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Impact of Supply Chain Management Practices and ICT on Competitive Advantage and MSME Performance

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Abstract

MSMEs play an important role in the Indonesian economy, especially in the growing handicraft sector. However, many MSMEs face challenges in improving their competitive advantage and business performance. This study aims to analyze the influence of supply chain management practices and information and communication technology on competitive advantage and firm performance. This study uses a quantitative approach by distributing questionnaires to 109 MSMEs in the handicraft sector in Bantul and Sleman Regency. Data analysis was conducted using SEM-AMOS to see the relationship between variables. The results showed that supply chain management practices and the utilization of information and communication technology have a positive effect on competitive advantage and firm performance. In addition, the application of information and communication technology is proven to be able to improve supply chain efficiency, which has an impact on increasing competitive advantage and firm performance. Competitive advantage also acts as a mediating factor that strengthens the relationship between supply chain, ICT, and firm performance. These findings confirm that the integration of supply chain strategies with the utilization of digital technology can help MSMEs survive and thrive amid market competition.

Keywords: Supply Chain Management Practices;Information and Communication Technology;Competitive Advantage;Firm Performance.

1 Introduction

MSMEs play an important role in the Indonesian economy. Based on data from dinkopukm.slemankab.go.id, the number of MSMEs in Sleman Regency has experienced significant growth in recent years. This growth is driven by increasing market demand, especially from the tourism sector in Yogyakarta, which makes handicraft products one of the main attractions (Liputan6, 2024). In 2023, the MSME sector contributed 61% of Indonesia's total Gross Domestic Product (GDP), equivalent to IDR 9,580 trillion (Kadin.id, 2023), demonstrating the crucial role of MSMEs in national economic growth.

Handicraft sector MSMEs in Bantul and Sleman have specific characteristics in their supply chains, especially in terms of long-term relationships with raw material suppliers. This is in line with the concept of strategic supplier partnerships, one of the key indicators in supply chain management practices (Sinaga et al., 2021). These long-term partnerships allow MSMEs to obtain raw materials stably, maintain product quality, and avoid fluctuations in raw material prices that can disrupt business operations (Perindag.slemankab.go.id, 2023).

In addition, digitalization is increasingly playing a role in increasing the competitiveness of MSMEs. Based on data from Liputan6 (2024), around 75% of MSMEs in Yogyakarta have used digital platforms for saleas and marketing. The INDEF study (2024) also showed that 88.37% of MSMEs that previously only sold offline experienced an increase in annual turnover after digitizing their business. However, although most MSMEs have utilized digital technology for marketing, the adoption of information and communication technology (ICT) in supply chain management is still relatively low. In fact, ICT can improve the efficiency of supplier coordination, inventory management, and product distribution (Runmarket.id, 2023). Therefore, this study will examine how supply chain management practices and the use of ICT affect the competitive advantage and performance of MSMEs in the handicraft sector.

According to Delbufalo (2022), competitive advantage occurs when a firm has a product or service that is considered by customers to be better than its competitors. A product or service that is better than competitors can create a competitive advantage. However, when there is a better process in each value provided to customers, the firm will create a better competitive advantage as well. Studies show that SCM and ICT can be key drivers in creating competitive advantage, as they contribute to improved operational efficiency, risk management, and adaptation to market changes (Rahadi, 2012).

Performance is also often interpreted as a work result or work achievement (Andi, 2017). Doing the best in every work component in the firm can create the best work results so as to improve firm performance. By making steady improvements to the operating process, the firm will create an advantage as evidenced by new achievements or achievements in the operating process so that it can improve the firm's performance because it has reached and even exceeded the target desired by the firm. Various studies have shown that good supply chain management can improve business efficiency, while technology utilization can accelerate decision-making and improve competitiveness (Budi Suprapto & Wijaya, 2022).

A number of studies have highlighted the importance of supply chain management in improving business performance. Budi Suprapto and Deonosius Ari Wisnu Wijaya (2022) found that supply chain management influences supplier relationships, which impacts the achievement of target prices and production levels. However, some other studies show different results. Nurdianti et al. (2017) found that the effect of supply chain management on firm performance is not always significant, especially in MSMEs with limited capital and production capacity. Similar results were found by Rahardi (2012), who stated that without the support of digital technology, the effectiveness of supply chains in improving the competitiveness of MSMEs is limited.

In addition, most previous studies have focused on the manufacturing and large retail sectors, while studies that specifically address MSMEs in the handicraft sector are limited (De Guimarães, 2018). Therefore, this study aims to fill the research gap by analyzing the supply chains of handicraft MSMEs, as well as adding information and communication technology (ICT) variables as factors that can strengthen the relationship between supply chains and business performance.
This research has novelty in several aspects compared to previous research, namely the focus on handicraft MSMEs, where this research is different from previous research which mostly discusses supply chains in other umkm sectors, this research specifically examines handicraft MSMEs in Bantul and Sleman, which have a pattern of long-term relationships with suppliers as the main supply chain strategy (Sinaga et al., 2021).

This study also focuses on the Integration of Information and Communication Technology (ICT) in Supply Chain Management practices, expanding the scope of supply chain research by adding ICT as a supporting factor that can improve efficiency in supplier coordination and product distribution (Koh, Orzes & Jia, 2019).

This study also seeks to address inconsistencies in the results of previous research, by re-examining the relationship between supply chain practices and firm performance in the context of MSMEs, where this

study aims to answer the differences in findings in previous studies (Nurdianti et al., 2017; Budi Suprapto & Wijaya, 2022)..

2 Literature Review

2.1 Literature Review

2.1.1 Supply Chain Management Practices

Supply chain management (SCM) is the management of the flow of products, information, and funds within a corporate network aimed at improving operational efficiency and customer satisfaction (Sinaga et al., 2021). Logistics management, which later evolved into supply chain management, is one of the key elements covered in operations management approaches (Rini, P. L., 2020). Supply chain management is a measurement instrument that starts with raw materials, moves on to business operations, and ends with consumer distribution (Saptiadi & Koesdiningsih, 2022).Good SCM practices can improve production and distribution efficiency, reduce operational costs, and strengthen relationships with suppliers and customers (Jamaludin, 2021). In addition, SCM enables companies to identify and reduce waste, improve supply chain visibility, and speed up the process of delivering goods to customers. Companies that implement a strong SCM strategy can be more responsive to market demand, reduce inventory costs, and avoid disruptions in product distribution. This shows that SCM is not just an additional element in business operations but an integral part of a successful business strategy.

2.1.2 Information and Communication Technology

Information and Communication Technology (ICT) is a major factor in improving the effectiveness of firm operations and strengthening relationships in the supply chain (Tripathy et al., 2016). The application of ICT in the supply chain can improve real-time information exchange, accelerate the decision-making process, and optimize inventory management and logistics (Alcaraz et al., 2017). It also enables businesses to expand their market reach through e-commerce and digital marketing. With ERP systems and cloud-based technologies, companies can integrate various aspects of business such as production, marketing, and distribution. Thus, ICT is not just a tool, but also a catalyst in improving business competitiveness and efficiency.

2.1.3 Competitive Advantage

Competitive advantage refers to the uniqueness possessed by a firm that distinguishes it from competitors (Heizer & Render, 2015). This advantage can be obtained through operational efficiency, innovation, product differentiation, and the use of better technology (Banerjee, 2015). By having a competitive advantage, companies can increase market share and maintain customer loyalty (Suprapto & Wijaya, 2022). In addition, companies that have a competitive advantage can set premium prices, build stronger brands, and create long-term relationships with customers. Competitive advantage also helps companies survive in increasingly fierce industry competition by adjusting strategies based on evolving market trends.

2.1.4 Firm Performance

Firm performance can be measured through sales growth, market share, profit, and operational efficiency (Basco et al., 2019). Improved firm performance is often associated with the effectiveness of SCM strategies and the use of ICT that supports business operations (Supriyadi & Setyorini, 2020). In addition, firm performance can also be influenced by customer satisfaction, innovation, and the firm's

ability to adapt to changes in the business environment. Sound financial management and data-driven business decisions also play a role in ensuring sustainable firm growth.

2.2 Hypothesis Development

2.2.1 Supply Chain Management Practices have a positive effect on Firm Performance

Good SCM practices help companies manage the flow of products, information, and funds more efficiently, thereby increasing customer satisfaction and firm productivity (Sinaga et al., 2021). With optimal SCM implementation, companies can increase effectiveness in distribution and production, which in turn has an impact on improving overall performance (Basheer et al., 2019; Buer et al., 2021).

2.2.2 Information and Communication Technology has a positive effect on Supply Chain Management Practices

The application of ICT in SCM plays an important role in increasing transparency, efficiency, and accelerating decision making. ICT helps companies obtain and analyze information to plan better supply chain strategies (Tripathy et al., 2016). With the use of technologies such as management information systems and business intelligence, companies can integrate data from various sources and provide deeper insights in decision making (Levi et al., 2004; Colin et al., 2016).

2.2.3 Supply Chain Management practices have a positive effect on Competitive Advantage

Effective supply chain management enables companies to reduce operational costs and increase product distribution speed. This provides a significant competitive advantage in a competitive market (Jamaludin, 2021). In addition, well-coordinated SCM increases the competitiveness of the firm by ensuring better product quality and timeliness in fulfilling customer demand (Hafid & Zulian, 2022).

2.2.4 Information and Communication Technology has a positive effect on Competitive Advantage

The use of ICT allows companies to automate various operational processes, increase efficiency in communication with suppliers and customers, and accelerate product innovation (Alcaraz et al., 2017). Information and communication technology also helps in the collection and analysis of market data, which allows companies to develop more effective marketing strategies and respond quickly to market changes (Tripathy et al., 2016).

2.2.5 Competitive Advantage has a positive effect on Firm Performance

Competitive advantage allows companies to increase market share, maintain customer loyalty, and increase profitability (Suprapto & Wijaya, 2022). In a competitive business environment, companies that have a competitive advantage are more likely to experience sustainable growth because they are able to offer products and services that are superior to competitors (Heizer & Render, 2015; Banerjee, 2015; Charisma et al., 2018).

2.3 Research Framework

Based on theory, previous research, and research hypotheses, a research framework was created as follows to test the influence between supply chain management practices and information and communication technology on competitive advantage and firm performance.

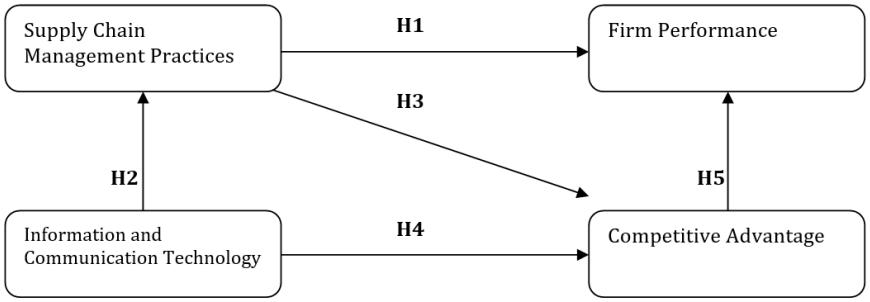

Figure 1: Research Framework

3 Research Methods

Population refers to the entire group of subjects relevant to the study (Sekaran & Bougie, 2017). In this study, the population consists of micro, small, and medium enterprises (MSMEs) in the handicraft sector located in Bantul and Sleman Regency.

The sampling technique used in this study is non-probability sampling, which means not all members of the population have an equal chance of being selected (Garaika, 2019). Specifically, this study employs purposive sampling, a method where the sample is chosen based on specific criteria (Sekaran & Bougie, 2017).

The selection criteria for MSMEs in this study include:

- MSMEs that have been operating for more than three years, ensuring that they have an established operational and supply chain management system.
- MSMEs that utilize social media platforms as a communication and coordination tool, aligning with the study's focus on information and communication technology (ICT).

By using purposive sampling, the study ensures that the selected MSMEs have the necessary experience and digital engagement, making them relevant subjects for analyzing the impact of supply chain management and ICT on competitive advantage and business performance.

This research employs primary data, which is collected directly from respondents through a structured questionnaire (Sekaran & Bougie, 2017). A questionnaire is an efficient tool for collecting a large amount of information in a relatively short time (Fink in Sekaran & Bougie, 2017). The questionnaire is distributed to MSMEs in the handicraft sector in Bantul and Sleman Regency, either online or in person, to ensure a higher response rate. From the questionnaires distributed, 114 questionnaires were returned and 5 of them did not meet the requirements so that the total number of respondents was 109 businesses.

The questionnaire is designed using a Likert scale, a widely used measurement tool in social sciences (Sekaran & Bougie, 2017). This study utilized a Likert scale consisting of five measurement points.

The questionnaire consists of multiple sections, including:

- Demographic information (number of employee, locatin, and types of social media used).
- Supply Chain Management Practices (strategic supplier partnership, customer relationship, information sharing, warehousing management, and forecasting) based on Sinaga et al. (2021).
- Information and Communication Technology (ICT) Adoption, including ICT for information dissemination, transaction facilitation, communication, and customization (Sinaga et al., 2021).
- Competitive Advantage (price, delivery, product innovation, product quality, time-to-market) (Sinaga et al., 2021).

- Business Performance, measured by sales growth, market share growth, profit growth, and return on investment (Basco et al., 2019).

The collected data is analyzed using quantitative analysis methods. The study employs descriptive statistics to summarize the characteristics of the respondents and the variables under investigation (Sekaran & Bougie, 2017). Descriptive statistics help in identifying patterns, trends, and general characteristics of the data.

To test the research hypotheses, the study applies structural equation modeling (SEM) with AMOS. In this study, which utilizes the SEM-AMOS method, the assumption of data normality was tested by examining the Critical Ratio (CR) values in the AMOS output. A CR value exceeding ±2.58 indicates a deviation from normal distribution, while a CR value within ±2.58 confirms that the data meets the assumption of normality.

Furthermore, model testing was conducted by evaluating the model fit using various goodness-of-fit indices, including Chi-Square, CMIN/DF, GFI, AGFI, TLI, CFI, and RMSEA. Hypothesis testing was carried out by analyzing the path coefficients between variables. If the path coefficient has a CR value greater than 2 or a p-value less than $\alpha = 0.05$, the path is considered statistically significant at the 5% significance level. Additionally, the direction of the effect can be determined by the sign of the path coefficient. A positive sign indicates that the independent variable has a positive influence on the dependent variable.

4 Research Results and Discussion

In this study, the measurement model was evaluated using the SEM-AMOS method as displayed in Figure 2.

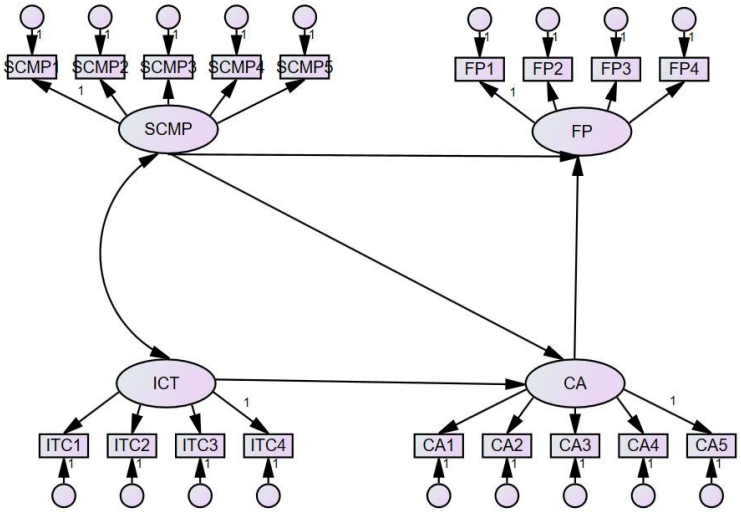

Figure 2: Measurement Model

Based on the measurement model, the normality assumption of the data distribution was tested, and the results are presented in the following table.

Table 1: Assumption of Normal Distribution Result

Indicator	Skewness	C.R	Kurtosis	C.R
SMCP 1	-0.104	-0.52	-0.461	-1.153
SCMP 2	-0.372	-1.859	-0.362	-0.906

SCMP 3	-0.366	-1.831	0.236	0.59
SCMP 4	0.257	1.284	-0.225	-0.562
SCMP 5	0.403	2.014	-0.348	-0.871
ICT 1	0.421	2.106	-0.244	-0.611
ICT 2	-0.414	-2.072	-0.361	-0.902
ICT 3	-0.491	-2.456	-0.445	-1.112
ICT 4	-0.453	-1.766	-0.609	-1.521
CA 1	-0.302	-1.511	-0.511	-1.278
CA 2	-0.233	-1.163	-0.52	-1.303
CA 3	-0.341	-1.722	-0.552	-1.384
CA 4	-0.435	-2.175	-0.528	-1.325
CA 5	-0.09	-0.45	-0.221	-0.554
FP 1	-0.177	-0.881	-0.253	-0.635
FP 2	-0.412	-2.062	0.064	0.162
FP 3	-0.293	-1.463	-0.054	-0.136
FP 4	-0.261	-1.306	-0.162	-0.404
Multivariate	-0.367	-1.835	-0.427	-1.086

From the table, it can be seen that the overall Critical Ratio (CR) values for the skewness and kurtosis of all indicators are less than 2.58 in absolute terms, indicating that the data follows a normal distribution. Therefore, the assumption of normality is fulfilled, and the data is suitable for further analysis. The primary data, derived from the responses of 109 participants, shows a normally distributed dataset.

In this study, the goodness-of-fit indices for the measurement model are presented as follows:

Table 2: Goodness of Fit of the Model Result

Index	Cut off Value	Result	Model Evaluation
Chi-Square	Expected to be small	159,962	Fairly Good
CMIN/DF	≤ 2,00	1,176	Good
GFI	≥ 0,90	0,906	Good
AGFI	≥ 0,90	0,869	Fairly Good
TLI	≥ 0,95	0,964	Good
CFI	≥ 0,95	0,971	Good
RMSEA	≤ 0,08	0,034	Good

According to the table, most of the goodness-of-fit indices indicate a good fit, suggesting that the model provides reliable estimates and can be considered a valid structural model. Although the Chi-Square and AGFI values are categorized as "fairly good," this does not imply that the model is weak. Chi-Square is known to be sensitive to sample size, which is why the CMIN/DF value—already meeting the "good" criteria—is a more appropriate metric. Meanwhile, AGFI remains within an acceptable range given the complexity of the model. With other indices such as GFI, TLI, CFI, and RMSEA meeting the "good" thresholds, the model is considered appropriate and valid for use in this research.

In this study, direct influence testing was conducted by observing the C.R and the significance value or p-value. The CR value must greater than 2 and the p-value ≤0.05 can be considered valid and significant. The results of the direct influence test in this study are as follows:

Table 3: Hypothesis Test Result

	Estimate	C.R	P-Value	Result
SCMP > FP	17,085	5,789	0,005	Positive and significant
ICT > SCMP	0,784	6,318	***	Positive and significant
SCMP > CA	0,781	2,356	0,018	Positive and significant
ICT > CA	9,069	4,212	0,041	Positive and significant
CA > FP	21,116	3,198	0,003	Positive and significant

The results of the path analysis of the influence of supply chain management practice variables on firm performance variables are said to be significant because the C.R ≥ 2 and the p-value is 0.005 which is <0.05. This means that supply chain management practices have a significant positive effect on firm performance. Furthermore, the results of the path analysis of the influence of information and communication technology variables on supply chain management practice variables are said to be significant because the C.R ≥ 2 and the p-value is *** which is <0.05. This means that information and communication technology has a significant positive effect on supply chain management practices. Then, the results of the path analysis of the influence of supply chain management practice variables on competitive advantage variables are said to be significant because the C.R ≥ 2 and the p-value is 0.018 which is <0.05. This means that supply chain management practices have a significant positive effect on competitive advantage. Then, the results of the path analysis of the influence of information and communication technology variables on competitive advantage variables are said to be significant because the C.R ≥ 2 and the p-value is 0.041 which is <0.05. This means that information and communication technology has a significant positive effect on competitive advantage. for the last hypothesis, the path analysis of the influence of the competitive advantage variable on the firm's performance variable is said to be significant because the C.R ≥ 2 and the p-value is 0.003 which is <0.05. This means that competitive advantage has a significant positive effect on firm performance.

The results confirm that Supply Chain Management (SCM) practices positively impact firm performance, supporting Hypothesis 1. Sustainable SCM practices in handicraft MSMEs in Bantul and Sleman Regency enhance efficiency, control production costs, and ensure business sustainability. Key aspects include strategic supplier selection for high-quality raw materials and cost-effective procurement. By maintaining strong relationships with suppliers and ensuring stable raw material availability, MSMEs can produce high-quality products that meet market demands while minimizing production costs. Additionally, SCM practices such as inventory control and demand forecasting help businesses optimize resource allocation and reduce operational risks. This finding aligns with Jamaludin (2021), who found that effective SCM enhances operational efficiency, improves supplier relationships, and increases firm performance through cost efficiency and customer satisfaction. Businesses that successfully implement SCM strategies tend to achieve higher productivity, better inventory turnover, and improved responsiveness to market changes, all of which contribute to superior firm performance.

Hypothesis 2 is supported, indicating that Information and Communication Technology (ICT) significantly enhances SCM practices. ICT plays a critical role in inventory monitoring, supplier communication, and demand planning, reducing supply chain disruptions and improving coordination among stakeholders. MSMEs in the handicraft sector benefit from real-time tracking systems, digital procurement platforms, and automated inventory management, all of which contribute to a more responsive and efficient supply chain. The adoption of ICT also improves transparency in supplier relationships by ensuring better data accuracy, faster order processing, and enhanced supplier

collaboration. Digital tools help MSMEs predict supply chain bottlenecks and adjust procurement strategies accordingly, leading to better operational outcomes. This finding is consistent with Sinaga et al. (2021), who demonstrated that integrating ICT into supply chain processes enhances efficiency, reduces delays, and allows businesses to respond more effectively to changes in market demand.

The results confirm that SCM practices positively influence competitive advantage, supporting Hypothesis 3. Effective SCM strategies allow MSMEs to gain a competitive edge by ensuring high-quality raw materials, efficient production processes, and timely delivery of products. By optimizing their supply chains, businesses can reduce lead times, improve product consistency, and offer better pricing strategies, making them more attractive to customers. Additionally, supplier collaboration and inventory optimization contribute to greater flexibility in adapting to market fluctuations. This finding aligns with Jamaludin (2021), who emphasized that well-managed SCM practices strengthen competitive positioning by enhancing product differentiation and cost efficiency. Firms that effectively manage their supply chains are more capable of sustaining long-term competitive advantages and expanding their market presence.

Hypothesis 4 is supported, showing that ICT adoption significantly enhances competitive advantage. MSMEs leveraging digital technologies gain a stronger market presence, improved customer engagement, and better operational agility. ICT tools such as e-commerce platforms, digital marketing, and real-time data analytics enable businesses to expand their reach and enhance customer experiences. Moreover, ICT allows businesses to respond faster to consumer trends, streamline order fulfillment, and offer personalized services, strengthening their competitive position. This is in line with Sinaga et al. (2021), who found that ICT integration improves business performance by enhancing supply chain visibility, reducing inefficiencies, and fostering innovation. Businesses that effectively implement digital solutions are more adaptable to market changes and capable of sustaining long-term growth.

The findings confirm that competitive advantage positively affects firm performance, supporting Hypothesis 5. MSMEs with strong competitive advantages, such as unique product offerings, superior quality, and efficient operations, tend to achieve higher profitability and customer retention. A well-established competitive advantage allows businesses to differentiate themselves in crowded markets, attract loyal customers, and drive consistent revenue growth. Additionally, firms with strong competitive advantages are better positioned to withstand market uncertainties and economic downturns. This finding is consistent with Jamaludin (2021), who found that businesses with distinct competitive advantages experience higher financial stability, better brand recognition, and increased market share. As a result, competitive advantage serves as a key driver for sustainable firm performance.

5 Conclusions and Suggestions

Based on a quantitative study using Structural Equation Modeling – AMOS, it is concluded that Supply Chain Management (SCM) positively affects firm performance, meaning that improved SCM efficiency enhances business outcomes. Information and Communication Technology (ICT) significantly influences SCM practices, improving integration and coordination within the supply chain. SCM also positively impacts competitive advantage, strengthening pricing, quality, and delivery efficiency, while ICT enhances competitive strategies through market analysis and business optimization. Furthermore, competitive advantage positively affects firm performance, proving that strong supply chain practices and ICT adoption contribute directly to overall business success. With 109 MSME respondents in the handicraft sector in Bantul and Sleman Regency, the study confirms that all proposed hypotheses are significant, highlighting the importance of effective SCM and ICT utilization in enhancing competitive advantage and firm performance.

To optimize these benefits, MSMEs should establish long-term relationships with strategic suppliers to maintain stable, high-quality, and cost-effective raw materials, while also strengthening customer

engagement to increase loyalty and align products with market demand. Information exchange with suppliers regarding strategic planning, demand forecasting, and warehouse management should be enhanced to prevent stock imbalances and optimize inventory storage. Additionally, ICT adoption for product information dissemination via social media, websites, and marketplaces should be prioritized, along with digital payment systems to streamline transactions. Finally, ICT should be integrated into logistics and customer interactions, enabling real-time product tracking, personalized services, and data-driven marketing strategies, allowing MSMEs to adapt more effectively to market needs and enhance overall business sustainability.

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