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## Article

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# The Effect of Trust and Relationship Commitment on Supply Chain Performance through Integration and Collaboration

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## ABSTRACT

**Purpose:** This study analyzed the effects of supply chain management trust and relationship commitment on financial and non-financial performance, focusing on the mediating effect of supply chain management integration and collaboration.

**Design/methodology/approach:** This study was designed as a conceptual research model to verify the mediating effect of integration and collaboration in the relationship trust and relationship commitment and supply chain performance. In order to design a conceptual research model, a total 30 items were investigated and the SEM method was verified using six observations variables

**Findings:** According to this study, it was found that financial and non-financial performance of companies adopting Korea's supply chain management increased when trust and relationship commitment were strengthened with partner companies. In particular, in the relationship between trust of supply chain management and supply chain management performance, integration with partner companies contributed to increase financial performance, but did not make a positive contribution to non-financial performance. On the other hand, in the relationship between supply chain management's relationship commitment and supply chain management, collaboration made a positive contribution to increasing financial and non-financial performance. What this study means is that higher trust and relationship commitment with partner companies in supply chain management contributed to a direct influence on financial and non-financial performance.

**Research limitations/implications:** This study used the citation count to measure the effect of trust and relationship on supply chain performance. While this serves the purpose of this study, citation counts may not perfectly represent the value and impact of a study. The findings of this study provide a guide post for future studies.

**Originality/value:** This study provides an updated, comprehensive literature review of the overall development, contributions and limitations of forecasting studies in the supply chain management fields. The researchers can see the subjects and types of research that already conducted and which topics remain unexamined.

*Keywords: Supply chain management, Trust and Relationship commitment, Supply chain performance, Mediation effect*

## I. Introduction

In today's global market, as the paradigm of competition and cooperation increases, interest in supply chain management is increasing. Integration and cooperation between suppliers are of great interest

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in that they effectively reduce transaction costs in the relationship between partnership and business performance in supply chain management. Firm performance represents a dependent variable relevant in a business's research and strategic management. In this regard, it entails efficiency, productivity, adaptability, employee motivation, reduced turnovers and costs, and all means and ends that create value for targeted customers (Pellegrino et al., 2020; Gardner et al., 2019; Ghadimi et al., 2018; Burki et al., 2019). For successful financial performance in supply chains, the relationship between buyers and sellers is essential in ensuring mutual benefit and continuation of growth and development in terms of the firm performance, and relationships in business continue to build on the importance of partnership between suppliers and buyers to highlight the goals and needs of each party to create a sustainable chain. That implies that establishment of a profitable supply chain partnership can reduce uncertainty, and continued information flow depends on establishing a buyer-supplier relationship (Birasnav et al., 2019; Handfield, 2019; Graca & Barry, 2019). The focus on the value of business relations between supply and buying also highlights the unique benefits of the essential interaction in meeting both consumer and business firm's needs. Numerous prior studies have emphasized the significance of the partnership between sellers and buyers in the supply chain, and insisted that partnerships are essential for supply chain management as they contribute to increased financial performance (Gallear et al., 2012; Itner et al., 1999] and to achieve an efficient partnership, both sellers and buyers should rely on trust (de Paula et al., 2019; Dubey et al., 2019), relationships commitment (Verghese et al., 2019), integration (Flynn et al., 2010; Mora-Monge et al., 2019), collaboration (Al-Doori, 2019; Alsaad et al., 2018) and utilizing these four factors to promote supply chain relations and increase supply chain performance.

What this study means is that higher trust and relationship commitment with partner companies in supply chain management contributed to a direct influence on financial and non-financial performance. On the other hand, when the mediating effect through collaboration with partner companies is strengthened,

researches' results have been obtained that improve both financial and non-financial performance. In terms of academic and practical aspects of this study, the necessity is as follows. In terms of academic necessity, research on transaction cost economy has been actively studied. In the field of supply chain management, systematic research between supply chain management partnerships between partner companies and business performance needs to be conducted in terms of transaction cost economy. In practical terms, in order to improve the business performance of supply chain management, partnership with partner companies is strengthened and the importance of integration and cooperation in supply chain management is increasing. In a situation where studies that have been verified on structural relationships are insufficient, this study needs to be studied from a practical point of view. Looking at the difference between this study and previous studies, Partnerships between buyers and sellers are instrumental in supply chain management. They influence financial outcomes, which contribute to business success. Prior studies show that trust, collaboration, and relationship commitment are critical determinants of meaningful partnerships and buyers and sellers must enhance their partnerships to increase revenue earnings and profitability. For this reason, the present review study will seek to draw evidence from existing research to suggest a new partnership framework in the supply chain management for seller and buyers, stating which partnership elements might be matched for three factors which mentioned previously to foster financial performance and add insight into the literature.

This study is a meaningful research result in that it verified the mediating effect of supply chain integration and collaboration in the relationship between supply chain management trust, relationship commitment, and supply chain performance. In the process of performing the equation model, a comparative analysis was performed by dividing the supply chain performance group into a group with high supply chain performance and a group with low supply chain performance. Supply chain management partner companies are trying to improve financial performance

through trust with partner companies from a long-term perspective, and from a short-term perspective, they are trying to improve non-financial performance through relationship commitment with partner companies. Therefore, when supply chain trust directly affects financial performance and relationship commitment directly affects non-financial performance, the focus of this study is on how integration and collaboration will play as mediators. This study analyzed the effects of supply chain management trust and relationship commitment on financial and non-financial performance through the mediating effect of supply chain management integration and collaboration. Structured equation modeling such as a completed mediation model and partial mediation model needs to be reflected and supplemented in future research.

## II. Literature Review and Hypotheses

### A. Trust and Relationship Commitment

The trust between sellers and buyers plays a significant role in influencing the financial performance of a business. Building a positive partnership between sellers and buyers is vital for increasing the sale of an organization's products (Brown et al., 2019; Graca & Barry, 2019). The partnership between buyers and sellers significantly depends on trust. Trust is also a measure of confidence and credibility that a party has towards others (Dubey et al., 2019; Hou et al., 2018). Dominguez et al. (2018) emphasized that creating an information sharing between the buyer and the seller helps establish a firm partnership in the supply chain. Specifically, knowledge sharing between supply chain partners appears as a partnership of information sharing through information technology and innovation between inter-partners in the ICT field (Jemenez-Jimenez et al., 2019; Khan et al., 2018; Handfield, 2018).

Research on the relationship between partnerships in supply chain management and business performance has been conducted in the fields of automobiles, electric and electronics, petrochemicals, and construction,

including ICT. In the automobile industry, supply chain management partnerships of information sharing, joint decision making, and electronic data interchange affect supply chain management performance (Ai-Doori, 2013). In the electric and electronic industry, information, flexibility, and integration of supply chain management partnerships have been found to affect supply chain management performance (Balfaqih & Yunus, 2014). Also, looking at the petrochemical industry, determinants and frameworks of supply chain management performance were presented for GSCM in the field of supply chain management (Shohan et al., 2019), and companies participating in supply chain management integration with supply chain management. It is said that it contributed to enhancing business performance through competitive advantage (Chadha et al., 2018). In addition, a firm that continually provides quality products will improve its collaboration with buyers. As a result, such firms will have the advantage of making more sales and increasing financial performance.

Improved relationship and relationship commitment between the buyer and the seller also helps establish a streamlined supply chain. Li and Zhuang (2017) emphasize that building a more efficient buyers-suppliers relationship requires the two parties to develop information technology-enabled interactions that makes them feel comfortable. It helps the parties be open and honest, which ensures that they are committed to supporting each other in achieving their goals. Relationship commitment also helps in reducing supply chain costs. Establishing relationship commitment enables a supplier to offer incentives such as reduced delivery costs to the customers, resulting in decreased costs (Keller, 2002; Abdullah & Musa, 2014). Therefore, enhanced commitment positively impacts the supply chain by reducing costs and streamlining business operations. Relationship commitment among parties involved in the supply chain also encourages suppliers to offer trade discounts to business entities, increasing revenue and financial performance (Qin et al., 2008; Brown et al., 2019). Khan et al. (2018) stated that when firms are provided with incentives such as trade discounts, they are likely to make more profits than a business that never received any incentive. As a

result, relationship commitment is a key driver of the profitability and financial performance of an organization. Therefore, trust and relationship commitment enhance partnership in the supply chain, leading to improved organizational financial performance.

## B. Integration and Collaboration

Past research on supply chain integration has mainly focused on the utility and importance of the supply chain structure itself. In recent years, supply chain integration show the importance of internal integration, external integration, functional integration, and supplier integration of supply chain management is increasing. While internal integration improves the performance of supply chain management through automation and standardization of internal logistics functions(Wong et al., 2007; Morash et al., 1997), external integration can be achieved through information sharing and strategic combination with suppliers and customers(Lai et al., 2010; Ragaz et al., 2002).It was emphasized that the improvement of internal functions in the internal supply chain integration stage should precede the connection with suppliers and customers in the external supply chain integration stage. As stated above, past studies have emphasized the needs and importance of step-by-step supply chain integration but lacked theoretical suggestions in practical implementation. The reason most companies fail to integrate their supply chains systematically and efficiently is due to their failure to efficiently integrate functional and supplier integration. Functional integration is related to internal integration and external integration, but it is argued that, in particular, from the point of view of external integration, supply chain performance is lowered because functional integration is less effective in external integration with suppliers or customers (Rungtusanatham et al., 2003). In addition, supplier integration is aimed at enhancing supplier integration in supply chain management through information sharing and knowledge sharing among supply chain partner companies (Hoopes et al., 2003).

Collaboration in the supply chain involves collaboration

between sellers and buyers, where they work together to accomplish their business and consumption goals. Lee and Ha (2020) emphasize that collaboration in the supply chain is planned jointly to facilitate the financial performance of the agreed duties. Collaboration facilitates sharing of resources and information between sellers and buyers, and this increases the efficiency of the supply chain, enabling them to achieve their common goals (Arif et al., 2021; Ma et al., 2020). Equally, collaboration between sellers and buyers involved in the supply chain helps reduce the risks associated with the buying and selling of goods and services each other's, increasing their profitability. Lee and Ha (2020) stated that challenges in the supply chain, such as inefficiency in logistics and marketing which might cause reducing profitability, can be effectively addressed through collaboration between suppliers and buyers. Collaboration also promotes partnership in the supply chain by facilitating joint planning involving all stakeholders. Kumar et al. (2012) emphasized that collaboration between sellers and buyers allows them to jointly plan the supply chain operations to accomplish their goals. It ensures that all stakeholders embrace and participate in implementing the planned activities (Mandal & Sarathy, 2018). Collaboration in the supply chain also facilitates resource sharing among firms and individuals involved in the distribution of products (Dania et al., 2018; Feng et al., 2010; Ma et al., 2020; Maestrini et al., 2018). Resource Sharing plays a significant role in promoting efficiency in supply chain operations. Collaboration between sellers and buyers also facilitates goal congruence in the supply chain. Cao and Qingyu(2011) stated that goal congruence is one of the essential outcomes of collaboration among firms and individuals involved in the supply chain. It also promotes incentive alignment between buyers and sellers. Incentive alignment and goal congruence ensure that customers' needs and business goals are accomplished. Collaboration is also associated with decreased transaction costs (Dania et al., 2018; Chang et al., 2019; Cho et al., 2018). Lower prices would result in improved firm performance. The partnership also helps reduce risk in the supply chain

by enabling stakeholders to effectively address the complexities encountered in the sale of goods (Francisco & Swanson, 2018; Arif et al., 2021). Therefore, integration and collaboration plays a significant role in promoting organizational performance through goal congruence, incentive alignment, reduced transaction costs, and risks.

### C. Supply Chain Performance

Early research on the performance factors of supply chain management measured the performance of supply chain management by dividing it into unit functional performance, process performance, and inter-company performance (Beamon and Ware, 1998). Unit functional performance is to set the goals of the unit organization based on the overall goals of the company in the state in which the overall goals of the company have been established and to measure the performance at the unit level. Process performance measures performance on the process in a company's internal supply chain management, and inter-company performance measures performance by extending intra-company performance to inter-company performance. The initial research on the performance factors of supply chain management measured performance by dividing it into unit functional performance, process performance, and inter-company performance. As the field expanded, the concept of performance factors of supply chain management was also expanded and applied to the areas of financial performance, non-financial performance, operational performance, and BSC performance, such as business performance and business performance of a company.

Studies on performance factors of supply chain management can be summarized as studies on financial and non-financial performance, financial and operational performance, and BSC performance (Agami et al., 2012; Chen and Paulraj, 2004; Bhagwat and Sharma, 2007; Hartono et al., 2010; Patterson et al., 2003). Agami et al. (2012) measured the performance factors of supply chain management as financial and non-financial performance. Financial performance was

measured based on financial indicators such as sales, net profit, and market share, whereas non-financial performance was measured. Performance is measured based on non-financial indicators such as customer loyalty, service quality, and customer satisfaction. Chen and Paulraj (2004) measured the performance factors of supply chain management as financial performance and operational performance. Financial performance measured externally expressed performance such as sales and net profit, whereas operational performance measured logistics cost and flexibility and measures internal performance such as rapid response ability. Bhagwat and Sharma (2007) measured the performance factors of supply chain management by applying BSC performance indicators such as financial performance, customer performance, internal process performance, and learning and growth performance. For financial performance, performance indicators of net productivity rate and return on investment were used. Customer performance is customer request and response time, customer's product value recognition performance indicator. Internal process performance is the performance indicator of flexibility and quick response. For learning and growth performance, the performance indicators of supplier support for technical problem solving and supplier capability for quality problem solving were used.

### D. Hypotheses Development

In supply chain management, trust between partner companies is the basis for forming social relationships in a mutually beneficial atmosphere. Therefore, as the supply chain trust continues, the integration between partner companies is strengthened. Unlike other industries, supply chain trust is sensitive to partner companies in the ICT field (Kumar et al., 1996). In the ICT field, the speed of technology development is fast, and opportunistic behavior between partner companies occurs frequently due to the digitization and acceleration of information technology (Vachona & Klassen, 2008). In the ICT field, major partner companies maintain partnerships, but often enter into

strategic partnerships with other companies for the transfer of other new technologies, resulting in huge business losses to partner companies. Therefore, strengthening of supply chain trust is becoming a key factor in building collaboration by reducing these opportunistic behaviors (Corsten & Kumar, 2005).

In the company's value-added chain, the relationship commitment between partner companies is different from the original activities and the support activities. Fundamental activities are mainly upstream of corporate management activities (Hoopes et al., 2003). In the process of R&D and production, integration through relationship immersion between partner companies plays a key role in enhancing a company's competitive advantage. In the R&D field, if the relationship between partner companies is not established, the project is often closed after a huge R&D investment is made before the prototype is even released (Sousa & Voss, 2008). The weakening of relationship commitment between partner companies acts as a factor undermining market competitiveness. In addition, support activities are mainly related to the establishment of information technology and human or physical infrastructure of partner companies (Yeung et al., 2009). In particular, in building information technology, relationship immersion through information sharing and knowledge sharing between partner companies increases corporate collaboration and secures competitive advantage. It is becoming a core competency. Accordingly, four hypotheses are thus suggested between trust and relationship commitment, and integration and collaboration.

**Hypothesis 1:** Trust positively affects integration in the supply chain management

**Hypothesis 2:** Trust positively affects collaboration in the supply chain management

**Hypothesis 3:** Relationship commitment positively affects integration in the supply chain management

**Hypothesis 4:** Relationship commitment positively affects collaboration in the supply chain management

According to Kaufmann et al. (2018), in case of short-term supply chain management, supply chain integration has a significant influence on the non-

financial performance of partner firms such as reflection of customer needs, reflection of market change, and shortening of lead time (Brown et al., 2019; Graca & Barry, 2019). On the other hand, in case of long-term supply chain management, supply chain integration has a significant influence on the financial performance of partner firms such as improving return on assets, increasing sales growth, and increasing market shares (Dubey et al., 2019; Hou et al., 2018). Thus, building integration can significantly improve relationship resilience, leading to increased inter-organizational performance. Graca et al. (2019) work with buyers for improved performance and growth. As a result, integration between sellers and buyers help maintain loyalty to the organization. Furthermore, when buyers are more comfortable dealing with a particular seller, they know well and integration for both parties is less likely to be lured away by any emerging competition (Michalski et al., 2019; Hou et al., 2018). Therefore, enhanced inter-organization and integration significantly help firms become more competitive by increasing their financial and non-financial performance.

Collaboration also allows stakeholders in the supply chain to contribute to developing new products that meet consumer needs, thus it leads to increasing businesses' sales and financial performance. There is little doubt that collaboration between sellers and buyers also plays a significant role in improving partnerships and financial performance in business. One of the benefits of collaboration among stakeholders in the supply chain is enhanced knowledge sharing (Sousa & Voss, 2008; Yeung et al., 2009). Knowledge sharing allows individuals and firms to exchange ideas on aspects related to the distribution of products from producers to consumers. Collaboration among stakeholders in the supply chain also contributes to improved decision-making due to information sharing (Flynn et al., 2010; Droge et al., 2004). As a result, collaboration enables buyers and suppliers to address unexpected market disruptions and uncertainties by making fast and better decisions. The main interest of this study is to first verify the effect of supply chain management partnership on business performance, and additionally to verify the mediating effect of

integration and cooperation in the relationship between supply chain management partnership and business performance. Susanto et al. (2022) suggested that cooperation acted as a mediating effect in the supply chain management partnership affecting business performance. In their study, in measuring the mediating effect of cooperation, a structural equation model was performed using the collaborative performance system as a surrogate variable. According to a study by Suryanto & Mukhsin (2020), an empirical analysis was performed using PLS-SEM to analyse the mediating effect of supply chain integration in the relationship between the market orientation and business performance of supply chain management. Accordingly, four hypotheses are thus suggested between integration and collaboration, and financial performance and non-financial performance.

**Hypothesis 5:** Integration positively affects financial performance in the supply chain management

**Hypothesis 6:** Integration positively affects non-financial performance in the supply chain management

**Hypothesis 7:** Collaboration positively affects financial performance in the supply chain management

**Hypothesis 8:** Collaboration positively affects non-financial performance in the supply chain management

According to Abdullah and Musa (2014), trust is a crucial determinant of parties' commitment in a relationship. Garcia and Barry (2019) stated that trust not only acted as a determinant of the relationship between a seller and a buyer, but also had a significant effect on the financial and nonfinancial performance of supply chain management. For instance, cognitive trust positively impacted customers' intention to remain in the relationship. Likewise, affective trust was associated with increased sellers' intention to remain in the relationship with a buyer (Brown et al., 2019; Srinivasan et al., 2020). Therefore, cognitive and affective trust is vital for increasing relationship

duration, leading to the long-term financial performance of a business. In addition, trust influences the switching behaviour of consumers. Enhanced trust between buyers and sellers strengthens their partnership, which increases the sales and nonfinancial performance of a business (Michalski et al., 2019). However, a lack of trust among stakeholders in the supply chain weakens their partnership. As a result, customers tend to switch to competitors when trust in a particular seller decline. Equally, trust plays a crucial role in influencing information sharing and financial and nonfinancial performance between sellers and buyers in a supply chain. Trust encourages knowledge sharing (Bin et al., 2010; Basheer et al., 2019). Knowledge sharing between sellers and buyers positively impacts the efficiency of supply chain operations.

Qun et al. (2008), Relationship commitment was defined as the persistence of a desire to retain valuable engagement. Similarly, a commitment means that either the buyer or the seller wants the relationship to last, and both are ready to work for preservation. Essentially, some factors that influence the relationship between a business entity and consumers include loyalty and mutual commitment (Keller, 2002). When the buyer and the sellers are loyal, they will constantly have repeated buying. Saad et al. (2001) also stated that in coping with the conditions of a free market, most businesses tend to establish customer loyalty to increase sales. Relationship commitment also leads to increased efficiency. Fyneset al. (2004) noted that efficiency increases when the buyers and sellers understand their business needs and how they are fulfilled. For instance, both the firm and customers can help each other reduce the lead times and provide products when needed. Furthermore, commitment will help businesses develop solutions that would result in improved business operations. An enhanced partnership between sellers and buyers also facilitates information sharing on cost and the quality of products, which results in increased satisfaction and organizational performance. Accordingly, two hypotheses are thus suggested between trust and relationship commitment, and financial performance and non-financial performance.



**Hypothesis 9:** Trust positively affects financial performance in the supply chain management

**Hypothesis 10:** Relationship commitment positively affects non-financial performance in the supply chain management

### III. Research Methodology

#### A. Instrumentation and Demographics

A structured questionnaire is designed for the study to collect empirical data. Research scales were set mainly on the basis of previous works. Some five-item scales used to measured non-mediated power were adopted from the previous works of Flynn, Huo and Zhao (2010), Cao and Zhang (2011) for collaboration, Vickery et al. (2003) for financial performance and Beamon (1999) for non-financial performance, Zacharia, Nancy and Robert (2009) for trust and Megha, Shada, Wesley and Cheng (2014) for relationship commitment. Table 1 presents the descriptive statistics for the latent constructs. The results of the measurement model reveal that the model meets all of the minimum requirements. Firstly, all of the constructs with reflective items suggest good indicator reliability with few indicator loadings below 0.62 (Table 3). However, since the criteria for reliability and convergent validity were met, we decided to retain all original items. In this study, the structural equation model presented in this study was verified using AMOS 20 statistical program.

This study primarily examines the effects of trust and relationship commitment on financial and non-financial performance through integration and collaboration. The qualified firms require an emphasis on the supply chain partnership and performance and considerable experience in supply chain management practice. This study conducted a survey on ICT, electrical and electronic, automobile, petroleum and chemical, machinery and metal, construction, and other industries. The company size was targeted at companies with annual sales of 50,000M to 100,000M. The survey was conducted for 30 days from March 21 to April 19, 2022. After the questionnaire was finalized 3000 questionnaires were successfully sent out for the potential respondents. 560 questionnaires were responded. After invalid responses deleted, this resulted in a sample of 540 for a response rate of 18.0%. Table 2 depicts the sample demographics. The seemingly low response rate raises concern about non-response bias.

#### B. Scale Validation

The evaluation was performed by reliability and validity. Reliability was assessed by the criterion. As a result of performing scale validation on six constructs including trust, relationship management, integration, collaboration, financial performance, and nonfinancial performance included in the research model, the following research results were obtained. In this study, convergent validity was measured by Beta, AVE, C.R, and Cronbach's alpha. Beta was

**Table 1.** Descriptive statistics, correlations for the study constructs

Variables	M	S.D	TRU	REL	INT	COL	FIN	NON
TRU	3.82	0.56	<b>0.98</b>					
REL	3.67	0.65	0.63**	<b>0.96</b>				
INT	3.77	0.61	0.55**	0.54**	<b>0.95</b>			
COL	3.72	0.59	0.60**	0.74**	0.69**	<b>0.96</b>		
FIN	3.55	0.63	0.53**	0.64**	0.55**	0.69**	<b>0.96</b>	
NON	3.56	0.60	0.52**	0.68**	0.51**	0.70**	0.76**	<b>0.95</b>

Note: M = Mean, S.D = Standard deviation, TRU =Trust, REL = Relationship commitment, INT =Integration, COL = Collaboration, FIN = Financial performance, NON = Nonfinancial performance. Diagonal and italicized bold elements are the square roots of the AVE (average variance extracted).

\*  $|t| \geq 1.65$  at  $p = 0.10$  level, \*\*  $|t| \geq 1.96$  at  $p = 0.05$  level.

measured from 0.68 to 0.74, and AVE was measured from 0.91 to 0.95. Also, C.R. was measured from 0.97 to 0.98, and Cronbach's alpha was measured from

0.76 to 0.85. Therefore, as a result of convergence validity, AVE was over 0.50, C.R. was over 0.70, and Cronbach's alpha was verified to be over 0.60,

**Table 2.** Demographics

Characteristics		Frequency	Percent
Gender	Male	278	51.5
	Female	262	48.5
Age	20~29 years	93	17.2
	30~39 years	235	43.5
	40~49 years	141	26.1
	50~59 years	63	11.7
	>60 years	8	1.5
Position	Assistant manager	242	44.8
	Manager	149	27.6
	Associate director/ Executive manager	126	23.3
	Executives	23	4.3
Working experience	<5 years	121	22.4
	5~10 years	142	26.3
	10~15 years	114	21.1
	>15 years	163	30.2
Annual sales	50,000 M	227	42.0
	50,000~100,000 M	121	22.4
	>100,000 M	192	35.6

**Table 3.** Convergent validity

Constructs	Code	Items	Overall Group				High Group				Low Group			
			Beta	AVE	C.R	$\alpha$	Beta	AVE	C.R	$\alpha$	Beta	AVE	C.R	$\alpha$
Trust	TRU01	We and our major suppliers have the confidence to do the right thing.	0.720				0.645				0.727			
	TRU02	We and our major suppliers keep our promise and protect them.	0.738	0.95	0.98	0.76	0.667	0.81	0.97	0.69	0.708	0.77	0.91	0.70
	TRU03	We and our major suppliers are always truthful and honest.	0.691				0.666				0.600			
Relationship commitment	REL07	Our company enjoys working with major suppliers.	0.743				0.619				0.677			
	REL08	Our company maintains partnerships with major suppliers by sharing a business philosophy.	0.754				0.671				0.739			
	REL09	Our company maintains partnerships with major suppliers by having a positive mindset.	0.805	0.92	0.98	0.84	0.737	0.78	0.93	0.75	0.750	0.79	0.93	0.79
	REL10	Our company maintain partnerships with major suppliers by building loyalty.	0.736				0.645				0.635			

**Table 3.** Continued

Constructs	Code	Items	Overall Group				High Group				Low Group			
			Beta	AVE	C.R	$\alpha$	Beta	AVE	C.R	$\alpha$	Beta	AVE	C.R	$\alpha$
Integration	INT01	Our company shares production schedules with major suppliers.	0.708				0.644				0.743			
	INT02	Our company shares inventory level with major suppliers.	0.659				0.563				0.707			
	INT03	Our company shares demand forecasting with major suppliers.	0.709	0.90	0.97	0.78	0.674	0.78	0.93	0.72	0.650	0.76	0.92	0.76
	INT04	Our company shares levels of participation in product design, procurement and production processes with major suppliers.	0.689				0.642				0.596			
Collaboration	COL06	We and our major suppliers are oriented towards a common goal for both companies.	0.735				0.637				0.688			
	COL07	We and our major suppliers recognize the importance of the overall collaboration between the two companies.	0.699											
	COL08	We and our major suppliers recognize that we must work together for the best of both companies.	0.709	0.92	0.98	0.85	0.567	0.78	0.94	0.75	0.631	0.82	0.95	0.80
	COL09	We and our major suppliers are working together to achieve the common goals of both companies.	0.770				0.572				0.664			
	COL10	We and our major suppliers are planning practical supply collaboration in order to achieve the common goal of both companies.	0.750				0.670 0.632				0.668 0.696			
Financial performance	FIN01	Supply chain has improved the return on investment.	0.735				0.469				0.483			
	FIN02	Supply chain has improved the return on assets.	0.713				0.424				0.567			
	FIN03	Supply chain has improved sales growth.	0.739	0.92	0.98	0.82	0.434	0.51	0.80	0.79	0.614	0.68	0.89	0.63
	FIN04	Supply chain has improved its market share.	0.739				0.452				0.551			
Nonfinancial performance	NON06	Supply chain contributed to reflect customer requirements.	0.676				0.546				0.528			
	NON07	Supply chain contributed to reflect market changes.	0.719				0.573				0.624			
	NON08	Supply chain contributed to the development of new products.	0.687	0.91	0.98	0.82	0.435	0.63	0.89	0.62	0.551	0.62	0.89	0.67
	NON09	Supply chain has improved product delivery for on-time delivery.	0.664				0.427				0.454			

**Table 3.** Continued

Constructs	Code	Items	Overall Group				High Group				Low Group			
			Beta	AVE	C.R	$\alpha$	Beta	AVE	C.R	$\alpha$	Beta	AVE	C.R	$\alpha$
Nonfinancial performance	NON10	Supply chain has improved customer service for customer complaints.	0.739				0.551	0.63	0.89	0.62	0.528	0.62	0.89	0.67

Note: All loading and weights are significant at 0.001 level (two-tailed), AVE = Average variance extracted, C.R = Composite reliability,  $\alpha$  = Cronbach's alpha, Beta = Standardized coefficient.

indicating that discriminant validity was secured.

## IV. Hypotheses Testing and Findings

### A. Overall Group with Financial and Nonfinancial Performance

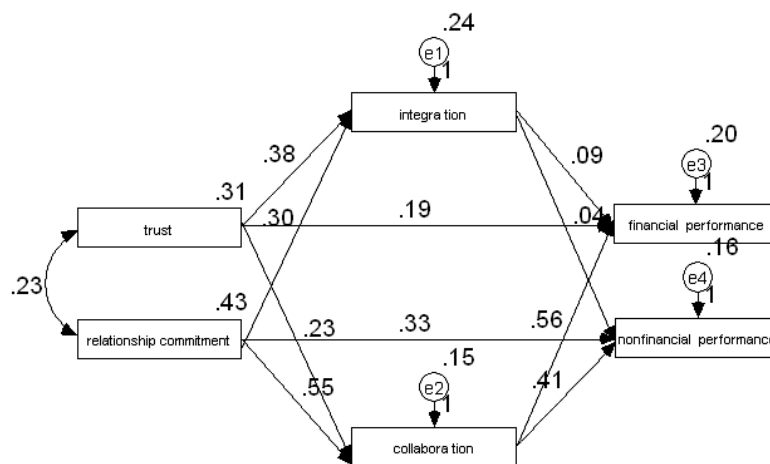
This research obtained results as follows by analyzing the effect of trust and relationship commitment on supply chain performance through integration and collation. The finding of the SEM model indicated that the resulting Chi-square value was 317.300 with 4 degree of freedom and probability value of 0.000 (Table 4). The result didn't support the main null hypothesis that the SEM model had a good fit ( $H_0$ ). A p-value was considerably substantial (probability value >0.05), in supporting the proposition that the overall model fitted the data. Furthermore, other statistical structural

indices such as Bentler comparative fit index (CFI = 0.977), Bollen incremental fit index (IFI = 0.977), Tucker and Lewis index (TLI = 0.881), Relative fit index (RFI = 0.880), and Normed fit index (NFI = 0.977) also provide strong evidence that the SEM model had a satisfactory fit (Table 4). Since the probability value and structural modelling indices were well above the recommended level, the model was considered to be a reasonable representation of the data. The direct structural effect of trust on integration was high with a structural effect value of 0.383. The standardized structural coefficient of trust on integration was associated with a low standard error (0.048) and a non-zero critical ratio (7.906), which indicated that the structural effect between these two constructs, was positive and the relationship was significant. And trust also exhibited a substantial and positive structural effect on collaboration with a structural effect value of 0.230 (standard error = 0.038 and critical ratio = 6.024). The direct structural effect of relationship

**Table 4.** SEM Model for Overall Group with Supply Chain Performance

	Path	Beta	S.E.	t-value	p-value	Model fit
<i>Overall group with supply chain performance</i>						
H1	Integration ← Trust	0.350	0.048	7.096	0.000***	$X^2 = 317.300$
H2	Collaboration ← Trust	0.216	0.038	6.024	0.000***	df = 4
H3	Integration ← Relationship commitment	0.323	0.041	7.292	0.000***	P = 0.000
H4	Collaboration ← Relationship commitment	0.609	0.033	16.954	0.000***	NFI = 0.977
H5	Financial performance ← Integration	0.092	0.038	2.446	0.014**	RFI = 0.880
H6	Nonfinancial performance ← Integration	0.039	0.034	1.141	0.254	IFI = 0.977
H7	Financial performance ← Collaboration	0.537	0.041	13.779	0.000***	TLI = 0.881
H8	Nonfinancial performance ← Collaboration	0.409	0.044	9.402	0.000***	CFI = 0.977
H9	Financial performance ← Trust	0.166	0.047	3.981	0.000***	
H10	Nonfinancial performance ← Relationship commitment	0.361	0.042	7.803	0.000***	

Note: NFI = Normed fit index, RFI = Relative fit index, IFI = Incremental fit index, TLI = Tucker-Lewis index, CFI = Comparative fit index  
 \*  $|z| \geq 1.65$  at  $p = 0.10$  level, \*\*  $|z| \geq 1.96$  at  $p = 0.05$  level, \*\*\*  $|z| \geq 2.58$  at  $p = 0.01$  level



**Figure 1.** SEM model for overall group with supply chain performance

commitment on integration was high with a structural effect value of 0.302. The standardized structural coefficient of perseverance of effort on hope was associated with a low standard error (0.041) and a non-zero critical ratio (7.292), which indicated that the structural effect between these two constructs, was positive and the relationship was significant. Furthermore, looking at the structural relationship between trust and supply chain performance, integration exhibited a substantial and positive structural effect on financial performance with a structural effect value of 0.093 (standard error = 0.038 and critical ratio = 2.446), while integration did not exhibit a substantial and positive structural effect on nonfinancial performance with a structural effect value of 0.038 (standard error = 0.034 and critical ratio = 1.141). And collaboration also exhibited a substantial and positive structural effect on financial performance with a structural effect value of 0.563 (standard error = 0.041 and critical ratio = 13.779), on nonfinancial performance with a structural effect value of 0.412 (standard error = 0.044 and critical ratio = 9.402). In addition, trust exhibited a substantial and positive structural effect on financial performance with a structural effect value of 0.185 (standard error = 0.047 and critical ratio = 3.981), whereas relationship commitment exhibited a substantial and positive structural effect on nonfinancial performance with a structural effect value of 0.330

(standard error = 0.042 and critical ratio = 7.803). Therefore, the first nine hypotheses such as H1, H2, H3, H4, H5, H7, H8, H9, and H10 were accepted out of 10 hypotheses set for the overall group with supply chain performance. The result also indicated that there was a mediating effect of integration in the relationship between trust and relationship commitment and financial performance, while integration did not show as mediating effect in the relationship between trust and relationship commitment and nonfinancial performance. In addition, the result also indicated that there was a mediating effect of collaboration in the relationship between relationship commitment and non-financial performance.

## B. High Group with Supply Chain Performance

The finding of the SEM model indicated that the resulting Chi-square value was 71.303 with 4 degrees of freedom and probability value of 0.000 (Table 5). The result didn't support the main null hypothesis that the SEM model had a good fit ( $H_0$ ). The p-value was considerably substantial (probability value > 0.05), in supporting the proposition that the overall model fitted the data. Furthermore, other statistical structural indices such as Bentler comparative fit index (CFI = 0.991), Bollen incremental fit index (IFI = 0.991),

Tucker and Lewis index (TLI = 0.995), Relative fit index (RFI = 0.952), and Normed fit index (NFI = 0.991) also provide strong evidence that the SEM model had a satisfactory fit (Table 5). Since the probability value and structural modelling indices were well above the recommended level, the model was considered to be a reasonable representation of the data.

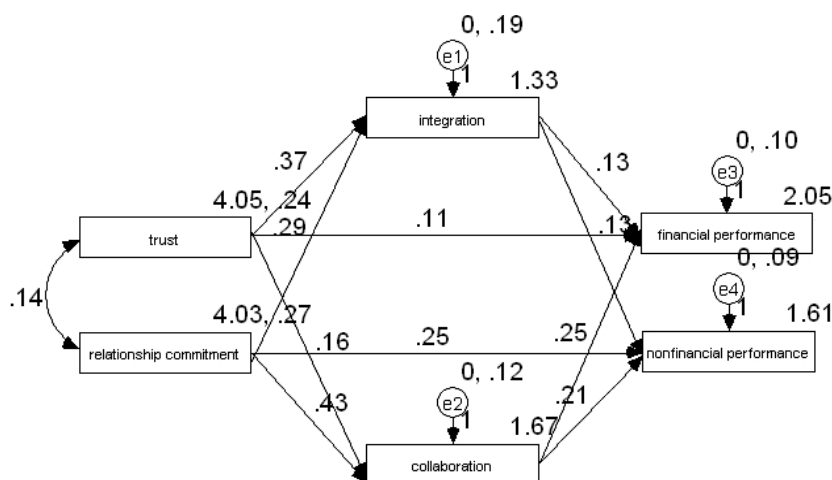
The direct structural effect of trust on integration was high with a structural effect value of 0.368. The standardized structural coefficient of trust on integration was associated with a low standard error (0.065) and a non-zero critical ratio (5.639), which indicated that the structural effect between these two constructs, was positive and the relationship was significant. And trust also exhibited a substantial and positive structural effect on collaboration with a structural effect value of 0.162 (standard error = 0.052 and critical ratio = 3.106). The direct structural effect of relationship commitment on integration was high with a structural effect value of 0.293. The standardized structural coefficient of perseverance of effort on hope was associated with a low standard error (0.062) and a non-zero critical ratio (4.734), which indicated that the structural effect between these two constructs, was positive and the relationship was significant. Furthermore, looking at the structural relationship between trust and supply chain performance, integration exhibited a substantial and positive structural effect

on financial performance with a structural effect value of 0.126 (standard error = 0.043 and critical ratio = 2.960), while integration exhibited a substantial and positive structural effect on nonfinancial performance with a structural effect value of 0.133 (standard error = 0.040 and critical ratio = 3.328). And collaboration also exhibited a substantial and positive structural effect on financial performance with a structural effect value of 0.250 (standard error = 0.049 and critical ratio = 5.083), nonfinancial performance with a structural effect value of 0.207 (standard error = 0.052 and critical ratio = 3.984). In addition, trust exhibited a substantial and positive structural effect on financial performance with a structural effect value of 0.114 (standard error = 0.049 and critical ratio = 2.348), whereas relationship commitment exhibited a substantial and positive structural effect on nonfinancial performance with a structural effect value of 0.247 (standard error = 0.048 and critical ratio = 5.126). Therefore, the first ten hypotheses such as H1, H2, H3, H4, H5, H6, H7, H8, H9, and H10 were accepted from 10 hypotheses set for the high group with supply chain performance. The result also indicated that there was a mediating effect of integration in the relationship between trust and relationship commitment and financial performance, and also integration showed as mediating effect in the relationship between trust and relationship commitment and nonfinancial

**Table 5.** SEM Model for High Group with Supply Chain Performance

	Path	Beta	S.E.	t-value	p-value	Model fit
<i>High group with supply chain performance</i>						
H1	Integration ← Trust	0.343	0.065	5.639	0.000***	$X^2 = 71.303$
H2	Collaboration ← Trust	0.179	0.052	3.106	0.002***	df = 4
H3	Integration ← Relationship commitment	0.288	0.062	4.734	0.000***	P = 0.000
H4	Collaboration ← Relationship commitment	0.501	0.049	8.699	0.000***	NFI = 0.991
H5	Financial performance ← Integration	0.181	0.043	2.960	0.003**	RFI = 0.952
H6	Nonfinancial performance ← Integration	0.181	0.040	3.328	0.001***	IFI = 0.991
H7	Financial performance ← Collaboration	0.302	0.049	5.088	0.000***	TLI = 0.955
H8	Nonfinancial performance ← Collaboration	0.238	0.052	3.984	0.000***	CFI = 0.991
H9	Financial performance ← Trust	0.153	0.049	2.348	0.019**	
H10	Nonfinancial performance ← Relationship commitment	0.330	0.048	5.126	0.000***	

Note: NFI = Normed fit index, RFI = Relative fit index, IFI = Incremental fit index, TLI = Tucker-Lewis index, CFI = Comparative fit index  
 \*  $|z| \geq 1.65$  at  $p = 0.10$  level, \*\* $|z| \geq 1.96$  at  $p = 0.05$  level, \*\*\*  $|z| \geq 2.58$  at  $p = 0.01$  level



**Figure 2.** SEM model for high group with supply chain performance

performance. In addition, the result also indicated that there was a mediating effect of collaboration in the relationship between trust and relationship commitment and supply chain performance.

### C. Low Group with Supply Chain Performance

The finding of the SEM model indicated that the resulting Chi-square value was 120.787 with 4 degrees of freedom and probability value of 0.000 (Table 6). The result didn't support the main null hypothesis that the SEM model had a good fit ( $H_0$ ). The p-value was considerably substantial (probability value  $>0.05$ ), in supporting the proposition that the overall model fitted the data. Furthermore, other statistical structural indices such as Bentler comparative fit index (CFI = 0.982), Bollen incremental fit index (IFI = 0.982), Tucker and Lewis index (TLI = 0.906), Relative fit index (RFI = 0.903), and Normed fit index (NFI = 0.982) also provide strong evidence that the SEM model had a satisfactory fit (Table 6). Since the probability value and structural modelling indices were well above the recommended level, the model was considered to be a reasonable representation of the data. The direct structural effect of trust on integration was high with a structural effect value of 0.368. The standardized structural coefficient of

trust on integration was associated with a low standard error (0.072) and a non-zero critical ratio (5.138), which indicated that the structural effect between these two constructs, was positive and the relationship was significant. And trust also exhibited a substantial and positive structural effect on collaboration with a structural effect value of 0.238 (standard error = 0.052 and critical ratio = 4.577). The direct structural effect of relationship commitment on integration was high with a structural effect value of 0.235. The standardized structural coefficient of perseverance of effort on hope was associated with a low standard error (0.065) and a non-zero critical ratio (3.620), which indicated that the structural effect between these two constructs, was positive and the relationship was significant. Furthermore, looking at the structural relationship between trust and supply chain performance, integration exhibited a substantial and positive structural effect on financial performance with a structural effect value of 0.119 (standard error = 0.043 and critical ratio = 2.746), while integration did not exhibit a substantial and positive structural effect on nonfinancial performance with a structural effect value of -0.022 (standard error = 0.043 and critical ratio = -0.506). And collaboration also exhibited a substantial and positive structural effect on financial performance with a structural effect value of 0.273 (standard error = 0.052 and critical ratio = 5.284), nonfinancial performance with a

structural effect value of 0.307 (standard error =0.060 and critical ratio = 5.119). In addition, trust exhibited a substantial and positive structural effect on nonfinancial performance with a structural effect value of 0.194 (standard error =0.056 and critical ratio = 3.454), while trust not exhibited a substantial and positive structural effect on financial performance with a structural effect value of 0.100 (standard error =0.055 and critical ratio = 1.820). Therefore, the first eight hypothesis such as H1, H2, H3, H4, H5, H7, H8, and H10 were accepted out of 10 hypotheses set for the low group with supply chain performance.

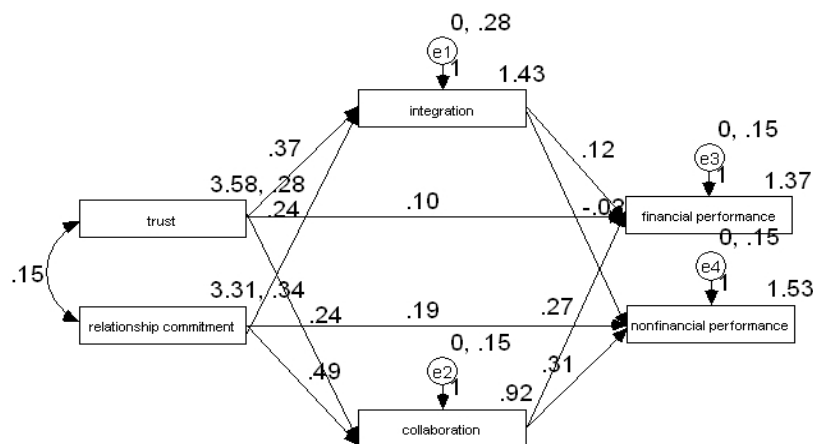
The result also indicated that there was a mediating effect of integration in the relationship between trust and relationship commitment and financial performance, while integration did not show as mediating effect in the relationship between trust and relationship commitment and nonfinancial performance. In addition, the result also indicated that there was a mediating effect of collaboration in the relationship between trust and relationship commitment and supply chain performance.

**Table 6.** SEM Model for Low Group with Supply Chain Performance

	Path	Beta	S.E.	t-value	p-value	Model fit
<i>Low group with supply chain performance</i>						
H1	Integration ← Trust	0.321	0.072	5.138	0.000***	$X^2 = 120.087$
H2	Collaboration ← Trust	0.237	0.052	4.577	0.000***	df = 4
H3	Integration ← Relationship commitment	0.226	0.065	3.620	0.000***	P = 0.000
H4	Collaboration ← Relationship commitment	0.533	0.047	10.275	0.000***	NFI = 0.982
H5	Financial performance ← Integration	0.164	0.043	2.746	0.006**	RFI = 0.903
H6	Nonfinancial performance ← Integration	-0.029	0.043	-0.506	0.613	IFI = 0.982
H7	Financial performance ← Collaboration	0.330	0.052	5.284	0.000***	TLI = 0.906
H8	Nonfinancial performance ← Collaboration	0.352	0.060	5.119	0.000***	CFI = 0.982
H9	Financial performance ← Trust	0.120	0.055	1.820	0.069*	
H10	Nonfinancial performance ← Relationship commitment	0.245	0.056	3.454	0.001***	

Note: NFI = Normed fit index, RFI = Relative fit index, IFI = Incremental fit index, TLI = Tucker-Lewis index, CFI = Comparative fit index

\*  $|t| \geq 1.65$  at  $p = 0.10$  level, \*\*  $|t| \geq 1.96$  at  $p = 0.05$  level, \*\*\*  $|t| \geq 2.58$  at  $p = 0.01$  level



**Figure 3.** SEM model for low group with supply chain performance



## V. Conclusions

### A. Discussion

This study analyzed the effects of supply chain management trust and relationship commitment on financial and non-financial performance through the mediating effect of supply chain management integration and collaboration. It was found that financial and non-financial performance of companies adopting Korea's supply chain management increased when trust and relationship commitment were strengthened with partner companies. In particular, in the relationship between trust of supply chain management and supply chain management performance, integration with partner companies contributed to increase financial performance, but did not make a positive contribution to non-financial performance. On the other hand, in the relationship between supply chain management's relationship commitment and supply chain management, collaboration made a positive contribution to increasing financial and non-financial performance. As a result of comparative analysis of the research model of this study between the high group with supply chain performance and the low group with supply chain performance, the fit of the structural equation was higher in the high group with supply chain performance than in the low group with supply chain performance. It was found that companies with high supply chain performance improved financial and non-financial performance by enhancing supply chain trust and relationship commitment with partner companies and strengthening supply chain system integration and collaboration compared to companies with low supply chain performance. Also, in the high degree of integration, integration and collaboration played a role of partial and completed mediation in the relationship between supply chain partnership and supply chain performance. In contrast, in the lower group, integration acts as a completed mediation, whereas collaboration acts as a partial mediator in the relationship between supply chain partnerships and supply chain performance. According to the research results, integration acted as a mediating effect in the relationship between

trust and financial performance among supply chain management partnerships, and collaboration acted as a mediating effect in the relationship between relationship commitment and non-financial performance. In particular, as a result of comparative analysis of the high-performing group and the low-performing group, in the case of the high group, consolidation had a significant effect on financial and non-financial performance, whereas in the case of the low group, consolidation had a significant effect on the financial performance. However, it had no significant effect on non-financial performance. This means that in the case of a group with high supply chain performance, supply chain partnership directly affects supply chain performance and also indirectly affects supply chain performance through integration and collaboration. On the other hand, in the case of the group with low supply chain performance, it means that collaboration had a direct or indirect effect on the relationship between supply chain partnership and supply chain performance, whereas it had an integrated indirect effect.

### B. Implications and Limitations

As a result of analysing the mediating role of supply chain integration and collaboration in the effect of trust and relationship commitment between supply chain partner firms on supply chain performance, the implications and limitations of the study are as follows. First, trust is a significant predictor of supply chain performance. It promotes flexibility and competitive advantage. Trust enhances resilience leading to increased flexibility in supply chain networks (Hou et al., 2018; Khan et al., 2018). Here, buyers and sellers use trust to overcome challenging situations such as delays. Consequently, flexibility allows organizations to adapt to market changes leading to better financial outcomes. Also, trust promotes competitive advantage. According to the previous study (Michalski et al., 2019; Mora-Momge, 2019), trust facilitates the integration of supply chain partners, which contributes to superior performance. Doing so allows firms to overcome the uncertainty that undermines competitive advantage.

Additionally, trust improves competitiveness through better decision-making and logistic integration (Mora-Momge, 2019; Tabrani et al., 2018). Thus, suppliers and buyers use trust to build effective partnerships that guarantee superior financial performance.

Second, relationship commitment can contribute to better financial outcomes through increased customer satisfaction. Customer relations are integral for supply chain outcomes. According to the prior research (Abdullah & Musa, 2014), strategic relationships between suppliers and buyers improve customer satisfaction. Partnerships help supply chain networks consolidate their business practices to boost customer relations. Consumer integration in the supply chain system enables organizations to evaluate and address customer behaviour patterns leading to increased performance (Cao, 2011; Zeebaree et. al, 2020). Doing so promotes decision-making and information sharing that accelerates goal attainment (Li et al, 2017; Yenyurt et al., 2014). In this way, effective partnerships based on relationship commitment between sellers and buyers allow firms to meet customer needs, contributing to better revenue earnings.

Lastly, integration and collaboration enhance partnerships between buyers and sellers in the supply chain. According to previous research groups (Yunus, 2018; Xu et al., 2017), supply chain collaboration improves financial performance leading to increased revenue earning and profitability. Notably, it contributes to information sharing. The information-sharing paradigm of supply chain, collaboration allows stakeholders to share resources to meet customer demands and market changes (Zhang and Cao, 2018). Customers have dynamic needs and preferences influenced by diverse factors such as age, gender, and education. As such, supply chain networks must address these preferences to ensure they adjust their business practices to meet increased demand. Therefore, trust and relationship commitment via integration and collaboration approach between sellers and buyers may promote meaningful partnerships that increase financial performance.

According to the academic implications of this study, integration and cooperation through supply

chain management have become indispensable for companies participating in the global market (Christopher, 2011). In this respect, this study contributes to academic implications in that it conducted supply chain management studies in Korea's manufacturing sector, such as ICT, electric and electronic, automobile, petroleum and chemical, machinery and metal, construction, and other industries. In addition, from the perspective of transaction cost economy (Hobbys, 1996; Williamson, 2008), in terms of the expansion of partnerships between companies through supply chain management, the relationship between supply chain management partnerships and business performance for Korea's major manufacturing companies is the key to integration and cooperation. A study analysing mediating effects is a study that suggests academic implications.

Looking at the practical implications of this study, although there are many recent studies that strengthen partnerships with partner companies and increase business performance through supply chain management (Chileshe & Phiri, 2022; Hejazi, 2022), supply chain management is realistically implemented. This is a study that presents practical implications for managers in charge of deriving the role of integration and cooperation in the relationship between supply chain management partnership and business performance. In addition, it is a meaningful study in that it performed an empirical analysis by applying the mediating effect of integration and cooperation to major manufacturing industries in Korea using the structural equation model in the relationship between partnership and business performance in supply chain management. This study has practical implications in that it suggests that cooperation can increase business performance and reduce transaction costs by strengthening trust and relationship commitment between partner companies.

This study had limited discussions in the process of analysing the relationship between supply chain partnership and supply chain performance. In the process of testing the research model and hypothesis of this study, the selection of sample to be investigated, the use of parameters and the structured equation modelling were discussed. The limitations of this

study are suggested, and future research should reflect the reflection of stratified sampling of the sample to be investigated, the use of moderator and control variables, and the application of the hierarchical linear model and the PLS-SEM model.

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