gas companies in KSA, therefore this study will fill this theoretical gap and answer the study main question " Is there any mediating role of the SC ambidexterity as mediator on the impact of the SC collaboration and SC cooperation on the SC performance in the oil and gas companies in KSA".

3. Previous Studies

In this section the previous literature related to the study variables will be discussed in detail. Hypotheses development based on the discussion of the relationships between variables as illustrated in the previous studies will be discussed also in the following sections.

3.1 SC Coordination

Although there have been efforts in the academic literature to integrate various supply chain functions, it is likely that emphasizing the coordination of individual tasks independently may not effectively facilitate overall collaboration within the entire supply chain. Heydari et al. (2021) suggests that the research on supply chain coordination is still in its early stages. The existing body of literature indicates a limited attempt in developing an integrated comprehension of coordination, despite the acknowledged importance of coordination. The scholarly discourse surrounding supply chain coordination encompasses an extensive range of subjects and perspectives.

The research conducted by Malik and Sarkar (2019) revealed that supply chain coordination involves collaborative efforts in various dimensions of the business model, such as joint planning and product development, information sharing and integration of information systems, cross-functional collaboration within the networked companies, long-term cooperation, and properly distribution of risks and rewards. According to the scholarly work of Sudan et al. (2023), supply chain (SC) coordination refers to the collaborative efforts of multiple entities to enhance the planning and execution of supply chain activities beyond the capabilities of any individual entity.

To ensure that the benefits and value provided can be maximized and distributed equitably, Kleindorfer and Saad (2005) and Ibrahim et al. (2023) found that coordination between supply chain parties is essential for risk avoidance, reduction, management, and mitigation. As stated by Allaoui et al. (2019), SC coordination is a strategic response to problems caused by interdependencies between supply chain participants. To better understand how SC coordination affects SC ambidexterity and performance, this study conducted on the oil and gas firms in the Kingdom of Saudi Arabia (KSA).

3.2 Supply Chain Cooperation (SC Cooperation)

From an organizational perspective, it has been proposed that supply chain management (SCM) encompasses a new approach to effectively manage the interactions between supply chain actors. According to the research conducted by Cheshmberah and Beheshtikia (2020), there is an observable trend in supply chain management (SCM) that involves a shift from an uninterested approach to a collaborative strategy. This transition entails the active cooperation and coordination among supply chain enterprises. As strategic partners, suppliers and buyers work together to ensure mutual success through joint investments in infrastructure, participation in quality assurance and product development programs, and the sharing of risks and rewards. The SC actors gain from cooperation in a number of ways (Kim & Shin, 2019). Time and cost savings, enhanced product design, and higher quality are only some of the potential benefits of cooperative SC connections (Kotzab et al., 2023). In the context of the oil and gas companies in the Kingdom of Saudi Arabia this study will examine SC cooperation as an independent variable to analyze its impact on the SC ambidexterity and SC performance.

3.3 Supply Chain Ambidexterity (SC Ambidexterity)

According to Partanen et al. (2020), the ambidexterity observed in the majority of empirical research models represents a trade-off between exploration and exploitation. The phenomenon known as "SC ambidexterity" was first described by O'Reilly and Tushman (2013). Activities associated with exploration in the SC involve looking for new things to try, taking risks in consideration, and thinking beyond the box. On the other hand, exploitation in the SC methods strive toward effectiveness, enhancement, and application. The goals of exploration-oriented organizational practices are more long-term in nature, whereas those of exploitation-oriented practices are more immediate in nature (Wang et al., 2019). Researchers have claimed that organizations need to adopt all of these approaches concurrently if they want to survive and succeed in today's dynamic marketplaces (Rashid & Ratten, 2021).

Nevertheless, scholarly research on the concept of SC ambidexterity has demonstrated the potential to effectively balance obviously conflicting objectives (Wang et al., 2019). Organizations require ambidexterity as they are driven to reproduce their existing business strategies to achieve short-term success, while simultaneously adjusting to the ever-changing market conditions to ensure long-term viability (Kumkale, 2022). This study aims to investigate the role of SC ambidexterity as mediation on the impact of the SC collaboration and SC cooperation on the SC performance of oil and gas firms in the Kingdom of Saudi Arabia (KSA).

3.4 Supply Chain Performance (SC Performance)

The significance of supply chain performance has grown in importance for firms seeking to gain a competitive advantage (Cahyono et al., 2023), and this trend continues in the supply chain literature. The performance criteria considered in early supply chain modeling studies encompassed cost, customer response, and activity time (Lee & Billington, 1993; Pyke & Cohen, 1994). The researchers typically utilized cost as the primary metric for evaluating supply chain performance in their studies, according to its simplicity in quantitative models (Sharma et al., 2020).

The SC performance measurement system must account for all relevant constraints. Beamon (1999) built a framework for choosing supply chain performance metrics on the strength of this argument. The flexibility, resource, and output performance measurements were recognized in this framework as the essential elements of a supply chain performance assessment system. This indicator was used to evaluate supply chain performance in a number of studies (Simo et al.,2022; Chand et al.,2022).

Supply chain should be assessed for their flexibility in adapting to changes in demand, delivery periods and volume. Accordingly, measurements of flexibility include the ability to introduce and implement a new product, as well as the ability to adjust the product mix, volume, and distribution. Costs associated with various resources, supply chain inventory levels, and investment returns are all examples of resource measurements that assess the effectiveness of a company's use of its available assets. On-time deliveries, order fill rate and response times, sales volume, and profit are all output parameters that point to satisfied customers. In the current study, these indicators of supply chain performance as asserted by Sezen, (2008) are operationalized through the use of questionnaire items that reflect the extent to which supply chains operate in each of these three 8dimensions.

3.5. Hypothesis Development.

The linkages between SC coordination, SC cooperation, SC ambidexterity and SC performance is discussed in this section. Furthermore, the hypotheses to be tested in the context of oil and gas companies in KSA will be formulated next. The model of the recent study model shown in Figure 1.

3.5.1 SC Coordination and Supply SC Performance

In the study conducted by Arshinder (2008), it was found that investigating the connection between supply chain coordination and supply chain performance is a critical measure for enhancing supply chain efficiency. This involves identifying the interdependent activities within the supply chain and developing strategies to manage them effectively. The measurement of performance improvement in supply chain (SC) operations, with the aim of benefiting all participants, can be assessed by evaluating the extent to which coordinating mechanisms are employed (Singh et al., 2019).

The supply chain is a dynamic structure that is always changing, which creates a number of fascinating problems for efficient system coordination. Members of the supply chain cannot compete on their own. Before reaching the final consumer, a product goes through a series of steps that add value to it (Li et al., 2019). Globalization, outsourcing, and consolidation of suppliers all contribute to an environment that is more vulnerable to supply chain disruptions and fraught with unpredictability. The safety stock, order splitting to suppliers, inventory pooling technique and hedging strategies are discussed in the literature as responses to risks associated with supply lead time reliability, pricing uncertainty, and demand volatility (De Giovanni, 2021). The complexity and susceptibility of modern supply networks to supply chain risks have, however, caught the attention of academics and industry professionals alike in recent years and linked with the coordination of the all parties in the supply chain to enhance the performance of the supply chain. (Nayal et al., 2022). Based on the above discussion the study formulates the following hypothesis to be tested in the current study of the impact of the SC coordination and SC performance.

H1: SC Coordination has a direct and positive impact on SC Performance.

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3.5.2 SC Cooperation and SC Performance

Cooperation in the supply chain (SC) is understood to be a win-win situation in which all parties involved stand to benefit (McClellan, 2002). Moreover, SC cooperation suggested as an important factor in enhancing SC performance (Ellram & Cooper, 1990; Ellram & Murfield, 2019) that cooperation has been gaining momentum in the workplace since the early 1990s. Working together has been shown to be beneficial on many levels for businesses. Improvements in performance and competitiveness, as well as a more defined division of labor among partners, are just a few of the many benefits of supply chain management (Kohli & Jensen, 2010; Bag et al., 2023).

Despite rising interest in SC cooperation research, this area of study needs more investigation. Daniel et al. (2017) asserted that enhancing the production planning and purchasing are significant priorities in the context of SC cooperation in the United Kingdom's construction industry. Cooperation both inside and outside of an organization was found to be significantly correlated. Abdalla and Nakagawa (2021) identified numerous requirements for effective learning, which encompassed integrating mechanisms, shared culture, dedication, trust, and communication. These factors were found to have a positive impact on performance indicators within the context of supply chain management. The research conducted by Pinto (2020) highlights the significance of interdependence in enhancing supply chain performance, as it provides organizations with a competitive advantage over competitors. Also, the study by Butt et al. (2023) indicated that the ability of managers to interact with partners enables the firms to integrate and link their operations, which boosts effectiveness and prospects for innovation. Newell et al. (2019) have highlighted the necessity of expanding company interactions beyond communication between companies that includes both suppliers and customers.

Several commonly mentioned benefits of supply chain (SC) cooperation include cost reduction, inventory reduction, shorter replenishing periods, and improved forecast accuracy (JS, Chilkapure, & Pillai, 2019). The implementation of coordinated promotional sales initiatives across strategic partners throughout the supply chain is crucial for producing substantial additional income that surpasses the anticipated outcomes of regular non-promotional sales activities. Study of O'Connor et al. (2020) note that a key benefit of SC cooperation is enhanced environmental management in manufacturing, which in turn stimulates more strategic planning of promotional sales in the future.

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Productive cooperation within the supply chain can be assessed through various measures, including sales expansion, market share gains, and the satisfaction of strategic channel (SC) partners. When a relationship has positive outcomes, there is an increased likelihood of both sides engaging in future collaborative efforts. Following the achievement of a commercial endeavor, the strategic collaboration (SC) partners frequently seek opportunities to sustain their cooperation efforts in subsequent undertakings (Ali et al., 2019). Therefore, SC cooperation partners may express an interest in continuing the partnership in the future. Based on above argument, the study hypnotized the following:

H2: SC Cooperation has a direct and positive impact on the SC performance.

3.5.3 SC Coordination and SC Ambidexterity

The current trend in ambidexterity literature has been described by Peng et al. (2019) as businesses that can expand on their existing capabilities while also venturing into unfamiliar area. Supply chain exploration is described as "practices that develop new supply chain solutions," whereas supply chain exploitation is the set of practices that refine and extend current skills and resources (Burin et al., 2020 Khan et al., 2022; Ojha et al., 2018). Reducing operational redundancy and upgrading and exploiting existing technologies are two ways in which supply chains can refine their present skills and resources. In contrast, it is through experimentation, exploration of new opportunities, and the pursuit of alternative solutions to a problem that new solutions of the supply chain can be produced (Kumar et al., 2021).

Researchers have recently begun to look into the significance of ambidexterity in the supply chain literature, and they've found that ambidextrous supply chains, in which supply chain partners identify new customers' needs and adapt to a shifting business environment, are better able to weather supply chain disruptions and boost business performance. Moreover, study of Souza-Luz and Gavronski (2020), also drawing from the ambidexterity literature, found that a company's capacity to introduce novel products is improved by increasing the degree to which its internal functional units collaborate with its suppliers and customers. The coordination within the supply chain can enhance the supply chain exploration and exploitation (SC Ambidexterity) based on the above discussion. In order to examine the impact of the SC coordination and SC ambidexterity, the following hypothesis is formulated.

H3: SC Coordination has a direct and positive impact on the SC Ambidexterity.

3.5.4 SC Cooperation and SC Ambidexterity

Abdalla and Nakagawa (2021) conducted a study whereby they identified cooperation between suppliers and consumers, commonly referred to as SC cooperation, as one of the prevailing forms of complementary agreements. In order to attain this objective, individuals involved in these cooperation's combine or trade several types of assets, each of which would pose challenges to acquire independently. Cooperation agreements with competitors are often pursued to enhance the competitive position of firms by improving overall supply chain ambidexterity, efficiency, and resource management. This is achieved through the utilization of economies of scale, risk diversification, and the application of experience (Aslam et al., 2020).

SC cooperation can help avoid a variety of problems, such as high communication costs, the risk of being locked onto a certain investment path, and unneeded information leakage (Burin et al., 2020). Since engaging with diverse cooperative partners leads in different SC outcomes as SC ambidexterity, this presents an additional difficulty in SC cooperation as picking the right partners. Several researches confirm the effect of cooperation with additional partners on SC ambidexterity (Partanen et al.,2020). The recent study hypnotized the impact of the SC cooperation and SC ambidexterity to be tested in the context of oil and gas companies in KSA.

H4: SC Cooperation has a direct and positive impact on the SC Ambidexterity.

3.5.5 SC Ambidexterity and SC performance

SC ambidexterity related to the ability of adjusting SC design in response to shifts in the market and coordinating the interests of all parties involved in the supply chain. Researchers have acknowledged the challenge of balancing alignment and adaptability, but they have also suggested that doing so leads to long-term competitive advantage (Wamba et al., 2020; Alamsjah & Asrol, 2022).

Supply chain ambidexterity refers to the ability to provide redundancy within a supply chain through the continuous integration of additional suppliers and logistical assistance. Consequently, the supply chain demonstrates resilience in the face of disruptions originating from the supply side (Alsmairat & Al-Shboul, 2023), exhibiting a notable ability to withstand such interruptions. According to Gibson and Birkinshaw (2004), the effectiveness of mitigation strategies relies

on the establishment of adaptable management systems that can promptly respond to emerging information. Aslam et al. (2020) have also provided evidence indicating that the practice of supply chain ambidexterity is associated with improved supply chain performance. The following hypothesis were derived from the most recent study in consideration of this issue.

H4: SC Ambidexterity has a direct and positive impact on the SC performance

3.5.6 Mediating role of the SC-Ambidexterity on the impact of the SC-Coordination on the SC-performance

Businesses that possess ambidexterity have the capability to leverage their current strengths while simultaneously venturing into unexplored domains. The development of collaborative patterners within the supply chain enables managers to achieve an optimal level of flexibility, enhance existing routines, and acquire new competencies from other departments within the firm and its environment. This practice facilitates the maintenance of a competitive advantage. Considering the demonstrated advantages that organizational ambidexterity offers to firms, it is imperative to explore its ramifications on supply chain performance (Tariq et al., 2022).

The impact of SC ambidexterity on a company's business units, projects, managerial levels, and inter-organizational alliances has been the subject of numerous studies, but there is still very limited empirical proof of its effect on performance (Birkinshaw & Gupta, 2013; Tariq et al., 2022). According to the research conducted by O'Reilly and Tushman (2013), further investigations on ambidexterity should encompass not just the firm as an individual entity but also its broader ecosystem, as well as its collaborative interactions with both partners and competitors. According to Bui et al. (2021), the authors argue that the center of performance will transition from the company itself to the community in which the firm is situated. Therefore, in the context of Saudi Arabian oil and gas firms, it is essential to examine ambidexterity in the SC as the mediator between the influence of collaboration and SC Performance.

H5: There is mediating role of the SC Ambidexterity on the impact of the SC Coordination on the SC performance

3.5.7 Mediating role of the SC Ambidexterity on the impact of the SC Cooperation on the SC performance

Given the continuous changes in competitive and market dynamics, the idea of ambidexterity suggests that the attempt of a competitive advantage by specialization in a specific domain is no longer tenable. Previous research has demonstrated that the implementation of organizational ambidexterity has a positive impact on various aspects such as creativity, productivity, and competitive advantage (O'Reilly and Tushman, 2013; Ramachandran et al., 2019). Numerous scholarly investigations have been undertaken to examine the concept of organizational ambidexterity; however, a limited number of research have explored this phenomenon specifically from the perspective of the supply chain (Partanen et al., 2020).

In addition, SC-cooperation and SC-ambidexterity have been discussed separately only infrequently. As a corollary, we argue that SC-Ambidexterity is a mediator between SC collaboration and SC performance. More collaboration in the SC is required to quickly respond to market shifts and customer expectations in today's competitive, complex, dynamic, and uncertain business environment (Dubey et al., 2018).

The dynamic capability view (DCV) is used as a theoretical foundation in the most recent research. However, DCV argues that enterprises need dynamic capacities to survive and preserve competitive advantage in the face of ever-evolving market conditions. O'Reilly and Tushman (2013) stated that DCV is the most applicable theoretical paradigm for the investigation of SC ambidexterity.

H5: There is mediating role of the SC Ambidexterity on the impact of the SC Cooperation on the SC performance

3.6 Theoretical Framework

The theory of the Resource-based view (RBV) promotes the strategic engagement of work groups through the utilization of organizational-level capabilities in order to enhance performance and achieve a competitive advantage within the industry. The Resource-Based View (RBV) suggests that each collaboration company within a Supply Chain (SC) can enhance SC performance by relying on its own resources. Therefore, it is imperative for every organization that seeks to engage in supply chain collaboration and cooperation

with other entities to thoroughly assess its capabilities and constraints. This evaluation will enable the organization to ascertain the appropriate level of collaboration and cooperation required (Chumphong et al., 2020). RBV promotes firms to employ tangible and intangible resources wisely to create valuable, uncommon, inimitable, and non-substitutable products and services (Barney, 1991). RBV encourages SC players to collaborate and sharing the knowledge and experiences to improve SC performance through supply chain collaboration and SC cooperation.

SC performance requires dynamic capabilities, according to prior study (Manzoor et al., 2022). Thus, by suggesting SC ambidexterity, a supply chain capability that improves SC performance. Recent study adds to SC ambidexterity model literature. SC ambidexterity as a mediator of SC collaboration and cooperation on SC performance. Thus, the study enriches ambidexterity theory. Moreover, Resource-based view RBV with the dynamic capability's view (DCV) are used to model the impact of SC coordination, SC cooperation, and SC performance in KSA oil and gas businesses through SC ambidexterity. SC ambidexterity will be the mediator variable in the recent study, which will assess SC coordination, cooperation, and performance. The suggested model, based on Khan et al.,2021; Li et al.,2023; Abdalla & Nakagawa, 2021; Thakkar et al.,2009, will be empirically evaluated in Saudi Arabian oil and gas firms. Figure 1 theoretical framework
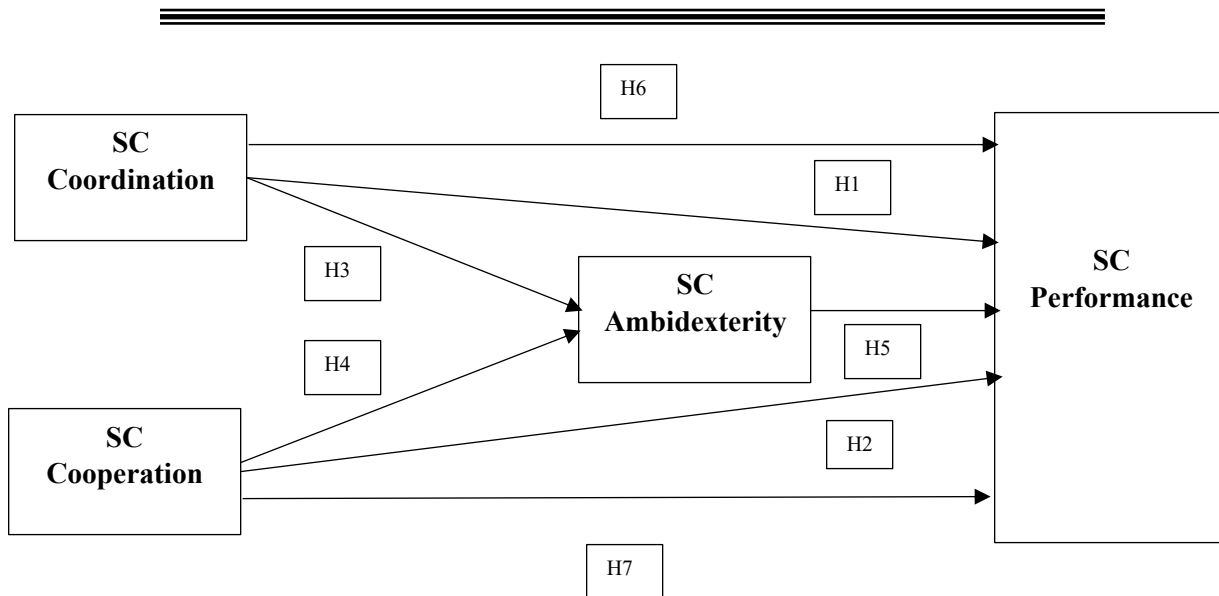
Figure 1: Theoretical Framework

4. Research Methodology

4.1 Design and Procedures

This study took an empirical approach to examining possible links between SC coordination, SC cooperation, and SC ambidexterity and SC performance. The study was based primarily on quantitative data collected from KSA oil and gas companies' managers. The exact dates range from August 20, 2023, to September 25, 2023, and the data collected covers that time. The study also made use of secondary data, from previous studies that had already explored the same topics. SPSS and SMART-PLS were used to analyse the data collected for the current study as descriptive indicators and cause-effect indicators, respectively, allowing us to reach our goals.

4.2 Population and sample

The population of the study is the managers in the top five oil and gas companies in Sambaed on the report published Scribd (2022) about oil and gas industry in KSA, the top five oil and gas companies are (Saudi Aramco, Aramco Gulf Operations Company (AGOC), Petromin, Saudi Texaco and Petroleum Services Company). A letter for permission was sent to the HR managers of these companies to conduct the study. Approval was received from these companies. After the approval to conduct the study received, the survey link was shared with the HR managers who administered the survey by forwarding the link to the managers in their respective companies.

This process conducted because the researcher had no direct access to the companies' managers. Similar approaches were adopted in other studies (Chami-Malaeb and Garavan, 2013; Alanazi, 2022). The data collected by online survey, resulting in total of participants of 522. After data coding and editing a final sample of 420 used to the purpose of the study analysis. According to Haire et al. (2014) asserted that 100 respondents are suitable for SEM analysis.

4.3 Study Tool (Questionnaire)

The questionnaire as data collection tool of this study designed based on the previous studies for each variable of the study. The items to measures of SC coordination the independent variable adapted from previous literature of (Li et al., 2018; Anbanandam et al., 2011). SC coordination measured by three items; while the SC cooperation measured by five items from the study of Anbanandam et al. (2011). Moreover, SC Ambidexterity measurement adapted from the study of Jaidi et al. (2022**)** by five items. Finally, SC performance measured by six items adapted from the studies of (Sezen, 2008). The items of the study variables included in Appendix A at the end of the study. The questionnaire used five Likert scale to rate the responses of the respondents from strongly agree to strongly disagree based on the study of (Sekaran & Bougie 2016).

4.4 Data Analysis

This section provides findings from an SPSS and SMART-PLS path modeling analysis of the data. Internal consistency reliability, discriminant validity and convergent validity, are displayed in the findings of the descriptive statistics, and the measurement model is evaluated. The structural model analysis that was performed to establish causality will be shown here as well.

4.4.1 Structural Equation Modelling (SEM)

The evaluation of PLS-SEM path model findings consists of a two-step approach was adopted in the recent work. This two-stage process consists of (1) evaluating the measurement model, which includes checking the items' reliability and validity, and (2) evaluating the structural model, which includes testing the significance of the path coefficients and calculating the R2 value (Figure 2).

4.4.2 Measurement Model Evaluation

Measurement model of the study involves the determination of reliability of the individual item, also, the internal consistency of reliability, discriminant validity, content validity and finally convergent validity as suggested by Hair, et al., (2014). The measurement model of the study displayed in figure 2
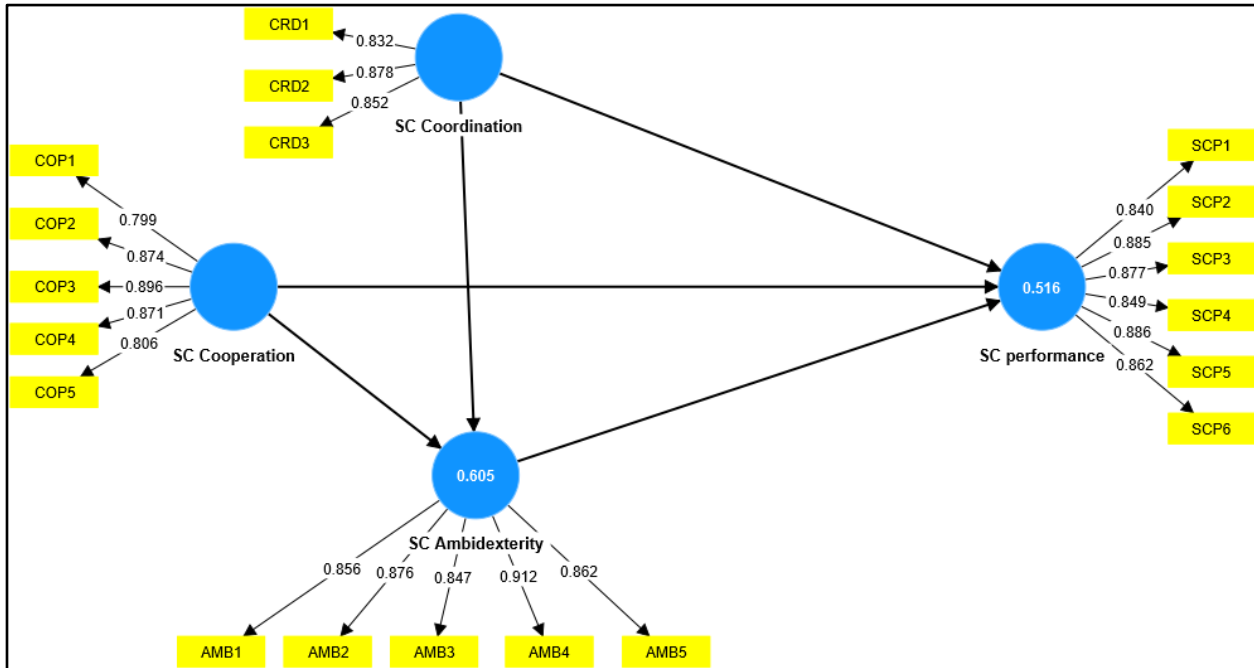

Figure 2: The measurement model of the study

The outer loadings of each of the latent variables are used to measure item reliability in relation to Figure 1 (Hair et al., 2014). The results demonstrate that all items in this study had loadings satisfied the acceptable level of 0.40. The Internal consistency reliability is the degree to which all components of a given scale measure the construct being measured, as depicted in Figure 2 of the measurement model. Cronbach's alpha and the composite reliability coefficient are often used indices in organizational research for measuring the internal consistency and reliability of a scale, especially one with multiple components.

Thus, the internal consistency, composite reliability and Cronbach's alpha displayed in table7.

Table 7: Assessment for Measurement Model

Construct	Items (Indicators)	Indicators Reliability	Internal consistency	Convergent validity	Reliability
		loading >0.70	CR >0.70	AVE >0.50	Cronbach's Alpha >0.70
SC Coordination	CRD1	0.832	0.89	0.73	0.815
	CRD2	0.878			
	CRD3	0.852			
SC Cooperation	COP1	0.799	0.929	0.723	0.903
	COP2	0.874			
	COP3	0.896			
	COP4	0.871			
	COP5	0.806			
SC Ambidexterity	AMB1	0.856	0.94	0.759	0.92
	AMB2	0.876			
	AMB3	0.847			
	AMB4	0.912			
	AMB5	0.862			
SC performance	SCP1	0.84	0.948	0.751	0.934
	SCP2	0.885			
	SCP3	0.877			
	SCP4	0.849			
	SCP5	0.886			
	SCP6	0.862			

As Hair, et al. (2014) advised, the coefficient of composite reliability should not be less than .70 to evaluate internal consistency of reliability. The coefficients of the composite reliability of the study's constructs all above the minimum reliability threshold of .70, indicating good internal consistency of the latent variables. According to Hair et al. (2014), AVE determines convergent validity. The variance of a construct compared to other constructs in the same model is projected to be less than its AVE value. However, AVE values of 0.5 or higher are normally acceptable (Barclay & Smith Jr 1995). The Average Variance Extracted (AVE) coefficients in Table7 show convergent validity for all constructs in this investigation.

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In addition to reliability, table 7 display the discriminant validity of the study variables, which indicates that a construct's measurement model is free from redundant items and that, by empirical standards, it is actually distinct from other constructs. Hence, to assess the discriminant validity of the measuring model, Smart-PLS used three measures: Cross loading, Fornell and Larcker, and Heterotrait-Monotrait Ratio. They are detailed below in connection to the current study. The first discriminant validity measure is cross loadings. There must be more factor loading on the associated construct than correlation with the other constructs (cross-loading) for each item (Purwanto, 2021). Thus, cross-loading explains discriminate validity. Table 8 shows the measurement model variable cross-loading analysis results

Table 8: Cross-loadings for Overall Measurement Model

	SC Ambidexterity	SC Cooperation	SC	SC performance
AMB	**0.856**	0.620	0.398	0.534
AMB	**0.876**	0.685	0.461	0.624
AMB	**0.847**	0.643	0.348	0.572
AMB	**0.912**	0.660	0.366	0.565
AMB	**0.862**	0.690	0.42	0.620
COP1	0.640	**0.799**	0.314	0.516
COP2	0.627	**0.874**	0.334	0.508
COP3	0.632	**0.896**	0.321	0.517
COP4	0.651	**0.871**	0.377	0.520
COP5	0.670	**0.806**	0.363	0.534
CRD1	0.400	0.291	**0.832**	0.391
CRD2	0.359	0.338	**0.878**	0.385
CRD3	0.413	0.395	**0.852**	0.491
SCP1	0.581	0.513	0.390	**0.840**
SCP2	0.542	0.481	0.420	**0.885**
SCP3	0.575	0.542	0.465	**0.877**
SCP4	0.583	0.497	0.389	**0.849**
SCP5	0.625	0.608	0.498	**0.886**
SCP6	0.579	0.527	0.425	**0.862**

The cross-loadings shown in table 8, the table show that each item's factor loading (in bold) on its related construct was stronger than its correlation with the other constructs. The discriminating validity assessment proved the study measurements' validity. Fornell–Larcker is the second discriminant validity criterion. Variable correlation utilizing Fornell-Larcker approach to test measurement model discriminant validity is shown in Table 9.

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Table9: Variable Correlation-Root Square of AVE

	SC Ambidexterity	SC Cooperation	SC Coordination	SC performance
SC Ambidexterity	**0.871**			
SC Cooperation	0.759	**0.85**		
SC Coordination	0.46	0.403	**0.854**	
SC performance	0.671	0.612	0.5	**0.867**

Fornell and Bookstein (1982) state that when the calculated square root of AVE is greater than the correlation between the factors accounting for each pair, the discriminate validity occurs. This is displayed in bold in table9. As was the case in this study's correlation matrix, the value should be greater than the other off-diagonal elements in the rows and columns. This showed that the criteria for the measures' discriminating validity had been met.

4.4.3 Structural Model Findings

The size and significance of the structural parameter estimates, as shown in the path diagrams by one-headed arrow, are not considered during a structural parameter evaluation. This assessment concludes by verifying the structural model's accuracy based on hypothesized relationships between identified and assessed variables. This study estimated the structural model using PLS-SEM and bootstrapping using 5000 replicates to test hypotheses. This included inner model R2, F2, and p-value tests (Hair et al., 2014). Figure 3 illustrates the structural (inner) model with p-value and beta coefficient of construct correlations.
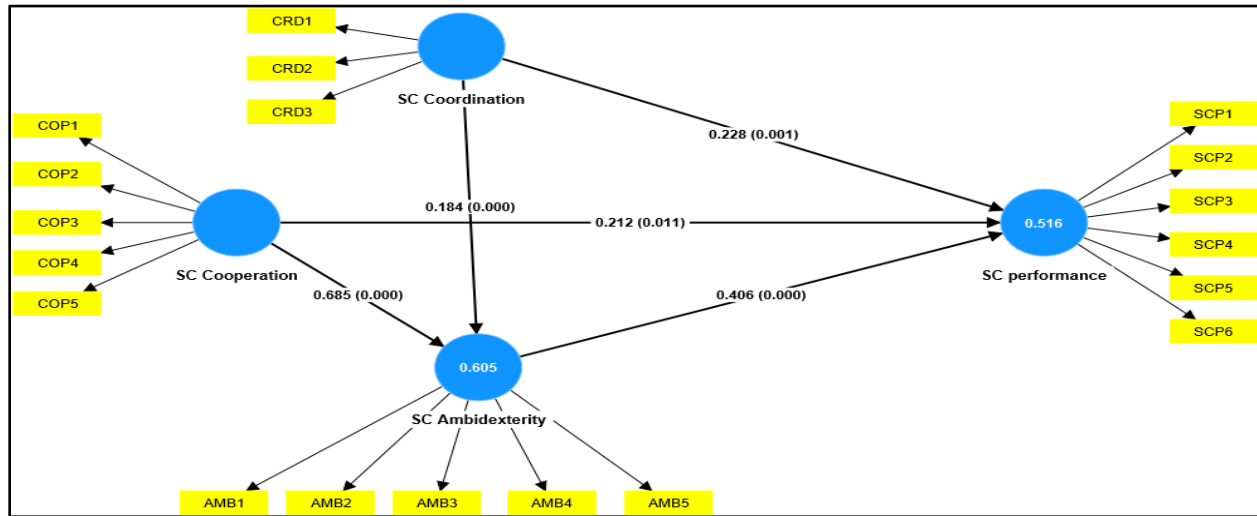
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Figure3: The Structural Model path coefficient and P value of the study

Calculating (R^2) is done when the changes between two variables in the correlation exist. Table 11 and Figure 2 show the results of this analysis, which was generated using the Smart-PLS algorithm function.

Table 11: R^2 of the Endogenous Variables

Variables Relation	R²	R² Adjusted
SC performance	0.516	0.511
SC Ambidexterity	0.605	0.602

Based on the findings of the structural model with R2 values and path coefficients, SC Coordination, SC Cooperation, and SC Ambidexterity may account for 51.6% of the variation of SC Performance among oil and gas companies in the Kingdom of Saudi Arabia. Sixty-five percent of the variance in SC ambidexterity can be explained by differences in SC coordination and SC cooperation. It is necessary to examine the significance of important links after establishing their existence between constructs (Hair et al., 2014). Consequently, Cohen (1988) offers a benchmark for evaluating the extent of an effect. The effect size F^2 is an approach that can be used to assess the significance of a predictor's influence on an endogenous variable. The F2 statistic is used to assess the significance of an exogenous construct's contribution to an endogenous one.

Based on the study of Cohen (1988) the value of the effect sizes F^2 of values of 0.35, 0.15 and 0.02 are regarded high, medium and small effect sizes respectively. Table12 presents the assessments of coefficient of effect size F^2.

Table 12: Effect Size of the Exogenous Constructs

Latent Construct Relation	F²	Effect Size
SC Ambidexterity -> SC performance	0.129	medium
SC Cooperation -> SC Ambidexterity	1.546	High
SC Cooperation -> SC performance	0.025	Small
SC Coordination -> SC Ambidexterity	0.087	medium
SC Coordination -> SC performance	0.111	medium

As described in Table 12, the effect size of the exogenous constructs on the endogenous were ranged between small, medium and high based on the study of (Cohen, 1988).

4.4.4 Hypotheses Testing (Path Coefficient)

This section discusses the findings of the path coefficient which used to examine the hypotheses of the study. The finding of direct (H1 to H5), are presented in Figure 2 also in Table14. The numbers in bracket represent the p-value in, and the values next to the bracket represent the co-efficient value (beta value).

Table 14: Structural Model Assessment for the direct effect hypotheses

		Path coefficient Beta	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Decision
H1	SC Coordination -> SC performance	0.228	0.069	3.315	0.001	Supported
H2	SC Cooperation -> SC performance	0.211	0.084	2.522	0.012	Supported
H3	SC Coordination -> SC Ambidexterity	0.183	0.041	4.419	0.000	Supported
H4	SC Cooperation -> SC Ambidexterity	0.685	0.042	16.317	0.000	Supported
H5	SC Ambidexterity -> SC performance	0.406	0.098	4.163	0.000	Supported

Notes: Significant level at ** = p < 0.05,

Assessment of the whole model is presented in Table 14. All direct effect hypotheses were supported by the data, including H1 about the effect SC Coordination on the SC performance, H2 about the effect of SC Cooperation on the SC performance, H3 about the effect of SC Coordination on the SC Ambidexterity, H4 about the effect SC Cooperation on the SC Ambidexterity, and H5 about the effect of SC Ambidexterity on the SC performance within oil and gas companies in the Kingdom of Saudi Arabia.

4.4.5 Indirect effects (Mediation Effect) of the SC Ambidexterity

The mediation analysis was used to determine the mediation effects of SC Ambidexterity as a mediating variable on the effects of SC coordination and SC cooperation as independent variables on SC performance as the dependent variable. Table 15 shows the mediation bootstrapping output using Preacher & Hayes (2008) method.

Table 15: meditation effect

No.	Hypothesis	Indirect effect (β)	p-value	Confidence Interval (BC)		Decision
				LL	UL	
H6	SC coordination- SC Ambidexterity -SC performance	0.278	0.000	0.033	0.135	Supported
H7	SC cooperation- SC Ambidexterity -SC performance	0.074	0.005	0.145	0.395	Supported

The result of the study shows the two-mediation effect were supported within oil and gas companies in the Kingdom of Saudi Arabia. The result of the study support H6 which related to the mediation impact of the SC ambidexterity in the relationship between SC coordination and SC performance, and support H7 which is related to the mediation impact of the SC ambidexterity on the relationship of the SC cooperation and SC performance within oil and gas companies in the Kingdom of Saudi Arabia.

4.5. Discussion and Conclusion

The result of the study support H1 which is related to the impact of the SC coordination on the SC performance in oil and gas companies in the KSA with (p-value= 0.011, Beta coefficient = 0.228) these results correspond with previous studies as the study of Parsaeifar et al. (2019). In addition, study result support H2 which is related to the impact of the SC cooperation on the SC performance in oil and gas companies in the KSA with (p-value= 0.012, Beta coefficient = 0. 211) these results correspond with the previous studies as study of O'Connor et al.'s (2020). The study result supports H3 which is formulized to examine the impact of the SC coordination on the SC ambidexterity with (p-value= 0.000, Beta coefficient = 0.183), this result confirmed by the previous studies as study of Abdalla and Nakagawa's (2021).

Moreover, the result support H4 which is related to the impact of the SC cooperation on the SC ambidexterity with (p-value= 0.000, Beta coefficient = 0.685), this result supported by study of Im, Rai, and Lambert (2019). Also, the study finding support H5 which is formalized to examine the effect of SC ambidexterity on SC performance with (p-value= 0.000, Beta coefficient = 0.406), this result supported by study of Gu et al. (2021).

Finally, many studies in the literature, such as studies by Kristal et al. (2010) and Li et al. (2023), show the relationship between SC collaboration, SC cooperation, and SC ambidexterity to achieve SC performance. RBV theory and DCV, respectively, regard SC ambidexterity as one of the most important capabilities of the organization that can improve SC performance thanks to the presence of cooperation and collaboration within the supply chain. These findings corroborate a more recent investigation into the impact of SC coordination and SC cooperation on SC performance in the oil and gas companies in KSA.

5. Implications

The following parts address the theoretical and practical implications of the study, which are based on the study's findings and drawn from the study's discussion and conclusion:

5.1 Practical Implications

The role of SC collaboration, SC cooperation, and SC ambidexterity in achieving SC performance has grown over the past few years across all industries, but particularly among oil and gas companies. The research has practical implications for practitioners since it helps oil and gas companies better manage

their supply chain and improve their SC performance. As a result, effective management of supply chains is increasingly seen as an additional source of income for oil and gas companies, making it essential that these businesses not only control the expenses of the integrated supply chain but also consistently endeavor to optimize the costs associated with exploration. This study provides a comprehensive model consisting of variables focused on collaboration and cooperation with the existence of ambidexterity within the supply chain in order to achieve the performance of the supply chain, which in turn improves oil and gas overall performance, which in turn affects the ability to meet customer needs and other business objectives (such as profitability and cost reduction).

New research provides useful insight for decision-makers by identifying factors that boost supply chain ambidexterity and performance, which in turn boost business performance. Policy recommendations based on the study's findings can be utilized to encourage the development of effective models of SC collaboration, cooperation, ambidexterity, performance, and practice and strategy. Enterprises can work together and reach an agreement on effective supply chain management to boost performance and give oil and gas companies in KSA a competitive edge.

5.2 Theoretical Implications

The recent study provides theoretical implications to the supply chain literature. The result of this study support that the performance of supply chains (SCs) can be enhanced by collaboration and cooperation, as per the resource-based view theory (RBV) of the organizations involved, due to their mutual dependence on resources. The commitment to long-term collaborative arrangements in supply chain management (SCM) is evident the substantial influence these collaborations have on the effectiveness of joint planning, decision-making, and execution. This finding highlights the significance of SC performance and extending the existing collaboration into future enterprises. If SC cooperation is fruitful and the partners are satisfied with the results, they will likely continue working together in the future. The future of cooperation amongst SC members can be scaled up or down based on how well the current cooperative arrangements are working. This can also be used to guide decisions about funding for SC cooperation. Each SC member contributes their ambidexterity, knowledge, and competence to the group's capacity for making collective decisions. Collaboration within a SC is more likely to succeed when all members have a resource-based view point of view (Nyaga et al., 2010). Success is communicated and SC performance is enhanced through increased sales, new projects, and happy customers.

6. Limitations and Future Research

The findings emphasize the importance of consistently implementing supply chain processes in order to maintain the successful performance of supply chains and to extend collaboration to future firms. If the collaboration between supply chain partners yields positive outcomes and satisfies the involved parties, it is probable that they will keep going in their collaborative efforts in future attempts. The extent of SC cooperation and collaborations among members of the SC can be adjusted depending on the effectiveness of the existing cooperative arrangements.

In this study questionnaire with survey method was used to data collection. Also, cross-sectional applied in this study which is only captures participants' perspectives at a single point in time; future studies may benefit from recognizing longitudinal research designs to more accurately indicate cause-and-effect relationships. Another limitation of this study related to the methodology; the current study only used the quantitative approach to define the impact of the study variables; future research in the field of supply chain management can focus on "depth" rather than "quantitative width" same as this study. The qualitative approach may provide new insights and a deeper comprehension of the issue at hand. Qualitative and quantitative approaches complement each other's to achieve more results.

Success on the global market depends on the efficiency of the oil and gas supply chain industry, thus future studies should evaluate the aspects related to that performance. It is proposed that research on the supply chain of oil and gas firms in KSA is urgently needed. Oil and gas companies in Saudi Arabia may engage in a diverse range of management activities related to supply logistics. These activities often involve collaborating with logistics operators to ensure the proper functioning and effectiveness of the tools discussed in this study. In order to establish a comprehensive supply chain for the oil and gas industry, it is imperative to engage in collaboration with logistics operators. This collaboration entails the identification and establishment of key performance indicators (KPIs), as well as the exploration of shared advantages and equitable distribution techniques among all partners involved in the chain.

References

Abdalla, S., & Nakagawa, K. (2021). The interplay of digital transformation and collaborative innovation on supply chain ambidexterity. Technology Innovation Management Review, 11(3).

Ahmad, N. K. W., de Brito, M. P., Rezaei, J., & Tavasszy, L. A. (2017). An integrative framework for sustainable supply chain management practices in the oil and gas industry. Journal of Environmental Planning and Management, 60(4), 577-601.

Alamsjah, F., & Asrol, M. (2022). Supply chain ambidexterity and performance under uncertainty: The case of inter-island logistics in Indonesia. Uncertain Supply Chain Management, 10(3), 759-770.

Alfaqiri, A., Hossain, N. U. I., Jaradat, R., Abutabenjeh, S., Keating, C. B., Khasawneh, M. T., & Pinto, C. A. (2019). A systemic approach for disruption risk assessment in oil and gas supply chains. International Journal of Critical Infrastructures, 15(3), 230-259.

Ali, Z., Gongbing, B., & Mehreen, A. (2019). Supply chain network and information sharing effects of SMEs' credit quality on firm performance: do strong tie and bridge tie matter?. Journal of Enterprise Information Management, 32(5), 714-734.

Allaoui, H., Guo, Y., & Sarkis, J. (2019). Decision support for collaboration planning in sustainable supply chains. Journal of Cleaner Production, 229, 761-774.

Alsmairat, M. A., & AL-Shboul, M. D. A. (2023). Enabling supply chain efficacy through supply chain absorptive capacity and ambidexterity: empirical study from Middle East region-a moderated-mediation model. Journal of Manufacturing Technology Management.

Anbanandam, R., Banwet, D. K., & Shankar, R. (2011). Evaluation of supply chain collaboration: a case of apparel retail industry in India. International Journal of productivity and Performance management, 60(2), 82-98.

Arshinder, K., Kanda, A., & Deshmukh, S. G. (2011). A review on supply chain coordination: coordination mechanisms, managing uncertainty and research directions. Supply chain coordination under uncertainty, 39-82.

Arshinder, Kanda, A., & Deshmukh*, S. G. (2008). Development of a decision support tool for supply chain coordination using contracts. Journal of Advances in Management Research, 5(2), 20-41.

Aslam, H., Khan, A. Q., Rashid, K., & Rehman, S. U. (2020). Achieving supply chain resilience: the role of supply chain ambidexterity and supply chain agility. Journal of Manufacturing Technology Management, 31(6), 1185-1204.

Aslam, J., Saleem, A., Khan, N. T., & Kim, Y. B. (2021). Factors influencing blockchain adoption in supply chain management practices: A study based on the oil industry. Journal of Innovation & Knowledge, 6(2), 124-134.

Baah, C., Opoku Agyeman, D., Acquah, I. S. K., Agyabeng-Mensah, Y., Afum, E., Issau, K., ... & Faibil, D. (2022). Effect of information sharing in supply chains: understanding the roles of supply chain visibility, agility, collaboration on supply chain performance. Benchmarking: An International Journal, 29(2), 434-455.

Bag, S., Rahman, M. S., Choi, T. M., Srivastava, G., Kilbourn, P., & Pisa, N. (2023). How COVID-19 pandemic has shaped buyer-supplier relationships in engineering companies with ethical perception considerations: A multi-methodological study. Journal of Business Research, 158, 113598.

Barclay, M. J., & Smith Jr, C. W. (1995). The maturity structure of corporate debt. the Journal of Finance, 50(2), 609-631.

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of management, 17(1), 99-120.

Beamon, B. M. (1999). Measuring supply chain performance. International journal of operations & production management, 19(3), 275-292.

Birkinshaw, J., & Gupta, K. (2013). Clarifying the distinctive contribution of ambidexterity to the field of organization studies. Academy of Management Perspectives, 27(4), 287-298.

Bui, T. D., Tsai, F. M., Tseng, M. L., Tan, R. R., Yu, K. D. S., & Lim, M. K. (2021). Sustainable supply chain management towards disruption and organizational ambidexterity: A data driven analysis. Sustainable production and consumption, 26, 373-410.

Burin, A. R. G., Perez-Arostegui, M. N., & Llorens-Montes, J. (2020). Ambidexterity and IT competence can improve supply chain flexibility? A resource orchestration approach. Journal of Purchasing and Supply Management, 26(2), 100610.

Butt, A. S., Shah, S. H. H., & Ahmad, A. B. (2023). Does knowledge hiding undermine buyer-supplier relationship performance in supply chains? A dyadic perspective. VINE Journal of Information and Knowledge Management Systems, 53(1), 142-165.

Cahyono, Y., Purwoko, D., Koho, I., Setiani, A., Supendi, S., Setyoko, P., ... & Wijoyo, H. (2023). The role of supply chain management practices on competitive advantage and performance of halal agroindustry SMEs. Uncertain Supply Chain Management, 11(1), 153-160.

Chami-Malaeb, R., & Garavan, T. (2013). Talent and leadership development practices as drivers of intention to stay in Lebanese organisations: The mediating role of affective commitment. The International Journal of Human Resource Management, 24(21), 4046-4062.

Chand, P., Kumar, A., Thakkar, J., & Ghosh, K. K. (2022). Direct and mediation effect of supply chain complexity drivers on supply chain performance: an empirical evidence of organizational complexity theory. International Journal of Operations & Production Management, 42(6), 797-825.

Cheshmberah, M., & Beheshtikia, S. (2020). Supply chain management maturity: An all-encompassing literature review on models, dimensions and approaches. LogForum, 16(1), 103-116.

Chumphong, O., Srimai, S., & Potipiroon, W. (2020). The resource-based view, dynamic capabilities and SME performance for SMEs to become smart enterprises. ABAC ODI Journal Vision. Action. Outcome, 7(2), 129.

Cohen, J. (1988). The effect size. Statistical power analysis for the behavioral sciences, 77-83.

Daniel, E. I., Pasquire, C., Dickens, G., & Ballard, H. G. (2017). The relationship between the Last Planner® System and collaborative planning practice in UK construction. Engineering, construction and architectural management, 24(3), 407-425.

De Giovanni, P. (2021). Smart Supply Chains with vendor managed inventory, coordination, and environmental performance. European Journal of Operational Research, 292(2), 515-531.

Dubey, R., Altay, N., Gunasekaran, A., Blome, C., Papadopoulos, T., & Childe, S. J. (2018). Supply chain agility, adaptability and alignment: empirical evidence from the Indian auto components industry. International Journal of Operations & Production Management, 38(1), 129-148.

Ellram, L. M., & Cooper, M. C. (1990). Supply chain management, partnership, and the shipper-third party relationship. The international journal of logistics management, 1(2), 1-10.

Ellram, L. M., & Murfield, M. L. U. (2019). Supply chain management in industrial marketing–Relationships matter. Industrial Marketing Management, 79, 36-45.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research, 18(1), 39-50.

Gardas, B. B., Raut, R. D., & Narkhede, B. (2019). Determinants of sustainable supply chain management: A case study from the oil and gas supply chain. Sustainable Production and Consumption, 17, 241-253.

Gu, M., Yang, L., & Huo, B. (2021). The impact of information technology usage on supply chain resilience and performance: An ambidexterous view. International Journal of Production Economics, 232, 107956.

Hair Jr, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. European business review, 26(2), 106-121.

Heydari, J., Govindan, K., & Basiri, Z. (2021). Balancing price and green quality in presence of consumer environmental awareness: A green supply chain coordination approach. International Journal of Production Research, 59(7), 1957-1975.

Ibrahim, N., Sobry, S. C., Ismail, N. Z. F., & Harahap, A. Z. M. K. (2023). Supply Chain Risks, Green Supply Chain Management Practices and Organizational Performance: A Research Direction. Information Management and Business Review, 15(3 (SI)), 429-438.

Im, G., Rai, A., & Lambert, L. S. (2019). Governance and resource-sharing ambidexterity for generating relationship benefits in supply chain collaborations. Decision Sciences, 50(4), 656-693.

Jaidi, N., Siswantoyo, Liu, J., Sholikhah, Z., & Andhini, M. M. (2022). Ambidexterity behavior of creative SMEs for disruptive flows of innovation: a comparative study of Indonesia and Taiwan. Journal of Open Innovation: Technology, Market, and Complexity, 8(3), 141.

JS, N., Chilkapure, A., & Pillai, V. M. (2019). Literature review on supply chain collaboration: comparison of various collaborative techniques. Journal of Advances in Management Research, 16(4), 537-562.

Khan, A., Chen, C. C., Lu, K. H., Wibowo, A., Chen, S. C., & Ruangkanjanases, A. (2021). Supply chain ambidexterity and green SCM: moderating role of network capabilities. Sustainability, 13(11), 5974.

Kim, J. S., & Shin, N. (2019). The impact of blockchain technology application on supply chain partnership and performance. Sustainability, 11(21), 6181.

Kleindorfer, P. R., & Saad, G. H. (2005). Managing disruption risks in supply chains. Production and operations management, 14(1), 53-68.

Kohli, A. S., & Jensen, J. B. (2010, January). Assessing effectiveness of supply chain collaboration: an empirical study. In Supply chain forum: An international journal (Vol. 11, No. 2, pp. 2-16). Taylor & Francis.

Kotzab, H., Bäumler, I., & Gerken, P. (2023). The big picture on supply chain integration–insights from a bibliometric analysis. Supply Chain Management: An International Journal, 28(1), 25-54.

Kristal, M. M., Huang, X., & Roth, A. V. (2010). The effect of an ambidextrous supply chain strategy on combinative competitive capabilities and business performance. Journal of operations management, 28(5), 415-429.

Kumar, P., Jakhar, S. K., & Bhattacharya, A. (2021). Two-period supply chain coordination strategies with ambidextrous sustainable innovations. Business Strategy and the Environment, 30(7), 2980-2995.

Kumkale, İ. (2022). Organizational Ambidexterity. In Organizational Mastery: The Impact of Strategic Leadership and Organizational Ambidexterity on Organizational Agility (pp. 1-22). Singapore: Springer Nature Singapore.

Lee, H. L., & Billington, C. (1993). Material management in decentralized supply chains. Operations research, 41(5), 835-847.

Li, N., Hu, C., & Zhang, L. (2023). Impact of governance mechanism on supply chain ambidexterity and enterprise cooperation performance: a combined perspective. Journal of Business & Industrial Marketing.\

Li, S., Cui, X., Huo, B., & Zhao, X. (2019). Information sharing, coordination and supply chain performance: The moderating effect of demand uncertainty. Industrial Management & Data Systems, 119(5), 1046-1071.

Li, S., Zhao, X., & Huo, B. (2018). Supply chain coordination and innovativeness: A social contagion and learning perspective. International Journal of Production Economics, 205, 47-61.

Lisitsa, S., Levina, A., & Lepekhin, A. (2019). Supply-chain management in the oil industry. In E3S Web of Conferences (Vol. 110, p. 02061). EDP Sciences.

Lund, S., Manyika, J., Woetzel, J., Barriball, E., & Krishnan, M. (2020). Risk, resilience, and rebalancing in global value chains.

Mahadevan, K., Elias, A., & Samaranayake, P. (2023). Supply chain performance measurement through collaborative effectiveness: an Asia–Pacific perspective. International Journal of Productivity and Performance Management, 72(6), 1667-1687.

Malik, A. I., & Sarkar, B. (2019). Coordinating supply-chain management under stochastic fuzzy environment and lead-time reduction. Mathematics, 7(5), 480.

Manzoor, U., Baig, S. A., Hashim, M., Sami, A., Rehman, H. U., & Sajjad, I. (2022). The effect of supply chain agility and lean practices on operational performance: a resource-based view and dynamic capabilities perspective. The TQM Journal, 34(5), 1273-1297.

Nayal, K., Raut, R. D., Yadav, V. S., Priyadarshinee, P., & Narkhede, B. E. (2022). The impact of sustainable development strategy on sustainable supply chain firm performance in the digital transformation era. Business Strategy and the Environment, 31(3), 845-859.

Newell, W. J., Ellegaard, C., & Esbjerg, L. (2019). The effects of goodwill and competence trust on strategic information sharing in buyer–supplier relationships. Journal of Business & Industrial Marketing, 34(2), 389-400.

O'Connor, N., Lowry, P. B., & Treiblmaier, H. (2020). Interorganizational cooperation and supplier performance in high-technology supply chains. Heliyon, 6(3).

Ojha, D., Acharya, C., & Cooper, D. (2018). Transformational leadership and supply chain ambidexterity: Mediating role of supply chain organizational learning and moderating role of uncertainty. International Journal of Production Economics, 197, 215-231.

O'Reilly III, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. Academy of management Perspectives, 27(4), 324-338.

Oyedijo, A., Francois Koukpaki, A. S., Kusi-Sarpong, S., Alfarsi, F., & Yang, Y. (2022). Restraining forces and drivers of supply chain collaboration: evidence from an emerging market. Supply Chain Management: An International Journal, 27(3), 409-430.

Parsaeifar, S., Bozorgi-Amiri, A., Naimi-Sadigh, A., & Sangari, M. S. (2019). A game theoretical for coordination of pricing, recycling, and green product decisions in the supply chain. Journal of cleaner production, 226, 37-49.

Partanen, J., Kohtamäki, M., Patel, P. C., & Parida, V. (2020). Supply chain ambidexterity and manufacturing SME performance: The moderating roles of network capability and strategic information flow. International Journal of Production Economics, 221, 107470.

Peng, M. Y. P., Zhang, Z., Yen, H. Y., & Yang, S. M. (2019). Dynamic capabilities and firm performance in the high-tech industry: quadratic and moderating effects under differing ambidexterity levels. Sustainability, 11(18), 5004.

Pinto, L. (2020). Green supply chain practices and company performance in Portuguese manufacturing sector. Business Strategy and the Environment, 29(5), 1832-1849.

Preacher, K. J., & Hayes, A. F. (2008). Assessing mediation in communication research (pp. 13-54). London: The Sage sourcebook of advanced data analysis methods for communication research.

Purwanto, A. (2021). Partial least squares structural squation modeling (PLS-SEM) analysis for social and management research: a literature review. Journal of Industrial Engineering & Management Research.

Pyke, D. F., & Cohen, M. A. (1994). Multiproduct integrated production—distribution systems. European Journal of Operational Research, 74(1), 18-49.

Ramachandran, I., Lengnick-Hall, C. A., & Badrinarayanan, V. (2019). Enabling and leveraging ambidexterity: influence of strategic orientations and knowledge stock. Journal of Knowledge Management, 23(6), 1136-1156.

Rashid, S., & Ratten, V. (2021). Entrepreneurial ecosystems during COVID-19: the survival of small businesses using dynamic capabilities. World Journal of Entrepreneurship, Management and Sustainable Development, 17(3), 457-476.

Saad, S. M., Elsaghier, E. H., & Ezaga, D. (2018). Planning and optimising petroleum supply chain. Procedia Manufacturing, 17, 803-810.

Saragih, J., Tarigan, A., Silalahi, E. F., Wardati, J., & Pratama, I. (2020). Supply chain operational capability and supply chain operational performance: Does the supply chain management and supply chain integration matters. Int. J Sup. Chain. Mgt Vol, 9(4), 1222-1229.

Scribd. (2022). Gas Industry in Saudi Arabia. Retrieved from:

https://www.scribd.com/document/593406444/Oil-Gas-Industry-in-Saudi-Arabia

Sezen, B. (2008). Relative effects of design, integration and information sharing on supply chain performance. Supply chain management: An international journal, 13(3), 233-240.

Sharma, R., Kamble, S. S., Gunasekaran, A., Kumar, V., & Kumar, A. (2020). A systematic literature review on machine learning applications for sustainable agriculture supply chain performance. Computers & Operations Research, 119, 104926.

Simatupang, T. M., & Sridharan, R. (2005). The collaboration index: a measure for supply chain collaboration. International journal of physical distribution & logistics management, 35(1), 44-62.

Singh, R. K., Kumar, P., & Chand, M. (2019). Evaluation of supply chain coordination index in context to Industry 4.0 environment. Benchmarking: An International Journal, 28(5), 1622-1637.

Souza-Luz, A. R., & Gavronski, I. (2020). Ambidextrous supply chain managers in a slow clockspeed industry: evidence from a Brazilian adhesive manufacturer. Supply Chain Management: An International Journal, 25(1), 101-114.

Sudan, T., Taggar, R., Jena, P. K., & Sharma, D. (2023). Supply chain disruption mitigation strategies to advance future research agenda: A systematic literature review. Journal of Cleaner Production, 425, 138643.

Sweidan, O. D., & Elbargathi, K. (2022). The effect of oil rent on economic development in Saudi Arabia: Comparing the role of globalization and the international geopolitical risk. Resources Policy, 75, 102469.

Tariq, E., Alshurideh, M., Akour, I., & Al-Hawary, S. (2022). The effect of digital marketing capabilities on organizational ambidexterity of the information technology sector. International Journal of Data and Network Science, 6(2), 401-408.

Thakkar, J., Kanda, A., & Deshmukh, S. G. (2009). Supply chain performance measurement framework for small and medium scale enterprises. Benchmarking: An International Journal, 16(5), 702-723.

Vosooghidizaji, M., Taghipour, A., & Canel-Depitre, B. (2020). Supply chain coordination under information asymmetry: a review. International Journal of Production Research, 58(6), 1805-1834.

Wamba, S. F., Dubey, R., Gunasekaran, A., & Akter, S. (2020). The performance effects of big data analytics and supply chain ambidexterity: The moderating effect of environmental dynamism. International Journal of Production Economics, 222, 107498.

Wang, Y., Zhang, H., & Song, M. (2020). Pure or ambidextrous strategy? A study of responsive and proactive market orientations in industrial firms. Journal of Business & Industrial Marketing, 35(6), 1001-1010.

Zhang, X., & Yousaf, H. A. U. (2020). Green supply chain coordination considering government intervention, green investment, and customer green preferences in the petroleum industry. Journal of Cleaner Production, 246, 118984.

APENDIX A

Questionnaire items of the Study and previous literature adapted from

Construct	Items indicators		Reference
Supply chain coordination	CRD1	The participation level of our major supplier in the process of procurement and production	Li et al. (2018); Anbanandam et al., (2011)
	CRD1	The participation level of our major supplier in the design stage	
	CRD1	We help our major supplier to improve their process to better meet our needs	
Supply chain cooperation	COP1	The extent to which the collaborative practice affects the on-time delivery	Anbanandam et al.,2011
	COP2	The extent to which the collaborative practice helps to increase inventory turnover	
	COP3	The extent to which the collaborative practice helps to decrease inventory days of supply	
	COP4	The extent to which the collaborative practice helps to decrease lead time	
	COP5	The extent to which the collaborative practice helps to increase flexibility	
SC Ambidexterity	AMB1	Our company accepts demands that go beyond existing products and services.	Jaidi et al. (2022)
	AMB2	We commercialize products and services that are completely new to our company.	
	AMB3	We frequently utilize new opportunities in new markets.	
	AMB4	Our company regularly uses new distribution.	
	AMB5	We frequently make small adjustments to our products and services.	
SC performance	SCP1	Our SC have the ability to respond to and accommodate demand variations, such as seasonality	Sezen (2008)
	SCP2	Our SC have the ability to respond to and accommodate periods of poor manufacturing performance (machine breakdowns)	
	SCP3	In our SC total cost of manufacturing, including labor, maintenance, and re-work costs	
	SCP4	In our SC costs associated with held inventory	
	SCP5	Our SC have the ability to respond to and accommodate periods of poor delivery performance	
	SCP6	Our SC have the ability to respond to and accommodate new products, new markets, or new competitors	

Dr. Yaser Alahmad

أثر التنسيق والتعاون في سلسلة التوريد في تحقيق الأداء: الدور الوسيط للبراعة ضمن سلسلة التوريد في المملكة العربية السعودية

د. ياسر الأحمد

الملخص

يعد النفط والغاز الطبيعي من أهم موارد الطاقة الحيوية في المجتمعات الحديثة حيث يؤثران على تطور العلاقات الدولية نظرا لأهميتهما الاستراتيجية اقتصاديا وسياسيا في جميع أنحاء العالم. ونظرا لأهمية شركات النفط والغاز في المملكة العربية السعودية فقد صممت هذه الدراسة لتقدم نموذجاً لكيفية تعزيز الأداء في سلاسل في هذه الشركات. فقد هدفت الدراسة إلى معرفة تأثير التنسيق والتعاون في سلاسل التوريد على أدائها من خلال الدور الوسيط للبراعة في إدارة سلسلة التوريد في شركات النفط والغاز في المملكة العربية السعودية. تم استخدام المنهج الوصفي في التحليل لتحقيق أهداف هذه الدراسة. وقد تكوَّن مجتمع الدراسة من المدراء في أكبر خمس شركات للنفط والغاز في المملكة العربية السعودية، حيث تم جمع البيانات من خلال الاستبيان الذي تم ارساله من خلال الانترنت الى (٥٢٢) مشاركا، وقد تم اعتماد (٤٢٠) استبانة لأغراض تحليل الدراسة. استخدمت الدراسة نمذجة المعادلات المهيكلة من خلال برنامج (SMART-PLS 4) لتحليل البيانات التي تم تطبيق نموذج القياس لتحليل صدق وثبات النموذج، ومعامل المسار في نموذج المعادلة البنائية المستخدم لاختبار فرضيات الدراسة. وقد دعمت نتائج التحليل فرضيات هذه الدراسة جميعها حيث توصلت النتائج الى أن هناك أثرا معنويا إيجابيا للتعاون في سلسلة التوريد على أداء سلسة التوريد والبراعة في إدارتها. بالإضافة الى ذلك هناك أثرا معنويا للتعاون في سلسلة التوريد على أداء سلسة التوريد والبراعة في إدارتها كما أظهرت النتائج أيضا أن هناك أثرا معنويا إيجابيا للتنسيق في سلسلة التوريد على أداء سلسلة التوريد والبراعة، كما توصلت نتائج الدراسة إلى وجود أثر إيجابي للبراعة في إدارة سلاسل التوريد على أدائها في شركات النفط والغاز في المملكة العربية السعودية. كما أكدت نتيجة الدراسة على الدور الوسيط للبراعة في إدارة سلسة التوريد. توفر الدراسة آثارًا مهمة جدًا للمدراء في شركات النفط والغاز في المملكة العربية السعودية لتحسين أداء سلاسل التوريد للوصول الى تحقيق ميزة تنافسية من خلال التعاون والتنسيق والبراعة في إدارة سلسلة التوريد.

الكلمات المفتاحية: التعاون في سلسلة التوريد، التنسيق في سلسلة التوريد، البراعة في إدارة سلسلة التوريد، أداء سلسلة التوريد، شركات النفط والغاز في المملكة العربية السعودية.