

# Uncertain Supply Chain Management

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## The role of supplier-buyer relationship in enhancing business performance through supply chain management practice, total quality management implementation and product innovation

Ronaldo Richard Gunawan<sup>a</sup>, Hotlan Siagian<sup>a</sup>, Zeplin Jiwa Husada Tarigan<sup>a\*</sup> and Ferry Jie<sup>b</sup>

<sup>a</sup>School of Business and Management, Petra Christian University, Indonesia

<sup>b</sup>School of Business and Law, Edith Cowan University, Joondalup 6027, Australia

### ABSTRACT

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The Company should collaborate with supply chain members to support business process activities and increase competitiveness. Company collaboration with suppliers is essential in supporting the adoption of supply chain practices and total quality management to pursue product innovation and enhance business performance. This study investigates the role of supplier-buyer relationships in enhancing business performance through supply chain management practice, total quality management, and product innovation. The research surveyed 150 companies implementing total quality management with ISO certification in East Java. Data processing employs partial least squares using SmartPLS software version 4.0. The research found that supplier-buyer relationships positively and significantly influence supply chain practice by 0.800, total quality management by 0.438, and product innovation by 0.293. The company's ability to implement supply chain practices positively affects total quality management by 0.443, product innovation by 0.206, and business performance by 0.263. Total quality management adopted by manufacturing companies by obtaining ISO certification has an impact on increasing product innovation by 0.412 and business performance by 0.276. The company's ability to build a supply chain strategy to produce innovative products affects business performance by 0.446. The research results contribute practically to managers who build coordination with supply chain members, especially purchasing and marketing managers, to be able to read the capabilities and advantages of external partners to be communicated internally in the company—theoretical contribution in enriching supply chain strategy theory in increasing competitiveness.

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## 1. Introduction

Many companies establish long-term collaborative relationships with their suppliers to create value and competitive advantage (Li et al., 2022a). The supplier-buyer relationship has become inseparable because of the attachment to create new value and improve performance for the company (Li et al., 2022b). The relationship between buyers and suppliers can be assessed when a contract agreement has been signed (Seyedghorban et al., 2021). With this vital relationship, there must be regular interaction between buyers and suppliers to equalize common goals through supplier integration (Siagian et al., 2022). The determining factor of the quality of the relationship between buyers and suppliers is the satisfaction and benefit of both parties, so they strive for initiatives to build value for both parties (Wu et al., 2023). Intensive communication can occur, and exchanging meaningful and timely information can improve a company's operational performance (Gesell et al., 2022; Da Silva et al., 2024). However, buyers often only have little information about suppliers, so it will be difficult to predict the supplier's ability to support business processes (Seyedghorban et al., 2021). Moreover, buyer-supplier relationships can encourage Total Quality Management (TQM) and impact customer satisfaction as the product meets customer expectations. The buyer-supplier relationship and reasonable communication impact customer satisfaction (Agarwal, 2020). Along with consumer development caused by culture, education, and standard of living, consumer expectations about quality increase over time to be able to

\* Corresponding author

E-mail address [zeplin@petra.ac.id](mailto:zeplin@petra.ac.id) (Z. J. H. Tarigan)

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confirm needs (Acquah et al., 2022). Applying TQM in companies can increase customer satisfaction because the goods or services produced meet the quality needed by consumers (Pellegrino et al., 2020). Many manufacturing companies implement TQM to improve performance and increase market growth and customer satisfaction. Companies have adopted TQM by involving suppliers in information sharing, commitment, trust, and interdependence in building long-term relationships (Pellegrino et al., 2020). Adopting the TQM can improve quality by integrating all parties regarding quality issues (Acquah et al., 2022). Benzaquen and Narro (2022) stated that applying TQM can help companies increase their competitive advantage by adapting to an uncertain market era. The implementation of TQM has an impact on productivity and increases customer satisfaction and loyalty. TQM is essential in collaborating with various competencies owned by companies and suppliers to ensure sustainability (Asante & Ngulube, 2020). The implementation of TQM provides benefits with well-controlled resources to reduce costs and improve the quality of management (Green et al., 2019).

Meanwhile, research by Khalfallah et al. (2022) states that a reciprocal relationship exists between TQM and product innovation in the manufacturing industry in Tunisia. Companies strive to continuously innovate their products or services to meet rapidly changing consumer demands (Tang et al., 2023; Schiavone et al., 2023). Companies must utilize all their resources to adapt to this rapid change, especially with information technology growing exponentially in increasing competitiveness (Siagian et al., 2022). In the current era, the emergence of various technologies such as the Internet (IOTs), blockchain, and artificial intelligence (AI) has provided opportunities for many companies to innovate with the availability of new, broader knowledge to share knowledge and information for supply chain members (Kesidou et al., 2022; Mirzaei et al., 2023). Global transformation is so competitive that new products and processes are needed that impact company performance (Costa et al., 2022). Supply chain practices in hotels can provide performance by integrating with suppliers and customers (Basana et al., 2022). Performance from innovation can be shared with the partners involved, and the ability of the company to bring together existing knowledge from various sources (Kesidou et al., 2022). Existing information must be combined with technology to make it more useful and widely used, especially in supplier and customer integration (Siagian et al., 2023). The company's technology development presents unprecedented opportunities for growth and the provision of new products (Tang et al., 2023). Product innovation can play a crucial role for every business in the relationship between the company and its consumers (Costa et al., 2022). This digital-based product innovation differs from product innovation because it is more difficult to predict, fluid, and vague with other industry boundaries (Basana et al., 2023; Tang et al., 2023). Supply chain practices can manifest in the supply chain activities to business partners, including collaboration, use of information technology, inventory stock, manufacturing, location, and transportation (Tarigan et al., 2021; Kaur et al., 2019). One key factor of supply chain management is sustainability, which is part of increasing corporate responsibility in the social, economic, and environmental sectors (Sayed et al., 2017; Kaur et al., 2020). In addition, environmental performance will increase when green supply chain management practices are implemented (Green et al., 2019). The involvement of all parties in the supply chain network to achieve high supply chain performance by focusing on quality management in the supply chain (Phan et al., 2019). Sustainable supply chain management practices can be optimal if there is a complete understanding of the parties' interactions in the supply chain (Sayed et al., 2017). Supply chain practices in companies during COVID-19 by building quality information sharing and strategic supplier partnerships have an impact on firm performance (Siagian & Tarigan, 2021). Operational performance impacts supply chain integration, focusing on customer interests and supply quality management (Phan et al., 2019; Siagian et al., 2023). Many companies strive to increase their competitive advantage through improving business performance in supply chain flows (Negi, 2021; Kwarteng et al., 2021). Innovation systems that run on companies in making the right business processes and new products impact business performance (Basana et al., 2024). The new environment and the speed of change will significantly impact business performance (Sturm et al., 2023). Based on the explanation above, the research objectives are set with four broad outlines: first, the magnitude of the influence of supplier-buyer relationships on total quality management, supply chain management practice, and product innovation. Second, the magnitude of the influence of supply chain management practice affects total quality management, product innovation, and business performance. Third, the magnitude of the influence of total quality management affects product innovation and business performance. Fourth, the magnitude of the influence of product innovation affects business performance.

This study is based on the above discussion of enhancing business performance within the scope of supply chain management. Combining all the factors discussed above, this study examines the role of the buyer-supplier relationship in improving business performance through adopting supply chain management practices, total quality management, and product innovation. This study is still considered essential, considering that the global competition is uncertain and volatile, which entails the companies renewing their practice and strategy. Three significant questions are raised to be examined: First, does the buyer-supplier relationship encourage supply chain management practices, TQM adoption, and product innovation? Second is whether supply chain management practices, TQM adoption, and product innovation affect business performance. Third, does supply chain practice support TQM implementation?

## **2. Literature Review**

### *2.1. Supply Chain Management*

Supply chain management is the planning and control of activities related to the procurement of raw goods, changes in form, and all logistics management activities (Tarigan et al., 2021). Supply chain management can also be interpreted as unlimited

design and management by being given added value that crosses existing boundaries in the company with the goal of customer satisfaction with its goods and services (Istimaroh et al., 2022). The supply chain's role is crucial in products that include the movement of goods but has led to an organizational transformation in decision-making that prioritizes interconnected, collaborative, and information sharing (Akbari et al., 2023). The combination of the ability of manufacturing companies to deal with suppliers, transportation systems, company inventory, production processes, distribution systems, and product delivery to customers in the supply chain management flow can improve company performance (Siagian et al., 2020). Supply chain management requires company managers to actively change strategies to improve operational performance (Zhang & Zhang, 2021; Siagian et al., 2023). With supply chain management, it can be ascertained how many processes need to be given to respond to enormous demands, provide resources for demand, and prepare production, logistics, storage, and transportation of goods effectively by re-examining processes to optimize the flow of raw materials, information, and capita (Kaleli & Baigin, 2022). Ultimately, the company aims to achieve a competitive advantage through profits to improve its supply chain system (Akbari et al., 2023).

## 2.2. *Supplier-Buyer Relationship (SBR)*

The supplier-buyer relationship is vital in building lasting relationships with business partners (Aghazadeh et al., 2022). The commitment of both parties shows efforts to build a lasting relationship in the long term (Vieira et al., 2022). Commitment to relationships can provide positive outputs such as improved communication and visibility, conflict resolution, cooperation, company operational performance, and consumer perspectives (Verghese et al., 2020). Relationships are built on technical settings, namely elements to support exchange; social settings, namely personal perceptions such as interest, trust, and commitment; exchange, namely the flow of actions to achieve resource integration; adaptation, namely actions to support the performance of the relationship undertaken, and finally coordination, namely dividing tasks and roles in the relationship built (Makkonen et al., 2018). Supplier-buyer relationships are complex because they are multidimensional, consisting of economic, structural, and social elements (Sombultawee & Pasunon, 2022). Trust, satisfaction, and commitment are the foundation that builds an effective supplier-buyer relationship (Agarwal, 2020). Supplier-buyer relationships can be divided into short-term for non-critical resources and long-term for critical resources (Li et al., 2022a). Supplier-buyer relationship is determined by the competence of suppliers and companies in building mutually beneficial coordination (Fan & Stevenson, 2018; Da Silva et al., 2024). The success and satisfaction of relationships in business are determined by communication, which is a determining factor for mutual trust building (Gesell et al., 2022). People directly representing the company in the purchasing process play a critical role in determining the supplier-buyer relationship (Seyedghorban et al., 2021). Ethical and responsible relationships require trust, openness, and honesty to survive long-term (Nassar et al., 2020). The satisfaction of each other's relationship between buyers and suppliers is a determining factor in the sustainability of the relationship (Wu et al., 2023; Vieira et al., 2022). Collaborative relationships with suppliers benefit companies by allowing them to obtain relevant opportunities (Pellegrino et al., 2020; Patrucco et al., 2019). The success or failure of the supply chain built by the company depends heavily on suppliers' satisfaction because suppliers' initiative plays a vital role in quality (Wu et al., 2023). With the complexity of business today, it is necessary for a relationship between buyers and suppliers who intend to give each other more so that trust increases (Seyedghorban et al., 2021). If there is a good relationship between buyers and suppliers in the long run, suppliers can participate in helping companies with quality selection and new product development (Phan et al., 2019).

## 2.3. *Total Quality Management (TQM)*

Total Quality Management is a business process involving the company's resources to produce quality products or services for customers (Tortorella et al., 2020). TQM allows companies to progressively implement quality standards to meet customer expectations and demands (Chen et al., 2022). TQM implemented in the company requires four things as a foundation for developing it: product quality, company employees, processes in the organization, and management commitment to achieve organizational effectiveness (Lepistö et al., 2022). TQM implemented in companies can determine the direction of continuous improvement (Sharma & Modgil, 2020; Wijaya et al., 2023). TQM, owned by companies, can produce varied products by providing more value for customers, creating a sustainable future, and creating vital product innovations (Chen et al., 2022). TQM is also a strategic approach to improving organizational performance, consisting of technical problems and organizational culture (Tortorella et al., 2020). TQM always focuses on continuous improvement made by the company with feedback obtained through continuous audits (Adjei & Mensah, 2016). The application of TQM is to improve organizational performance and create a competitive advantage that the company has compared to competitors in the same product or substitute products (Asante & Ngulube, 2020). Implementing TQM in organizations can increase customer satisfaction by improving product and service quality and process improvements (Pellegrino et al., 2020). All parties' role in implementing TQM involves external and internal partners to produce efficiency and effectiveness appropriate for company goals and customer desires (Ahinful et al., 2023). TQM can be considered an approach to continuously improve the organization's quality by involving management, employees, customers, and business processes (Wijaya et al., 2023; Schiavone et al., 2023). The principles in implementing TQM consist of management leadership, support from top management, knowledge management, process management, training, supplier quality management, and strategic and customer-focused quality planning (Acquah et al., 2022).

TQM can be viewed as a systematic approach to building organizational behavioral expectations that emphasizes management and increased employee participation and involve customers collaborating to increase added value (Tortorella et al., 2019). The organization's internal and external quality processes are closely related to the motivation and commitment of workers to streamline the work process and reduce errors (Hudnurkar et al., 2022). Determinants of TQM success include a commitment from top management, focus on customer interests, training and education, innovation and continuous improvement, supplier management, and employee engagement (Psomas & Jaca, 2016). TQM plays a significant role in harmonizing an organization's managerial competencies (Asante & Ngulube, 2020). TQM itself is closely related to focusing on customers, so customer requests will be tried to be fulfilled (Khalfallah et al., 2022). TQM also focuses on environmental sustainability so that demands from customers who want sustainability can be met using resources appropriately (Green et al., 2019).

#### *2.4. Supply Chain Management Practice*

Supply chain practices are practical activities carried out in a supply chain flow that aims to improve the competitiveness and performance of companies that align with the supply chain flow (Tarigan et al., 2021; Siagian et al., 2022). Supply chain management is a series of processes needed to integrate and coordinate between supply, demand, and relationships to satisfy customer needs (Attia & Eldin, 2018; Basana et al., 2022). Supply chain practices require ethical leadership to encourage companies to fulfill environmental and social responsibilities. They also need to be encouraged by organizational ethics to continuously commit to maintaining sustainability practices in their supply chains (Mensah et al., 2023). Sustainability in the supply chain requires simple practices that focus on the health and safety of the people involved (Mirzaei et al., 2023). A series of supply chain practice applications that include organizational activities in promoting supply chains effectively (Tarigan & Siagian, 2021), a fast approach is needed to achieve better supply chain performance (Rahimi et al., 2020). In practice, supply chain management depends on communication that shares information, what information is shared, and when it is shared (Agarwal et al., 2020). Supply chain management practices supported by quality management can influence performance quality, customer satisfaction, and company performance (Phan et al., 2019; Saleh et al., 2024). Supply chain operations are crucial in limiting adverse effects on nature while improving operational performance (Siagian et al., 2023). In addition, companies that can initiate supply chain operations that prioritize green principles can reduce social and ecological effects (Hartono et al., 2023). Many companies adopt environmentally friendly supply chain practices, between environmental performance and economic benefits, because green practices can reduce negative environmental impacts (Basana et al., 2022). Companies can achieve competitive advantage dimensions, including cost, quality, delivery reliability, product innovation, and time to market, if they implement supply chain practices in their business (Tukamuhabwa et al., 2021). The practice of the supply chain in a company is positively influenced by total quality management practices (Sharma & Modgil, 2020). Integrated supply chain practices can lead to collaboration as a driver of innovation because of the knowledge transfer and creation of new knowledge (Solaimani & Van der Veen, 2022). Ultimately, the company's business performance will increase due to supply chain practices that can manage existing resources in making appropriate products on location and on time (Sharma & Modgil, 2020).

#### *2.5. Product Innovation*

Modern organizations that adapt to rapidly changing environments are affected by uncertainty, so they need product innovation to create added value for their customers (Vilkas et al., 2022). Changes that occur very quickly result in products that cannot last long in the market (Costa et al., 2022). Product innovation is the development of new products/services or improvements from existing products (Piñera-Salmerón et al., 2023). Product innovation can also introduce new products to the company or market to improve function (Ko et al., 2020). Product innovation is the introduction of new or significantly better products and services to the market to provide different user benefits (Kesidou et al., 2022). An innovative product has unique characteristics, namely product suitability with developing technology and marketing resources owned by the company (Vilkas et al., 2022; Jimenez-Jimenez et al., 2019). Product innovation's drivers differ from process innovation, in which product innovation is driven by market demand and external customers, while production needs drive process innovation (Abdelaziz et al., 2023; Tarigan, 2018). It can also be said that every business strives to establish a good relationship with its customers, and companies are required to constantly innovate products (Costa et al., 2022; Reyes-Gomez et al., 2024; Solaimani & Van der Veen, 2022). Product users' role is also crucial in product innovation because 40% of the innovations come from product user ideas (Xiao et al., 2023). Companies must use product innovation strategies to attract customer attention by showing their involvement in innovation-related activities (Ko et al., 2020; Matekenya & Moyo, 2022). In innovating, the customers' role is essential because they share various important information so companies can continuously innovate their products (Tian & Yang, 2023). Efforts in product innovation can determine whether the company can be successful because it can adapt to existing demands in the market (Basana et al., 2024), and the products offered vary according to user needs (Piñera-Salmerón et al., 2023). Product innovation driven by new technologies, applications, and information explains a company's competitive advantage compared to other companies (Abdelaziz et al., 2023; Novijanti et al., 2023).

Product innovation needs to consider the frequency, novelty, and value of innovation that can benefit its users significantly when the product is introduced to the market (Santos et al., 2023). Innovation carried out by companies must be continuous and multigenerational, meaning the development of several generations of new products based on improving the functions or technology of existing products (Severo et al., 2020). Emphasis on improving and expanding existing products to innovate

into the next and emphasis on interconnectedness and continuity of generations of its products (Bo et al., 2023). By applying social media analytics through various studies, it was found that product innovation is one of the most essential company performance results (Cheng et al., 2023). In innovating products, companies can take advantage of assistance from developing information technology to support their plans and implementation (Ko et al., 2020; Basana et al., 2024). Product innovation is crucial to meet current market demand because it is one of the efforts to gain a competitive advantage (Wahyono, 2020; Novijanti et al., 2023). Ultimately, new product companies will rely heavily on technology because their development is so fast that they can play a crucial role (Chen et al., 2022; Muhwezi et al., 2023).

## 2.6. Business Performance

Business performance is complex, and the concept has various dimensions: profitability, reduced risk from investment, return on equity, increased cash flow, and competitive advantage with competitors (Ameyibor et al., 2022). Business performance aims to create and implement business strategies to maintain competitive advantage (Hu et al., 2022; Maaz et al., 2022; Soares et al., 2017). The trend of ideas about business performance is now considered vital because it includes understanding performance variations (Kwarteng et al., 2021; Negi, 2021). The concept of business performance can be viewed from a financial perspective, which includes financial operations and operations that efficiently manage company products (Fikri et al., 2022; Basana et al., 2023). With the various benefits of business performance measurement, it is beneficial for professional managers in various companies to determine competitive strategies (Campos et al., 2020; Tukamuhabwa et al., 2021). The performance measure is generally translated as quantifying the efficiency and effectiveness of the activities to be carried out (Sturm et al., 2023; Da Silva et al., 2024). There are three different aspects of business performance: production, market, and financial performance (Kafetzopoulos et al., 2019). It can be said that business performance consists of financial aspects, company reputation, and company productivity (Choudhury Kaul et al., 2023).

Business performance can be measured objectively by looking at financial and non-financial performance (Ameyibor et al., 2022; Basana et al., 2024). Companies measure business performance by examining the company's position compared to other similar companies, communicating the position of the company in the form of performance communication in its internal and external scope, confirming priorities by managing performance, costs, actions, and forcing progress as a forum for motivation and reward (Fikri et al., 2022; Xiao et al., 2023). Business performance is closely related to the success or failure of a business; for example, organizations that can show good performance can win the battle in the market (Reyes-Gomez et al., 2024), while those that perform poorly can fail (Rehman et al., 2023). Business performance, which is indicated by indicators such as customer satisfaction, number of sales, market share control, and profitability, will increase, resulting in a competitive advantage if the customer-focus culture is put forward by the company (Larbi, 2023; Hartono et al., 2023). Business performance can be considered in decision-making for stakeholders because it is essential for every company (Tjahjadi et al., 2022). Companies can set business performance targets to avoid problems when economic conditions are not friendly because they have succeeded in fixing areas that need improvement (Hu et al., 2021). Business performance must be measured on all small and medium scales (Tarigan, 2018), and large companies to map their focus on which areas need improvement (Fikri et al., 2022).

## 2.6. Concept Relationship

### 2.6.1. Supplier Buyer Relationship with Total Quality Management, Supply Chain Management Practice, and Product Innovation

Increasingly fierce competition is expected by suppliers to be able to provide more responsiveness and flexibility than all buyer requests so that trust increases and reduces perceived risk (Seyedghorban et al., 2021; Verghese et al., 2020; Basana et al., 2023). Companies have adopted the practice of total quality management to meet buyer demand. However, suppliers need to form supplier relationship management as a strategy for continuous improvement to produce superior quality (Pellegrino et al., 2020). TQM implementation will be achieved through a relationship between buyers and suppliers (Psomas & Jaca, 2016). Intensive communication is part of relationships and impacts satisfaction (Agarwal, 2020; Sombultawee & Pasunon, 2022; Vieira et al., 2022). Research on garment companies found that quality interventions can improve performance by reducing production defects and establishing a good relationship between buyers and suppliers (Hoque & Maalouf, 2022).

Communication with raw material suppliers goes well and can affect the results of the organization's process because suppliers can provide good quality raw materials (Acquah et al., 2022). Buyers and suppliers need to establish a relationship so that supply chain management practices can be appropriately applied. Satisfaction from suppliers established in the supplier-essential relationship is a determining factor for the success of the supply chain because the quality of the relationship between the two depends on the initiative of the supplier (Wu et al., 2023). The relationship between buyers and suppliers must be maintained so that the supply chain built by the company can run smoothly and without obstacles. Research has found that supply chain social responsibility in buyer-supplier relations in the automotive industry has been proven to reduce customer concerns regarding product recalls that have been purchased (Nassar et al., 2020). Purchasing strategy set on companies by building supplier-buyer relationships in the long-term impacts supply chain practices (Tarigan & Siagian, 2021). The combination of knowledge can encourage the creation of product innovation through internal relations within the company

(Phan et al., 2019; Tjahjadi et al., 2022). Knowledge can be obtained by sharing information between buyers and suppliers in a unified supply chain (Rahimi et al., 2020). The formed Supply chain practices impact supply chain integration by involving suppliers as members in upstream integration (Basana et al., 2022). Previous research revealed that the relationship between buyers and suppliers can increase the effectiveness and creativity of both parties in the long run (Li et al., 2022b). To achieve the quality of products and increase productivity, suppliers need support in supplier evaluation, building long-term relationships, involving suppliers in product development, and quality selection from suppliers (Phan et al., 2019). Research has found that customer attractiveness positively affects innovation and cost performance guaranteed by suppliers (Petrucci et al., 2019). Knowledge sharing with suppliers can provide good innovation for companies (Santos et al., 2023). The relationship between buyers and suppliers, bargaining power, partnership, and original brand manufacturing from suppliers can strengthen the positive relationship between value creation and value appropriation (Huang et al., 2023).

Based on the relationship between concepts, three hypotheses (H1, H2, and H3) can be established to answer the objectives of the first outline.

**H<sub>1</sub>:** *Supplier-buyer relationship influences total quality management.*

**H<sub>2</sub>:** *Supplier-buyer relationship influences supply chain management practice.*

**H<sub>3</sub>:** *Supplier-buyer relationship affects product innovation.*

### *2.6.2. Supply Chain Management Practice with Implements of Total Quality Management, Product Innovation, Business Performance*

Companies that adopt green supply chain management practices can seriously improve environmental performance (Green et al., 2019). Total quality management that is carried out must adopt the principles of sustainability from the environment (Saleh et al., 2024). It was found that total quality management practices positively affect supply chain practices (Sharma & Modgil, 2019). Integrating total quality and supply chain management in the entire supply chain run significantly impacts organizational performance (Kaur et al., 2019). Studies have revealed that business actors in India successfully improve business performance in their organizations by combining total quality management and supply chain management (Kaur et al., 2020). Supply chain innovation is an organization's ability to be a component of the supply chain, with a variety of knowledge, experience, and resources owned by each member (Muhwezi et al., 2023). Collaboration of the built supply chain system can positively affect technological innovation, which then affects product innovation in a further stage (Jimenez-Jimenez et al., 2019; Bo et al., 2023). Collaboration in a unified supply chain enables the transfer of knowledge from various sources, the creation of knowledge, and the acceleration of cycle times from research and development so that it can be a driving force in innovating (Solaimani & Van der Veen, 2022). Through empirical studies, it was found that supply chain quality management practices and their effects statistically significantly affect product quality performance in aggregate (Soares et al., 2017). Supply chain management practices occur in an organization to ensure adequate supply chain management (Sharma & Modgil, 2019). Supply chain management practices help companies allocate and produce their resources appropriately. They also help companies produce products on location and time because the manufacturing process is integrated (Sharma & Modgil, 2019). In today's era, environmental sustainability is an inevitable factor in measuring business performance (Zhang & Zhang, 2021). Manufacturing companies in Jordan found that green supply chain management and total quality management significantly and positively affect environmental sustainability (Jum'a et al., 2024). Supply chain stakeholders and managers working in the industry know that supply chain performance positively affects organizational performance, and the relationship between the two is mediated by consumer satisfaction (Maaz et al., 2022; Tukamuhabwa et al., 2021). Supply chain practices in companies by building strategic supplier partnerships and customer relationship management have an impact on improving firm performance by increasing new product development and process flexibility practices (Siagian & Tarigan, 2021; Novijanti et al., 2023).

Based on the relationship between concepts, hypotheses can be established to answer the objectives of the first outline with the three hypotheses (H4, H5, and H6).

**H<sub>4</sub>:** *Supply chain management practice impacts total quality management.*

**H<sub>5</sub>:** *Supply chain management practice impacts product innovation.*

**H<sub>6</sub>:** *Supply chain management practice affects business performance.*

### *2.6.3. The Relationship of Total Quality Management Implementation with Product Innovation and Business Performance*

Research conducted by Khalfallah et al. (2022), using 205 questionnaires conducted in the manufacturing industry in Tunisia, found the relationship between TQM and innovation in terms of products and processes. The production process of environmentally friendly goods and services is in demand among customers today. Therefore, the components of TQM implementation must meet the requirements customers request (Green et al., 2019). Every organization that practices TQM needs to find ways to meet the demands of each of its customers, so the principle of customer focus helps organizations understand what their customers want (Khalfallah et al., 2022). Research in the banking sector also found that TQM has a connection with innovation performance, which will ultimately stimulate innovative behavior in its employees (Ahinful et al.,

2023). In addition, through research conducted with statistical analysis of managers, TQM significantly affects customer behavior through continuous improvement in quality and innovation (Ershadi et al., 2019). Furthermore, in the food industry's micro, small, and medium sectors, a positive direct relationship was found between TQM and organizational culture, both of which significantly positively affect driving innovation (Saleh et al., 2024). Total quality management aims to meet customers' wishes by using an approach from customer-centric principles through continuous improvement (Acquah et al., 2022). If there is a customer-centric application, it can meet customer demand so that business performance will also increase. Implementing TQM in Australia can support efforts to achieve environmental sustainability by meeting customer expectations using optimal resource allocation (Green et al., 2019). Research has found that the two dimensions of TQM, namely customer focus and product management, are related to customer satisfaction with the company (Lepistö et al., 2022). Through other research, applying TQM in Nigeria in the construction sector can help ensure the procurement of materials according to established standards and quality improvement in the process to achieve quality control (Egwunatum et al., 2022). Wijaya et al. (2023) stated that the implementation of total quality management and production waste management can improve firm performance. Furthermore, research on the automotive engineering sector in Nigeria shows that TQM practices, such as employee engagement and innovation, are critical predictors of a company's non-financial performance (Abdi & Singh, 2022).

Based on the relationship between concepts, a hypothesis can be established to answer the purpose of the third outline with both hypotheses (H7 and H8).

**H7:** *Total quality management influences product innovation.*

**H8:** *Total quality management affects business performance.*

#### 2.6.4. The relationship of product innovation with business performance

New product opportunities can be created due to new technologies sourced from external knowledge to bridge technological obsolescence with existing knowledge (Chen et al., 2022). The company strives to make product innovations to increase business performance (Negi, 2021). Product innovation positively impacts competitive advantage (Wahyono, 2020). System innovation in producing new processes and products impacts business performance (Basana et al., 2024). Research conducted on micro, small, and medium enterprises in South Africa has proven that the creation of new products drives their business performance (Matekenya & Moyo, 2022). In addition, it was also found through research conducted in Rio Grande do Sul, Brazil, that sustainable innovation affects product innovation in an organization, which can further reduce energy consumption and waste emissions so that it is more environmentally friendly (Severo et al., 2020). Product innovation in small and medium companies in East Java impacts operational performance (Tarigan, 2018). Innovation fully mediates the relationship between entrepreneurial orientation and firm performance (Reyes-Gomez et al., 2024). Based on the relationship between concepts, a hypothesis can be established to answer the purpose of the fourth outline with a hypothesis (H9).

**H9:** *Product innovation affects business performance.*

A research model can be determined based on the introduction's explanation, the literature review's findings, and the relationship between concepts (Fig. 1).

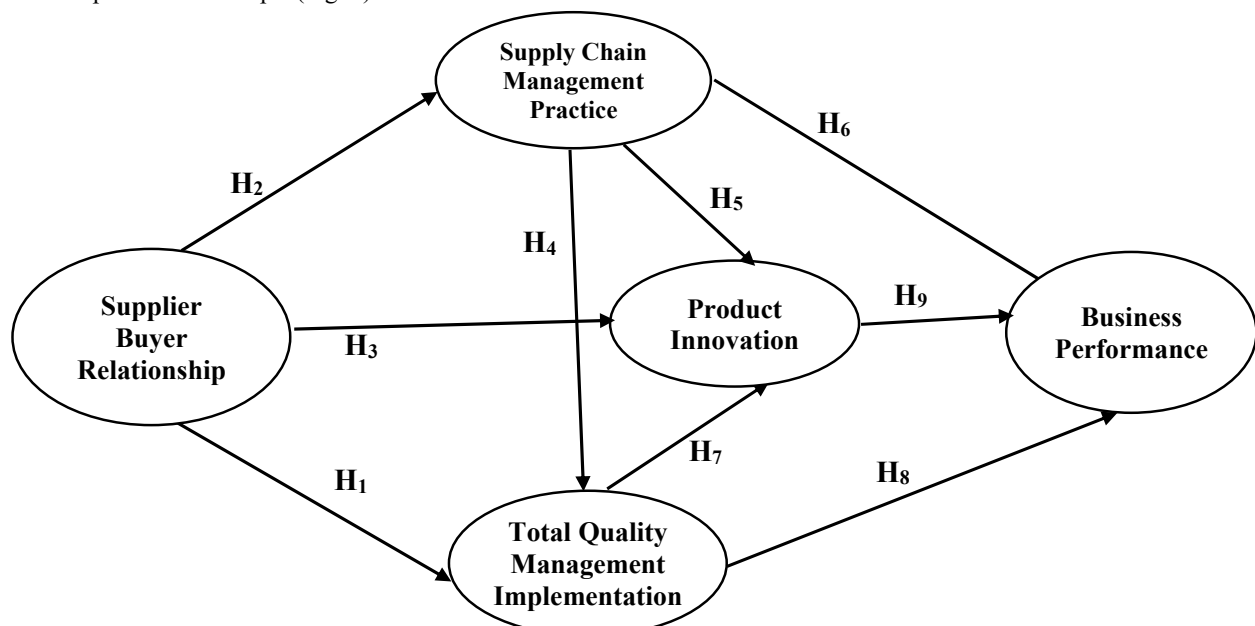


Fig. 1. Research Model

### 3. Method

The type of research used in quantitative research is causal because it is causal. A method that uses survey results in testing samples to be studied using numerical data and statistical analysis. This study aims to obtain how much influence the supplier-buyer relationship has on business performance through supply chain management practice, total quality management implementation, and product innovation. The population studied is medium and large-scale manufacturing companies in the supplier-buyer relationship stage located in East Java. The total population of manufacturing companies in Surabaya City and its surroundings currently amounts to 3,160 companies. The company is spread to several cities, namely Surabaya City with 882 companies, Gresik City with 562 companies, Sidoarjo City with 946 companies, and Pasuruan City with 770 companies and other cities. The questionnaires again obtained were 105 questionnaires that respondents had filled out. Data collection is determined by determining that the company already has an excellent supplier-buyer relationship. Respondents are permanent employees who have worked for at least two years and are at the minimum level of company staff.

Measurement items in research have been determined based on concepts that have been formulated. Supplier-buyer Relationships are formed between buyers and suppliers based on trust and commitment to achieve satisfaction for both parties. The research indicators set to measure supplier-buyer relationships adopted by the research of Wu et al. (2023) are companies working with suppliers (SBR1), companies respecting relationships with suppliers (SBR2), companies communicating effectively with suppliers (SBR3), work procedures implemented by companies are easy to understand suppliers (SBR4), companies communicating intensively with suppliers (SBR5), and companies involving suppliers to solve operational problems (SBR6). Total quality management implementation is innovation and continuous improvement in all company business processes to achieve a competitive advantage in customer satisfaction. The research indicators set to measure total quality management implementation adopt the research of Hudnurkar et al. (2022) is that the company implements an orderly series of business processes (TQM1), each process in the company produces appropriate specifications (TQM2), the company has selected suppliers/vendors who are committed to quality (TQM3) and the company carries out a continuous improvement process (TQM4). Supply chain management practice is a series of processes that integrate, and coordinate parties involved in the supply chain flow owned by companies to create competitiveness. The research indicators set to measure supply chain management practice adopt the research of Tarigan et al. (2021) and Siagian and Tarigan (2021) is that companies implement strategic supplier partnership (SCMP1), companies apply the principle of mutual communication of information (SCMP2), companies apply the principle of sharing quality information (SCMP3) and companies implement interaction in terms of demand management (SCMP4). Product innovation is the development of new products that follow the development of existing technology and can provide significant added value for its users. The research indicators set to measure product innovation adopt the research of Vilkas et al. (2022) and Tarigan (2018) are the time needed for companies to make new products already fast (PI1), continuous innovation by companies from new products issued (PI2), intensive product quality improvement (PI3) and accelerate the production of new products according to market needs (PI4). Business Performance is a measure of the company's success in various aspects, both financial and non-financial, in winning the competition in the market. The research indicators set to measure business performance adopted by the research of Fikri et al. (2022) are companies have good sales growth (BP1), companies have profit growth (BP2), companies have reasonable customer satisfaction (BP3), companies have increased customer loyalty (BP4), and product delivery to customers on time (BP5).

The study established data analysis using structural equation modeling smart-PLS 4. Analysis of the outer model obtained a latent relationship with its indicators, namely outer loading, discriminant validity, and composite reliability. The outer loading value obtained is at least 0.5, so further analysis can be conducted. While composite reliability with the condition that the value is more significant than 0.7, Average Variance Extracted (AVE) with the condition that the number is more significant than 0.5. Test the inner model to obtain the magnitude of the influence value between variables by testing the P-Value research hypothesis obtained smaller than 0.05 or a t-value greater than 1.96.

### 4. Analyzes Data

The distribution of questionnaires conducted at manufacturing companies in East Java found that the characteristics of respondents based on gender were obtained by men as many as 59 people (56.19%) and women as many as 46 people (43.81%). Respondents, when viewed from the working experience, obtained two years < - ≤ 3 years of 23 people (21.90%), three years of < - ≤ 5 years of 6 people (5.71%), five years of < - ≤ 7 years of 5 people (4.76%) and > seven years of work of 71 people (67.63%). Profile respondents based on positions in companies with staff positions of 23 people (21.90%), supervisor positions of 11 people (10.48%), manager positions of 16 people (15.24%), and director or owner positions of 55 people (52.38%). This result indicated that all respondents were eligible and knowledgeable to respond to the survey. Table 1 shows research testing in outer model tests by conducting validity, reliability, and Average Variance Extracted (AVE) tests. Based on Table 1, the average value for the supplier-buyer relationship is 4.2603, which shows that the company already has a high relationship with the supplier. Both parties have had intensive and effective communication and always respect each other's relationship. This can be seen from the average value of measurement items at 3.7429-4.4667. Results for total quality management implementation with an average value of 4.3333. This condition illustrates that the company has implemented



TQM well and is continually audited for implementing the system. Manufacturing companies as research objects already have ISO, so they make continuous improvements.

**Table 1**

The test result of the outer model.

Research Items	Mean	Factor loading	Cronbach Alpha	Composite Reliability	AVE
<b>Supplier buyer relationship (SBR)</b>	<b>4.2603</b>	0.892	0.877	0.897	0.638
The company cooperates with suppliers (SBR1))	4.4000	0.854			
Company respects relationships with suppliers (SBR2)	4.4667	0.896			
The company communicates effectively with suppliers (SBR3)	4.4000				
The work procedures implemented by the company are easy for suppliers to understand (SBR4)	4.2571	0.776			
The company communicates intensively with suppliers (SBR5)	4.2952	0.824			
The company engages suppliers in resolving operational issues (SBR6)	3.7429	0.566			
<b>Total quality management implementation</b>	<b>4.3333</b>	0.802	0.707	0.741	0.536
The company implements an orderly set of business processes (TQM1)	4.2762				
Every process within the company produces the appropriate specification (TQM2)	4.2667	0.613			
The company has selected suppliers/vendors who are committed to quality (TQM3)	4.4762	0.657			
The company carries out a continuous improvement process (TQM4)	4.3143	0.833			
<b>Supply chain management practice.</b>	<b>4.1881</b>		0.859	0.905	0.704
The company implements strategic supplier partnership (SCMP1)	4.2762	0.844			
The company applies the principle of mutual communication of information (SCMP2)	4.1619	0.901			
The Company applies the principle of sharing quality information (SCMP3)	4.0381	0.847			
The company implements interaction in terms of demand management (SCMP4)	4.2762	0.759			
<b>Product innovation</b>	<b>4.2262</b>		0.687	0.809	0.519
The time it takes for a company to create a new product is fast (PI1)	4.1714	0.842			
Continuous innovation by the company of new products issued (PI2).	4.3429	0.702			
Intensive product quality improvement (PI3)	4.3619	0.573			
Accelerate the production of new products according to market needs (PI4).	4.0286	0.739			
<b>Business Performance</b>	<b>4.1962</b>		0.788	0.857	0.548
The company has good sales growth (BP1)	4.3905	0.836			
The company has profit growth (BP2)	4.0381	0.823			
The company has reasonable customer satisfaction (BP3)	4.3084	0.729			
The company has increased customer loyalty (BP4)	4.2571	0.676			
Delivery of products to customers on time (BP5)	3.9905	0.611			

The average value for each measurement item was 4.2667 – 4.4762. This result shows that the company has a sound system through selecting suppliers committed to quality, controlling each process to meet production criteria, and well-organized business processes. Supply chain management practice is the third construct, with an average value of 4.1881. This shows that the company has run it well. Product innovation produced by the company was obtained with an average value of 4.2262. Product innovation in the company has been following the plan with continuous product innovation and intensive product quality improvement. The average value of measurement items is 4.0286 – 4.3619, which shows that the company has produced innovative products according to needs. Business performance as the company's final goal was obtained with an average value of 4.1962. The highest value on the company's measurement items had a good sales growth of 4.3905 and the lowest on product delivery to customers on time, 3.9905. This condition shows that the company's business performance has been achieved well. The outer model test in the study met the requirements with the loading factor above 0.5; composite reliability is more incredible than 0.700, and AVE is more significant than 0.500.

**Table 2**

Results of research hypotheses with direct influence

Direct Path Coefficient	Path Coefficient	T statistics	P values
Supplier Buyer Relationship → Total Quality Management (H1)	0.438	3.700	0.000
Supplier Buyer Relationship → Supply Chain Management Practice (H2)	0.800	17.965	0.000
Supplier Buyer Relationship → Product Innovation (H3)	0.293	2.214	0.027
Supply Chain Management Practice → Total Quality Management (H4)	0.443	3.773	0.000
Supply Chain Management Practice → Product Innovation (H5)	0.206	2.482	0.013
Supply Chain Management Practice → Business Performance (H6)	0.263	3.146	0.002
Total Quality Management → Product Innovation (H7)	0.412	2.885	0.004
Total Quality Management → Business Performance (H8)	0.276	2.532	0.011
Product Innovation → Business Performance (H9)	0.446	4.807	0.000

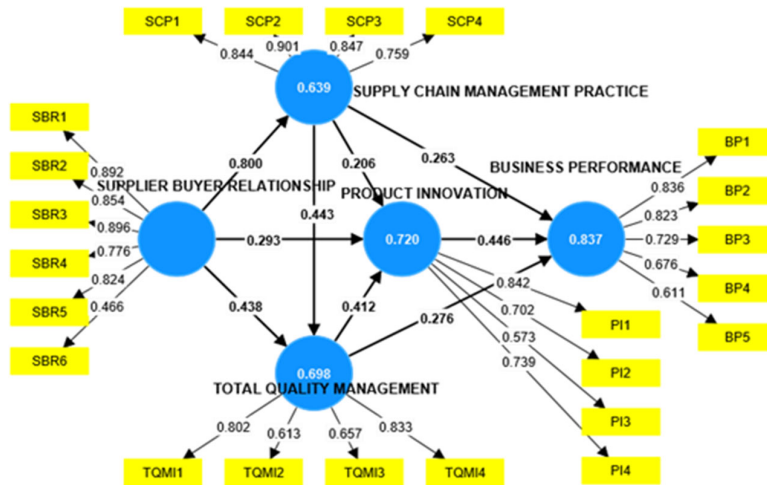


Fig. 2. Results of research hypotheses on structural PLS models

Based on Table 2, it is obtained for the first hypothesis (H1) that the supplier-buyer relationship affects total quality management by 0.438 and t-statistics 3.700 ( $>1.96$ ) or p-value 0.000 ( $<0.05$ ). These results show that the first hypothesis is acceptable, so it is found that the supplier-buyer relationship described by the company communicates effectively with suppliers. The work procedures applied by the company are easy to understand; suppliers affect total quality management by increasing the selection of suppliers/vendors who are committed to quality and produce appropriate specifications. The results confirm the research results that the supplier-buyer relationship affects total quality management (Seyedghorban et al., 2020; Pellegrino et al., 2020; Agarwal, 2020). The supplier-buyer relationship has an effect of 0.800 on supply chain management practice as the second hypothesis (H2) obtained a t-statistics value of 17,965 ( $>1.96$ ). This result shows that the supplier-buyer relationship determined by the company's items in collaboration with suppliers impacts supply chain management practices with increased strategic supplier partnerships. The results support the results of research, which states that supplier-buyer relationships affect supply chain management practices (Acquah et al., 2022; Wu et al., 2023).

The supplier-buyer relationship to product innovation is the third hypothesis with t-statistics of 2,214 ( $>1.96$ ), and then the hypothesis is accepted. The supplier-buyer relationship, as shown by cooperation and mutual respect for relationships with suppliers, positively affects product innovation by 0.293. The company can innovate products with support from suppliers and produce new products in relatively fast time and quality according to customer needs. The results of the study confirm the results of the study, which state that the supplier-buyer relationship is related to product innovation (Phan et al., 2019; Petrucci et al., 2019; Santos et al., 2023; Huang et al., 2023). Supply chain management practice on total quality management (H4) with a t-statistics value of 3,773 ( $>1.96$ ) is therefore accepted. Supply chain management in companies by applying the principles of sharing, communicating well, and sharing quality information impacts total quality management by 0.443. The company can empower all components by building good communication to cause continuous improvement and organize a series of business processes. The results support research that states that supply chain management practice has a positive influence on improving total quality management (Saleh et al., 2024; Sharma & Modgil, 2019; Kaur et al., 2019). The fifth hypothesis (H5) stated by supply chain management practice affects product innovation with t-statistics 2,482 ( $>1.96$ ) accepted. By implementing strategic supplier partnerships, supply chain management practices can involve suppliers in company processes to impact product innovation. Suppliers' active participation in providing materials on time and material quality as needed can produce new products quickly and according to market needs. The results of the study are in line with research that states that supply chain management practices affect product innovation (Muhwezi et al., 2023; Jimenez-Jimenez et al., 2019; Bo et al., 2023; Solaimani & Van der Veen, 2022; Soares et al., 2017). Supply chain management practice affects business performance with a t-statistics value of 3,146 ( $>1.96$ ) declared acceptable. Supply chain management practices that are active in companies with strategic supplier partnerships and good interaction in demand management can have an impact of 0.263 on business performance with increased sales growth and product delivery to customers on time. The results confirm the results of research that state that supply chain management practice affects business performance (Zhang & Zhang, 2021; Jum'a et al., 2024; Maaz et al., 2022; Tukamuhabwa et al., 2021; Siagian & Tarigan, 2021; Novijanti et al., 2023). The seventh hypothesis that total quality management affects product innovation with a t-statistics value of 2,885 ( $>1.96$ ) is acceptable. Total quality management in the company is achieved by implementing a series of orderly business processes, and each process produces appropriate product specifications, affecting product innovation by 0.412. Companies can produce timely innovative products with quality that meets customer requirements. The results of the study support the previous statements of researchers, namely that total quality management affects product innovation (Khalfallah et al., 2022; Ahinful et al., 2023; Ershadi et al., 2019; Saleh et al., 2024; Acquah et al., 2022). The eighth hypothesis states that total quality management affects business performance with a t-statistics value of 2,532 ( $>1.96$ ). Total quality management in companies with an overview that carries out a good continuous improvement process and every process in the company produces high appropriate specifications

can impact 0.276 on business performance. The results confirm the results of research that state that total quality management affects business performance (Lepistö et al., 2022; Egunatum et al., 2022; Wijaya et al., 2023; Abdi & Singh, 2022).

Product innovation affects business performance as the ninth hypothesis with a t-statistics value of 4,807 ( $>1.96$ ). Product innovation that occurs in companies with company images to make new products fast and produce new products according to market needs has an impact of 0.446 on business performance. The company strives to build competitiveness by improving business performance by maintaining good sales growth, profit growth, customer satisfaction, increased customer loyalty, and delivering products on time. The results confirm the results of research that state product innovation affects business performance (Negi, 2021; Wahyono, 2020; Basana et al., 2024; Matekenya & Moyo, 2022; Severo et al., 2020; Tarigan, 2018). The company strives to build a good supplier-buyer relationship and improve the supply chain integration system to support the programs applied to the company. The company's ability to run supply chain practices well can provide progress in adopting total quality management. The company is committed to implementing TQM by obtaining ISO (International Organization for Standardization) certification to maintain consistency in good implementation. The commitment of management and employees to maintaining TQM and increasing the role of members in the supply chain provides high-innovation products by producing new quality products at the right time for the market. This condition results in the company improving business performance, which ultimately increases strong competitiveness above similar companies. Practical research contribution for purchasing managers to build good relationships with suppliers to support the company's programs on an ongoing basis in implementing TQM in the form of ISO 9000 and ISO 14000, which are mandatory for manufacturing companies. Purchasing managers can involve members in the upstream supply chain to be consistent in supply chain practices and communicate with production planning to control the company's shop floor. Practical contribution for marketing managers to be able to build communication with the downstream supply chain to be able to obtain order assurance and requirements set by customers. Theoretical contributions can enrich supply chain quality theory and strategy to increase company competitiveness by involving external partners. In addition, it also enriches the theory of total quality management by involving all components responsible for producing new and existing products.

## 6. Conclusion

This study examines the role of buyer-supplier relationships on business performance through supply chain management practices, TQM adoption, and product innovation. The results are highlighted as follows. The significant role of the leading supplier for the company is to ensure the continuity of the process of producing products to meet customer needs. Companies need to maintain good relationships with suppliers to gain an edge compared to competitors. Supplier-buyer relationships formed with the ability to communicate effectively with suppliers and work procedures implemented by the company are easy to understand and affect supply chain practice, total quality management, and product innovation. The Company has involved supply chain members to maintain consistency in implementing supply chain management practices by applying the principles of sharing, communicating well, and sharing quality information, impacting total quality management, product innovation, and business performance. The company's policy in adopting total quality management is described by carrying out a continuous improvement process. Every process in the company that produces high specifications can impact product innovation and business performance. The company always tries to produce products and services above the average of similar companies. Product innovation formed in manufacturing companies in East Java by making new products quickly according to needs and acceptable to the market impacts business performance with increased sales growth, profit growth, reasonable customer satisfaction, customer loyalty, and timely product delivery. The role of top management in maintaining the continuity of programs in the company can increase superiority compared to competitors.

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