

Collaborative supply chain and firm performance: insights from fruits and vegetables sector in Souss Massa Morocco

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Abstract:

Collaborative supply chains provide strategic advantages that can enhance firm performance by strengthening coordination, resource integration, and inter-organizational relationships. This study examines the impact of collaborative supply chain practices on firm performance in the Moroccan fruits and vegetables sector, with a particular focus on the Souss Massa region. A quantitative approach was adopted using data collected from 203 companies and analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings provide partial empirical support for the collaborative supply chain framework proposed by Cao and Zhang (2011). Among the seven collaborative practices examined, information sharing, resource sharing, and collaborative communication were found to have a positive and significant impact on firm performance, whereas goal congruence, decision synchronization, incentive alignment, and knowledge creation did not show significant effects. The model explains 54.6% of the variance in firm performance ($R^2 = 0.546$), with resource sharing ($\beta = 0.321$), information sharing ($\beta = 0.214$), and collaborative communication ($\beta = 0.259$) showing the strongest effects. These results demonstrate that the effectiveness of collaborative practices depends on the organizational and sectoral context. The study contributes to the collaborative supply chain literature by extending existing empirical evidence to the Moroccan agricultural sector and provides practical recommendations for managers seeking to strengthen collaboration and improve firm performance.

Keywords: Collaborative supply chain, firm performance, competitiveness, collaboration, collaborative practices.

Classification JEL : Q13, L22, M11

Paper type : Empirical Research

Résumé:

Les chaînes d'approvisionnement collaboratives offrent des avantages stratégiques susceptibles d'améliorer la performance des entreprises en renforçant la coordination, l'intégration des ressources et les relations inter organisationnelles. Cette étude analyse l'impact des pratiques collaboratives de la supply chain sur la performance des entreprises dans le secteur marocain des fruits et légumes, en prenant comme terrain d'étude la région du Souss Massa. Une approche quantitative a été adoptée à partir des données recueillies auprès de 203 entreprises et analysées à l'aide de la méthode des équations structurelles par moindres carrés partiels (PLS-SEM). Les résultats apportent un soutien empirique partiel au modèle de chaîne d'approvisionnement collaborative proposé par Cao et Zhang (2011). Parmi les sept pratiques collaboratives étudiées, le partage de l'information, le partage des ressources et la communication collaborative exercent un effet positif et significatif sur la performance des entreprises, tandis que le partage des objectifs, la synchronisation des décisions, l'alignement des incitations et la création de connaissances ne présentent pas d'effet statistiquement significatif. Le modèle explique 54,6 % de la variance de la performance des entreprises ($R^2 = 0,546$), le partage des ressources ($\beta = 0,321$), le partage de l'information ($\beta = 0,214$) et la communication collaborative ($\beta = 0,259$) présentant les effets les plus marqués. Ces résultats montrent que l'efficacité des pratiques collaboratives dépend du contexte organisationnel et sectoriel. Cette étude enrichit la littérature sur les chaînes d'approvisionnement collaboratives en apportant des preuves empiriques issues du secteur agricole marocain et propose des recommandations managériales visant à renforcer la collaboration et la performance des entreprises.

Mots-clés : chaîne d'approvisionnement collaborative, performance des entreprises, compétitivité, collaboration, pratiques collaborative.

Classification JEL : Q13, L22, M11

Type d'article : Recherche empirique

1. Introduction

The global economy is characterized by fluctuating demand and diverse supply sources. Organizations must strengthen their efforts to remain competitive and meet the evolving needs of customers. To enhance responsiveness and flexibility, companies are encouraged to seek new opportunities. Collaborative supply chains provide effective solutions that improve organizational performance by harnessing the resources and expertise of multiple partners (Lejeune & Yakova, 2005). Indeed, these supply chains enable partners to work closely together toward common objectives, operating as if they were a single unified entity (Lambert, 2000; Mentzer, 2001).

Collaborative supply chains offer numerous advantages, including cost reduction, access to complementary resources, productivity improvement, and risk sharing. According to Singh et al. (2018), collaboration has a significant impact on firm performance. It provides firms with a unique competitive advantage (Park et al., 2004; Kalwani & Narayandas, 1995; Mentzer et al., 2000) and creates a collaborative advantage that strengthens their market position (Cao & Zhang, 2013). However, the success of collaborative relationships depends largely on the ability of partners to effectively implement and sustain collaborative practices (Min et al., 2005).

While previous research has extensively documented the benefits of collaboration, many collaborative initiatives still fail to achieve the expected performance outcomes. Existing studies mainly emphasize the potential benefits of collaboration, while providing limited evidence on the collaborative practices that most effectively improve firm performance, particularly in emerging economies. Moreover, although factors such as trust, goal congruence, and information sharing are frequently highlighted, their relative contribution to organizational performance remains insufficiently explored in specific sectoral contexts. This gap is particularly evident in the Moroccan agricultural sector, where empirical studies on collaborative supply chain practices remain scarce.

Building on this observation, this study examines the impact of collaborative supply chain practices on firm performance by identifying the collaborative dimensions that significantly contribute to organizational performance. More specifically, this research addresses the following research question: to what extent do collaborative supply chain practices influence firm performance in the Moroccan fruits and vegetables sector? To achieve this objective, a quantitative research design was adopted based on a sample of 203 companies, and the proposed relationships were tested using Partial Least Squares Structural Equation Modeling (PLS-SEM).

This study offers both theoretical and empirical contributions to the collaborative supply chain literature. Although the collaborative supply chain framework proposed by Cao and Zhang (2011) has been widely used to explain the relationship between collaboration and firm performance, its empirical validation has mainly been conducted in industrial and developed-country settings, with limited attention given to emerging economies and sector-specific characteristics. In addition, empirical evidence from the Moroccan agricultural sector remains limited. By applying this framework to the Moroccan fruits and vegetables supply chain, this study extends its empirical applicability to a new context characterized by fragmented production systems, the predominance of small-scale producers, and high exposure to environmental and market uncertainties. The findings therefore contribute to enriching the existing literature while providing practical insights for managers and policymakers seeking to strengthen collaboration and improve firm performance in the Moroccan agricultural sector.

The remainder of this article is organized as follows. The first section presents the concept and theoretical foundations of collaborative supply chains. The second reviews the literature on the relationship between collaborative supply chain practices and firm performance. The third

describes the research methodology and presents the empirical results. Finally, the last section discusses the theoretical and managerial implications of the findings before concluding with the main contributions, limitations, and directions for future research.

2. Conceptual framework:

2.1 Collaborative supply chain:

Collaborative supply chains represent the most advanced form of supply chain management. They are founded on long-term relational commitment, shared objectives, and mutual trust among partners, who may agree to relinquish part of their autonomy to improve the competitiveness and sustainability of the entire supply chain. This concept has attracted increasing attention from researchers (Ramanathan, 2012; Nyaga et al., 2010; Cao & Zhang, 2011; Simatupang & Sridharan, 2005). By coordinating physical and information flows, supply chain partners work together to achieve common objectives that would be difficult to attain individually, thereby improving the overall performance of the supply chain (Lambert, 2000; Mentzer, 2001).

Unlike traditional supply chains, where firms mainly seek to optimize their individual performance, collaborative supply chains emphasize cooperation, trust, joint decision-making, and shared objectives to improve collective performance (Barratt, 2004; Simatupang & Sridharan, 2005). This collaborative approach enables partners to reduce transaction costs (Sheu et al., 2006), share risks (Kogut, 1988), access complementary resources (Park & Ungson, 2001), strengthen inter-organizational relationships (Min et al., 2005; Barratt, 2004), and ultimately improve both individual and collective performance (Mentzer et al., 2000).

Recent empirical studies have shown that collaborative supply chains are more resilient, adaptable, and responsive to uncertainty than traditional supply chains, particularly through shorter lead times and more stable operations (Sheu et al., 2006). Consequently, collaboration transforms the supply chain into an integrated system in which partners jointly manage resources, risks, and rewards to enhance competitiveness and long-term sustainability (Cao & Zhang, 2011; Ramanathan, 2012; Nyaga et al., 2010).

According to Simatupang and Sridharan (2005), a collaborative supply chain involves two or more organizations that jointly plan and execute supply chain activities to achieve better outcomes than they could individually. Building on this work and that of Nagati et al. (2009), Cao and Zhang (2011) proposed a multidimensional model composed of seven collaborative practices: resource sharing, information sharing, goal congruence, decision synchronization, incentive alignment, collaborative communication, and knowledge creation. These dimensions constitute the conceptual foundation of the present study and are discussed in the following sections.

- **Resources sharing:**

Resource sharing refers to the ability of supply chain partners to mobilize and combine complementary resources to achieve common objectives. Several authors have highlighted its importance in collaborative environments such as supply chains (Dyer, 1998). Harland et al. (2007) identified different forms of shared resources, including human, physical, informational, knowledge-based, and organizational resources. To ensure their effective utilization, organizations must first identify the resources available within the supply chain and align their management with its strategic objectives (Lee, 2004; Gong, 2018).

The effectiveness of resource sharing, however, depends on several relational and organizational conditions. Trust and commitment encourage partners to share valuable resources without fear of opportunistic behavior (Morgan & Hunt, 1994). Appropriate governance mechanisms, supported by both contractual and relational arrangements, help

regulate resource use and promote equitable collaboration (Williamson, 1985; Wilding & Humphries, 2006). In addition, firms need sufficient absorptive capacity to recognize, assimilate, and exploit external resources effectively (Cohen & Levinthal, 1990). The complementarity of resources also plays a key role, as collaborative value is created when partners combine resources with different but compatible capabilities rather than redundant assets (Barney, 1991). Finally, maintaining a balanced contribution of resources among partners helps reduce potential conflicts and strengthens long-term collaborative relationships (Das & Teng, 2000).

Consequently, resource sharing should be viewed not only as the exchange of tangible and intangible assets but also as a collaborative capability that enables supply chain partners to create value and strengthen collaborative advantage

- **Information sharing:**

Information sharing is a fundamental practice for the success of collaborative supply chains (Simatupang & Sridharan, 2005). It refers to the willingness of supply chain partners to exchange relevant and, when necessary, confidential information to support collaborative activities. This exchange facilitates planning, coordination, and control across the supply chain by providing timely and accurate information for decision-making (Simatupang & Sridharan, 2003). It also enhances visibility across organizational boundaries, enabling partners to better coordinate their activities and respond more effectively to operational and market changes (Whipple, 2007).

The effectiveness of information sharing, however, depends on several relational, organizational, and technological conditions. Trust remains a fundamental prerequisite, as firms may be reluctant to disclose sensitive information in the absence of strong collaborative relationships (Morgan & Hunt, 1994). The value of shared information also depends on its quality, accuracy, and timeliness, since incomplete or outdated information can negatively affect forecasting and coordination processes (Li et al., 2006). Furthermore, technological integration is essential to ensure the interoperability of information systems and the seamless exchange of data among supply chain partners (Lee, 2004). At the same time, organizations must avoid information overload by ensuring that shared information is relevant and appropriately managed to support decision-making (Galbraith, 1974). Appropriate governance mechanisms are also necessary to reduce the risk of opportunistic behavior and ensure the proper use of shared information (Williamson, 1985).

Consequently, effective information sharing enhances coordination, improves supply chain visibility, and increases organizational agility, enabling firms to respond more rapidly to environmental uncertainty and changing market conditions (Nejjar, 2017; Cao et al., 2015). As one of the key collaborative practices identified by Cao and Zhang (2011), information sharing contributes to the development of collaborative advantage and ultimately supports firm performance.

- **Goal congruence:**

Goal congruence refers to the alignment of individual and collective objectives among supply chain partners to achieve mutually beneficial outcomes (Cao & Zhang, 2011). It enables organizations to pursue their own objectives while contributing to the achievement of common supply chain goals. This collaborative approach facilitates the optimization of physical resources, information flows, and operational processes across the supply chain. It also supports the coordination of activities, the efficient use of resources, and the exchange of knowledge and information among partners (Rakotonarivo, 2009; Gonzalez-Feliu, 2013).

The effectiveness of goal congruence, however, depends on several organizational and relational conditions. The alignment of individual and collective objectives is essential, as

conflicting priorities may reduce collaboration effectiveness (Lejeune & Yakova, 2005). Trust also plays a central role because partners are more willing to support common objectives when they believe that collective success will also contribute to their individual performance (Ramanathan & Gunasekaran, 2014). Appropriate governance mechanisms are equally important to reduce opportunistic behavior and ensure that partners remain committed to shared objectives (Williamson, 1985). Furthermore, common objectives should be supported by shared performance indicators to facilitate their monitoring and evaluation (Kaplan & Norton, 1992).

Consequently, goal congruence represents a fundamental collaborative practice that aligns partners around common objectives, strengthens collaborative advantage, and supports improved firm performance.

- ***Incentive alignment:***

Incentive alignment refers to the mechanisms through which supply chain partners share costs, risks, and rewards in a fair and balanced manner according to their respective contributions (Lee, 2001; Simatupang et al., 2005). By aligning individual interests with collective objectives, these mechanisms encourage partners to make decisions that benefit the entire supply chain rather than pursuing individual gains (Clemons & Row, 1993). Incentive alignment also strengthens collaborative relationships by fostering mutual commitment, encouraging resource sharing, and motivating partners to create value collectively (Khan et al., 2015).

The effectiveness of incentive alignment, however, depends on several organizational and governance conditions. Appropriate governance mechanisms are essential to limit opportunistic behavior and ensure that rewards are distributed fairly among partners (Williamson, 1985). Achieving an equitable allocation of costs, risks, and benefits may nevertheless be challenging, as partners often contribute different levels of resources and capabilities to the collaboration (Zsidisin & Ellram, 2003). Furthermore, incentive systems should rely on transparent and measurable performance indicators to strengthen their credibility and effectiveness (Kaplan & Norton, 1992). Finally, incentive mechanisms should encourage long-term collaboration rather than short-term individual performance, thereby supporting the sustainability of collaborative relationships (Holmström & Milgrom, 1991).

Consequently, incentive alignment represents a key collaborative practice that promotes fairness, strengthens partners' commitment, enhances collaborative advantage, and ultimately contributes to improved firm performance.

- ***Decision synchronization***

Decision synchronization refers to the process through which supply chain partners jointly plan and coordinate their decisions to achieve common objectives and improve the overall performance of the supply chain (Simatupang & Sridharan, 2002). By coordinating their decisions rather than acting independently, partners can create synergies that improve resource allocation and operational efficiency (Lee, 1997). The effectiveness of decision synchronization depends on the availability of timely, accurate, and relevant information, effective information sharing, and the willingness of partners to coordinate their decisions (Cao & Zhang, 2013).

The successful implementation of decision synchronization requires several organizational and relational conditions. Trust and goal congruence facilitate joint decision-making by encouraging partners to coordinate their actions and pursue common objectives (García-Alcaraz et al., 2021). Similarly, the quality and reliability of shared information are essential, as inaccurate forecasts or incomplete information may reduce the effectiveness of synchronized decisions and increase coordination costs (Holgado de Frutos et al., 2020). In addition, limited

access to information and the complexity of coordinating multiple partners may constrain collective decision-making, particularly in large and complex supply chains (Jensen & Meckling, 1995). Therefore, decision synchronization should be supported by appropriate governance mechanisms that provide sufficient flexibility to respond to changes in the business environment.

Consequently, decision synchronization represents a fundamental collaborative practice that strengthens coordination among supply chain partners, enhances collaborative advantage, and ultimately contributes to improved firm performance.

- ***Collaborative Communication:***

Collaborative communication refers to the continuous exchange of information among supply chain partners through appropriate communication channels, considering the frequency, quality, methods, and content of communication (Cao & Zhang, 2011). It promotes open, frequent, balanced, and multidirectional interactions that strengthen both inter- and intra-organizational relationships (Cao & Zhang, 2010; Tuten et al., 2001). Mohr and Nevin (1990) emphasized that effective communication strategies facilitate cooperation among supply chain partners by supporting the coordination and management of material and information flows. Collaborative communication also relies on formalized procedures that ensure the timely and accurate transmission of information, thereby improving clarity and reducing misunderstandings between partners (Anderson, 1987; O'Callaghan, 1992; Bandyopadhyay, 1994).

The effectiveness of collaborative communication, however, depends on several organizational and relational conditions. Communication should remain clear, relevant, and well managed, as excessive information exchange may create communication overload and reduce decision-making efficiency (Daft & Lengel, 1986). Differences in organizational practices and cultural contexts may also affect the interpretation of information and hinder collaboration among supply chain partners (Hall, 1976). Although formal communication procedures improve consistency and transparency, they should remain sufficiently flexible to support decision-making in dynamic business environments (Mintzberg, 1979). Furthermore, collaborative communication requires trust and appropriate incentive mechanisms to encourage partners to exchange information openly and reduce opportunistic behavior (Simatupang & Sridharan, 2005).

Consequently, collaborative communication represents a fundamental collaborative practice that strengthens coordination, facilitates information exchange, enhances collaborative advantage, and ultimately contributes to improved firm performance.

- ***knowledge creation:***

Knowledge creation refers to the process through which supply chain partners develop, exchange, and apply knowledge to improve their capabilities and achieve common objectives (Amendola, 1990). This process requires continuous learning, mutual commitment, and investment, particularly when knowledge extends beyond the boundaries of individual organizations (Weinstein, 2010). Trust plays a fundamental role in facilitating knowledge exchange and encouraging partners to share their expertise (Granovetter, 1985). By creating and applying new knowledge, supply chain partners enhance their understanding of each other's capabilities and customer needs, thereby supporting innovation and strengthening long-term collaborative relationships (Malhotra et al., 2005; Harland, 2007).

The effectiveness of knowledge creation, however, depends on several organizational and relational conditions. The development of new knowledge often requires significant and sometimes unpredictable investments in terms of time and resources (Nonaka & Takeuchi, 1995). Partners may also be reluctant to share strategic knowledge because of concerns about

losing valuable competitive assets (Grant, 1996). In addition, opportunistic behavior may discourage knowledge exchange if partners perceive an imbalance between contributions and benefits (Williamson, 1985). Coordinating knowledge creation across multiple organizations can also be challenging because it requires effective collaboration and appropriate coordination mechanisms (Inkpen & Tsang, 2005). Finally, the value of newly created knowledge should be effectively integrated into organizational practices to maximize its contribution to supply chain performance (Spender, 1996).

Consequently, knowledge creation represents a fundamental collaborative practice that promotes learning, stimulates innovation, enhances collaborative advantage, and ultimately contributes to improved firm performance.

The seven collaborative supply chain practices identified by Cao and Zhang (2011)—resource sharing, information sharing, goal congruence, decision synchronization, incentive alignment, collaborative communication, and knowledge creation—constitute the foundation of effective inter-organizational collaboration. Together, these practices strengthen coordination, trust, and commitment among supply chain partners while facilitating the efficient management of resources, information, and knowledge. Their effective implementation creates the conditions necessary to develop collaborative advantage, which, in turn, contributes to improved firm performance.

2.2 Firm performance

Firm performance refers to the extent to which an organization achieves its financial and strategic objectives relative to its competitors (Li et al., 2006). It reflects the organization's ability to attain predetermined objectives while adapting to its business environment (Notat, 2007). In the context of collaborative supply chains, firm performance is commonly assessed using financial indicators such as sales growth, profit margin, and return on investment, which respectively measure market expansion, profitability, and the efficiency of invested resources (Cao & Zhang, 2011).

Although financial indicators provide valuable information on organizational performance, they do not fully capture the benefits of supply chain collaboration. Kaplan and Norton (1992) argue that performance assessment should also consider strategic dimensions such as innovation, organizational learning, and long-term sustainability. Similarly, Chen and Paulraj (2004) emphasize the importance of relational outcomes, including trust, commitment, and partner satisfaction, which contribute to the sustainability of collaborative relationships. In addition, Venkatraman and Ramanujam (1986) note that financial measures alone may overlook the long-term effects of collaboration, while Richard et al. (2009) highlight that performance indicators may vary across industries and organizational contexts. Furthermore, opportunistic behavior may also influence organizational performance if collaborative relationships are not supported by appropriate governance mechanisms (Williamson, 1985).

Consequently, firm performance should be considered a multidimensional construct that combines financial, strategic, and relational dimensions. This broader perspective provides a more comprehensive assessment of the outcomes of collaborative supply chain practices and supports the evaluation of their contribution to collaborative advantage and firm performance.

2.3 The Impact of Collaboration on Firm Performance

Collaborative supply chain practices have been widely recognized as a major driver of firm performance. By fostering coordination, information sharing, and joint decision-making, collaboration enables supply chain partners to improve operational efficiency and create value that would be difficult to achieve individually. Several studies demonstrate that collaborative relationships enhance supply chain operations, leading to improved overall performance (Fabbe-Costes, 2000). When firms engage in collaborative supply chains, they expect benefits

at both the individual and collective levels through the integration of resources, capabilities, and expertise.

Collaboration enables supply chain partners to coordinate activities such as demand forecasting, procurement planning, production scheduling, and distribution planning. This integrated approach improves operational efficiency, reduces inventory levels, minimizes uncertainties, and enhances the responsiveness of the supply chain (Sahin, 2005). By sharing information on constraints and operational requirements, partners can develop more flexible production schedules and improve service levels while reducing the risk of stock shortages.

Beyond operational improvements, collaborative relationships generate strategic benefits. Long-term partnerships facilitate the exchange of knowledge and expertise, stimulate innovation, and strengthen collective learning among supply chain members. According to Nassimbeni et al. (2001), the integration of partners into manufacturing processes accelerates product development, improves product quality, and reduces production costs. These cost reductions result from lower operating, coordination, storage, and transportation costs (Dorandeu, 2004; Sahin, 2005).

The success of collaborative supply chains also depends on the establishment of a collaborative performance system based on clearly defined objectives and appropriate performance indicators. Such a system enables supply chain members to evaluate both their individual performance and the overall effectiveness of the supply chain while supporting continuous improvement. Collaborative objectives should therefore be jointly defined, measurable, realistic, and regularly reviewed to ensure that all partners remain aligned with common goals. Through this collaborative approach, firms can achieve higher levels of profitability, return on investment, customer satisfaction, and overall competitiveness.

Despite these benefits, collaboration also presents several challenges. Coordinating activities across multiple supply chain partners requires significant investments in time and resources, leading to higher coordination costs (Simatupang & Sridharan, 2005). Opportunistic behavior may also emerge when partners benefit from shared resources or information without making equivalent contributions, thereby weakening trust and long-term collaboration (Williamson, 1985). Furthermore, the benefits of collaboration generally emerge over the medium and long term, whereas short-term financial indicators may not fully capture its value (Venkatraman & Ramanujam, 1986). Assessing collaborative performance is also challenging because it requires the integration of both financial and relational dimensions, including trust, commitment, and partner satisfaction (Chen & Paulraj, 2004). Finally, excessive coordination may reduce organizational flexibility in highly dynamic environments where rapid decision-making is required (Mintzberg, 1979).

Overall, the literature suggests that collaborative supply chain practices improve firm performance by enhancing operational efficiency, fostering innovation, reducing costs, and strengthening long-term relationships among supply chain partners. These findings provide the theoretical basis for examining the relationship between collaborative supply chain practices and firm performance in the context of the present study.

3. Theoretical framework

Collaborative supply chains represent an advanced approach to supply chain management, characterized by long-term inter-organizational relationships based on cooperation, coordination, and mutual commitment (Koh, 2017; Chen & Paulraj, 2004). Unlike traditional supply chains, which primarily focus on optimizing the performance of individual firms, collaborative supply chains emphasize the creation of shared value through the integration of complementary resources, capabilities, and expertise. This collaborative perspective reflects the concept of collaborative advantage, whereby partners achieve outcomes that would be

difficult to attain independently (Kanter, 1994; Dyer, 2000). Rather than competing individually, firms collaborate to strengthen the performance and competitiveness of the entire supply chain (Lavie, 2006).

The theoretical foundations of collaborative supply chains are supported by three complementary perspectives. Transaction Cost Theory explains collaboration as a governance mechanism that reduces transaction and coordination costs by replacing market-based exchanges with long-term collaborative relationships (Williamson, 1985). Resource-Based Theory emphasizes that collaboration enables firms to access, combine, and leverage complementary resources and capabilities, thereby creating sustainable competitive advantage (Barney, 1991). Finally, the Relational View highlights the importance of trust, commitment, and relational governance in generating collaborative advantage, arguing that superior performance arises not only from internal resources but also from the quality of inter-organizational relationships (Dyer & Singh, 1998).

Together, these theoretical perspectives provide a comprehensive framework for understanding how collaborative supply chain practices contribute to collaborative advantage and ultimately improve firm performance. They also provide the theoretical foundation for the conceptual model and hypotheses developed in this study

3.1 Theory of transaction costs

Transaction Cost Theory explains how organizations select the most appropriate governance structure to minimize the costs associated with economic transactions (Williamson, 1975, 1988; Hobbs, 1996). These transaction costs include the expenses related to managing exchanges between organizations as well as the coordination costs associated with internal resources. According to this theory, the choice of governance mechanisms depends on the characteristics of transactions, particularly their frequency, uncertainty, and complexity, with the objective of reducing opportunistic behavior and ensuring the effective fulfillment of contractual commitments (Williamson, 1975).

Although Transaction Cost Theory provides a valuable framework for understanding governance decisions, several authors have highlighted its limitations. Hodgson (1998) argues that the theory places excessive emphasis on individual transactions while giving limited attention to innovation, technological change, and the development of organizational capabilities. Similarly, Coriat (2010) emphasizes that this perspective overlooks the social and relational dimensions of inter-organizational collaboration, particularly learning processes, competence development, and long-term partnerships. Other authors also point out that Transaction Cost Theory offers a relatively static view of organizational exchanges, making it less suitable for explaining the dynamic nature of collaborative relationships (Langlois, 1992). Furthermore, its focus on contractual control tends to underestimate the role of trust and social norms in reducing coordination costs (Granovetter, 1985). In increasingly complex and innovative supply chains, these limitations suggest that Transaction Cost Theory should be complemented by other theoretical perspectives capable of capturing the relational and strategic dimensions of collaboration (Ghoshal & Moran, 1996; Dyer & Singh, 1998).

Consequently, Transaction Cost Theory provides an essential foundation for understanding governance mechanisms in collaborative supply chains by explaining how organizations seek to minimize transaction and coordination costs. However, its limitations justify the integration of complementary theoretical perspectives, particularly the Resource-Based Theory and the Relational View, to provide a more comprehensive explanation of collaborative advantage and firm performance.

3.2 Resource theory:

Resource-Based Theory views the firm as a bundle of tangible and intangible resources and capabilities that constitute the foundation of its competitive advantage (Hoskisson et al., 1999). According to this perspective, organizations seek to maximize value by effectively deploying their existing resources while continuously developing new capabilities to sustain future performance (Grant, 1996). Within collaborative supply chains, Resource-Based Theory provides a useful framework for understanding how firms combine complementary resources and capabilities to create value that would be difficult to achieve individually (Cao & Zhang, 2011). By sharing complementary resources, expertise, and capabilities, collaborative partners can strengthen their core competencies, reduce duplication of efforts, achieve cost savings, and improve their competitive position (Jap, 2001; Park et al., 2004). Such collaborative relationships generate joint value that exceeds what each partner could achieve independently (Dyer, 1998).

Despite its significant contribution to the understanding of competitive advantage, Resource-Based Theory has several limitations. Priem and Butler (2001) argue that the concept of resources remains broadly defined, making intangible assets such as knowledge, trust, and reputation difficult to identify and measure. In addition, the theory has been criticized for adopting a relatively static perspective that pays limited attention to the dynamic processes of learning, innovation, and organizational adaptation that characterize collaborative environments (Teece, Pisano, & Shuen, 1997). Another limitation is its traditional focus on the individual firm, whereas competitive advantage increasingly depends on collaboration and inter-organizational networks (Lavie, 2006). Furthermore, Resource-Based Theory gives limited consideration to the relational mechanisms that sustain long-term collaboration, such as trust, commitment, and relational governance (Dyer & Singh, 1998).

Consequently, Resource-Based Theory provides an important theoretical foundation for explaining how collaborative supply chain partners create value through the combination of complementary resources and capabilities. However, its limitations highlight the importance of integrating relational perspectives to better explain how collaborative advantage is developed and translated into improved firm performance.

3.3 Relational view:

The Relational View emphasizes that competitive advantage can be created through inter-organizational relationships rather than through the resources and capabilities of individual firms alone (Teece, 1986; Dyer & Singh, 1998). According to this perspective, firms generate collaborative advantage by combining complementary resources, sharing knowledge, and developing long-term relationships that create value beyond organizational boundaries (Lavie, 2006). Unlike traditional approaches that focus primarily on internal resources, the Relational View argues that organizations can achieve relational rents, defined as joint value that cannot be generated independently but results from collaborative relationships among partners (Dyer & Singh, 1998). This perspective therefore complements other theoretical approaches by emphasizing the importance of trust, commitment, and cooperation in explaining collaborative advantage.

Within collaborative supply chains, partners build on each other's knowledge, experience, and capabilities to improve the management of shared resources and strengthen their collective competencies (Sanchez, 1997; Métais, 1997). At the same time, they develop individual capabilities that contribute to the creation of joint value and the achievement of common objectives (Williamson, 1994; Durand, 2000). Consequently, trust, commitment, and mutual learning become essential conditions for sustaining long-term collaborative relationships and improving overall supply chain performance.

Despite its significant contribution, the Relational View also presents several limitations. It may overestimate the willingness of firms to cooperate while underestimating the risks of opportunistic behavior and conflicts of interest (Williamson, 1985). Building and maintaining trust and commitment also requires considerable time and effort, making collaborative relationships difficult to establish and sustain (Ring & Van de Ven, 1994). Furthermore, relational assets such as trust, commitment, and reputation remain difficult to measure, which complicates the assessment of their contribution to organizational performance (Uzzi, 1997). Finally, collaborative relationships evolve over time, requiring continuous adaptation and renewal to preserve their value in dynamic business environments (Gulati, 1998).

Consequently, the Relational View provides an essential theoretical foundation for explaining how collaborative supply chain partners create value through trust, commitment, and long-term cooperation. Combined with Transaction Cost Theory and Resource-Based Theory, it offers a comprehensive explanation of how collaborative practices generate collaborative advantage and ultimately improve firm performance.

3.4 Complementarity of theories:

Although each theoretical perspective provides valuable insights into collaborative supply chains, none of them alone fully explains the complexity of collaborative relationships. Transaction Cost Theory explains how appropriate governance mechanisms reduce transaction and coordination costs while limiting opportunistic behavior. Resource-Based Theory complements this perspective by showing how firms create value through the combination of complementary resources and capabilities. The Relational View further extends this analysis by emphasizing the importance of trust, commitment, and mutual learning in generating collaborative advantage and sustaining long-term partnerships.

These three theoretical perspectives are therefore complementary rather than competing. Transaction Cost Theory explains the governance mechanisms that support efficient collaboration, Resource-Based Theory highlights the strategic value created through shared resources and capabilities, and the Relational View demonstrates how inter-organizational relationships strengthen collaborative advantage. Together, they provide a comprehensive theoretical foundation for understanding how collaborative supply chain practices contribute to collaborative advantage and ultimately improve firm performance. This theoretical synthesis provides the basis for the conceptual model and the research hypotheses developed in the following section.

3.5 Research hypotheses:

The literature reviewed in the previous sections demonstrates that collaborative supply chain practices constitute important drivers of organizational performance. Previous studies have consistently shown that collaboration improves supply chain efficiency, reduces operational costs and risks, facilitates access to complementary resources, enhances information and knowledge sharing, and strengthens firms' competitive advantage (Mentzer et al., 2000; Sheu et al., 2006; Kogut, 1988; Park et al., 2004; Simatupang & Sridharan, 2003).

The collaborative practices proposed by Cao and Zhang (2011)—resource sharing, information sharing, goal congruence, decision synchronization, incentive alignment, collaborative communication, and knowledge creation—represent the key mechanisms through which supply chain partners coordinate their activities, share resources and capabilities, reduce uncertainty, and create collaborative advantage. These practices enable organizations to improve responsiveness, strengthen innovation, optimize resource utilization, and enhance overall firm performance.

The theoretical foundations presented in this study further support these relationships. Transaction Cost Theory explains how collaborative governance reduces transaction and coordination costs, Resource-Based Theory emphasizes the strategic value created through the

combination of complementary resources and capabilities, and the Relational View highlights the role of trust, commitment, and long-term relationships in generating collaborative advantage. Together, these theoretical perspectives provide a strong foundation for explaining why collaborative supply chain practices are expected to improve firm performance.

Building on the collaborative supply chain model developed by Cao and Zhang (2011), and drawing on the theoretical and empirical literature reviewed above, this study examines the relationship between collaborative supply chain practices and firm performance in the Moroccan fruits and vegetables supply chain. Although the collaborative supply chain model has been widely validated in different industrial contexts, empirical evidence remains limited in the Moroccan agricultural sector. Applying this framework to the Souss Massa region, before extending the analysis to the national level, provides an opportunity to assess its relevance in a context characterized by fragmented production systems, multiple stakeholders, and significant environmental and market uncertainties.

Based on these theoretical arguments, the following research hypotheses are proposed.

- ***Collaborative supply chain and firm performance:***

Previous studies have consistently demonstrated that collaborative supply chain practices contribute to improving firm performance, particularly when collaborative relationships are developed over the long term (Duffy, 2004; Sheu et al., 2006). Through resource integration, information sharing, coordinated decision-making, and mutual commitment, collaboration enables firms to reduce costs, improve service quality, strengthen responsiveness, and create value that would be difficult to achieve individually (Dyer & Singh, 1998; Ring & Van de Ven, 1994; Ramdas & Spekman, 2000). These collaborative relationships also generate relational rents and reinforce the competitive advantage of supply chain partners by improving both operational efficiency and long-term organizational performance (Dyer & Singh, 1998).

Drawing on the collaborative supply chain framework proposed by Cao and Zhang (2011), this study examines the effect of the seven collaborative practices on firm performance. Based on the theoretical and empirical literature reviewed in the previous sections, the following hypotheses are proposed:

By enhancing supply chain visibility and providing partners with timely and accurate information for decision-making, information sharing enables firms to coordinate their activities more effectively and respond faster to environmental uncertainty (Simatupang & Sridharan, 2003; Whipple, 2007). Prior empirical studies confirm that firms exchanging information more extensively achieve superior operational and financial outcomes (Nejjar, 2017; Cao et al., 2015).

H1: Information sharing has a positive impact on firm performance.

Goal congruence aligns individual and collective objectives among supply chain partners, facilitating the coordination of activities and the efficient use of shared resources (Rakotonarivo, 2009). When partners perceive that collective success also serves their own interests, they are more willing to commit to common objectives, which strengthens joint performance (Ramanathan & Gunasekaran, 2014).

H2: The pooling of objectives has a positive impact on firm performance.

Decision synchronization enables supply chain partners to jointly plan their activities rather than act independently, creating synergies that improve resource allocation and operational efficiency (Simatupang & Sridharan, 2002; Lee, 1997). Coordinated decision-making, when supported by timely and reliable information, has been shown to enhance the responsiveness and performance of collaborative supply chains (Cao & Zhang, 2013).

H3: Timing of decisions has a positive impact on firm performance.

Incentive alignment mechanisms encourage partners to make decisions that benefit the entire supply chain rather than pursuing individual gains, by ensuring a fair distribution of costs, risks,

and rewards (Lee, 2001; Clemons, 1993). Well-designed incentive systems have been associated with stronger resource sharing and superior collective performance (Khan et al., 2015).

H4: Incentive alignment has a positive impact on firm performance.

Resource sharing allows supply chain partners to mobilize and combine complementary human, physical, informational, and knowledge-based resources to achieve common objectives (Dyer, 1998; Harland et al., 2007). When resources are effectively identified and aligned with strategic objectives, firms are better able to optimize resource utilization and strengthen their competitive position (Lee, 2004; Gong, 2018).

H5: Resource sharing has a positive impact on firm performance.

Collaborative communication, characterized by frequent, open, and multidirectional exchanges among partners, strengthens inter-organizational relationships and supports the coordination of material and information flows (Cao & Zhang, 2011; Mohr & Nevin, 1990). Effective communication strategies facilitate cooperation and reduce misunderstandings between partners, thereby improving joint outcomes (Anderson, 1987; Tuten et al., 2001).

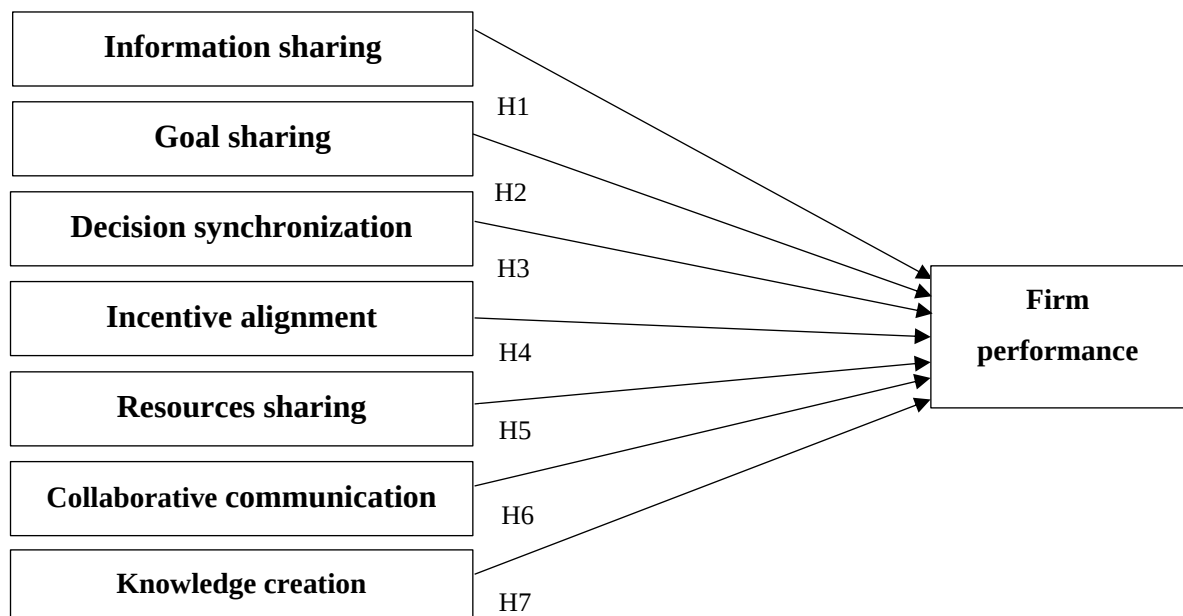
H6: Collaborative communication has a positive impact on firm performance.

Knowledge creation enables supply chain partners to develop and apply new knowledge that enhances their understanding of each other's capabilities, thereby supporting innovation and long-term collaboration (Amendola, 1990; Malhotra et al., 2005). Trust-based knowledge exchange strengthens partners' collective capacity to adapt and improve their performance (Granovetter, 1985; Harland, 2007).

H7: Knowledge creation has a positive impact on firm performance.

The following figure illustrates the conceptual model of this study. It presents the proposed relationships between the seven collaborative supply chain practices and firm performance and provides the analytical framework used to test the research hypotheses.

Figure 1: Conceptual Research Model: Impact of collaborative supply chain on firm performance



Source: Personal elaboration, inspired from Cao and Zhang's model (2001)

- ***The Impact of Collaborative Supply Chain Practices on Firm Performance: A Case Study of the Fruits and Vegetables Sector in the Souss Massa Region, Morocco***

This study examines the impact of collaborative supply chain practices on firm performance through the case of the fruits and vegetables sector in the Souss Massa region of Morocco. The choice of this sector is motivated by its strategic importance to both the regional and national economy. Agriculture remains one of the main pillars of the Moroccan economy, employing more than 73% of the rural population and approximately 39% of the national workforce, while providing the primary source of income for more than three million people (APEFEL, 2014). The Souss Massa region occupies a central position within the Moroccan agricultural sector. It accounts for more than 40% of the country's agricultural production and nearly 60% of national fruit and vegetable production, supplying both domestic markets and international exports, which represent approximately 60% of Morocco's agricultural exports (Ministry of Agriculture, 2019). Despite this strategic importance, the region continues to face several structural, organizational, and environmental constraints that limit the full exploitation of its agricultural potential (ORMVA Souss Massa, 2019).

These characteristics make the Souss Massa region an appropriate context for examining collaborative supply chain practices. The concentration of fruit and vegetable producers, together with the complexity of interactions among supply chain actors, provides an opportunity to investigate how collaboration contributes to improving firm performance. Furthermore, applying the collaborative supply chain framework developed by Cao and Zhang (2011) in this context extends existing empirical evidence to the Moroccan agricultural sector, where studies on collaborative supply chains remain limited.

The empirical investigation was initially conducted in the Souss Massa region before being extended to the national level. This approach allows the proposed conceptual model to be examined in a strategic agricultural context while providing empirical evidence on the relationship between collaborative supply chain practices and firm performance.

3.6 Research Methodology

- ***Conduct of the study:***

This section describes the research methodology adopted to test the proposed conceptual model. It first presents the sampling procedure and the data collection process. It then describes the exploratory phase, which was conducted as a pre-test to assess the clarity and relevance of the questionnaire before its large-scale administration. Finally, the procedures followed for administering the questionnaire and collecting the data are presented.

The survey instrument comprised 35 items measuring the seven collaborative supply chain practices examined in this study: information sharing (7 items), goal congruence (5 items), decision synchronization (4 items), incentive alignment (4 items), resource sharing (5 items), collaborative communication (5 items), and knowledge creation (5 items). Firm performance was measured through 10 items, covering financial performance (4 items) and non-financial performance (6 items). All items were measured on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

The questionnaire was pre-tested in three stages. First, its translation from English into French was verified by bilingual researchers and practitioners to ensure conceptual equivalence. Second, three university professors in management science and rural economics reviewed the questionnaire for clarity and consistency, leading to minor adjustments to the introduction and the respondent profile section. Third, face-to-face interviews lasting between 45 minutes and 1.5 hours were conducted with nine sector professionals and experts (including managers of producer groups, cooperatives, agricultural consulting firms, and regional agricultural authorities), in line with the recommendation of Eisenhardt (1989) and Malhotra et al. (2005)

that four to ten interviews are sufficient for questionnaire pre-testing. This stage confirmed the clarity, relevance, and appropriate length of the questionnaire. The final questionnaire was then administered to the target population via email, the data collection period extended over several weeks.

- **Target population:**

Moroccan agriculture has historically represented a major source of income for a large proportion of the rural population. However, identifying all stakeholders involved in the fruits and vegetables supply chain remains challenging due to the fragmented structure of the sector. According to the Moroccan Ministry of Agriculture (2014), the implementation of an agricultural aggregation system aims to organize producers into professional groups. This initiative seeks to provide farmers with technical support, training, and advisory services through professional organizations while facilitating their access to financial assistance and modern agricultural practices.

To identify the target population, this study relied on data provided by the APEFEL (Association Marocaine des Producteurs et Producteurs Exportateurs de Fruits et Légumes) and the ORMVA-SM (Office Régional de Mise en Valeur Agricole du Souss-Massa). These institutions provided lists of fruit and vegetable producers and aggregation companies, which served as the sampling frame for the survey. Their collaboration ensured the reliability of the sampling process and facilitated access to companies operating within the sector.

A total of 250 companies were contacted to participate in the study. Among them, 203 usable questionnaires were collected, corresponding to a response rate of 81.2%. This high response rate provides a robust empirical basis for the statistical analyses and strengthens the reliability of the study findings.

Table 1: Sample profile (n = 203)

Caractéristique	Catégorie	Fréquence (n)	Pourcentage
Chiffre d'affaires (MDH)	500 et plus	27	13.3%
Chiffre d'affaires (MDH)	100 à 500	32	15.8%
Chiffre d'affaires (MDH)	50 à 100	51	25.1%
Chiffre d'affaires (MDH)	10 à 50	48	23.6%
Chiffre d'affaires (MDH)	Moins de 10	45	22.2%
Effectif salarié	5000 et plus	15	7.4%
Effectif salarié	1000 à 5000	21	10.3%
Effectif salarié	500 à 1000	18	8.9%
Effectif salarié	100 à 500	66	32.5%
Effectif salarié	Moins de 100	83	40.9%
Mode de décision SC	Formelle	106	52.2%
Mode de décision SC	Informelle	97	47.8%
Fonction SC dédiée	Oui	140	69.0%
Fonction SC dédiée	Non	63	31.0%

Source: Authors

4. Results of the empirical study:

To analyze the empirical data, this study employed Structural Equation Modeling (SEM), a statistical approach widely recognized for examining complex relationships between latent constructs (Sarstedt et al., 2017). SEM is particularly suitable for management research, where theoretical concepts are generally measured through latent variables that cannot be observed directly (Nitzl, 2016).

Among the different SEM approaches, the Partial Least Squares Structural Equation Modeling (PLS-SEM) method was selected and implemented using SmartPLS software. PLS-SEM is particularly appropriate for predictive research and the analysis of complex conceptual models (Sarstedt et al., 2020). It also provides greater flexibility by accommodating relatively small

sample sizes and does not require normally distributed data (Henseler et al., 2009). This approach therefore enabled us to assess both the measurement model and the structural model using the data collected.

The evaluation of the measurement model focused on the reliability and validity of the constructs. Internal consistency reliability was assessed using Cronbach's Alpha (α) and Composite Reliability (CR), while convergent validity was examined through the Average Variance Extracted (AVE) and the indicator loadings. The predictive relevance of the structural model was evaluated using the Stone–Geisser Q^2 coefficient obtained through the Blindfolding procedure implemented in SmartPLS. A positive Q^2 value indicates that the model has predictive relevance. Discriminant validity was assessed using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio of correlations, both of which confirmed adequate discrimination between the constructs of the model (values available upon request).

Table 2: Reliability and convergent validity of the measurement model

Construit	Composite Reliability (CR)	Cronbach's Alpha (α)	AVE
Information sharing	0.860	0.865	0.550
Goal congruence	0.878	0.827	0.591
Decision synchronization	0.850	0.762	0.580
Incentive alignment	0.860	0.796	0.551
Resource sharing	0.855	0.788	0.530
Collaborative communication	0.868	0.810	0.569
Knowledge creation	0.785	0.853	0.538
Firm performance	0.797	0.628	0.568

Note: All CR, Alpha, and AVE values exceed the recommended thresholds (CR > 0.70; AVE > 0.50; Fornell & Larcker, 1981; Hair et al., 2019), confirming the reliability and convergent validity of the measurement model.

Source: Authors

Once the quality of the measurement model had been established, the structural model was assessed to examine the relationships among the latent variables and test the proposed research hypotheses. The evaluation focused on the significance of the structural relationships, the explanatory power of the endogenous constructs, and the overall predictive capability of the proposed model.

4.1 Hypothesis Testing:

The proposed hypotheses were tested using the bootstrapping resampling procedure available in SmartPLS. This non-parametric technique estimates the significance of the path coefficients (β) by generating standard errors and confidence intervals from repeated subsamples. Following the recommendations of Chin (1998), Tenenhaus (2008), and Hair et al. (2017), 5,000 bootstrap resamples were performed to ensure the robustness and stability of the parameter estimates.

The results of the hypothesis testing are presented in the following table:

Table 3: SmartPLS Hypothesis Test (Direct Effects)

Hypothèses	Coef. β	T value	Résultat
H1: Information sharing → Firm Performance	0.214	2.102**	A
H2: Goal congruence → Firm Performance	0.013	0.124	R
H3: Decision synchronization → Firm Performance	0.129	1.173	R
H4: Incentive alignment → Firm Performance	0.009	0.095	R
H5: Resource sharing → Firm Performance	0.321	2.59***	A
H6: Collaborative communication → Firm Performance	0.259	1.987*	A
H7: Knowledge creation → Firm Performance	0.009	0.091	R

*** significant to 0,01 ** significant to 0,05 * significant to 0,1 A=approved R=rejected

Source: Authors

For the two-tailed tests, statistically significant confidence intervals were obtained. The significance of the structural relationships was assessed using the Student's t-values generated through the bootstrapping procedure. Following the recommendations of Hair et al. (2017), path coefficients were considered significant at the 1%, 5%, and 10% significance levels when the corresponding t-values exceeded 2.57, 1.96, and 1.64, respectively. Values below these thresholds indicate that the proposed relationships are not statistically supported.

The results indicate that the positive relationship between information sharing and firm performance (H1) is supported. This finding is consistent with previous studies demonstrating that effective information sharing improves collaborative relationships, reduces uncertainty, lowers operational costs, and enhances supply chain performance (Kumar & Van Dissel, 1996). By contrast, the relationship between goal congruence and firm performance (H2) is not supported. This result differs from previous studies, particularly those of Ramanathan and Gunasekaran (2012), which reported a positive relationship between shared objectives and organizational performance. The absence of a significant relationship in the present study suggests that the influence of goal congruence may vary depending on the organizational and sectoral context.

Similarly, the relationship between decision synchronization and firm performance (H3) is not supported. This finding contrasts with the results reported by Ramdas and Spekman (2000) and Simatupang and Sridharan (2002), who found that synchronized decision-making contributes to lower costs and improved supply chain performance. The present findings indicate that this relationship is not statistically significant within the context of the study.

The results also show that incentive alignment does not have a significant impact on firm performance (H4). This finding differs from previous research suggesting that incentive alignment reduces conflicts of interest and encourages collaborative behavior, thereby improving supply chain performance (Clemons & Row, 1993; Simatupang et al., 2002; Morin, 2015).

Resource sharing (H5) has a positive and statistically significant impact on firm performance. This result is consistent with previous studies emphasizing that the sharing of complementary resources contributes to cost reduction, improved operational efficiency, and enhanced organizational performance (Simatupang & Sridharan, 2005; Min et al., 2005; Tanriverdi, 2006).

Collaborative communication (H6) is also found to have a positive and significant effect on firm performance. This finding supports earlier studies showing that effective communication strengthens collaboration, facilitates information flows, and improves coordination among supply chain partners (Anderson et al., 1990; Bleeke & Ernst, 1993; Dong et al., 2001).

Finally, the relationship between knowledge creation and firm performance (H7) is not supported. Although previous studies have highlighted the importance of knowledge creation in fostering innovation and improving organizational capabilities (Nonaka & Takeuchi, 1995), the present study does not provide empirical evidence of a significant direct relationship between this collaborative practice and firm performance.

Overall, three of the seven proposed hypotheses (H1, H5, and H6) are supported. These findings provide partial empirical support for the collaborative supply chain framework developed by Cao and Zhang (2011) within the context of the Moroccan fruits and vegetables sector. More specifically, the results indicate that information sharing, resource sharing, and collaborative communication represent the collaborative practices that contribute most significantly to improving firm performance in the study context. These findings enrich the existing literature by providing empirical evidence from the Moroccan agricultural sector and offer useful managerial implications for strengthening collaboration among supply chain partners.

4.2 Results and discussion

The empirical results confirm the robustness of the proposed structural model. The assessment of the measurement and structural models indicates that the reliability, validity, and predictive relevance criteria are satisfactorily met. In particular, the model demonstrates adequate explanatory power, while the positive Stone–Geisser (Q^2) values confirm its predictive relevance. Overall, these results support the statistical reliability of the proposed framework and provide a sound basis for interpreting the relationships between collaborative supply chain practices and firm performance.

Table 4: Explanatory and predictive power of the structural model

Construit endogène	R ²	R ² ajusté*	Q ²	SRMR	NFI
Firm performance	0.546	0.530	0.046	0.066	0.951

*Adjusted R² computed as $1 - (1 - R^2) \times (n - 1) / (n - k - 1)$, with $n = 203$ and $k = 7$ predictors. The positive Q^2 value (Stone-Geisser) confirms the predictive relevance of the model, and SRMR/NFI values indicate an acceptable overall model fit (Hu & Bentler, 1999).

Source: Authors

The findings reveal that three collaborative practices—information sharing, resource sharing, and collaborative communication—have a positive and significant impact on firm performance. These results emphasize that collaboration creates value primarily through the effective exchange of information, the sharing of complementary resources, and continuous communication among supply chain partners. These practices strengthen coordination, reduce uncertainty, and improve the responsiveness of firms operating in complex and dynamic environments.

By contrast, goal congruence, decision synchronization, incentive alignment, and knowledge creation do not exhibit a statistically significant direct effect on firm performance in the context of this study. Although previous research has generally reported positive relationships between these practices and organizational performance, the present findings suggest that their effects may depend on the institutional, organizational, and sectoral characteristics of the environment in which collaboration takes place. These results reinforce the importance of considering contextual factors when applying collaborative supply chain models to emerging economies. From a managerial perspective, the findings indicate that managers in the Moroccan fruits and vegetables sector should prioritize mechanisms that facilitate information exchange, resource sharing, and collaborative communication. Strengthening these collaborative practices may improve coordination among supply chain partners, enhance operational efficiency, and increase the sector's resilience in the face of market and environmental uncertainties.

From a theoretical perspective, this study provides partial empirical support for the collaborative supply chain framework proposed by Cao and Zhang (2011). While only three of the seven collaborative dimensions were found to significantly influence firm performance, the results confirm that collaboration remains a multidimensional construct whose effectiveness depends on the context in which it is implemented. Consequently, the findings support the view that collaborative supply chain models should be interpreted within their institutional and sectoral environments rather than being considered universally applicable.

More broadly, the results reinforce the complementarity of the theoretical perspectives adopted in this study. The significant effects of information sharing, resource sharing, and collaborative communication support the relational approach by emphasizing the importance of trust, interaction, and cooperation in creating value. At the same time, the mixed results obtained for the remaining collaborative dimensions suggest that neither transaction cost theory nor the resource-based theory alone is sufficient to explain collaborative performance. Instead, the findings confirm that combining transaction cost theory, resource-based theory, and the relational approach provides a more comprehensive framework for understanding collaborative supply chains and their impact on firm performance.

5. Conclusion

This study examined the impact of collaborative supply chain practices on firm performance by applying the collaborative supply chain framework developed by Cao and Zhang (2011) to the Moroccan fruits and vegetables sector, with a particular focus on the Souss Massa region. The objective was to investigate whether the seven collaborative practices identified in the literature contribute to improving firm performance within an emerging economy characterized by specific institutional, organizational, and market conditions.

The empirical findings provide partial support for the proposed conceptual framework. Among the seven collaborative practices, only information sharing, resource sharing, and collaborative communication were found to have a positive and significant impact on firm performance. Conversely, goal congruence, decision synchronization, incentive alignment, and knowledge creation did not exhibit statistically significant effects. These results suggest that the influence of collaborative supply chain practices is context-dependent and that their effectiveness varies according to the characteristics of the sector and the environment in which collaboration takes place.

This study makes several contributions to the literature. First, it extends the collaborative supply chain framework of Cao and Zhang (2011) to the Moroccan agricultural sector, an empirical context that has received limited attention in previous research. Second, it provides evidence that collaboration should be understood as a multidimensional construct whose dimensions do not necessarily contribute equally to firm performance. Third, the findings reinforce the complementarity of transaction cost theory, resource-based theory, and the relational approach, demonstrating that collaboration emerges from the interaction between governance mechanisms, strategic resources, and inter-organizational relationships.

Managerial implications

From a managerial perspective, the results suggest that managers should prioritize information sharing, resource sharing, and collaborative communication to strengthen coordination, improve operational efficiency, and enhance competitiveness within agricultural supply chains. These collaborative practices appear to represent the most effective levers for improving firm performance in the Moroccan context.

Limitations

Like any empirical research, this study has several limitations. The analysis was conducted within a single economic sector and was initially focused on the Souss Massa region before being extended to the national level, which may limit the generalizability of the findings. In addition, the study adopted a cross-sectional design and relied on perceptual measures collected through questionnaires, preventing the observation of collaborative relationships over time. The sample was drawn using a non-probability (purposive) sampling procedure based on lists provided by APEFEL and ORMVA-SM, which may introduce selection bias, and the reliance on self-reported data collected from a single respondent per firm exposes the study to common method bias. Finally, although collaborative advantage was extensively mobilized in the theoretical framework of this study, it was not empirically tested as a construct; future research should examine its mediating role between collaborative supply chain practices and firm performance, in order to determine whether it constitutes a mechanism through which these practices generate value.

Future research directions

Future research could extend this work by examining other agricultural and industrial sectors, conducting comparative studies across countries, or adopting longitudinal approaches to better understand how collaborative practices evolve and influence firm performance over time.

Additional research could also investigate the moderating role of institutional, technological, and cultural factors in shaping collaborative supply chain relationships.

Overall, this study contributes to a better understanding of collaborative supply chain practices in the Moroccan context and provides both theoretical and managerial insights into the conditions under which collaboration enhances firm performance. It also confirms that collaborative supply chain models should be adapted to the specific characteristics of emerging economies rather than being applied uniformly across different contexts

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