Uncertain Supply Chain Management 12 (2024) 207–220

Contents lists available at GrowingScience

Uncertain Supply Chain Management

homepage: www.GrowingScience.com/uscm

The influence of supplier competency on business performance through supplier integration, vendor-managed inventory, and supply chain collaboration in Fuel Station: An evidence from Timor Leste

Rosalia Maria da Silva[a], Zeplin Jiwa Husada Tarigan[a*] and Hotlan Siagian[a]

[a]*School of Business and Management, Petra Christian University, Indonesia*

A B S T R A C T

Fuel availability is essential in supporting the sustainable economic growth of a country. The manufacturing industry, transportation activities, and shipping products between regions are the primary sectors that require a sustainable fuel supply. The fuel station contributes to distributing and delivering fuel in serving the demand for the fuel. This study investigates supplier competency's role in supporting fuel station business performance through supplier integration, vendor-managed inventory, and supply chain collaboration. The research surveyed 71 fuel stations in Timor Leste using a questionnaire designed with a five-point Likert scale. The questionnaires are distributed to supervisors or higher positions at fuel stations by distributing questionnaires by direct delivery and also through Google Forms for areas far away in downtown Timor Leste. Data from respondents were analyzed using smartPLS software version 4.0. The results found that supplier competency positively impacts supplier integration, vendor-managed inventory, and supply chain collaboration. Moreover, supplier integration positively impacts vendor-managed inventory, supply chain collaboration, and business performance. Vendor-managed inventory fuel station sites can have an impact on improving supply chain collaboration and business performance. In addition, supply chain collaboration between vendors and fuel stations in Timor Leste enables continuous business performance improvement. This research paves the way for supervisors, managers, and fuel station top management to collaborate with suppliers in maintaining inventory levels and forecasting the supply and demand for fuel procurement requirements. Finally, this research contributes to the theory of inventory optimization and supply chain performance.

Article history:
Received May 25, 2023
Received in revised format July 28, 2023
Accepted October 5 2023
Available online
October 5 2023

Keywords:
Business performance
Supplier competency
Supplier integration
Supply chain collaboration
Vendor-managed inventory

1. Introduction

Stock scarcity and fluctuating fuel prices make it difficult for the fuel station business to survive in an increasingly competitive world. Community activities that returned to normal after post-COVID-19 have caused the demand for fuel stocks at fuel stations to increase for motorists, cars, trucks, and public transportation. The scarcity of stock at fuel stations can cause panic in the community, which causes impulsive buying from consumers. Some fuel stations must temporarily close their businesses until fuel stocks are available again. The phenomenon of stock scarcity makes fuel station business owners want to stock fuel supplies continuously in a short time. Colin et al. (2015) explain that the proper supply chain that has been established is essential for organizational attractiveness, as it confirms the efficiency of goods and service management with providers, mediators, and market requirements. The potential ability of suppliers to help an organization meet the benefits of an increasingly competitive global environment to better understand the relationship between production capability and competitiveness (Siagian et al., 2022). Supplier capabilities at retailers are determined by the company's suppliers and customers (Tarigan et al., 2021). Supplier integration involves the exchange of operational information and production plans

* Corresponding author
E-mail address zeplin@petra.ac.id (Z. J. H. Tarigan)

ISSN 2291-6830 (Online) - ISSN 2291-6822 (Print)

doi: 10.5267/j.uscm.2023.10.004

(Baah et al., 2022). Supplier integration can also forecast demand and inventory levels to improve product and production requirements with suppliers and better use suppliers' capabilities and cost structures (Swink et al., 2007). Supplier integration occurs between functions in an integrated company with existing business functions at company vendors as a form of cross-functional external integration (Basana et al., 2023). Supply chain capabilities in companies can improve business performance (Yuan et al., 2022). Supply chain integration in companies can mitigate supply chain risk with information sharing, synchronous planning, and operation coordination (Qiao & Zhao, 2023). Supplier integration owned by the company integrates business processes and functions in producing downstream integration (Pirmanta et al., 2021). Vendor inventory management is a strong and trusting collaboration between companies and suppliers (Sainathan & Groenevelt, 2019). Vendor companies are given authority and responsibility in material procurement and time to determine the size of inventory levels to reduce company costs (Guimarães et al., 2013).

Vendors who are trusted to determine inventory planning and control based on optimizing inventory levels and arranging replenishment to reduce inventory costs (Han et al., 2017). Vendor inventory management is a decision related to replenishment in maintaining demand fluctuations (Taleizadeh et al., 2020). Supply chain collaboration in companies with vendors in sharing information to run vendor inventory management and collaborative planning (Chilkapure & Pillai, 2019). Vendor Managed Inventory (VMI) used by companies can determine decisions by sharing information between partners who have already formed integration (Golpîra, 2015). Vendors achieve higher demand forecasting accuracy and more flexibility in inventory planning in VMI systems (Rad et al., 2014). Supply chain networks have capabilities if they can coordinate with suppliers (Golpîra, 2015). Good supplier competency affects supply chain integration and responsiveness in an inventory system (Yuan et al., 2022). The company strives to build supplier integration to share solutions to problems and share ideas in development (Tarigan et al., 2020). Manufacturers can manage inventory by setting VMI production levels (De Giovanni, 2021). This condition can be achieved by collaboration in the supply chain to strive to create products to meet and understand customer needs and desires (Hu et al., 2018). Implementing good inventory management, facilities, and transportation among the parties in the coordination supply chain lowers inventory costs. Supplier collaboration between companies and partners can impact inventory control, so controlling costs is the goal of lean manufacturing and VMI (Riofiandi & Tarigan, 2022). Diversify products and eliminate obsolete items to minimize unexpected cases (Vu et al., 2020). Process and outcome control are essential in determining vendor capability to improve business outsourcing performance (Liu et al., 2017).

Supplier integration involves sharing information with accurate, timed, and standardized data with external partners (Vafaei-Zadeh et al., 2020). Integration that occurs can be coordinated and trusted, and integrated processes can impact agile and flexible systems (Fayezi & Zomorrodi, 2015). Integration with partners can be done with long-term contracts, assisting suppliers by improving production processes, driving quality improvement, investing supplier assets, including suppliers in new product development, improving overall supplier capabilities, risk and reward sharing, and mutual benefits of development efforts (Echtelt et al., 2008). Supply chain collaboration can increase productivity and customer satisfaction with minimal costs as a form of business performance (Golpîra et al., 2023). Supply chain collaboration in manufacturing companies in Thailand increases company performance (Panahifar et al., 2018). The company's supply chain collaboration with partners in sharing benefits and costs can improve the company's performance cost associated with held inventory (Baah et al., 2022). Supplier and customer collaboration can increase economic performance to form cost-saving, sales, and profit margins (Ardakani et al., 2023). Supply chain collaboration consisting of suppliers and customer integration in building partnerships and good communication and following up on the feedback provided can improve company performance (Teng et al., 2022).

Based on the explanation above, several studies in supply chain management have found a relationship between supplier competency, business performance, supplier integration, and supply chain collaboration. However, those studies did not involve those constructs simultaneously. A business performance, including the fuel station industry, faces many factors that affect the success of its business. Based on this perspective, this study investigates the relationship of those five constructs to examine the impact of supplier competency on business performance with the mediating role of supplier integration, supply chain collaboration, and vendor-managed inventory. This study is considered essential in the context of the Timor Leste nation, a developing country with many challenges in bringing the country into a more prosperous one. These research objectives are set to determine the influence of supplier competency to improve supplier integration, vendor-managed inventory, and supply chain collaboration in the pursuit of improved business performance. This study is expected to pave the way for fuel station management to partner with suppliers to improve business performance. Lastly, this study will enrich the past research in the field of supply chain management.

2. Literature Review

Supply chain management is a cooperative relationship between a company and an interdependent organization (Tarigan et al., 2021). The supply chain is an industry solution to improve efficiency in production, inventory management, and order fulfillment to meet market demand (Colin et al., 2015). Supply chain management is a complex relationship between suppliers, distributors, and customers, which requires information sharing to support successful efficiency and effectiveness for all partners in the supply chain network (Pirmanta et al., 2021; Vafaei-Zadeh et al., 2020). Verma and Singhal (2018) explain that supply chain efficiency and effectiveness can be achieved through collaboration between all interdependent partners, such

as providers, producers, distributors, and customers. This integration is critical to efficient and effective material and goods delivery to improve economic and environmental performance (Ardakani et al., 2023).

2.1. Supplier Competency

Supplier competency is defined as the ability of suppliers to develop and focus on their human resources and technology to provide products that suit customer needs (Samuelsson et al., 2016). In other words, the ability of suppliers to help an organization capitalize on the benefits of an increasingly competitive global environment. Supplier competency allows the supplier to better understand the relationship between production capability and competitiveness. Supplier capabilities are dictated by its customers and market conditions (Pirmanta et al., 2021). Excellent supplier competency implies that the company can provide high-quality products and timely delivery. Increasing supplier competence provides a competitive advantage over competitors and increases customer value (Hwang & Min, 2015; Doan, 2020). The supplier's competence will also be assessed by its ability to anticipate, prepare, and respond to disruptions that occur in the supply chain (Ali et al., 2017). Liu et al. (2017) stated that vendor capabilities defined with items are having adequate technical knowledge, business knowledge, special skills, and experienced vendor employees.

2.2. Supplier Integration

The interconnection between supply chain partners, namely, suppliers and customers, enables valuable information sharing about new markets' demand for products and related customers to serve. This information allows those integrated partners to establish strategic decisions to outperform the competitor in the supply chain integration (Beheshti, 2014). Supply chain integration involves supplier, internal functions, and customer integration (Flynn et al., 2010). Information technology enables the business partners to be integrated with upstream (Tarigan et al., 2021). Internal integration emphasizes the importance of integrated processes and process management in functions and departments and primarily involves cross-functional data in internal business (Basana et al., 2023). Supplier and customer integration refer to strategic collaboration between companies (Qiao & Zhao, 2023; Siagian et al., 2022). External integration between companies and partners leads to practices that share information, plan, and synchronize demand forecasting (Kim, 2017; Chang et al., 2016). Build strategic partnerships with suppliers and customers to solve problems jointly and facilitate operations to generate shared value (Yu et al., 2013; Jacobs et al., 2016). Supplier integration involves exchanging operational, technical, and financial information about production plans, demand forecasts, and inventory levels to improve product and production requirements with suppliers and better use suppliers' capabilities and cost structures (Swink et al., 2007; Ali et al., 2017). Upstream relationships, in which suppliers provide and share information and participate in decision-making (Petersen et al., 2008). Customer integration focuses on collaboration and information-sharing activities with downstream customers for market opportunities (Basana et al., 2022). A process that creates an adequate level of satisfaction with the safety and quality of the product for the end customer synchronized with the fulfillment of requirements (Riofiandi & Tarigan, 2022). Supplier integration, defined by items, participates in the company's new product development, shares demand information, shares information about production planning, and builds long-term cooperation (Qiao & Zhao, 2023).

2.3. Vendor Managed Inventory

Vendor-managed inventory (VMI) is a concept of inventory planning and control with management handed over by the company to the vendor (Govindan, 2013). Vendors who can have direct access to buyers determine the appropriate inventory size and policies in procurement (Liu et al., 2017). VMI implementation allows vendors to achieve higher demand forecasting accuracy and more flexibility in inventory planning (Guimarães et al., 2013). Vendors have much information related to demand, so it can provide opportunities to increase efficiency and effectiveness, which ultimately impacts profits (Rad et al., 2014). It is essential to design a VMI system to ensure optimal inventory planning in determining decision-making at appropriate inventory levels and recurring purchase quantities (Chilkapure & Pillai, 2019). Companies need to make a policy to control optimal inventory by implementing VMI so that inventory control can be carried out centrally (Pasandideh et al., 2010). VMI with consignment stock by screening defective goods (De Giovanni, 2021). VMI with consignment stock allows supply chains to operate more economically (Taleizadeh et al., 2020). VMI vendors can leverage information obtained from various retailers to maximize their profits (Yu et al., 2013).

2.4. Supply Chain Collaboration

Supply chain collaboration is the coordination of two or more companies working together to plan and implement supply chain operations to substantially benefit the supply chain partners involved (Tarigan et al., 2020). The supply chain collaboration used by companies so far is sharing information in solving problems and determining planning, but not yet at the level of building teams together (Panahifar et al., 2018). Supply chain collaboration shown with external partners synergizing in determining plans and goals together can help companies achieve a competitive position by ensuring cost reduction (Baah et al., 2022; Ali et al., 2017). Collaboration with suppliers can help companies manage risk and provide access to raw material sources (Riofiandi & Tarigan, 2022), thereby increasing profitability and performance through developing competitive advantages for a long time (Ardakani et al., 2023). Collaboration in the supply chain seeks to create

products in the market to meet and understand customer needs by producing product quality (Teng et al., 2022). Collaboration with the creation of good inventory management, facilities, and transportation among parties will contribute to lowering inventory costs (Vu et al., 2020).

2.5. Business Performance

Business performance is the result that refers to a company's success in meeting its business objectives compared to its competitors (Hong et al., 2019; Siagian et al., 2022). Company performance is divided into operational performance and performance related to finance (Basana et al., 2023). Business performance in operational aspects, according to Rajaguru and Matanda (2019), is meeting requirements, responding to changes in market demand, the effectiveness of on-time delivery, reducing waiting time to fulfill customer orders, the effectiveness of reliable delivery of quality products, reducing of shipping costs to customers, reduction of *overhead* costs and inventory costs. Business performance produces products or businesses based on customer wishes (Basana et al., 2022). Business performance measurement in industrial manufacturing consists of product quality, fulfillment of requirements, customer satisfaction, delivery time, and flexibility (Tarigan & Siagian, 2021). Sales growth and operational performance in manufacturing companies in Thailand as business performance determined by Panahifar et al. (2018). Companies can provide products according to customer criteria and submit products by predetermined times in detail as performance items in Riofiandi & Tarigan Research (2022).

2.7. Relationship Between Research Concepts

2.7.1. Relationship of supplier competency with supplier integration

Vendor competency is owned by determining procedures, processes, and systems to make the services run smoothly (Liu et al., 2017). Integration results in better decision-making, increased knowledge sharing, aligned capabilities, built learning routines, and improved SC partner performance (Echtelt et al., 2008). Supplier integration implies that companies will tend to work with fewer suppliers (Samuelsson et al., 2016). Thus, the cost of materials supplied will be reduced due to economies of scale for suppliers. Supplier integration also minimizes incoming material inspection. Customer companies will be driven to assist and certify suppliers on quality management, resulting in increased productivity and better parts quality and design. Supplier integration ensures flexible material supply by having adequate product quality and cost as per company planning (Basana et al., 2022). This decision improves supply chain integration from product planning, raw material supply, and operations to sales (Flöthmann et al., 2018). Supply chain integration with suppliers and customers can enhance manufacturers' new product development capabilities and promote product quality, flexibility, innovation, and competitive advantage (Seebacher & Winkler, 2015).

H_1: *Supplier competency affects supplier integration.*

2.6.2. Relationship between Supplier Competency and Vendor Managed Inventory

An important issue in designing VMI systems is ensuring optimal inventory planning, such as decision-making at inventory levels and replenishment frequency (Guimarães et al., 2013). Most research on VMI is focused on centralized inventory control (Pasandideh et al., 2010). Vendors achieve higher demand forecasting accuracy and more flexibility in inventory planning in the system (Taleizadeh et al., 2020). Vendors have better insight into buyer demand information; thus, vendors can increase their profits rather than incur losses (Rad et al., 2014). Supplier competency can adequately implement a real-time tracking system on VMI beneficial for storage resources, including warehousing facilities and distribution centers. One strategy to achieve and maintain competitive advantage in a dynamic environment is to create a flexible organization with production capacity and raw material supplier relationships (Golpîra et al., 2023). Lee et al. (2016) also revealed that limited storage capacity will limit flexibility and impact VMI, which has fewer benefits. Replacement inventory management and transportation are closely related to shipments in the supply chain (Hu et al., 2018).

H_2: *Supplier competency influences vendor-managed inventory.*

2.6.3. Relationship between Supplier Competency and Supply Chain Collaboration

The company's ability to improve collaboration in the supply chain improves operational performance (Tarigan & Siagian, 2021). The supplier-buyer partnership is designed to operate an optimal product acceptance plan for all parties (Tarigan & Siagian, 2021; Mabrouk, 2020). The company receives materials from suppliers, so the company determines the size and number of products received, checked, and the size of the production process. It makes deliveries to customers (Vafaei-Zadeh et al., 2020). Flexibility is also a significant factor in the smooth integration of supply chains, affecting production's ability to collaborate directly with information exchange between departments and make joint decisions in aligning goals (Fayezi & Zomorrodi, 2015). This partnership is essential for cooperation and work results (Tarigan et al., 2020). A dynamic approach to networking with suppliers is crucial as it influences product innovation from a corporate perspective (Mitrega et al., 2017). Strategic partnerships enhance long-term relationships to mitigate risk (Siagian et al., 2022). The company's ability to build

collaboration with suppliers can develop company suppliers in increasing capabilities to match company demand (Panahifar et al., 2018).

H_3: *Supplier competency impacts supply chain collaboration.*

2.6.4. Relationship between Supplier Integration and Vendor-Managed Inventory

Timely information sharing in the supply chain makes more accurate decisions and can manage inventory availability (Basana et al., 2022). Information sharing allows companies to implement VMI to improve inventory control and distribution (Niknamfar, 2015). The integration allows the company to hand over responsibility to the vendor in inventory control (Guimarães et al., 2013). Sharing information in VMI strategies among supply chain partners can improve shipping performance, logistics communication, and material flow (Golpîra et al., 2023). Sharing information on supply chain integration can be used to make decisions to reduce costs and shorten cycle times as a form of VMI strategy (Golpîra, 2015). Information sharing is how critical and proprietary information is communicated to supply chain partners (Hu et al., 2018). Advances in information technology have significantly contributed to information sharing in internal and external integration (Qiao & Zhao, 2023). Regular exchange of information allows all supply chain parties to work together effectively and efficiently (Fayezi & Zomorrodi, 2015).

H_4: Supplier integration influences vendor managed inventory.

2.6.5. Relationship between Supplier Integration and Supply Chain Collaboration

The information shared has different types related to inventory, resources, products, demand, delays, and planning information. Information is provided by suppliers to companies or vice versa as a form of collaboration (Singh, 2013). Sharing information between suppliers and companies must be adequate, accurate, and timely so that cross-functional with suppliers runs well (Basana et al., 2023). Information sharing is essential for companies to build supply chain collaboration to improve performance (Panahifar et al., 2018). Supplier integration refers to the extent of coordination between producers and suppliers in decision-making regarding capacity planning, demand forecasting, inventory management, replenishment, and material flow (Flynn et al., 2010). The ability of companies to share information and forecasting with internal and external parties can increase production capacity due to reduced synchronization of corporate planning (Baah et al., 2022). Supply chain integration results in good communication, collaboration, supply chain flow, and operational capabilities (Rajaguru & Matanda, 2019; Hwang & Min, 2015; Behesti et al., 2014; Shou et al., 2017). Supply chain integration is sharing internal and external company information in making decisions, sharing demand forecasting with partners, and strategic partnerships in collaboration with partners (Tarigan & Siagian, 2021).

H_5: *Supplier integration influences supply chain collaboration*.

2.6.6. Relationship between Vendor Managed Inventory and Supply Chain Collaboration

Han et al. (2017) found that it reduces the risk of stockouts and responds to production fluctuations. Vendors must provide a certain amount of inventory by carefully optimizing the warehouse in considering the amount and time (Guimarães et al., 2013). Established supply chain coordination can receive benefits in implementing VMI because it lowers costs (Lee et al., 2016). The main obstacle to VMI implementation is that vendors bear higher costs than buyers because VMI systems give the responsibility to vendors to bear the costs associated with the risk of shortages and excess stocks (Govindan, 2013). Collaboration in the supply chain seeks to create products in the market to meet and understand customer needs and desires in inventory management and procurement (Chilkapure & Pillai, 2019). The collaboration that occurs can make facilities and transportation well between parties will contribute to lowering inventory costs (Taleizadeh et al., 2020). Vu et al. (2020) stated that product diversification, eliminating obsolete goods, and minimizing unexpected cases such as errors or delays can affect the effectiveness of the supply chain. Information is essential for manufacturing companies in Thailand to implement VMI to maintain secure information and impact company performance (Panahifar et al., 2018).

H_6: Vendor managed inventory influences supply chain collaboration.

2.6.7. Relationship between Supplier Integration and Business Performance

Flynn et al. (2010) argue that integration brings additional dependence on internal and external stakeholders to the company. Yu et al. (2013) verified that supplier and customer integration are significantly and positively related to business performance. Integrating suppliers with companies impacts business performance to increase competitiveness (Siagian et al., 2022). Supplier integration can reduce procurement costs by building close relationships with suppliers, which is conducive to improved business performance (Basana et al., 2023). Supplier integration helps facilitate mutual understanding, reduce transaction costs, and reduce production/operational costs (Qiao & Zhao, 2023). Collaboration and information sharing are needed to create accurate, timely, and necessary information flows for decision-making (Panahifar et al., 2018). Supplier

integration with knowledge sharing and complete and comprehensive information sharing is critical in supply chain performance, especially in controlling inventory (Riofiandi & Tarigan, 2022). The exchange of information between manufacturers and retailers through orders over time will help minimize the risk of information shortages or gaps and complete products in the best way to increase customer satisfaction (Vu et al., 2020).

H7: *Vendor-managed inventory affects supply chain collaboration.*

2.6.8. Relationship between Vendor Managed Inventory and Business Performance

According to Han et al. (2017), the purpose of information sharing in VMI systems. Vendors have full knowledge of inventory costs, demand data, distributor and buyer policies, as well as related production decisions of each buyer. When planning VMI, a vendor prioritizes inventory-level decisions that minimize total cost and material quality while still considering an optimal decision-making process based on shared information (Guimarães et al., 2013). Pasandideh et al. (2010) identified that retailers enjoy advantages in vendor-managed inventory systems. Vendors can achieve higher demand forecasting accuracy and more flexibility in inventory planning under the VMI system (Lee et al., 2016). Vendors can share better information about inventory information (Niknamfar, 2015) to reduce the occurrence of stock-out and indirectly increase sales (Lee et al., 2016).

H8: *Vendor-managed inventory affects business performance.*

2.6.9. Relationship between Supply Chain Collaboration and Business Performance

The collaboration built by the company is integrated with intra-organization and inter-organization by carrying out communication processes, information sharing, and knowledge sharing to achieve the quality of products or services in the supply chain flow according to the requirements set by the customer (Vafaei-Zadeh et al., 2020). This collaboration seeks to create many products in the market to meet and understand customer needs and wants (Baah et al., 2022). Collaboration with partners can implement good inventory management, facilities, and transportation among the parties will contribute to the decline in inventory (Ardakani et al., 2023). The collaboration that occurs can eliminate goods use and minimize unexpected cases, such as errors or delays that affect supply chain efficiency (Tarigan & Siagian, 2021). The exchange of information between manufacturers and retailers over time can help minimize information gaps (Teng et al., 2022) and produce products according to established criteria to increase customer satisfaction (Vu et al., 2020).

H9: *Supply chain collaboration affects business performance.*

3. Research methods

This study establishes a research model represented by supplier competency that impacts business performance through supplier integration, vendor inventory management, and supply chain collaboration (Fig. 1).

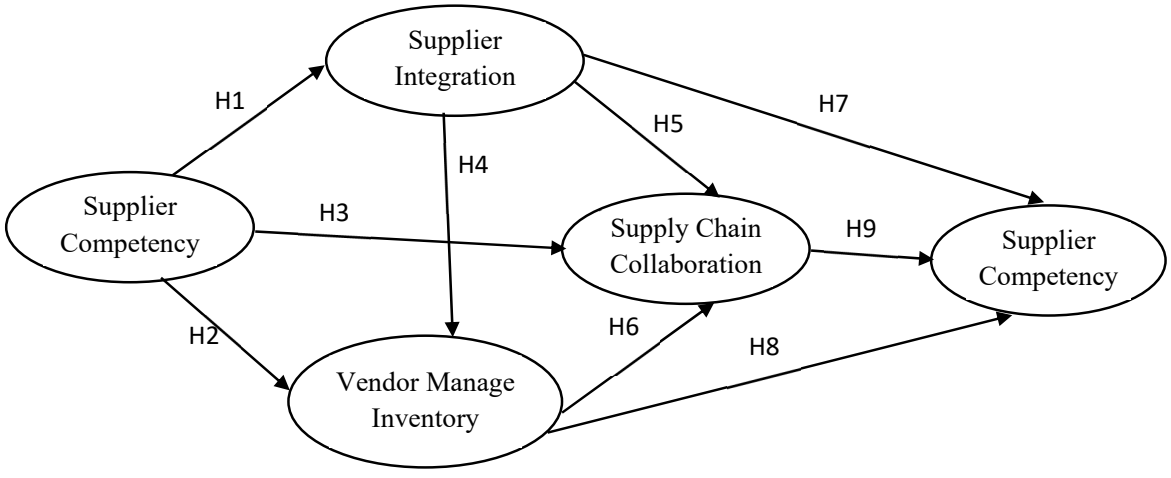

Fig. 1. Research Models and Hypotheses

Based on Fig. 1, nine research hypotheses were proposed. Data analysis used the partial Least Square (PLS) technique with SmartPLS software version 4.0. Data collection used questionnaires designed with a five-point Likert scale distributed to domestic fuel station companies in Timor Leste country. Questionnaires were distributed online, with a Google Form link and onsite visits to deliver the questionnaire directly to the selected respondents. During the onsite visit, the authors also

interviewed with the respondents. Samples used a judgmental technique due to the widespread fuel station location throughout the country. The sample criteria for respondents are employees who worked for at least one year in a supervisor position or higher. The measurement items to assess each research variable are defined as follows: Supplier competency is assessed using five indicators: the ability to guarantee inventory that can adjust needs (SC1), the ability to deliver products efficiently (SC2), the ability to respond quickly to changes in customer demand (SC3), the ability to meet customer requests to be according to plan (SC4), and the ability to determine efficient operational costs (SC5). Supplier integration is an interconnection formed between supply chain partners, which is measured by four indicators: the company exchanging information with partners (SI1), the company having adequate internal integration (SI2), the company communicating regularly (SI3), and the company coordinating with partners in determining planning (SI4).

Furtherly, vendor-managed inventory variables are set with five indicators: vendor companies can hold accurate demand forecasting for customer demand (VMI1), vendor companies can adjust inventory to customers so that excess inventory does not occur (VMI2), vendor companies can adjust inventory to customers so that stock-out does not occur (VMI3), vendor companies can determine inventory levels (VMI4), and vendor companies can determine costs efficient inventory (VMI5). For supply chain collaboration variables defined with five measurement items: suppliers and customers collaborate in ensuring product quality to conform to standards (SCC1), suppliers and customers collaborate in timely product delivery (SCC2), suppliers and customers collaborate in ensuring occupational safety and health (SCC3), suppliers and customers work together in solving operational problems (SCC4) and suppliers and customers participate in incurring costs during collaboration runs (SCC5). Finally, the business performance set is with five indicators as follows: fuel station companies experience an increase in sales (BP1), fuel station companies achieve profits on target (BP2), fuel station companies provide fast and appropriate responses to customers (BP3), fuel station companies receive goods on time (BP4), and fuel station companies provide customer satisfaction (BP5).

As defined previously, data collection used questionnaires given to practitioners as supervisors' positions at fuel stations. The questionnaire is designed with a five-point Likert scale, with one as strongly disagree and five as strongly agree. As many as 72 respondents correctly filled in the questionnaires and were considered valid for analysis. The first analysis is performed on the respondent profile, as shown in Table 1.

Table 1
Respondent Profile

Item Measurement	Description	Frequency	%
Gender	Female	6	8
	Male	66	92
Job title at work	Owners	66	92
	Manager	6	8
Length of Work in the Company	2 to < 5 years	12	17
	5 to < 8 Years	34	47
	8 to < 10 Years	20	28
	Ten years over	6	8
Education	High School Equivalent	42	58
	S1 equivalent	30	42
Number of Workers Fuel Station	20 to < 60 Employees	71	99
	Over 100 Employees	1	1
Supplier	PT. Pertamina Indonesia	71	98
	ETO Moving Energy	72	100

Table 1 demonstrates that the gender composition of respondents was male, as much as 92% (66 people) and female as 8% (6 people). Most respondents were 66 company owners (92%), and the others were at the manager level, as much as 8%. Judging from the length of work experience, the majority of them worked between 5 to 8 years, totaling 34 respondents (47%), while when viewed from respondents who already have expertise in their fields, those who have worked for more than five years totaled 60 people (83%). Further analysis related to respondents' education obtained graduates from undergraduate, amounting to 30 people (42%). This shows that fuel stations in Timor Leste still require formal education in conducting data analysis and business development, which is still relatively large in the company's area. The number of workers in the fuel station is between 20 to 60 employees at a medium-sized fuel station while there is a large fuel station. As a research sample, the Fuel station has vendors or suppliers consisting of PT. Pertamina Indonesia has 71 fuel stations (98%), and all fuel stations are supplied by ETO Moving Energy, totaling 72.

Further analysis uses smartPLS version 4 to assess the outer model for validity and reliability and examines the proposed hypotheses. Table 2 illustrates the outer model assessment test result for convergent validity as indicated by factor loading and average variance extracted (AVE), reliability by composite reliability, and Cronbach Alpha).

Table 2
Outer Model Assessment

Item measurement	Factor Loading	Composite reliability	Cronbach alpha	AVE
Supplier Competency		0.882	0.879	0.675
SC1	0.790			
SC2	0.865			
SC3	0.788			
SC4	0.881			
SC5	0.778			
Supplier Integration		0.864	0.855	0.700
SI1	0.744			
SI2	0.919			
SI3	0.866			
SI4	0.807			
Vendor-Managed Inventory		0.897	0.894	0.702
VMI1	0.855			
VMI2	0.868			
VMI3	0.860			
VMI4	0.849			
VMI5	0.752			
Supply Chain Collaboration		0.809	0.798	0.561
SCC1	0.595			
SCC2	0.742			
SCC3	0.677			
SCC4	0.866			
SCC5	0.832			
Business Performance		0.784	0.772	0.529
BP1	0.686			
BP2	0.852			
BP3	0.784			
BP4	0.587			
BP5	0.701			

The results of Table 2 show that the validity test has been fulfilled by considering the factor loading value above 0.500. The lowest value of factor loading on supplier competency on fuel station capability items determines efficient operational costs (SC5) of 0.778, supplier integration on fuel station items exchanges information with partners (SI1) of 0.744, vendor managed inventory on fuel station companies can determine efficient inventory costs (VMI5) of 0.752, supply chain collaboration on items Suppliers and customers collaborate in ensuring product quality to conform to the standard (SCC1) of 0.595 and business performance with the lowest item value at 0.587. With these findings, the validity test satisfies the minimum factor loading value requirement of 0.500. Further, the reliability of those indicators is considered reliable since the reliability values have met the requirements set of 0.700. The composite reliability and Cronbach Alpha value in supplier competency, supplier integration, vendor-managed inventory, supply chain collaboration, and business performance have met the requirements. In summary, the convergent validity test has met the goodness of fit test, which is above 0.500 with a minimum value on supplier competency of 0.675, supplier integration of 0.700, vendor-managed inventory of 0.702, supply chain collaboration of 0.561, and business performance of 0.529.

4. Analysis Result and Discussion

4.1. Analysis Result

The hypotheses examination result using SmartPLS version 4.0 is shown in Table 3 and Fig. 2.

Table 3
Hypothesis Testing Result

Hypotheses (Direct)	Path Coefficient	T Statistics	P Values
Supplier Competency → Supplier Integration (H1)	0.700	10.878	0.000
Supplier Competency → Vendor Managed Inventory (H2)	0.420	3.758	0.000
Supplier Competency → Supply Chain Collaboration (H3)	0.259	2.379	0.017
Supplier Integration → Vendor Managed Inventory (H4)	0.407	4.616	0.000
Supplier Integration → Supply Chain Collaboration (H5)	0.515	3.863	0.000
Vendor Managed Inventory → Supply Chain Collaboration (H6)	0.018	0.157	0.875
Supplier Integration → Business Performance (H7)	0.330	2.281	0.023
Vendor Managed Inventory → Business Performance (H8)	0.327	3.163	0.002
Supply Chain Collaboration → Business Performance (H9)	0.266	2.379	0.017

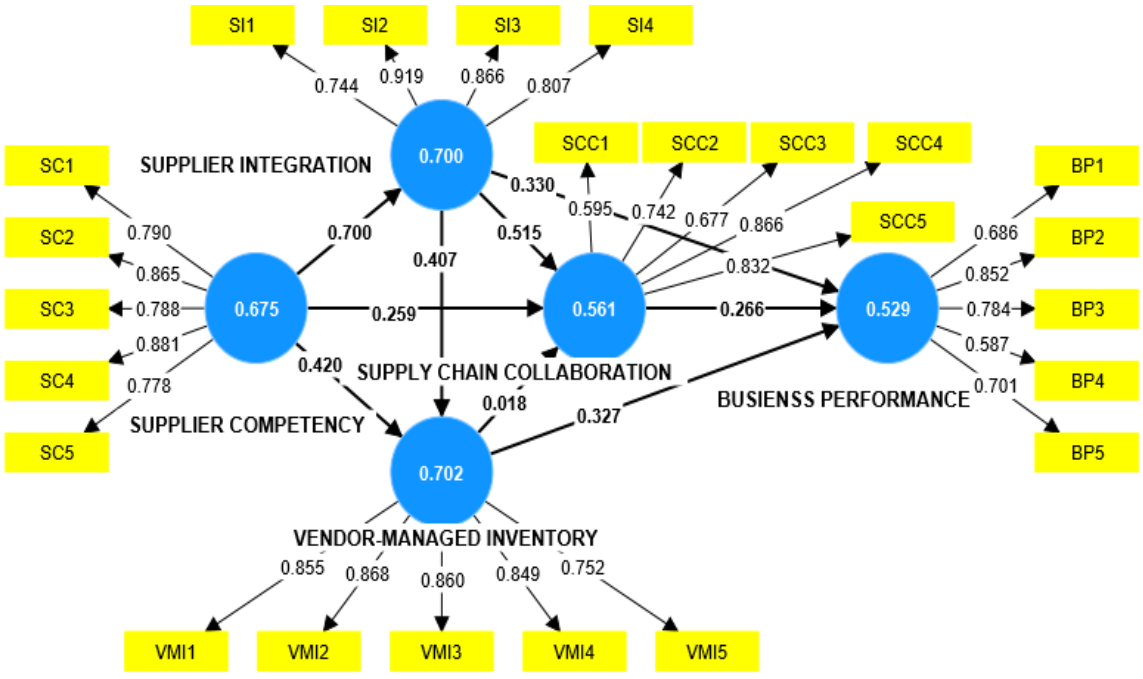

Fig. 2. PLS output research results

Table 3 and Fig.e 2 show the analysis results of hypothesis testing. One of the nine hypotheses formulated was rejected (H6). The remaining eight hypotheses were supported in this study, indicated by the T-statistic value exceeding 1.96, the cut-off value for a 5% significant level adopted in this research. The first hypothesis found that supplier competency affects supplier integration by a path coefficient value 0.700. The second and third hypotheses are that supplier competency affects vendor-managed inventory by 0.420 and supply chain collaboration by 0.259. The fifth and seventh hypotheses found that supplier integration affects supply chain collaboration by 0.515 and business performance by 0.330. The eighth hypothesis that managed inventory affects business performance by 0.327, and the ninth hypothesis found that supply chain collaboration affects business performance by 0.266. All the path coefficient values are positive, which means that the relationship between constructs in each hypothesis is in the same positive direction. The findings indicated that the sixth hypothesis is not significantly supported. The vendor-managed inventory does not affect supply chain collaboration since its t-statistics value is 0.157 (<1.96) and p-value 0.875 (>0.05). Based on the results of this explanation, a research model can be established in Figure 3, which illustrates the hypotheses supported and rejected.

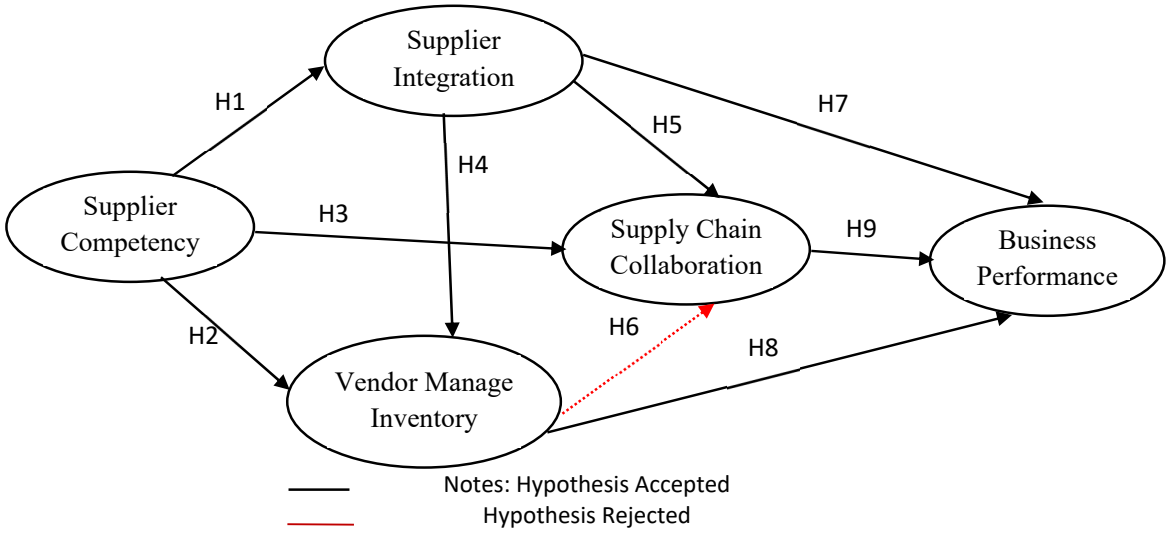

Fig. 3. Hypothesis test results on conceptual model

The results showed that eight hypotheses were accepted, and one hypothesis (H6) was rejected.

4.2. Discussion

The research result for the first hypothesis is supplier competency, which is determined by the supplier's ability to deliver products efficiently and meet customer demand to fit the plan to affect supplier integration. Companies can increase information exchange with partners more intensively and have adequate internal integration. The company quickly provides information to suppliers so that they can prepare the materials needed based on the plan that has been set. This study supports the results of research that state supplier competency affects supplier integration (Liu et al., 2017; Echtelt et al., 2008; Flöthmann et al., 2018; Seebacher & Winkler, 2015). Supplier competency positively affects vendor-managed inventory, the second hypothesis that has been accepted. The company's ability to coordinate with supplier competency can guarantee inventory tailored to the needs and ability to meet customer demand to match the plan impacts vendor-managed inventory management. Companies can manage inventory by involving suppliers so that companies can hold accurate demand forecasting of customer demand. This study confirms the results of research that states that supplier competency has a positive effect on vendor-managed inventory (Guimarães et al., 2013; Pasandideh et al., 2010; Rad et al., 2014; Golpîra et al., 2023; Lee et al., 2016; Hu et al., 2018). Supplier competency positively and significantly impacts supply chain collaboration by forming the company's ability to work with suppliers and customers in solving operational problems and involve them in financing ongoing collaboration. The company's supplier competency in managing operational costs and efficient shipments can increase supply chain collaboration. The results of the study are to the results of previous research, which states that supplier competency impacts increasing supply chain collaboration (Tarigan & Siagian, 2020; Tarigan & Siagian, 2021; Mabrouk, 2020; Vafaei-Zadeh et al., 2020; Fayezi & Zomorrodi, 2015; Tarigan et al., 2020; Mitrega et al., 2017; Siagian et al., 2022; Panahifar et al., 2018).

The fourth hypothesis is that supplier integration affects vendor-managed inventory. The company's ability to build supplier integration with internal integration owned by the company and communicate regularly improves vendor inventory management with suppliers. Companies need to provide separate access rights to suppliers to get real-time inventory availability to strengthen coordination. Currently, many fuel station companies have not provided adequate access rights to suppliers, so it is difficult to find out the condition of fuel stocks in warehouses. This research is in line with the results of research which states that supplier integration affects vendor-managed inventory (Basana et al., 2022; Niknamfar, 2015; Guimarães et al., 2013; Golpîra et al., 2023; Golpîra, 2015; Qiao & Zhao, 2023; Fayezi & Zomorrodi, 2015). Supplier integration influences supply chain collaboration, as the fifth hypothesis is accepted. Companies with adequate internal integration describe supplier integration, and companies that communicate regularly can improve supply chain collaboration. This result shows that supply chain collaboration has improved in ensuring product quality, meeting standards, and maintaining timely product delivery. This research supports the results of research that state that supplier integration influences increasing supply chain collaboration (Singh, 2013; Basana et al., 2023; Panahifar et al., 2018; Flynn et al., 2010; Rajaguru & Matanda, 2019; Hwang & Min, 2015; Behesti et al., 2014; Shou et al., 2017; Tarigan & Siagian, 2021).

The sixth hypothesis was rejected, so it was found that vendor-managed inventory did not affect increasing supply chain collaboration. The trust given by the company to vendor companies to carry out activities in managed inventory is illustrated by the ability to adjust inventory to customers so that excess inventory and stock-outs cannot impact supply chain collaboration. This condition is due to fuel inventory as one of the essential types of information for vendors to manage. It is not obtained in real-time due to limited access to their information systems. Vendors only send fuel according to the order requested by the fuel station. Activities provided to vendor-managed inventory cannot form collaboration in delivering products on time and working together in solving operational problems. The seventh hypothesis is that supplier integration positively impacts business performance. The company's ability to build activities with vendors as a form of supplier integration is described by exchanging information with partners and actively coordinating in determining plans to improve business performance. The company's ability to make supplier integration can increase fast and precise responses to customers to provide customer satisfaction. The results of this study support the results of research that state that supplier integration has an increasing impact on business performance (Flynn et al. (2010; Siagian et al., 2022; Basana et al., 2023; Qiao & Zhao, 2023; Panahifar et al., 2018; Riofiandi & Tarigan, 2022); Vu et al., 2020).

The eighth hypothesis is stated to be accepted so that vendor-managed inventory positively impacts business performance. The ability of fuel vendor companies to manage inventory that fuel stations have trusted can make vendor companies hold accurate demand forecasting of customer demand and be able to determine efficient inventory costs, which can improve business performance. The vendor's ability to manage fuel can make fuel station companies receive goods on time to provide a fast and appropriate response to customers. The results of this study confirm the results of research that state that vendor-managed inventory has a positive impact on business performance (Han et al. (2017; Guimarães et al., 2013; Pasandideh et al. (2010; Lee et al., 2016; Niknamfar 2015; Lee et al., 2016). The ninth hypothesis stated by supply chain collaboration having an impact on business performance is accepted. Fuel station companies, when building collaboration with vendors through activities collaborating with partners in delivering products on time and working together in solving operational problems, can increase sales, achieve profits according to set targets, and provide fast and appropriate responses to customers. The results of this study are in line with the results of research that states supply chain collaboration has a positive impact on business performance (Vafaei-Zadeh et al., 2020; Baah et al., 2022; Tarigan & Siagian, 2021; Teng et al., 2022; Vu et al., 2020).

The results of the overall research found that supplier competency at fuel stations in Timor Leste, namely Pertamina Indonesia and ETO Moving Energy, were able to send products efficiently and meet customer requests so that, according to plan, they could produce supplier integration with adequate internal integration and the company could communicate regularly with an impact on business performance. Supplier competency run by both vendors can improve vendor inventory management, as shown by the ability to adjust customer inventory so that excess inventory does not occur. Stock-out can produce business performance by increasing profits according to or exceeding targets and quickly responding to customers. The practical contribution to this research provides insight for both Pertamina Indonesia and ETO Moving Energy vendors to improve integration to produce accurate and fast data so that vendor inventory management can be controlled very well to increase efficiency and profit for fuel stations. Another practical contribution is advising managers and top management to invest in adequate information technology infrastructure, so supply chain integration can run well and efficiently. The theoretical contribution of the research is to enrich the theory of supply chain partnership and supply chain integration in the grand theory of resource-based view.

5. Conclusion

This study aims to examine supplier competency's impact on business performance with the mediating role of supplier integration, supply chain collaboration, and vendor-managed inventory. Fuel stations in Timor Leste have a massive role in the economy and community activities. This condition results in the government always maintaining that fuel does not occur scarcity. There are not many vendors or leading suppliers, so they need to be monitored to have high performance. This condition puts pressure on vendors to constantly innovate to improve their capabilities. Several conclusions were obtained in the study based on the data processing results. Supplier competency owned by vendors can impact supplier integration by forming fuel station companies, exchanging information with partners, and intensively coordinating in determining planning. Supplier competency owned by fuel station companies impacts vendor inventory management so that companies can adjust inventory to customers so that excess inventory and stock-out do not occur. Supplier competency, owned with the ability to deliver products efficiently and meet customer demand according to planning, can impact supply chain collaboration. Supplier integration formed in the company can impact vendor inventory management. The company's ability to integrate with suppliers can increase the capability to produce vendor inventory management. Supplier integration owned by fuel station companies with vendors can impact business performance. Fuel stations that have adequate internal integration and communicate regularly can improve business performance by achieving targeted profits and fast responses to customers. Vendors managing inventory owned by the company are not strong enough to produce supply chain collaboration due to limited access to data provided to vendors in obtaining inventory accurately. Vendors manage inventory owned by the company by adjusting inventory based on conditions in the field so that excess inventory and stock-out do not occur. Supply chain collaboration at a fuel station in Timor Leste depicted suppliers and customers working together to solve operational problems and participating in costs while collaborating in producing business performance. This condition can be seen in the fuel station company's profit, sales, and customer satisfaction increase. This research contributes to the government's ability to control the availability of fuel to increase economic growth and community welfare sustainably.

References

Ali, A., Mahfouz, A. & Arisha, A. (2017). Analysing supply chain resilience: integrating the constructs in a concept mapping framework via a systematic literature review. *Supply Chain Management*, *22*(1), 16-39. https://doi.org/10.1108/SCM-06-2016-0197

Ardakani, D.A., Soltanmohammadi, A. & Seuring, S. (2023). The impact of customer and supplier collaboration on green supply chain performance. *Benchmarking: An International Journal*, *30*(7), 2248-2274. https://doi.org/10.1108/BIJ-12-2020-0655

Baah, C., Opoku Agyeman, D., Acquah, I.S.K., Agyabeng-Mensah, Y., Afum, E., Issau, K., Ofori, D. & Faibil, D. (2022). Effect of information sharing in supply chains: understanding the roles of supply chain visibility, agility, collaboration on supply chain performance. *Benchmarking: An International Journal*, *29*(2), 434-455. https://doi.org/10.1108/BIJ-08-2020-0453

Basana, S.R., Suprapto, W., Andreani, F. & Tarigan, Z.J.H. (2022). The impact of supply chain practice on green hotel performance through internal, upstream, and downstream integration. *Uncertain Supply Chain Management*, *10*(1), 169-180, DOI: 10.5267/j.uscm.2021.9.010

Basana, S.R., Ubud, S., Malelak, M.I. & Tarigan, Z.J.H. (2023). The effect of key user capability on supply chain digital and flexibility in improving financial performance. *Uncertain Supply Chain Management*, *11*(1), 267-276, DOI: 10.5267/j.uscm.2022.9.016

Beheshti, H.M., Oghazi, P., Mostaghel, R. & Hultman, M. (2014). Supply chain integration and firm performance: An empirical study of Swedish manufacturing firms. *Competitiveness Review*, *24*(1), 20–31, https://doi.org/10.1108/CR-06-2013-0060

Chang, W., Ellinger, A.E., Kim, K. & Franke, G.R. (2016). Supply chain integration and firm financial performance: a meta-analysis of positional advantage mediation and moderating factors. *European Management Journal*, *34*(3), 282–295. https://doi.org/10.1016/j.emj.2015.11.008

Chilkapure, A.J.S.N. & Pillai, V.M. (2019). Literature review on supply chain collaboration: comparison of various collaborative techniques. *Journal of Advances in Management Research*, *16*(4), 537-562. https://doi.org/10.1108/JAMR-10-2018-0087

Colin, M., Galindo, R. & Hernández, O. (2015). Information and communication technology as a critical strategy for efficient supply chain management in manufacturing SMEs. *Procedia Computer Science*, *55*, 833-842, DOI:10.1016/j.procs.2015.07.152

Doan, T.T.T. (2020). Supply chain management drivers and competitive advantage in the manufacturing industry. *Uncertain Supply Chain Management*, *8*(3), 473–480, https://doi.org/10.5267/j.uscm.2020.5.001

Echtelt, F., Wynstra, F., Weele, A. & Duysters, G. (2008). Managing supplier involvement in new product development: A multiple-case study. *The Journal of Product Innovation Management*, *25*(2), 180–201. https://doi.org/10.1111/j.1540-5885.2008.00293.x

Flynn, B.B., Huo, B. & Zhao, X. (2010). The impact of supply chain integration on performance: a contingency and configuration approach. *Journal of Operations Management*, *28*(1), 58–71. https://doi.org/10.1016/J.JOM.2009.06.001

Flöthmann, C., Hoberg, K. & Wieland, A. (2018). Competency requirements of supply chain planners analysts and personal preferences of hiring managers. *Supply Chain Management: An International Journal*, *23*(6), 480-499. https://doi.org/10.1108/SCM-03-2018-0101

De Giovanni, P. (2021). Smart supply chains with vendor-managed inventory, coordination, and environmental performance. *European Journal of Operational Research*, *292*(2), 515-531, https://doi.org/10.1016/j.ejor.2020.10.049

Fayezi, S. & Zomorrodi, M. (2015). The role of relationship integration in supply chain agility and flexibility development: An Australian perspective. *Journal of Manufacturing Technology Management*, *26*(8), 1126–1157. https://doi.org/10.1108/JMTM-11-2014-0123

Govindan, K. (2013). Vendor-managed inventory: a review based on dimensions. *International Journal of Production Research*, *51*(13), 3808–3835. https://doi.org/10.1080/00207543.2012.751511

Golpîra, H. (2020). Optimal integration of the facility location problem into the multi-project, multi-supplier, multi-resource Construction Supply Chain network design under the vendor-managed inventory strategy. *Expert Systems with Applications*, *139*, 112841. https://doi.org/10.1016/j.eswa.2019.112841

Golpîra, H., Tirkolaee, E.B., Maihami, R. & Karimi, K. (2023). A robust Tri-Objective optimization to supply chain configuration under Vendor-Managed inventory policy considering supply chain visibility. *Expert Systems with Applications*, *224*, 119916, https://doi.org/10.1016/j.eswa.2023.119916

Guimarães, C.M., Crespo de Carvalho, J. & Maia, A. (2013). Vendor managed inventory (VMI): evidence from lean deployment in healthcare. *Strategic Outsourcing: An International Journal*, *6*(1), 8-24. https://doi.org/10.1108/17538291311316045

Han, J., Lu, J. & Zhang, G. (2017). Tri-level decision-making for decentralized vendor-managed inventory. *Information Sciences*, *421*, 85-103, https://dx.doi.org/10.1016/j.ins.2017.08.089

Hong, J., Liao, Y., Zhang, Y. & Yu, Z. (2019). The effect of supply chain quality management practices and capabilities on operational and innovation performance: Evidence from Chinese manufacturers. *International Journal of Production Economics*, *212*, 227-235, https://doi.org/10.1016/j.ijpe.2019.01.036

Hwang, D. & Min, H. (2015). Identifying the drivers of enterprise resource planning and assessing its impacts on supply chain performances. *Industrial Management & Data Systems*, *115*(3), 541-569. https://doi.org/10.1108/IMDS-10-2014-0284

Hu, B., Meng, C., Xu, D. & Son, Y.-J. (2018). Supply chain coordination under vendor-managed inventory-consignment stocking contracts with wholesale price constraint and fairness. *International Journal of Production Economics*, *202*, 21-31, https://doi.org/10.1016/j.ijpe.2018.05.009

Jacobs, M.A., Yu, W. & Chavez, R. (2016). The effect of internal communication and employee satisfaction on supply chain integration. *International Journal of Production Economics, 171*, 60–70. https://doi.org/10.1016/J.IJPE.2015.10.015

Kim, H.J. (2017). Information technology and firm performance: the role of supply chain integration. *Operations Management Research*, *10*(1–2), 1–9. https://doi.org/10.1007/s12063-016-0122-z

Lee, J.-Y., Cho, R.K. & Paik, S.-K. (2016). Supply chain coordination in vendor-managed inventory systems with stockout-cost sharing under limited storage capacity. *European Journal of Operational Research*, *248*(1), 95-106, https://doi.org/10.1016/j.ejor.2015.06.080

Liu, S., Wang, L. & Huang, W. (2017). Effects of process and outcome controls on business process outsourcing performance: Moderating roles of vendor and client capability risks. *European Journal of Operational Research*, *260*, 1115-1128, http://dx.doi.org/10.1016/j.ejor.2017.01.020

Mabrouk, N.B. (2020). Interpretive structural modeling of critical factors for buyer-supplier partnerships in supply chain management. *Uncertain Supply Chain Management*, *8*(3), 613–626. https://doi.org/10.5267/j.uscm.2020.2.002

Mitrega, M., Frokmann, S., Zaefarian, G. & Henneberg, S.C. (2017). Networking capability in supplier relationships impacts product innovation and firm performance. *International Journal of Operations & Production Management*, *37*(5), 577-606. https://doi.org/10.1108/IJOPM-11-2014-0517

Niknamfar, A.H. (2015). Multi-objective production-distribution planning based on vendor-managed inventory strategy in a supply chain. *Industrial Management & Data Systems*, *115*(6), 1086-1112. https://doi.org/10.1108/IMDS-03-2015-0073

Panahifar, F., Byrne, P.J., Salam, M.A. & Heavey, C. (2018). Supply chain collaboration and firm's performance: The critical role of information sharing and trust. *Journal of Enterprise Information Management*, *31*(3), 358–379. https://doi.org/10.1108/JEIM-08-2017-0114

Pasandideh, S.H.R., Niaki, S.T.A. & Roozbeh Nia, A. (2010). An investigation of vendor-managed inventory application in the supply chain: the EOQ model with shortage. *The International Journal of Advanced Manufacturing Technology*, *49*, 329-339. https://doi.org/10.1007/s00170-009-2364-5

Petersen, K.J., Handfield, R.B., Lawson, B. & Cousins, P.D. (2008). Buyer dependency and relational capital formation: the mediating effects of socialization processes and supplier integration. *Journal of Supply Chain Management*, *44*(4), 53–65. https://doi.org/10.1111/j.1745-493X.2008.00072.x

Pirmanta, P., Tarigan, Z., & Basana, S. (2021). The effect of ERP on firm performance through information quality and supply chain integration in the Covid-19 era. *Uncertain Supply Chain Management*, *9*(3), 659-666. DOI: 10.5267/j.uscm.2021.5.004

Qiao, R. & Zhao, L. (2023). Reduce supply chain financing risks through supply chain integration: dual approaches of alleviating information asymmetry and mitigating supply chain risks. *Journal of Enterprise Information Management*, https://doi.org/10.1108/JEIM-01-2023-0016

Rad, R.H., Razmi, J., Sangari, M.S. & Ebrahimi, Z.F. (2014). We are optimizing an integrated vendor-managed inventory system for a single-vendor to-buyer supply chain by determining a weighting factor for vendor's ordering cost. *International Journal of Production Economics*, *153* (295–308). https://doi.org/10.1016/j.ijpe.2014.03.013

Rajaguru, R. & Matanda, M.J. (2019). Role of compatibility and supply chain process integration in facilitating supply chain capabilities and organizational performance. *Supply Chain Management: An International Journal*, *24*(2), 301-316. https://doi.org/10.1108/SCM-05-2017-0187

Riofiandi, D. & Tarigan, Z.J.H. (2022). The effect of supplier collaboration on company performance through lean manufacturing and inventory control. *Petra International Journal of Business Studies*, *5*(1), 74-86, DOI: https://doi.org/10.9744/ijbs.5.1.74-86

Sainathan, A. & Groenevelt, H. (2019). Vendor-managed inventory contracts – coordinating the supply chain while looking from the vendor's perspective. *European Journal of Operational Research*, 272, 249-260. https://doi.org/10.1016/j.ejor.2018.06.028

Samuelsson, J., Andersén, J., Ljungkvist, T. & Jansson, C. (2016). Formal accounting planning in SMEs: The influence of family ownership and entrepreneurial orientation. *Journal of Small Business and Enterprise Development*, 23(3), 691-702. https://doi.org/10.1108/JSBED-12-2015-0167

Seebacher, G. & Winkler, H. (2015). A capability approach to evaluate supply chain flexibility. *International Journal of Production Economics*, 167, 177–186. https://doi.org/10.1016/j.ijpe.2015.05.035

Shou, Y., Li, Y., Park, Y.W. & Kang, M. (2017). The impact of product complexity and variety on supply chain integration. *International Journal of Physical Distribution & Logistics Management*, 47(4), 297-317, https://doi.org/10.1108/IJPDLM-03-2016-0080

Siagian, H., Tarigan, Z.J.H. & Basana, S.R. (2022). The role of top management commitment in enhancing competitive advantage: The mediating role of green innovation, supplier, and customer integration. *Uncertain Supply Chain Management*, 10(2), 477-494, DOI: 10.5267/j.uscm.2021.12.003

Siagian, H. & Tarigan, Z.J.H. (2021). The central role of IT capability is to improve firm performance through lean production and supply chain practices in the COVID-19 era. *Uncertain Supply Chain Management*, 9(4), 1005-1016, DOI: 10.5267/j.uscm.2021.6.012

Singh, R.K. (2013). Prioritizing the factors for a coordinated supply chain using the analytic hierarchy process (AHP). *Measuring Business Excellence*, 17(1), 80–98. http://dx.doi.org/10.1108/13683041311311383

Swink, M., Narasimhan, R. & Wang, C. (2007). Managing beyond the factory walls: effects of four types of strategic integration on manufacturing plant performance. *Journal of Operations Management*. 25 (1), 148–164. https://doi.org/10.1016/j.jom.2006.02.006

Taleizadeh, A.A., Shokr, I., Konstantaras, I. & VafaeiNejad, M. (2020). Stock replenishment policies for a vendor-managed inventory in a retailing system. *Journal of Retailing and Consumer Services*, 55, 102137, https://doi.org/10.1016/j.jretconser.2020.102137

Tarigan, Z.J.H. & Siagian, H. (2021). The effects of strategic planning, purchasing strategy, and strategic partnership on operational performance. *Uncertain Supply Chain Management*, 9(2), https://doi.org/10.5267/j.uscm.2021.2.006

Tarigan, Z.J.H., Jiputra, J.A. & Siagian, H. (2021). The effect of supply chain practices on retailer performance with information technology as a moderating variable. *International Journal of Data and Network Science*, 5(1), 47-54, DOI: 10.5267/j.ijdns.2020.11.003

Tarigan, Z.J.H., Tanuwijaya, N.C. & Siagian, H. (2020). Does top management attentiveness affect green performance through green purchasing and supplier collaboration? *Academy of Strategic Management Journal*, 19(4), 1-10

Teng, T., Tsinopoulos, C. & Tse, Y.K. (2022). IS capabilities, supply chain collaboration and service quality performance: the moderating effect of environmental dynamism. *Industrial Management & Data Systems*, 122(7), 1592–1619. https://doi.org/10.1108/IMDS-08-2021-0496

Vafaei-Zadeh, A., Ramayah, T., Hanifah, H., Kurnia, S. & Mahmud, I. (2020). Supply chain information integration and its impact on the operational performance of manufacturing firms in Malaysia. *Information & Management*, 57, 103386, https://doi.org/10.1016/j.im.2020.103386

Verma, A. & Singhal, N. (2018). A computing methodology for evaluating supply chain competitiveness. *Materials Today: Proceedings*, 5, 4183–4191, https://doi.org/10.1016/j.matpr.2017.11.681

Vu, T.H., Tran, H.L., Le, T.T., Nguyen, M.D. & Duong, B.N. (2020). Relationship between supply chain activities in Vietnamese retailer business enterprises. *Uncertain Supply Chain Management*, 8, 321-330, DOI:10.5267/j.uscm.2019.11.006

Yu, W., Jacobs, M.A., Salisbury, W.D. & Enns, H. (2013). The effects of supply chain integration on customer satisfaction and financial performance: An organizational learning perspective. *International Journal of Production Economics*, *146*(1), 346-358, https://doi.org/10.1016/j.ijpe.2013.07.023

Yuan, Y., Liu, L. & Liu, L. (2022). How does information integration enhance SMEs' credit quality: the mediating role of supply chain capabilities. *Industrial Management & Data Systems*, *122*(2), 544-561. https://doi.org/10.1108/IMDS-10-2020-0621