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Message from The Organizers

I am pleased to welcome you to this joint online conference of the 2nd International Conference on Automotive, Manufacturing, and Mechanical Engineering (IC-AMME) and the 4th International Conference on Logistics and Supply Chain Management (LSCM). This conference was supposed to be conducted in 2020, but it was delayed because of the COVID-19 pandemic. Afterwards, we decide to consider this pandemic an opportunity to have our conference online because we must adapt to the new normal. The committee receives around 70 submissions and accepts 59 full papers from Brazil, France, Japan, Malaysia, Nigeria, Norway, Portugal, Taiwan, Thailand, the USA, and Indonesia.

We are honoured to have two excellent keynote speakers, Prof. Takashi Suzuki, PhD from Sophia University and Prof. Benny Tjahjono, PhD from Coventry University, that will share their lots of experience and discuss future trends in sustainable energy and circular economy.

On this occasion, I want to express my great appreciation to all reviewers that have done a great job reviewing all the submissions. Special thanks to our partners: the Indonesian Supply Chain and Logistics Institute (ISLI), Sophia University, Lusofóna University, and UCSI University for supporting this conference. I want to appreciate the hard work and dedication of all committee members.

Finally, I hope you will enjoy this one day conference. I look forward to seeing you at the next conferences.

Assoc. Prof. Dr. Didik Wahjudi

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Conference Schedule

* Jakarta Time (UTC/GMT +7 hours)

Saturday, October 2, 2021

07.30 - 08.00	Registration
08.00 - 08.15	Opening Ceremony
08.15 - 09.00	**Keynote Speaker:** Prof. Takashi Suzuki (Sophia University, Japan) **"Energy for Sustainable Future"**
09.00 - 09.15	Group photo & Session preparation
09.15 - 11.55	SESSION 1 (See the detailed concurrent session schedule)
11.55 - 13.00	Lunch break
13.00 - 13.45	**Keynote Speaker:** Prof. Benny Tjahjono (Coventry University, UK) **"Demystifying the Circular Economy Business Models in Operations and Supply Chain Management"**
13.50 - ….....	SESSION 2 (See the detailed concurrent session schedule)

Conference List of Abstract

RESEARCH ARTICLE | JANUARY 18 2024

The role of information technology implementation, information sharing, and supply chain collaboration in improving supply chain performance FREE

Glenn Ryan Purwanto; Hotlan Siagian; Oviliani Yenty Yuliana ✉

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The Role of Information Technology Implementation, Information Sharing, and Supply Chain Collaboration in Improving Supply Chain Performance

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Abstract. Various governments, including Indonesia, have imposed restrictions on gatherings to prevent the spread of COVID-19. However, these restrictions have led to many companies experiencing the need to monitor and control supply and demand, resulting in a slowdown of the economy and the closure of several service companies, retail stores, and industries. This research investigates how implementing information technology, information sharing, and supply chain collaboration affects supply chain performance. The study collected data from seventy manufacturing companies in Surabaya, using non-probability techniques with convenience sampling methods, and analyzed the data using Partial Least Square software. The research found that sharing information through supply chain collaborations can give a company a competitive advantage. Adopting greater supply chain collaboration through information technology implementation enhance overall supply chain performance. Moreover, having access to accurate and high-quality information by implementing information technology makes it easier for companies to make decisions together.

INTRODUCTION

To stay competitive in the present economic landscape, companies must optimize their supply chains by running them efficiently and implementing appropriate strategies considering interactions at various stages. Making decisions at different levels of Supply Chain Management (SCM), from strategic to operational, is necessary for cutting expenses and enhancing customer satisfaction [1]. As a result of the Covid-19 pandemic, businesses are encountering obstacles in their unrestricted growth, and this crisis has had an impact on industrial processes worldwide, including in Indonesia. Supply chain management has been impacted by the pandemic, resulting in reduced availability of factory workers, an economic downturn, and challenges in forecasting demand and managing inventory in the short and long term. Furthermore, due to customers' preference for buying in bulk to avoid crowded spaces, shops are facing inventory shortages.

According to Bank Indonesia's Prompt Manufacturing Index (PMI) data, the Indonesian manufacturing sector's performance declined from the last quarter of 2019 to the first quarter of 2020 [2]. In the fourth quarter of 2019, the PMI stood at 49.5, indicating a contraction in the manufacturing sector. It was due to declining new orders, production levels, and employment. In the first quarter of 2020, the PMI fell further to 45.3. The COVID-19 pandemic led to declining new orders, production levels, employment, supply chain disruptions, and exports. The decline in the manufacturing purchasing index in Indonesia is partially attributable to the high number of places impacted by Covid-19, as acknowledged by the Indonesian Minister of Industry. To address this, the Minister proposes a strategy to improve competitiveness by leveraging the 4.0 industrial revolution and streamlining the flow of raw materials, which is expected to boost the digital economy.

The Fourth Industrial Revolution (also known as Industrial Revolution 4.0) aims to reduce human labor by maximizing the collaboration between automation technology and cyber networks. With the substantial advancements

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in information technology, information can be presented quickly and easily. By implementing information technology, Supply Chain Management operations can be significantly improved, resulting in the efficient management of raw materials. Effective supply chain management is crucial for a company's financial success, and it is continuously evolving, even with an established management system in place. However, coordinating logistics and managing resources in the supply chain still need to catch up. Still, Information Technology Implementation can help solve this problem by acting as a supply function and improving corporate performance [3]. The utilization of Information Technology Implementation enables businesses to communicate relevant information in a fast and efficient manner, which in turn enhances Supply Chain Performance. Furthermore, Supply Chain Performance is a crucial aspect of information technology [5]. Therefore, comprehending the influence of Information Sharing and Supply Chain Collaboration on Supply Chain Management across different industries is vital, and the implementation of Information Technology is crucial.

Companies engage in technical advances that promote effective communication and cooperation channels to construct good Information Sharing and improve Supply Chain Performance. Salam [6] established a relationship in Thailand's supply chain between trust, technology, teamwork, and corporate operational effectiveness. The research indicates that better partnership with supply chain participants, facilitated by higher confidence and technological capabilities, improves operating performance. Supply Chain Collaboration is a long-term approach [5] that underscores the importance of building sustainable relationships. Any future collaborative engagement between supply chain partners will, without a doubt, necessitate the commitment of both parties to achieve their objectives. Previous research has explored the impact of different factors, but none has investigated their influence on a single model. Hence, this study aimed to investigate how implementing information technology affects the performance of the supply chain by analyzing the role of Information Sharing and Collaboration of the Supply Chain as mediators. The study sought to answer three questions: 1) Does Supply Chain Collaboration mediate the relationship between Information Technology Implementation and Supply Chain Performance? 2) Does Information Sharing act as a buffer between Supply Chain Performance and Information Technology Implementation? 3) Do Information Sharing and Supply Chain Collaboration mediate between Information Technology Implementation and Supply Chain Performance? The research findings indicate that when Information Sharing and Supply Chain Collaboration are used together, they can provide companies with a competitive advantage by enabling shared decision-making based on accurate and high-quality data. Additionally, combining the use of supply chain collaboration with information technology implementation may contribute to improved firm performance.

LITERATURE REVIEW

Information Technology (IT) Implementation

IT is companies' use of information systems and technologies to interact with their supply chain partners for exchanging information, organizing tasks, cooperating, and communicating effectively [7]. These capabilities can provide numerous advantages to organizations, including decreased operational expenses, enhanced customer service, and a lasting competitive edge [8]. Investing in IT is crucial for supply chain collaborations as it can help reduce coordination expenses and minimize transaction hazards by building a dependable and secure connection between parties. IT is a crucial aspect of business operations [9] that considerably impacts productivity, customer satisfaction, innovation, and management control. The advancements in information and communication technology have a significant role in supply chain management, facilitating effective decision-making that enhances the organization's competitiveness, reduces inventory, lowers supply chain costs, and mitigates electronic risks, resulting in better service levels. IT is also essential for successful integration and information systems both within and outside the organization. Additionally, the adoption of advanced information technologies and applications, like Electronic Data Interchange (EDI), Radio Frequency Identification (RFID), autonomous vehicles, e-commerce, decision support systems, and (ERP) software [10], is facilitating the shift towards virtual supply chains in the SCM industry.

Information Sharing

Information Sharing refers to the exchange of data in various forms, such as between different departments within a company, within a department, or among organizations in a supply chain network. This practice can benefit businesses by preventing repetition, reducing expenses, and enhancing response time and quality. The effectiveness and efficiency of information flow between a corporation and its supply chain partners [4] are critical for promoting

Information Sharing, which is facilitated by advancements in information technology. This data includes predictions, production schedules, and inventory draw rates [11]. According to this study, EDI is a common way for customers and suppliers to exchange information and improve company performance. Information Sharing is essential for SCM [12] because it meets timeliness standards and enables continual supply replenishment. Sharing information is essential to Supply Chain Collaboration [9], as it enables organizations to gather, evaluate, and exchange data with other chain participants to enhance decision-making. The effectiveness of Information Sharing requires real-time, relevant, and precise information to enable managers to make better collaborative decisions, despite functional or organizational barriers. As a result, effective information sharing is regarded as a vital competency for organizations to communicate knowledge among their supply chain partners.

Supply Chain Collaboration

Supply Chain Collaboration involves sharing information, coordinating production and inventory, collaborating on product design, developing joint marketing campaigns, and aligning performance metrics [13]. It offers benefits such as cost reduction, profit, prediction accuracy, and inventory control, which have been proven in multiple studies. The use of collaboration is rising because of globalization and information technology [6]. Critical dimensions (sharing knowledge and resources, making synchronized choices, and effective communication [2]) can enhance collaborative partnerships. Establishing acceptable collaboration norms, building trust, and showing dedication are also essential for success. Many companies worldwide have embraced Supply Chain Collaboration after witnessing successful partnerships [14], such as Walmart's collaboration with suppliers. Collaborative partnerships encourage all supply chain participants to plan and share information and resources. The absence of cooperation in the supply chain leads to inefficiency, excess inventory, and higher expenses. Therefore, Supply Chain Collaboration is a crucial expertise for businesses in the world market.

Supply Chain Performance

The assessment of Supply Chain Management involves measuring different aspects of Supply Chain Performance, such as inventory investment, delivery efficiency, service quality, supplier performance, and expenses [11]. This study evaluates how Information Sharing and business systems influence the supply chain. Supply Chain Performance refers to the ability of a supply chain to carry out its activities effectively and minimize costs, with the primary aim of meeting customers' critical needs [2]. The success of an organization's supply chain is crucial to its overall success as a partner. Customer satisfaction is the key to supply chain success, and effective Supply Chain Management can improve end-customer satisfaction while reducing the total cost of the product or service [6]. The primary task for supply chain operations and management is to ensure the delivery of profitable products or services while upholding superior levels of customer satisfaction. To tackle this challenge, it is imperative that each participant of the supply chain, such as suppliers, manufacturers, distributors, retailers, logistics providers, and customers, collaboratively contribute to establishing a competent supply chain [15].

Interrelationship of Two Concepts

The use of information technology is considered essential in the field of Supply Chain Collaboration as it enables the sharing of information and communication among partners, resulting in better individual performance. A crucial aspect of successful Supply Chain Collaboration is the ability of all parties to communicate effectively, building trust, commitment, and a common understanding. This two-way communication creates a foundation for exchanging information that benefits the supply chain [16]. By using electronic systems, such as those that allow for the rapid transmission of data, the supply chain can work as a team, resulting in more efficient interactions.

H1: Information Technology Implementation affects Supply Chain Collaboration.

The integration of IT into business processes allows companies to share information instantly, leading to improved Supply Chain Performance by producing accurate data [17]. The global environment's demand for rapid response services to remain competitive has had a significant impact on the development of information technology in supply chain management. Advancements in IT and communication have led to the convergence of particular information network patterns, allowing for the sharing of information [18].

H2: Information Technology Implementation affects Information Sharing.

By implementing information technology into their business processes, companies can engage with their supply chain partners, exchange information, carry out electronic transactions, and make decisions. As a result, it leads to improved efficiency, effectiveness, competitiveness, and profitability that can enhance Supply Chain Performance [19]. Furthermore, implementing Information Technology can directly improve Supply Chain Performance by positively affecting the quality and exchange of information [4, 17]. Therefore, information sharing, and quality mediate the relationship between Information Technology Implementation and Supply Chain Performance.

H3: Information Technology Implementation Affects the Supply Chain Performance.

Businesses prioritizing partnerships are more inclined to engage in Information Sharing with their partners when implementing operational, technical, and strategic activities [5]. Supply Chain Collaboration provides fast, accurate, and relevant data, allowing for better, more collaborative decision-making. In addition, companies' capacity to connect and perform Information Sharing has increased dramatically due to technological advancements [20].

H4: Information Sharing affects Supply Chain Collaboration.

Supply Chain Collaboration is essential for many global businesses. Its benefits, such as reduced cost, profit and demand forecasting, and improved inventory management, are crucial for enhancing Supply Chain Performance [2]. In addition, effective Supply Chain Management requires well-connected inter-organizational relationships between partners, which is essential for achieving customer satisfaction and ultimately becoming a competitive advantage [9].

H5: Supply Chain Collaboration affects Supply Chain Performance.

Shared decision-making and EDI are all critical components of operational success [20]. Therefore, Information Sharing is a vital component of a company's long-term viability and supply chain integration empowerment. In addition, when supply chains cooperate and coordinate, Information Sharing becomes more efficient, increasing its competitive advantage [21, 18].

H6: Information Sharing affects Supply Chain Performance.

The following theories are based on the above hypotheses. Figure 1 depicts the research framework.

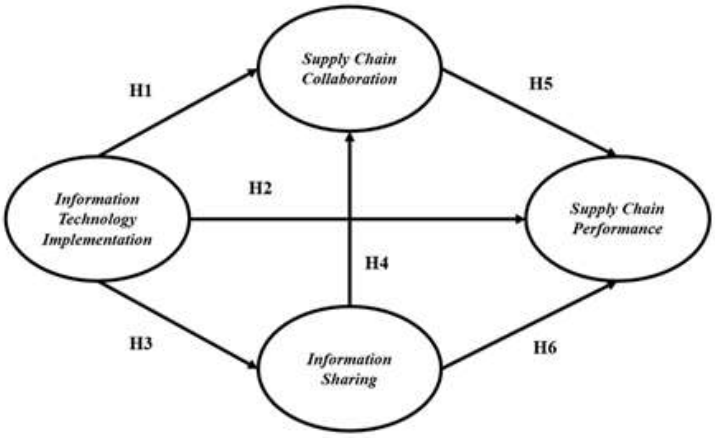

FIGURE 1. Research model framework

METHODS

The independent variable (Information Technology Implementation), mediating variables (Information Sharing and Supply Chain Collaboration), and a dependent variable (Supply Chain Performance), that were defined in the hypotheses in the preceding section was measured using a quantitative technique. The following is a list of the indicators for each variable. Information technology measurement adopts from [9]. Six indicators were used to assess the Information Technology Implementation (ITI), namely, electronic systems (ITI1), digital payment systems (ITI2), product landing pages (ITI3), integrated business management software (ITI4), RFID technologies (ITI5), electronic commerce (ITI6). Furthermore, information sharing is sharing information from a supply chain network's operation,

marketing, and logistics activities. Therefore, it is measured using four indicators, namely, information sharing with consumers (IS1), sharing with vendors (IS2), cross-functional collaboration (IS3), and intra-departmental collaboration (IS4) [21].

Moreover, the third variable is Supply Chain Collaboration (SCC), which adopts the research by [6] and is measured using the following three indicators: decision making cooperatively (SCC1), demand forecasting (SCC2), and inventory replenishment (SCC3). The last variable was Supply Chain Performance (SCP); customer satisfaction determines whether a supply chain succeeds. A successful supply chain provides the maximum level of customer satisfaction while also managing businesses efficiently and effectively [22]. For the SCP variable, the following indicators were used [20]: improved product performance (SCP1), delivery speed (SCP2), volume or capacity flexibility (SCP2), and production costs (SCP2). This survey included 206 manufacturing enterprises in Surabaya with more than 100 employees [23]. The Slovin formula [24] was used to generate a sample size of 70 responders. This study employed a convenience sample approach, utilizing a non-probability sampling method where data was collected from the most easily accessible respondents. The data was collected using a five-point Likert scale questionnaire, ranging from Strongly Disagree to Strongly Agree. Partial Least Squares (PLS) software was used to analyze the data in this research. PLS is a structural equation modeling technique that evaluates the inner and outer models using components or variations. The examination of the outer model was separated into two parts - tests for validity and reliability. The validity tests were further divided into two categories: convergent and discriminant validity, with the inner model being evaluated using R-Square and Q-Square.

RESULTS AND DISCUSSION

Research Respondent Profile

Respondents to this study represented various positions of a manufacturing organization. The manager position consists of 28 respondents (40%), supervisor 13 respondents (18.6%), Director/CEO 7 respondents (10%) and staff 22 respondents (31.4%). This composition describes the respondents as representing the structure of positions within an organization and judging from the functions of the organization involved in this study also represents functions directly involved on the supply chain, namely purchasing 41 respondents (58.6%), distribution 12 respondents (17.1%), warehousing eight respondents (11.4%), and other nine respondents (12.9%). Then, looking at the composition of respondents also represents various sectors of the industry. From the classification of manufacturing industry, most of it is electrical equipment industry/engineering, which is 23.71 %. Followed by Agriculture, fishing, and livestock industries (18.57%), Pharmaceutical chemical and industry (17.57%), Industrial paint and printing (13.29%), Food and beverage industry (11.68%), Metal goods industry (10.00%), and others 5%.

Validity and Reliability of Measurements

In the outer model, the evaluation will be divided into two, namely validity and reliability. Validity is also divided into two, namely convergent validity and discriminant validity. Convergent validity test results can be seen through the outer loadings of each item, as shown in Table 1. Indicators are considered valid if they have outer loadings values greater than 0.5.

In Table 1, the outer loading values on each indicator are greater than 0.5. That is, it can be said that the indicators used in this study have qualified convergent validity. Discriminant validity test can be done by comparing the outer loading of each indicator with cross-loading. The entire outer-loading for each indicator is greater than the cross-loading. Thus, all indicators can be simulated to meet the requirements of discriminant validity.

Reliability

In this study, AVE, Cronbach's Alpha, and composite reliability values were utilized to assess the reliability of the measurements. For a variable to meet the reliability criteria, the variable must have an AVE value of more than 0.5, Cronbach's Alpha of more than 0.7, and Composite Reliability greater than 0.7. Table 1 displays that each variable has an AVE value greater than 0.5, while Cronbach's Alpha and Composite Reliability values are above 0.7. These outcomes demonstrate that the indicators of each variable meet the reliability standards.

Inner Model Evaluation

The inner model analysis was conducted against the value of R^2, which shows the ability of variable independent to explain variants of the variable dependent. Besides, it is necessary to look at the Q^2 value that describes the model's predictive relevance. From the analysis obtained, the value of R^2 for each variable is found as follows: Information Sharing (IS) has R^2 of 0.169, Supply Chain Collaboration (SCC) of 0.474, and Supply Chain Performance (SCP) of 0.560. IT was able to explain variance on IS by 16.9%. Information Technology Implementation (ITI) explains 47.4% variance of SCC. Furthermore, ITI, IS, and SCC were able to explain the variance of SCP by 56.0%. The predictive relevance test is done by doing calculations with the formula $Q^2 = 1 - \left(\left(1 - {R_1}^2\right) \times \left(1 - {R_2}^2\right) \cdots \left(1 - {R_p}^2\right)\right)$. The calculation result returns a value of 0.482 > 0.0. These results show that the model has a good predictive relevance.

TABLE 1. Outer loadings, AVE, Cronbach alpha, composite reliability

Variable	Item	Outer Loadings	AVE	Cronbach Alpha	Composite Reliability
IT Implementation (ITI)	ITI1	0.734	0.604	0.891	0.914
	ITI2	0.706			
	ITI3	0.844			
	ITI4	0.788			
	ITI5	0.706			
	ITI6	0.866			
	ITI7	0.782			
Information Sharing (IS)	IS1	0.703	0.640	0.809	0.876
	IS2	0.900			
	IS3	0.841			
	IS4	0.742			
Supply Chain Collaboration (SCC)	SCC1	0.854	0.661	0.809	0.875
	SCC2	0.704			
	SCC3	0.871			
Supply Chain Performance (SCP)	SCP1	0.873	0.667	0.746	0.853
	SCP2	0.747			
	SCP3	0.817			
	SCP4	0.749			

Hypothesis Test

The researchers performed hypothesis testing with a 95% confidence level, which implies a critical *t-value* of 1.96 or a *p-value* of 0.05. Along with the *t-value* and *p-value*, the analysis evaluated the path coefficient value, which indicates the causal relationship's direction between the two constructs. The positive value denoted the causal relationship varies in the same direction and opposite direction when negative. The research hypothesis is acceptable if that-statistics value is > 1.96 or *p-value* < 0.05. Table 2 shows the results of a hypothetical test conducted using bootstrapping procedures. All hypotheses have a value of *t*>1.96 and *p-value* < 0.05, and the positive path coefficient, which means hypotheses are supported in this study. ITI affects SCC with a value of *t*=3.229, *p-value* 0.001 and *path coefficient*=0.312. Furthermore, ITI affects SCP with a value of *t*=2.145, a *p-value* of 0.032, and a coefficient of 0.244. ITI affects IS (*t*=3.736, *p-value* = 0.000, and path coefficient 0.411). Another result is that IS affects the SCC (*t*=5.51, *p-value*=0.000, and path coefficient of 0.498). The H5 hypothesis is also supported in this study, where SCC affects SCP (*t*=3.939, *p-value* = 0.000, and path coefficient 0.394). The last hypothesis, Information Sharing influencing SCP, was also accepted in this study (*t*=2.964, *p-value* =0.003, and path coefficient 0.258).

ITI has a significant influence on Supply Chain Collaboration. ITI with adequate communication infrastructure enabling partners to collaborate. Sharing information with partners in the supply chain will make the relationship more effective in collaboration, such as accurate and real-time forecasting. The results of this study supported previous research by [17]. In addition, ITI has a significant influence on Supply Chain Performance. The integration of IT into business operations enables fast and timely Information Sharing among companies, and it facilitates the provision of quality information that can enhance SCP. These findings highlight the significance of implementing IT, sharing knowledge, and ensuring information quality to achieve excellence in SCP. Effective communication with upstream

and downstream business partners is crucial and can even provide a competitive advantage. The study's results are consistent with earlier research [4,20].

TABLE 2. Hypothesis test results

Hypothesis	*Path Coefficient*	*t-value*	*p-value*	Remarks
ITI → SCC (H1)	0.312	3.229	0.001	supported
ITI → SCP (H2)	0.244	2.145	0.032	supported
ITI → IS (H3)	0.411	3.736	0.000	supported
IS → SCC (H4)	0.498	5.510	0.000	supported
SCC → SCP (H5)	0.394	3.938	0.000	supported
IS → SCP (H6)	0.258	2.964	0.003	supported

Another finding is that Information Technology Implementation has a significant influence on information sharing. information technology allows access to information with other organizations to extend its boundaries to the extent that it is along the enterprise value chain. The findings of this study are consistent with previous research [18], indicating that the utilization of Information Technology (IT) can facilitate the exchange of business information, data, and applications among trading partners for companies. Moreover, IT can simplify electronic transactions like purchasing and selling goods and services, which can enhance communication, decision-making, efficiency, effectiveness, competitiveness, and profitability and ultimately improve the overall performance of an organization. Additionally, this study's results confirm that Information Sharing significantly impacts supply chain collaboration. Based on the research findings, companies committed to partnerships have a greater tendency to exchange information with their associates. In addition, information sharing is connected to executing operational, technical, and strategic activities with partners. These findings support the previous studies conducted by [5, 21].

Furthermore, Supply Chain Collaboration has a significant influence on Supply Chain Performance. The benefits of Supply Chain Collaboration include cost reduction, profit, the accuracy of estimates and inventory control, reduced waiting times, reduced bullwhip effect, development of special capabilities. Therefore, it is acceptable that Supply Chain Collaboration plays a positive role in Supply Chain Performance [14]. Establishing strong and trusting relationships with suppliers can offer several advantages to a company, especially in terms of improving the customer-facing aspects of the supply chain, as per research [23]. Recent studies indicate that sharing information between supply chain partners is a crucial factor that affects the overall performance of the supply chain. Sharing information helps businesses survive and integrate their supply chains, and with advancements in communication and information technology, it is becoming more feasible. Collaborating and coordinating with global partners over extended periods further enhances the efficiency of information sharing and boosts a company's competitive edge. This study supports earlier research on the subject [19].

CONCLUSION

This study aims to examine how information technology implementation in manufacturing companies located in East Java affects supply chain performance by analyzing the impact of information sharing and supply chain collaboration. Six hypotheses are formulated and tested as part of this research. The test results indicate that the entire hypothesis is accepted. IT implementation has a positive effect on supply chain collaboration (H1). IT implementation also affects supply chain performance (H2). In addition, IT implementation influences information sharing (H3). Information sharing affects supply chain collaboration (H4). Other findings show that information sharing has a direct effect on improving supply chain performance (H5). The last result is that the supply chain collaboration can increase supply chain performance (H6). The use of information technology by companies is crucial for companies, especially in the current pandemic. With information technology, companies can share two-way information with partners. Information technology can also improve the tightness of relationships between partners in the form of mutually beneficial collaboration. These results show that the application of information technology has multiple impacts in improving the supply chain performance of a manufacturing company. The results of this study can provide insights for practitioners on how to improve the performance of the company's supply chain. This study also provides a wealth of theory because previous research applies to different populations, namely manufacturing companies in East Java, Indonesia. However, this study has a particular concern and limitation in the sampling that only includes manufacturing companies in East Java and the non-probability sampling method that may not fully represent the population. In addition, research in the future needs to expand the scope of policing as in-service companies and include other variables such as risk management, customer integration, and leadership to include broader stakeholders.

REFERENCES

1. A. Diabat and E. Theodorou, Computers and Industrial Engineering **90**, 381-389 (2015).
2. T. M. Mofokeng and R. Chinomona, South African Journal of Business Management **50**(1), 1-10 (2019).
3. O. H. Castorena, L. A. Enríquez, and M. G. Adame, International Journal of Business, Economics and Management **1**(12), 382-396 (2014).
4. H. Siagian, Z. J. H. Tarigan, and E. Susilo, International Journal of E-Education, e-Business, e-Management and e-Learning **9**(4), 338-347 (2019).
5. I. L. Wu, C.-H. Chuang, and C.-H. Hsu, International Journal of Production Economics **148**, 122-132 (2014).
6. M. A. Salam, Benchmarking: An International Journal **24**(2), 298-317 (2017).
7. A. S. Harnowo, "Roles of Information Technology in Supply Chain Management," Ph.D. Georgia Southern University, 2015.
8. A. Singh and J. T. C. Teng, Computers in Human Behavior **54**, 290-300 (2016).
9. R. Kumar, R. K. Singh and R. Shankar, International Journal of Business Information Systems **22**(4), 455-475 (2016).
10. D. T. N. Varma and D. A. Khan, Journal of Supply Chain Management Systems **3** (3), 35-46 (2014).
11. H. H. Chang, K. H. Wong, and W. S. Chiu, Information and Management **56**(6), 103-140 (2019).
12. M. Mäkinen, "Information Sharing in Improving Supply Chain Performance," Bachelor Thesis, Aalto University, 2017.
13. L. N. K. Duong and J. Chong, International Journal of Production Research **58**(11), 3488-3507 (2020).
14. U. Ramanathan and A. Gunasekaran, International Journal of Production Economics **147**, 252-259 (2014).
15. Y. Zhan and K. H. Tan, European Journal of Operational Research **281**(3), 559-574 (2020).
16. D. Jimenez-Jimenez, M. Martínez-Costa, and C. S. Rodriguez, Journal of Knowledge Management **23**(3), 548-567 (2019).
17. Z. J. H. Tarigan, H. Siagian, and R. R. Bua, "The impact of information system implementation to the integrated system for increasing the supply chain performance of manufacturing companies," in *IOP Conference Series: Materials Science and Engineering*, **473**(1), 2019, pp. 12-50.
18. Z. Lotfi, M. Mukhtar, S. Sahran, dan A. T. Zadeh, Procedia Technology **11**, 298-304 (2013).
19. X. Zhang, D. P. Van Donk, and T. van der Vaart, International Journal of Operations & Production Management **36**(7), 803-824 (2016).
20. J. A. Al-Doori, Journal of Industrial Engineering and Management **12**(2), 241-253 (2019).
21. I. Koçoğlu, S. Z. Imamoğlu, H. Ince and H. Keskin, Procedia-Social and Behavioral Sciences **24**, 1630-1649 (2011).
22. S. Ergun and A. Doganay, Journal of Management Marketing and Logistics **4**(1), 30-39 (2017).
23. Badan Pusat Statistik. Kota Surabaya Dalam Angka 2018. Badan Pusat Statistik Kota Surabaya, 2018. https://surabayakota.bps.go.id/publication/2018/08/21/35de76f19338e3ecd445b838/kota-surabaya-dalam-angka-2018
24. S. M. Amirullah, *Metode Penelitian Manajemen* (Bayumedia, Malang, 2015).