



The Influence of Inter-Organizational Collaboration on Supply Chain Agility and Buyer-Supplier Relationships: Evidence from Export-Oriented Firms in Pakistan

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ABSTRACT

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This study analyzes the influence of inter-organizational collaboration on supply chain agility and buyer-supplier relationships quality among export oriented firms of Pakistan. The combined effect of Information sharing, joint planning and trust was examined on supply chain agility and buyer-supplier relationship is studied under Resource-Based View, Dynamic Capabilities Theory and Relational Exchange Theory. Although collaboration is a widely recognized concept in supply chain management, there is limited empirical evidence in developing economies like Pakistan. Primary data from 400 supply chain and operations professionals in export-oriented manufacturing and trading firms was collected to address this gap. A cross-sectional quantitative design was adopted using structured and validated scales, administered through physical and electronic surveys. IBM SPSS Statistics 29 and SmartPLS 4.0 were used to conduct Reliability analysis (Cronbach's alpha), confirmatory analysis, correlation analysis and structured equation modeling for six hypothesis. The results show that information sharing, joint planning and trust each positively influence supply chain agility and buyer-supplier relationships, which shows that all six hypothesis were supported. The model explained 58.4% of variance in supply chain agility and 61.2% variance in buyer-supplier relationship. This study contributes an integrated empirical model of the collaborative antecedents of relational and operational supply chain performance in a developing-economy environment and proposes that export companies invest in digital information-sharing platforms, in standardized joint-planning processes, and in long-term partnerships with their supply chain. Limitations and directions for further research are discussed.

Introduction

The shifts in technology, consumer behavior, politics and trade patterns reshaped the global supply chain market to be more complex over the past couple of years. In the context of exporting, companies dealing with such activities have to face complex multi-national value chains, where the coordination of relationships and the movement of goods across the border has become a major operational issue (Ambulkar et al., 2025; Cao & Zhang, 2025).

Pakistan exports a large number of textile and garments, sporting goods, surgical instruments agro-products and leather which significantly contribute to its economy through foreign exchange earnings. This also creates employment and grow industrial competitiveness (State Bank of Pakistan 2025). However substantial hurdles are faced by Pakistani exporters while coordinating with partners, adapting to the changing market demands and maintaining relationships with international clients (Khan et

a;.,2025, Iqbal and Raza,2026).inter-organizational collaboration allows firms to work together and achieve shared goals by sharing information and resources and aligning decisions to resolve these difficulties (Simatupang & Sridharan, 2005; Zhao et al., 2025). Thee common types of collaboration are sharing information, exchanging operational and strategic data rapidly and accurately with each other, and synchronizing forecasting, planning, and production processes with each other, and the last one, assessing the reliability, goodwill and honesty of the partner.(Nyaga et al., 2010; Mohammed & Al-Rashed, 2025).

This study revolves around supply chain agility which is an organizations capacity to efficiently and accurately understand and respond to change (Sangari & Razmi, 2015; Liu & Wang, 2026), it has gained significant importance as global competition rises with frequent shifts in supply and demand. For Pakistani exporters, agility simply means their ability to ensure reliability for international orders while sustaining competitiveness in emerging market suppliers (Ahmed et al., 2026). The second key concept is the quality of buyer-supplier relationship which reflects the relational capital, firm's cooperative values, commitments and supply chain patterns (Cai et al., 2010; Zheng et al., 2026). The higher quality of these relationships lowers transitional costs, improves the flow of information and supports consistency and volume of export orders (Rahman & Hossain, 2025).

Although Collaboration is a widely accepted concept of supply chain management, its theoretical and practical significance remains under researched in Pakistan's export sector. The available literature focus on single dimension of collaboration in developed economies which limit its relevance to Pakistan's developing economy (Mohammed & Al-Rashed, 2025; Zhao et al., 2025). Institutions in Pakistan are unique in at least three ways and these are the factors that distinguish Pakistan from comparator emerging markets. First, contract enforcement is more time consuming and expensive in comparison to those from economies like India, Bangladesh and China, encouraging over the legal structure, firms to adopt relational governance. (State Bank of Pakistan, 2025; Ahmed et al., 2026). Second, Pakistani export companies are at a disadvantageous bargaining position vis-à-vis international buyers in comparison to firms of these comparator markets, so there is a risk in generalizing the collaboration-outcome relationships seeing elsewhere to Pakistan. Third, unreliable infrastructure, such as electricity and logistics, increases the cost to coordinate joint planning and information sharing, which may change the value of each dimension of collaboration. Whether the ideas found in previous studies on collaboration transfer to a market with these institutional characteristics is an empirical question, but one that has not been studied in Pakistan. Whether the ideas found in studies of collaboration are transferrable is an open empirical question, as previous studies have been conducted in India, China, Bangladesh, and Saudi Arabia.

An integrated model tests information sharing, joint planning and trust collectively rather than individual concepts affecting both supply chain agility and buyer-supplier relationship quality in Pakistani export oriented firms to address this gap. This model is supported by three theories, Resource Based View (RBV), explains how collaboration works as a strategic resource, something the competitors struggle with, giving firms a competitive advantage (Barney, 1991; Wernerfelt, 1984; Akter et al., 2026). Dynamic Capabilities theory tells how the organization's ability to identify and effectively respond to the changes and varying environmental conditions helps in the development of supply chain agility (Teece et al., 1997; Wilden et al., 2025). Finally the Relational Exchange Theory represents how inter-organizational relationships and buyer-supplier relationship quality are both shaped by trust, mutual exchange and commitment (Macneil, 1980; Liu et al., 2026).

Six Hypothesis test relationship linking information sharing, joint planning and trust to supply chain agility and buyer-supplier relationship quality through a survey of 400 supply chain and operations professionals working in export sector. Intergrading Resource Based view, Dynamic Capabilities Theory and Relational Exchange Theory in a single empirical model and testing all three dimensions of collaboration simultaneously against both operational and relational outcomes theoretically contributes to the prior studies testing single relationships. Practically, it provides evidence to managers, policy makers and buyers in export sector to identify the most effective forms of collaboration to strengthen supply chain flexibility and relations with partners , guiding investments in information systems, collaborative planning practices and building trust (Khan et al., 2025; State Bank of Pakistan, 2025).

The next sections cover the theoretical formulations, hypothesis development, methodology used, results, theoretical and practical implications, limitations and future research directions. Theoretical Background And Hypothesis Formulation

Theoretical Foundations

Resource-Based View (RBV) presented by Wernerfelt (1984) and extended by Barney (1991) states that firms that gain and utilize valuable, rare and non-substitutable resources achieve sustainable competitive advantage. RBV suggests that the supply chain flexibility and relational quality In firms can be enhanced through effective information sharing, strong relationships based on trust and well-coordinated joint planning processes, which improve their collaborative capabilities and help them gain a competitive advantage (Akter et al., 2026; Cao & Zhang, 2025). It is difficult for competitors to replicate these capabilities because these are built over time through experience, investments and relationships with specific partners (Liu & Wang, 2026). Recent developments

Recent developments of the RBV approach to the firm, however, do not focus on the firm itself, but rather on the inter-firm relationship; that is, trust and knowledge sharing, and collaborative governance constitute resources which can be brought into the relationship to create rents not otherwise available from the arms' length relationship with partners (Dyer & Singh, 1998; Mohammed & Al-Rashed, 2025). This relational extension justifies the rationale of the present study of linking collaboration to the buyer-supplier relationship quality specifically, in contrast to the relationship quality as a byproduct of operational performance. The RBV also suggests that the value of the resources may be more about how the resources are combined than any single resource in isolation, that is, the combined value of the resources, such as information sharing, joint planning and trust, will likely be greater than the sum of its parts, and that this composite collaborative capability will be the key to making export-oriented firms more valuable in the challenging international marketplace. This is especially true in the context of Pakistani exporters, which operate in a volatile world economy where traditional export strengths, such as low-cost labour, are not enough to provide a competitive advantage and co-operation is a relatively scarce but valuable asset because of infrastructural and institutional issues.

Dynamic Capabilities Theory (DCT) extends RBV by also stating that firms must have valuable resources, but they must also possess organizational processes to sense and respond to threats and opportunities, in both the Teece et al. (1997) and (2007) versions and Eisenhardt and Martin (2000). The adaptive capacity is broken down into three stages by Teece (2007): Sensing, identifying and evaluating external threats and opportunities; Seizing, mobilizing of strategy and resources to exploit threats and opportunities; and Transforming (or reconfiguring), continual realignment of the firm's resources and capabilities with the environment.

All these are accomplished by inter-organizational collaboration. Information sharing allows a firm to have more situational awareness beyond the boundaries of the firm, which enhances their capacity to sense the changes in demand, supply, and competition (Zhao et al., 2025). Joint planning can be an effective tool for seizing as partners can combine their forecasting and harmonize their calendars to maximise the benefits of opportunities identified; reducing the inefficiencies of uncoordinated decision making. As the environment changes, trust helps reduce re-negotiation and re-distribution of shared resources, and helps to ease the transition to new collaborative working practises (Liu et al., 2026). Therefore, in this study, DCT is complementary to the RBV, as this identifies that information sharing, joint planning and trust are strategic resources; DCT provides an explanation of how firms utilise these resources to achieve the agility, one of the two outcome variables studied in this research. In countries such as Pakistan, where the external environment is prone to volatility, and where the changing nature of trade policies and international demand and supply for exports create a volatile environment, collaborative practice can serve as a valuable tool for developing dynamic capabilities that are necessary for an agile response to changing external conditions, especially in export industries (Wilden et al., 2025).

Relational Exchange Theory (RET) proposed by Macneil (1980) and later expanded to Commitment-Trust Theory (CTT) by Morgan and Hunt (1994) describes the exchanges as either discrete transactions, characterized as brief transactions, set by prices; and relational exchanges, characterized as embedded in the social context, more resilient. Once partners have established trust and invested in the relationship, the relationship between the buyer and supplier becomes a relational exchange (RET); in the same manner, open communication between the partners increases their trust, and consequently the risk of opportunism is reduced; joint planning and information sharing foster relational exchange as well, it creates a sense of commitment and builds together understanding, on which the relational governance depends (Nyaga et al., 2010; Rahman & Hossain, 2025). In certain cases, RET can also serve as an explanation for buyer-supplier relationships that are more characterized by long-term relationships, dependence and uncertainty that is un-settleable with formal contracts. This is especially noticeable in countries such as Pakistan, where formal institutional structures are not yet in place effectively, and trust-based relational governance serves as a substitute to costly formal contracts (Ahmed et al., 2026). The RBV, the DCT and the RET provide complementary explanations that do not compete for each other for the two outcome variables of this study: collaborative capability is valuable, DCT is another mechanism through which collaborative capability contributes to operational agility, and RET is another mechanism through which collaborative capability contributes to relational quality.

Core Constructs

to another along the supply chain which is the basis for them to make coordinated decision (Cheng et al., 2008; Liu & Wang, 2026). This exchange can lessen customers' uncertainty in demand and make the supply-demand match as much as possible across the chain (Lee et al., 1997; Zhao et al., 2025). The average effect size (r) of .42 (Cao & Zhang, 2025) from a meta-analysis on 52 studies is the largest for the dimension of information sharing, and this pattern shown in the emerging-economy literature, although there is some variation in the effect size by industry and institutional context, ranging from $r = .32$ (Khan et al., 2025) to $r = .46$ (Ambulkar et al., 2025; Liu & Wang, 2026).

Joint planning is to match the forecasting, scheduling, inventory management and product development processes of the supply chain partners, not only the information, but also the decisions and problem solving (Simatupang & Sridharan, 2005; Zhao et

al., 2025). The most well established is Collaborative Planning, Forecasting and Replenishment (CPFR) framework (Fliedner, 2003; Ahmed et al., 2026). Mohammed and Al-Rashed (2025) found that the relationship between formal planning contracts and agility is stronger when demand uncertainty is high, a finding which is particularly relevant to the context of Pakistan's exporters in a world market that is extremely volatile. Zheng et al. (2026) reported that formal planning agreements and mutual monitoring enhance the relationship between inter-firm trust and supply chain performance, which is applicable in the context of Pakistani exporters working in the volatile world market.

There are three types of trust, competence trust, goodwill trust, and consistency trust, which are confidence in the partner's competence to provide, confidence in the partner's good will towards the focal firm and confidence in the partner's acting on agreed shared values respectively (Mayer et al., 1995; Nyaga et al., 2010). Opportunism, transaction costs, and the ability to share information to enable effective collaboration can be reduced through trust (Cai et al., 2010). In the context of the Pakistani export firms, with informal and mostly relational governance, inter-organizational trust is found to be a strong mediator between collaborative capabilities and supply chain responsiveness (Wilden et al., 2025), and the highest predictor of supply chain agility (Ahmed et al., 2026).

Supply chain agility is an acuteness and flexibility in responding to changes, i.e., reconfiguration of supply chain resources, assets and processes (Sangari & Razmi, 2015; Liu & Wang, 2026). Agility is different from efficiency, which involves cost minimisation in stable markets and from resilience, which focuses on recovery after disruption, rather it is proactive and reactive responsiveness in volatile markets (Ambulkar et al., 2025). Christopher (2000) highlights three factors necessary for the agile supply chain model: market sensitivity, virtual integration and process integration, which all require collaboration between organizations; and Christopher and Towill (2001) demonstrate how to achieve market sensitivity and process integration without compromising the lean efficiency achieved through inter-organizational collaboration within a strategically located decoupling point. A positive correlation between agility and order fulfillment, faster lead time and better competitive positioning has been identified (Cao & Zhang, 2025; Zhao et al., 2025) and this correlation is particularly relevant in developing countries due to poor infrastructure conditions and volatility in demand (Khan et al., 2025; Ahmed et al., 2026).

The quality of buyer-supplier relationship is a reflection of the relationship capital, mutual commitment, cooperative norms, and long-term orientation in a buyer-supplier relationship rather than a transactional one, which is mainly based on price and formal contract (Cai et al., 2010; Rahman & Hossain, 2025; Macneil, 1980). These relationships enable a firm's ability to cooperate and innovate (Zheng et al., 2026) and in the export industries, affect the amount of export orders that are still on the go and a firm's international expansion potential (Iqbal & Raza, 2026; Mohammed & Al-Rashed, 2025). Relationship quality often has collaborative behaviors as antecedents, and information sharing and joint planning are among the collaborative behaviors that can be considered as a common antecedent of relationship quality; trust is also a common antecedent and a result of high-quality buyer-supplier relationship, where trust shows a form of reciprocity and dynamism (Nyaga et al., 2010; Rahman & Hossain, 2025). The outcome of the inter-organizational coordination work is the buyer-supplier relationship quality, as analyzed in this study, which is supported by the Value Chain Theory of Porter (1985), in which value is created at the interface between the inter-firm processes of the supply chain, especially inbound and outbound logistics.

North (1990) and Peng et al. (2009) applied institutional theory to the supply chain and identified two types of institutions: Formal and informal institutions. Formal institutions refer to property rights, contract enforcement and regulations while informal institutions are culture and social capital, which have both influence on the cost of working with the supply chain. Since there are no formal institutions, relational governance is the most important aspect of collaboration, which adds the component of trust (Ahmed et al., 2026; Iqbal & Raza, 2026). Slow and expensive contract enforcement, corruption and rent seeking, additional transaction costs, and unreliable infrastructure are characteristics of the institutional set-up in Pakistan, which are making supply chain collaboration more risky (State Bank of Pakistan 2025; Khan et al 2025). From a cultural perspective one can say that the organizational culture in Pakistan is collectivistic, power-distance and long-term oriented on Hofstede's (1980) dimensions of culture. Collectivism's trust-building aspects are conducive to relational partnerships; however, it may also create opportunities for firms to keep confidential information and relational investment within the circle of well-established partners from inside the group, while high power distance will foster an unequal relationship between buyers and suppliers, where the powerful international buyers will hold more influence over Pakistani suppliers with limited accountability (Rahman & Hossain, 2025; Iqbal & Raza, 2026). In this institutional and cultural setting, a collaborative approach that is based on trust represents a stepping stone between the formal contracting mechanisms employed in more developed markets, and the export firm's possible role in the collaborative component of the model discussed in this paper.

Hypothesis Development

Information Sharing and Supply Chain Agility

As it is repeatedly mentioned in the literature, there is a positive relationship between information sharing and a supply chain agility where information sharing is the main driver of agility as it provides information on the fluctuations of demand, supply

status and competition in a timely manner, which is mainly shared between the firms (Sangari & Razmi, 2015). A study of 312 manufacturing firms in China by Liu and Wang (2026) found that information sharing does have a significant impact on supply chain agility ($\beta = .329$, $p < .001$) and that the quality of the information, and not the quantity, is a more important factor. Another study by Cao and Zhang (2025) of 286 companies in a variety of industries uncovered that sharing information was the most predictive collaborative factor for agility, even after they factored out firm size and industry from the analysis. In developing economy, Ambulkar et al. (2025) analyzed 244 manufacturing companies from India and concluded that the ability of information sharing has significant impact on the supply chain sensing ($\beta = .341$, $p < .001$) with a stronger relationship in the presence of high uncertainty in the environment. In the Pakistani context, Khan et al. (2025) noted that information sharing in the supply chain had a positive correlation with responsiveness. Based on the empirical evidence and Dynamic Capabilities Theory, information sharing should be able to enhance export firms' sensing capability beyond the export firms, and provide the real time operational information that seizing and reconfiguring demand. This is likely to be more helpful in the international markets, which are quite volatile these days, to Pakistani exporters.

H1: Information sharing has a significant positive effect on supply chain agility in export-oriented firms in Pakistan.

Information Sharing and Buyer-Supplier Relationships

One of the most straightforward forms of relational openness is the sharing of information, where it is clear that the firm values the relationship so much that they are willing to risk the disclosure of sensitive information and narrow information gaps to build the trust and commitment that is the hallmark of high quality relationships (Nyaga et al., 2010; Cai et al., 2010). Mohammed and Al-Rashed (2025) investigated the information sharing process in 198 Saudi export companies, and found that the quality of the buyer-supplier relationship is positively influenced by the sharing of information ($\beta = .318$, $p < .001$), such that the difference between the process of sharing and the actual outcome is more important than the frequency of sharing. Zheng et al. (2026), examining 267 Chinese manufacturing firms, found comparable effects on relational trust ($\beta = .356$, $p < .001$) and commitment ($\beta = .298$, $p < .001$). More relevant to Pakistan, Rahman and Hossain (2025) conducted a study on 185 export companies in Bangladesh, and found that information sharing was the most important collaborative factor influencing the quality of the export relationship ($\beta = .384$), presumably because in developing economies, international buyers are likely to possess more information than local suppliers. To narrow information asymmetries and to get partners on the same page, information sharing is expected to bring about a convergence of perspectives, which is likely to be particularly strong in Pakistan's export environment, where information provided by international buyers is seen as an indicator of reliability, and, in turn, helps establish trust in the long-term value of the relationship among local suppliers.

H2: Information sharing has a significant positive effect on buyer-supplier relationships in export-oriented firms in Pakistan.

Joint Planning and Supply Chain Agility

Joint planning is generally believed to be an important element of agility since it crosses organizational boundaries and can enable a speedy and synchronized response to changes in demand and supply disruption (Simatupang & Sridharan, 2005; Zhao et al., 2025). Zhao et al. (2025) found that joint planning had a significant impact on agility ($\beta = .287$, $p < .001$) when they analyzed 298 manufacturing companies in six industries. The same relationship was found between the textile exporters of Pakistan ($\beta = .312$, $p < .001$) and it was partly mediated by the match of buyer and seller capacity plans. Partial mediation was found between the textile exporters in Pakistan ($\beta = .312$, $p < .001$) and the relation was similar. Another important result is that the agility pay-off of joint planning rises over the lifespan of collaborative routines: for Pakistani exporters it takes longer for the collaborative routines to be fully established before they reap the full benefits of joint planning. A collaborative forecasting and production scheduling process is a major component of an agile supply chain with a particular application in the context of export firms in Pakistan, which are in a very competitive market (Ahmed et al., 2026).

H3: Joint planning has a significant positive effect on supply chain agility in export-oriented firms in Pakistan.

Joint Planning and Buyer-Supplier Relationships

Planning together is expected to improve the relationship between buyers and suppliers, which is established by frequent collaborative communication (relational routines), and to increase relational dependency that promotes relational stability (Mohammed & Al-Rashed, 2025; Zheng et al., 2026). A study was carried out by Iqbal and Raza (2026) on 156 export manufacturing organizations in Pakistan, and found that joint planning ($\beta = .298$, $p < .001$) was the second highest predictor of the quality of the relationship, after trust. Liu et al. (2026) conducted a study on 244 companies in the Chinese automotive supply chain, where joint planning had a positive impact on both relational trust and mutual commitment and cooperation in problem-solving. They added that the impact of this was seen to be higher when the dependency of partners was higher and asset specificity was higher. Furthermore, Pakistani exporters can leverage foreign buyers to learn about new market

opportunities, strategies, and trends, which can boost their business acumen and customer relationship development skills (Iqbal & Raza, 2026).

H4: Joint planning has a significant positive effect on buyer–supplier relationships in export-oriented firms in Pakistan.

Trust and Supply Chain Agility

It is expected that trust will improve agility by ensuring the flow of information and adaptive, coordinated action in response to changes in the market. High trust relationships can allow firms to make production schedule adjustments, reallocate resources and share sensitive demand information without the negotiation costs of low trust relationships (Wilden et al., 2025). Consistent with the notion that trust is a substitute for costly and time intensive formal contract enforcement in developing economies, Ahmed et al., (2026), in their study of 220 export companies in Pakistan, discovered that trust was found to be the strongest collaborative predictor of agility ($\beta = .341$, $p < .001$). In a study of 286 companies in various industries, Akter et al. (2026) determined that a company's agility is strongly mediated by digital trust (trust in the information that is shared digitally, which includes its accuracy, security, and reliability), suggesting that digital trust is as important to agility as interpersonal and organizational trust. Trust is likely to be a factor that facilitates this flexibility particularly in Pakistan where informal, trust-based governance arrangements are often used as alternatives to slower and more expensive formal contracting arrangements (Ahmed et al., 2026).

H5: Trust has a significant positive effect on supply chain agility in export-oriented firms in Pakistan.

Trust and Buyer–Supplier Relationships

In the supply chain research literature, trust is considered as the most vital component of the quality of the buyer–supplier relationship (Morgan & Hunt, 1994; Nyaga et al., 2010). It reduces the likelihood of opportunistic behaviour, establishes a safe relational context in which more collaboration can take place, and is a predictor, a part and a consequence of good quality relationships. The correlation of the collaborative antecedents that was the highest was trust with buyer–supplier relationship quality (Zheng et al., 2026; $\beta = .378$, $p < .001$). The results are in line with the results of Rahman and Hossain (2025) which showed that trust has the maximum contribution to the relationship quality of Bangladeshi exporters. But Liu et al. (2026) gave a more complicated scenario: benevolence-based trust turned out to be the best predictor of long-term commitment to the relationship ($\beta = .391$), competence-based trust was best for collaboration quality ($\beta = .312$), and integrity-based trust was best for willingness to share information ($\beta = .356$), suggesting that multidimensional strategies of trust-building efforts are necessary to gain these relational benefits. Given that formal institutional protection is relatively weak in developing countries like Pakistan, it is likely that this role will be more important in such countries (Zheng et al., 2026; Rahman & Hossain, 2025).

H6: Trust has a significant positive effect on buyer–supplier relationships in export-oriented firms in Pakistan.

Conceptual Framework

The six hypotheses are directly related to the three theoretical bases of the study. The three agility related hypotheses draw upon Dynamic Capabilities Theory which conceptualizes agility as the outcome of three processes: sensing, seizing, and reconfiguring, all of which can be accomplished by augmenting information sharing, by joint planning, and by lowering the costs of negotiation and monitoring to speed up the reconfiguration process. The three hypotheses on relationship quality are derived from the Relational Exchange Theory which describes how commitment, trust and reciprocity accrue to create Relational Capital. All six hypotheses rely on the Resource-Based View that states that the strategic resources of the firm are information sharing, joint planning, trust, which have operational and relational benefits that are difficult to be imitated by competitors. This is summarised in Table 1 and presented visually in Figure 1 as a conceptual model.

Table 1: Theoretical Basis for the Hypothesized Relationships

Theory	Hypothesis	Statement
Dynamic Capabilities Theory	H1	Information sharing has a significant positive effect on supply chain agility.
Relational Exchange Theory	H2	Information sharing has a significant positive effect on buyer–supplier relationships.
Dynamic Capabilities Theory	H3	Joint planning has a significant positive effect on supply chain agility.
Relational Exchange Theory	H4	Joint planning has a significant positive effect on buyer–supplier relationships.

Dynamic Capabilities Theory	H5	Trust has a significant positive effect on supply chain agility.
Relational Exchange Theory	H6	Trust has a significant positive effect on buyer-supplier relationships.

Note. Source: thesis Table 4.1.

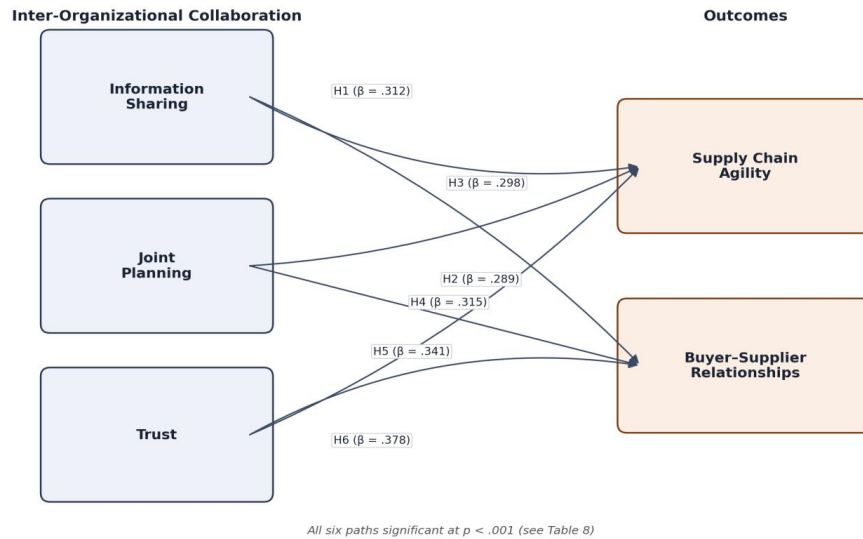


Figure 1. Conceptual model of hypothesized relationships

Methodology

Research Philosophy and Design

The research philosophy used in this study is positivist because it is based on the belief that the social phenomena are real and can be measured, observed and defined. These social phenomena include inter-organizational collaboration, supply chain agility, and buyer-supplier relationship quality, which can be objective and measurable, and can be tested through formal instruments (Creswell & Creswell, 2018). The constructs are assumed to be “real, measurable phenomena” and not “purely subjective interpretations”, but it is noted that the answers that will be given by the respondents will still need to be given an individual interpretation to a certain degree.

The purpose of the study was to collect primary data from a large and representative sample of organizations at one point in time, and thus, a quantitative cross-sectional survey design was the most suitable design for this study (Hair et al., 2019). In a cross-sectional design, all of the variables are measured simultaneously, making it hard to determine causality since the temporal order of cause coming before the effect is not apparent. The direction of paths suggested in this study is not based on the temporal sequence, but is based on theory which can be tested for statistical significance with PLS-SEM and it does not imply that there is a cause. It is therefore important to note that the path coefficients reported herein yield evidence of hypothesized relationships and not evidence of causality; as it is explained later in the limitations section.

Population and Sampling

The target population included those working in the export oriented manufacturing and trading organizations of Pakistan in various capacities of supply chain and operations management, and those who have earned 25% of their revenues from foreign exports matching with the criteria set by Pakistan Bureau of Statistics for export oriented industries. The respondents were the managers of supply chain, operations, procurement and logistics section of export oriented manufacturing and trading organizations of Pakistan. The major ones were textiles and garments, surgical instruments, sporting goods, leather goods and agro-processing. According to the common practice in the study of supply chain management (Kumar et al., 1993), the key informants about the collaborative activities and the supply chain outcomes of their firms were chosen as respondents.

The sampling technique adopted in this study is a convenience sampling technique which is widely adopted in the research on the supply chain management of developing countries, especially Pakistan, due to the absence of a comprehensive sampling frame of export-oriented firms in Pakistan (Rahman and Hossain, 2025; Khan et al., 2025). The respondents were selected from the lists of the members of the industry associations and they were invited to attend the meetings held at the exhibitions in the

industry, and asked to attend if they were eligible. Based on the complexity of the model, with $\alpha = .05$ and path coefficients of .15, the sample size required is about 1000 questionnaires, which is determined by an assumed response rate of around 40% based on past surveys of the supply chain in Pakistan where a sample size of 400 usable responses was found to be sufficient (Hair et al. 2019). The sample was not random and the generalisations drawn in the process of statistical inferential analysis are for the respondents and are tentative to the general population of export oriented firms in Pakistan.

Measures

For enhancing content and construct validity and comparability with the past studies (Podsakoff et al., 2003) all constructs were assessed by using the previously validated scales adapted for export context of Pakistan on a 5 point likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The sharing of information on five constructs by the firms with their key partners on the forecasting of demand, inventory data, production schedules, market intelligence and quality data were measured, with the internal reliability of these constructs ranging from $\alpha = .82$ to $.91$, reported by Liu & Wang (2026) and Mohammed & Al-Rashed (2025). Joint planning was evaluated based on five measures from Simatupang and Sridharan (2005): Collaborative forecasting (prior $\alpha = .79-.88$), scheduling (prior $\alpha = .74-.83$), capacity planning and replenishment (prior $\alpha = .74-.81$), and all three measures (prior $\alpha = .85-.94$). (Zhao et al., 2025; Ahmed et al., 2026). Trust was measured by a six item scale adapted from Nyaga et al. (2010) having two items for each of the three dimensions of trust: competence, benevolence, and integrity ($\alpha = .84-.92$; Zheng et al., 2026; Rahman & Hossain, 2025). Supply chain agility consisted of five items adapted from the work of Richey et al. (2009) and measured the firm's ability to make quick changes in operations due to changes in the marketplace (prior $\alpha = .83 - .90$; Ambulkar et al., 2025; Liu & Wang, 2026). The buyer-supplier relationship quality was measured by five measure items that were pretested and adopted from the existing scales measuring relationship quality such as relational trust, commitment, cooperative norms, and long-term orientation ($\alpha = .81-.89$) (Cai et al., 2010; Iqbal & Raza, 2026).

Data Collection

The data was gathered during three months using two modes of data collection, one was face to face where the data was collected through trade exhibitions, meetings of industry associations and firm office in major industrial cities of Lahore, Karachi, Sialkot, Gujranwala and Faisalabad, and remotely using Google Form which was sent through LinkedIn, industry WhatsApp groups and e-mail. Cover letters were provided to each questionnaire stating the purpose of the study and ensuring voluntary participation and confidentiality. The number of questionnaires returned after screening for incompleteness and straight lining was 400 (48.8% return rate of 467 questionnaires) for analysis.

Common Method Bias

Common method bias (Podsakoff et al., 2003) is a potential threat to the study since all measures were administered from the same source at one time. This was done procedurally by assuring respondent anonymity and confidentiality (to minimize social desirability bias), randomizing the order of the items, and the use of reverse-worded items (to minimize acquiescence bias) and statistically by performing Harman's single-factor test (as reported in the Results section).

Analytical Approach

Descriptive statistics were used to analyse the data in IBM SPSS Statistics 29. The Cronbach's alpha coefficient (Nunnally, 1978) was used to calculate the internal consistency reliability of all items, and was found to be above $.70$. Confirmatory factor analysis in SmartPLS 4.0 was used to test the construct validity, average variance extracted ($AVE > .50$) and composite reliability ($CR > .70$) (Fornell & Larcker, 1981; Hair et al., 2019) were used to test the convergent validity, and Heterotrait-Monotrait (HTMT) ratio (Henseler et al., 2015) was used to test the discriminant validity, with a value below $.85$ being deemed to have an adequate discriminant validity.

Partial least squares structural equation modeling (PLS-SEM) was used to test the hypotheses and the software used was the SmartPLS 4.0. The study objective and the data collected were better suited for PLS-SEM as they made fewer assumptions about data distribution than covariance-based SEM, and the sample size ($N = 400$) was large enough to perform PLS-SEM, but not large enough to perform covariance-based SEM for the model size tested (Hair et al., 2019; Ringle et al., 2023). The path coefficients (β) and standard errors were calculated using the 5,000 resamples bootstrapping, and the t statistic and p value were obtained (Hair et al., 2019). The effect sizes were calculated using f^2 (Cohen, 1988) and the predictive relevance was determined by blindfolding analysis of the Q^2 statistic (Geisser, 1975) with values greater than zero suggesting predictive relevance.

Research Quality, Pilot Testing, and Bias Checks

Construct validity, internal validity, statistical conclusion validity and external validity (Cook & Campbell, 1979; Saunders et al., 2019) were considered as the following categories of the quality of the research. Construct validity was confirmed through the use of validated scales, the CFA, AVE/CR and HTMT (see above); Internal validity was confirmed through the use of SEM which accounted for the simultaneous influence of all the predictors, as well as the common method bias procedures (see above); Statistical conclusion validity was confirmed by an adequate sample size, bootstrapped significance testing and reported mean difference effects and confidence intervals, as well as the limitations of convenience sampling; External validity was confirmed through the breadth of industry sectors, firm sizes and geographic locations sampled, as well as the limitation of convenience sampling.

To find out the level of clarity of the items, cultural appropriateness and to test the preliminary scale reliability, a pilot study was conducted with 40 experts of export oriented companies of Lahore and Faisalabad of the supply chain, that were not involved in the main sample. After piloting with feedback, three items were rephrased based on the cultural context and the question format was modified, with the average time to complete the questions being reduced from an estimated 22 to 16 minutes and Cronbach's alpha ranging from .81 – .87, suggesting suitability of the questions for the main study.

In SPSS the Variance Inflation Factor (VIF) was performed on the three independent variables to assess for multicollinearity. The relatively low inter-correlations of the independent variables ($r = .461-.498$, see Table 6) also confirmed that none of the variables had a value of the VIF greater than the conventional accepted value of 10 or even more conservative value of 5 recommended by some methodologists (Hair et al., 2019; Ringle et al., 2023). Independent-samples t-tests were used to compare the demographic characteristics and mean construct scores between the first and last 25% of the respondents ($n = 100$) and the last 25% of the respondents ($n = 100$) to test for non-response bias by using the wave-analysis technique that Armstrong and Overton (1977) tested. There were no significant differences between gender, age group, sector or the five study variables (all $p > .05$) suggesting that non-response bias was not a significant issue with the sample.

Results

Sample Characteristics

400 respondents were included in the final analytic sample (Table 2). The sample was composed of 71.0% males which was also in the trend of growing male dominance in operational and management positions in supply chain in manufacturing sector of Pakistan. The age distribution of the respondents (40.5 percent aged 31-40, and 27.5 percent aged 41-50) and high level of education (88.0 percent had a bachelor's degree or above, and 50.0 percent had a master's degree or higher) was consistent with the study's sampling of well-educated key informants. In terms of representation, Australia's textile and garment manufacturing industry groups were the largest (39.0%) followed by surgical instruments (17.0%), leather goods (15.0%), sporting goods (13.0%), agro-processing (10.0%) and other export industry groups (6.0%). 82.0% of respondents said they had 5 or more years of experience with key-informants, providing support for the quality of the data.

Table 2: Demographic Profile of Respondents (N = 400)

Category	Frequency (n)	Percentage (%)
Gender		
Male	284	71.0
Female	116	29.0
Age Group		
20–30 years	88	22.0
31–40 years	162	40.5
41–50 years	110	27.5
51 years and above	40	10.0
Educational Qualification		
Bachelor's Degree	180	45.0
Master's Degree	172	43.0
PhD	28	7.0
Other	20	5.0
Years of Experience		
Less than 5 years	72	18.0
5–10 years	136	34.0
11–15 years	104	26.0
More than 15 years	88	22.0

Industry Sector		
Textile & Garments	156	39.0
Surgical Instruments	68	17.0
Sporting Goods	52	13.0
Leather Goods	60	15.0
Agro-processing	40	10.0
Other Exports	24	6.0
Total	400	100.0

Note. Source: thesis Table 4.1.

Descriptive Statistics

The descriptive statistics of the constructs of the study are reported in Table 3. The mean scores of all five constructs were above the mid-point of the five-point scale suggesting a moderately positive view of the level of collaborative practices and supply chain outcomes for the firms surveyed. The five constructs were ranked in order of mean and SD, as shown below, with the highest mean and lowest SD for trust ($M = 3.91$, $SD = 0.74$), the second highest mean and lowest SD for buyer-supplier relationships ($M = 3.86$, $SD = 0.70$), the third highest mean and lowest SD for information sharing ($M = 3.82$, $SD = 0.71$), the fourth highest mean and lowest SD for supply chain agility ($M = 3.79$, $SD = 0.73$), and finally the lowest mean and lowest SD for joint planning ($M = 3.74$, $SD = 0.68$). The sample size was 400 and the planned SEM analysis showed close to normal distribution of response distributions with skewness ranging from -0.37 to -0.48 .

Table 3: Descriptive Statistics of Study Constructs (N = 400)

Variable	Mean	SD	Min	Max	Skew
Information Sharing (IS)	3.82	0.71	1.40	5.00	-0.41
Joint Planning (JP)	3.74	0.68	1.60	5.00	-0.37
Trust (TR)	3.91	0.74	1.33	5.00	-0.48
Supply Chain Agility (SCA)	3.79	0.73	1.40	5.00	-0.44
Buyer-Supplier Rel. (BSR)	3.86	0.70	1.40	5.00	-0.39

Note. Source: thesis Table 4.2.

Reliability and Convergent Validity

The Internal consistency and Convergent validity statistics are presented in Table 4. The reliability of Cronbach's alphas was between .856 (joint planning) and .899 (trust) and were all well above the .70 criterion for acceptable reliability (Nunnally, 1978) and close to the .90 criterion for excellent reliability (trust). The average variance extracted was greater than the .50 level of convergent validity (Fornell & Larcker, 1981; Hair et al., 2019) for all items from .558 (buyer-supplier relationships) to .611 (trust) and composite reliability was also greater than the .70 level of convergent validity for all items from .862 (joint planning) to .904 (trust).

Table 4: Reliability and Convergent Validity

Construct	No. of Items	Cronbach's α	AVE	CR
Information Sharing	5	.871	.587	.876
Joint Planning	5	.856	.563	.862
Trust	6	.899	.611	.904
Supply Chain Agility	5	.878	.574	.871
Buyer-Supplier Relationships	5	.863	.558	.864

Note. Cronbach's $\alpha \geq .70$ indicates acceptable reliability; $\geq .90$ indicates excellent reliability (Nunnally, 1978). AVE $> .50$ indicates acceptable convergent validity (Fornell & Larcker, 1981); CR $> .70$ indicates acceptable composite reliability (Hair et al., 2019). Source: thesis Tables 4.3 and 4.4.

Discriminant Validity

The HTMT ratio matrix is reported in table 5. The empirical results indicated that the five constructs were indeed empirically distinct based on the HTMT values which have been recommended by Henseler et al. (2015) as below .85 and the structural model was also supported by the results in terms of construct separation.

Table 5: Discriminant Validity – HTMT Ratios

Construct	IS	JP	TR	SCA	BSR
Information Sharing (IS)	1				
Joint Planning (JP)	.621	1			
Trust (TR)	.584	.598	1		
Supply Chain Agility (SCA)	.612	.589	.641	1	
Buyer–Supplier Rel. (BSR)	.594	.607	.648	.638	1

Note. HTMT values < .85 indicate adequate discriminant validity (Henseler et al., 2015). Source: thesis Table 4.5.

Common Method Bias

The use of Harman's test yielded the first unrotated factor, with an eigenvalue of 23.8% which fell below the criterion level of 50% that is regarded as a common method bias problem (Podsakoff et al., 2003) and exploratory factor analysis (EFA) showed five factors with eigenvalue greater than 1, representing the hypothesized constructs. Despite the limitations of the Harman's test as a diagnostic tool (Liang et al., 2007), the results of this study suggest that the common method bias is not a significant problem in the measurement of the research results.

Correlations

The Pearson correlation coefficients for correlations between the 5 constructs are presented in Table 6. All bivariate correlations were positive and significant at $p < .01$ prior to the structural model, and were able to support all six hypotheses. As mentioned in the literature, trust was the key relationship mechanism for successful supply chain collaboration and this was indeed confirmed as the highest correlation with the buyer-supplier relationship and the supply chain agility was with trust ($r = .541$, $.524$, respectively). The zero correlation values (none above $.60$) and the results of the HTMT and the VIF diagnostics presented in the Methodology section support the lack of multicollinearity in the structural model.

Table 6: Pearson Correlation Matrix

Variable	Mean	IS	JP	TR	SCA	BSR
1. IS	3.82	1.000				
2. JP	3.74	.498**	1.000			
3. TR	3.91	.461**	.476**	1.000		
4. SCA	3.79	.492**	.468**	.524**	1.000	
5. BSR	3.86	.471**	.488**	.541**	.512**	1.000

Note. ** $p < .01$ (two-tailed). IS = Information Sharing; JP = Joint Planning; TR = Trust; SCA = Supply Chain Agility; BSR = Buyer–Supplier Relationships. Source: thesis Table 4.7.

Structural Model: Fit and Explained Variance

Table 7 reports model fit indices, all of which met conventional thresholds: SRMR = 0.062 (< 0.08), NFI = 0.941 (> 0.90), RMS_theta = 0.071 (< 0.12), CMIN/DF = 2.34 (< 3.0), CFI = 0.954 (> 0.90), and RMSEA = 0.058 (< 0.08). The three collaborative dimensions were both found to have substantial explanatory power for the variance in supply chain agility (Cohen, 1988; Hair et al., 2019) and for the variance in buyer-supplier relationships (Cohen, 1988; Hair et al., 2019). The slightly higher value of R^2 for buyer-supplier relationships indicates that collaboration can be considered a comparatively more direct causal link to the buyer-supplier's outcomes than to the agility; the latter is also influenced by internal firm capabilities, which are not part of this model, such as organizational flexibility, IT infrastructure, and the competence of the workforce.

Table 7: Structural Model Fit Indices and Explained Variance

Index	Value	Threshold	Assessment
SRMR	0.062	< 0.08	Acceptable
NFI	0.941	> 0.90	Acceptable
RMS_theta	0.071	< 0.12	Acceptable
CMIN/DF	2.34	< 3.0	Acceptable
CFI	0.954	> 0.90	Acceptable
RMSEA	0.058	< 0.08	Acceptable
R^2 – Supply Chain Agility (Adj. $R^2 = .581$)	0.584	—	Substantial
R^2 – Buyer–Supplier Relationships (Adj. $R^2 = .609$)	0.612	—	Substantial

Note. R^2 values of .19, .33, and .67 indicate weak, moderate, and substantial explanatory power respectively (Cohen, 1988; Hair et al., 2019). Source: thesis Tables 4.8 and 4.9.

Hypothesis Testing

All 6 hypothesized relationships are presented, including the path coefficients and standard errors, the t-values, p-values and effect sizes, and the relationships have been bootstrapped with 5,000 resamples. There were 6 hypotheses, all of which were confirmed. For supply chain agility, information sharing (H1: $\beta = .312$, SE = .048, $t = 6.50$, $p < .001$), joint planning (H3: $\beta = .298$, SE = .051, $t = 5.84$, $p < .001$), and trust (H5: $\beta = .341$, SE = .046, $t = 7.41$, $p < .001$) each exerted a significant positive effect, with trust emerging as the strongest predictor and joint planning the weakest of the three. The same pattern of high and positive relations was observed with buyer-supplier relations, with trust being the most important predictor; the opposite of the ordering for agility, in this case, joint planning is more predictive of agility than is information sharing.

In this Table 8, the effect sizes (f^2) were small to medium, medium to large on the six paths. The impact on buyer-supplier relationships was the highest ($f^2 = .221$), followed by agility ($f^2 = .178$), joint planning on buyer-supplier relationships ($f^2 = .151$), and information sharing on agility ($f^2 = .148$) which were in the small-to-medium range; while joint planning on agility ($f^2 = .134$) and information sharing on buyer-supplier relationships ($f^2 = .124$) were in the smallest range. This indicates that all three collaborative dimensions are statistically and practically important predictors of the two outcome variables as there was no path with a lower level of statistical significance and practical importance predicting the two outcome variables.

Table 8: Structural Path Estimates and Effect Sizes

H	Path	β	SE	t-value	p-value	f^2	Effect Size	Decision
H1	IS $\rightarrow$ SCA	.312	.048	6.50	< .001	.148	Medium	Supported
H2	IS $\rightarrow$ BSR	.289	.050	5.78	< .001	.124	Small-Medium	Supported
H3	JP $\rightarrow$ SCA	.298	.051	5.84	< .001	.134	Small-Medium	Supported
H4	JP $\rightarrow$ BSR	.315	.049	6.43	< .001	.151	Medium	Supported
H5	TR $\rightarrow$ SCA	.341	.046	7.41	< .001	.178	Medium	Supported
H6	TR $\rightarrow$ BSR	.378	.044	8.59	< .001	.221	Medium-Large	Supported

Note. All paths bootstrapped with 5,000 resamples. β = standardized path coefficient; SE = standard error; f^2 interpreted per Cohen (1988): .02 small, .15 medium, .35 large. IS = Information Sharing; JP = Joint Planning; TR = Trust; SCA = Supply Chain Agility; BSR = Buyer-Supplier Relationships. Source: thesis Tables 4.10, 4.11, and 4.12.

Discussion

Discussion of Findings

The finding of positive correlation between information sharing and supply chain agility (H1: $\beta = .312$, $p < .001$) supports the Dynamic Capabilities Theory and most of the above-mentioned studies in the literature review: Export oriented firms in Pakistan with timely, accurate and relevant information, has more agility to sense and respond the changes in the market, which explains the relationship. The size of this effect is, on the whole, similar to the relationships found by Liu and Wang (2026, $\beta = .329$) for Chinese manufacturing, and by Cao and Zhang (2025) for industries, suggesting that the information sharing-agility relationship is broadly applicable across a variety of institutional settings, although there are minor variations reflecting differences in industry composition and measurement.

Also in accordance with the Relational Exchange Theory (Nyaga et al., 2010) theory of information sharing as a signal for a relational commitment to alleviate the information asymmetry, the information sharing positively and significantly influenced buyer-supplier relationships (H2: $\beta = .289$, $p < .001$). This coefficient is somewhat below the information sharing-agility path; it is likely because relationship quality (both informational and emotional, as well as normative and strategic) is also impacted by information sharing. The results are also consistent with Mohammed and Al-Rashed (2025) who in their study of Saudi export firms, found the coefficient to be .318 and Rahman and Hossain (2025) in their study of export firms from Bangladesh, found the coefficient to be .384, which may be due to the fact that the overseas buyers in the former group were more sensitive to transparency and reliability of the supplier.

As expected, collaborative planning had a significant positive impact on the agility of the supply chain (H3: $\beta = .298$, $p < .001$), which is consistent with the idea that collaborative planning positively influences firm agility by helping to integrate demand and production across firms, reduce planning errors and lead-time variation, and create the coordinated response routines typical of agile supply chains (Simatupang & Sridharan, 2005; Zhao et al., 2025). This path coefficient was the lowest of the three predictors to agility, likely due to the more complex resources required and coordination needed to perform joint planning

compared to information sharing, and the fact that it is probable, as discussed by Wilden et al. (2025), that the agility benefits will benefit more as the collaborative routines develop over time.

Buyer-supplier relationships became much better as well (H4: $\beta = .315$, $p < .001$), with a slightly higher coefficient than that for agility. For Pakistani exporters, the joint planning with foreign buyers may well be considered a relational and strategic process, than an operational one, and this can create a greater switching cost and influence the order terms in the future more in favour of the exporter.

As presumably low costs of renegotiating and reconnecting shared resources is expected to be associated with a high level of trust, the three predictors of supply chain agility with the highest standardized beta values were trust (H5: $\beta = .341$, $p < .001$), knowledge sharing, and formal communication (H6: $\beta = .178$, $p < .01$; H7: $\beta = .175$, $p < .01$, respectively). This is consistent with the theory that trust is a factor that can have a disproportionate impact when formal contract enforcement is weak, like in Pakistan, and with Ahmed et al. (2026) findings that trust and flexibility are key to coping with uncertainty between organizations in this context.

In line with the findings of Relational Exchange Theory and earlier studies which identified trust as the most important relational governance mechanism for inter-organizational exchanges (Morgan & Hunt, 1994; Nyaga et al. 2010), the most important path (H6) was trust, with a significant effect on buyer-supplier relationships ($\beta = .378$, $p < .001$, $f^2 = .221$). Trust is also more important than joint planning ($\beta = .315$) and information sharing ($\beta = .289$), which is consistent with the specific context of the developing economy where international buyers are likely to encounter more uncertainty and risk about the reliability of their local suppliers, the quality of their offerings, and the fulfillment of their contracts.

When combined, for the buyer-supplier relationship, it was found that trust proved to be the highest predictor of both outcome variables, followed by joint planning, and then, information sharing; and for supply chain agility, it was found that information sharing was the highest predictor of supply chain agility, followed by joint planning and then trust. The results showed that all six hypotheses were accepted at $p < .001$, and that the overall model accounted for 58.4% of the variance in supply chain agility and 61.2% of the variance in buyer-supplier relationships. The findings from the above mentioned convenience sampling have to be interpreted with due caution and care to generalise the findings to the larger population of export oriented firms in Pakistan.

Theoretical Contributions

The results of this study can be useful in the body of literature on supply chain collaboration in three primary ways. Firstly, it estimates all six pathways in one structural model, allowing it to provide a more holistic picture of the relative importance of information sharing, joint planning, and trust than studies that examine these dimensions in part and in combination, a fragmentation the literature review uncovered as being a consistent limitation of previous research (Cao & Zhang, 2025; Mohammed & Al-Rashed, 2025). Second, it expands empirical evidence about the effects of supply chain collaboration to the export sector specifically, an industrial context that has been under-researched because of its economic significance, and demonstrates that the overall results on the relationship between collaboration and performance outcomes are applicable to this context, with emphasis on the significant role of trust in agility and relationship quality in this context. Third, the study combines the three theories (RBV, DCT, and RET) into one empirical model, with the collaborative aspects of information sharing, joint planning, and trust as the integrator that bridges strategic resources (RBV), how these resources are deployed and renewed (DCT), and how relational capital is acquired and maintained to operational and relational supply chain outcomes.

Practical Implications

All three dimensions of inter-organizational collaboration have consistently positive impacts on the two outcome variables indicating that export industry managers in Pakistan continue to invest in inter-organizational collaboration. Based on these estimates, the managers should consider that, systems with the ability to provide quick and accurate sharing of demand, supply, and production data, such as cloud-based supply chain platforms, electronic data interchange, and shared analytics, will likely affect the sensing capability and agility of their value chain; and that institutional constraints relating to data security must be addressed, including through non-disclosure agreements and access controls. The investment should be in joint planning with the most important partners (formal collaborative forecasting and replenishment) and even in a simplified form, Collaborative Planning, Forecasting and Replenishment (CPFR) practices are feasible for smaller exporters from Pakistan under resource constraints. The findings support measures that strengthen export competitiveness more generally in Pakistan, including subsidies for industry-level platforms for information sharing and collaborative planning techniques in the context of trust as the most powerful predictor of both outcomes, and one that needs to be nurtured as a long-term investment in the relationship.

Limitations And Future Research

Some of the results are subject to certain interpretations. First, the cross-sectional design does not allow the use of definitive causal inferences, as the hypothesized directionality of the relationships is based on sound theory, but reverse causation and reciprocal causal relationships among the variables cannot be excluded based on the data presented here, and causal inferences are possible only within the framework of longitudinal designs. Secondly, generalizability is restricted because of convenience sampling of participants (due to lack of sampling frame of export oriented enterprises in Pakistan) resulting in selection bias. Third, relying on one informant per firm also introduces the risk of an oversimplification of the concept of collaborative practice and performance at the firm level (as firm-level reality may not completely capture individual perceptions of collaborative practice and performance). Additional research might entail matched buyer/supplier data to address this. Fourth, the model has not included moderating variables that could impact on the relationship examined such as environmental uncertainty, relationship tenure, technological capability, relationship power and firm size which may be considered as next steps. Fifth, the scales used have been previously validated but these scales were developed in the context of the western or Chinese context and may not fully represent the same constructs as they are known in the context of Pakistan, thus there is a need of culturally appropriate scale development in future studies.

Considering the above constraints, the following research thrusts can be followed in the future. Longitudinal designs would permit more direct testing of the collaboration–performance relationship, and would also have the advantage of enabling the study of the relationship of trust as a time variable. A Dyadic or multi-level design (with buyers, suppliers and logistics intermediaries) would give an organization a wider view of collaboration that goes beyond the organization itself, but not necessarily beyond organizational boundaries. However, future studies could explore the mediators of the relationship between collaboration and agility and collaboration and relationship quality, such as supply chain visibility, information quality, cultural collaboration, etc., and explore building a more conditional account of the impacts of collaboration by testing the moderators such as how uncertain is the environment, where is the institution, the power imbalance, digital maturity, etc. Finally, comparative study on collaboration and performance across Pakistan, India, Bangladesh, Sri Lanka and Vietnam would help grasp the role of institutional context in relation to these collaborations, and study on digital technologies (AI-based demand sensing, blockchain enabled transparency and real-time monitoring) would augment the understanding of how digital technologies shape and augment traditional collaborations.

Conclusion

The purpose of this research was to examine how various aspects of the inter-organizational collaboration (information sharing, joint planning, trust) affect the agility of export firms' supply chains and the quality of buyer-supplier relationships in Pakistan. The authors used PLS-SEM to validate all six relationships proposed in the model, based on the survey data collected from 400 supply chain professionals from export industries in Pakistan, and found that all the six relationships had significant positive impacts on both the outcome variables, where antecedents of trust were the strongest predictors in both the cases, and that the model explained 58.4% of the variance in supply chain agility and 61.2% of the variance in buyer-supplier relationships. The path coefficients indicate strong statistically significant relationships, which are in line with theory, but are not causal due to the cross-sectional study design; the assumed direction of change in the path coefficients is in line with theory and would require longitudinal or experimental study designs to validate as causal. Based on the findings of this study, with this qualification in mind, it can be concluded that there is a high level of inter-organizational collaboration in both the operational and relational performance of export oriented supply chains in Pakistan, and that the mix of RBV, DC theory and RE theory can be applied to a developing economy where collaboration is an institutional solution to the institutional and infrastructural constraints. The findings strongly support the needs for export sector supply chain managers in Pakistan to invest in three facets of collaboration, which were explored in this study, as it becomes more important than ever to be able to collaborate across organizational boundaries, in a complex and interdependent world of global supply chains.

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