



The Influence of Operational Planning, Control and Supervision on E-Commerce Order Management Performance in MSMEs in Yogyakarta

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ARTICLE INFO

Keywords: Operational Planning, Operational Control, Operational Supervision, Order Management Performance, MSMEs

Received : 16, August

Revised : 30, August

Accepted: 25, September

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ABSTRACT

This study aims to analyze the influence of operational planning, control, and supervision on the performance of e-commerce order management in MSMEs in Yogyakarta with a quantitative approach using the Structural Equation Modeling-Partial Least Squares (SEM-PLS) method on 232 respondents. The results of the study indicate that operational planning and control do not have a significant effect on order management performance, while operational supervision has a positive and significant effect. This finding confirms that the supervision aspect, especially monitoring the implementation of SOPs and direct order processes, is more effective in increasing customer satisfaction compared to planning and control which are still constrained by limited MSME resources. This study provides practical implications for MSMEs to strengthen operational supervision and gradually improve the quality of planning and control so that the performance of e-commerce order management is increasingly optimal.

INTRODUCTION

In today's digital era, e-commerce has become an integral part of the business strategies of many companies, including some MSMEs following the pandemic. Utilizing e-commerce as a primary channel for sales and customer interaction is arguably promising. E-commerce is the trade of goods or services through electronic systems such as the internet or other computer networks. All components of commerce are applied to e-commerce, such as customer service, product services, payment methods, and promotional methods (Sitepu et al., 2019). With e-commerce, all stock information can be displayed to customers on the front page, so customers can see and be interested in reading promotions offered by an MSME (Sitepu et al., 2019). E-commerce allows businesses to reach a wider market with relatively lower operating costs than brick-and-mortar stores. This phenomenon has grown even more since the COVID-19 pandemic, which has accelerated business digitalization, including in the Micro, Small, and Medium Enterprises (MSMEs) sector in Indonesia (Mustafa et al., 2023)

In e-commerce, one of the most important aspects determining success is order management performance. This process encompasses a series of activities, from receiving and packaging to shipping, to after-sales service. Effective order management can impact customer satisfaction and the overall reputation of a business (Nasution et al., 2024). Therefore, an operational management system is needed that can support the smooth and efficient running of all these processes. Effective order management in e-commerce directly impacts the customer experience, particularly in terms of timely delivery and product conformity. Customer satisfaction is key to building loyalty and reputation, which are crucial in an increasingly competitive market.

Operational management plays a role in regulating core operational activities such as planning, controlling, and supervising the order fulfillment process. Implementing good operational management enables MSMEs to improve order processing accuracy, delivery speed, and customer service quality. Research by (Mikraj et al., 2024) stated that the integration between operational management and digital systems greatly influences the speed and accuracy of order fulfillment, which ultimately impacts overall business performance.

Operational planning is a systematic stage that includes activity scheduling, capacity estimation, and process readiness. The results of the SEM-PLS analysis by Inuwa, (2023) shows that the planning aspect in process management has a positive influence on the quality of customer relationships in SMEs, as an indication of higher operational readiness and effectiveness.

Operational control refers to the process of monitoring and correcting during operational activities. The same study by Inuwa, (2023) found that control significantly supports good customer relationships, indicating that strong internal control impacts the stability of operational quality and service.

Operational supervision includes systematic observation and assessment of operational implementation to ensure compliance with standards. Lean manufacturing research by (Panigrahi et al., 2023) shows that lean practices, including quality control and productive maintenance, significantly improve

operational performance, which reflects the effectiveness of control in operational processes.

A common problem often faced by MSMEs is the limitation in implementing operational management optimally (Sukarnasih et al., 2024). Some of the main obstacles include a lack of strategic planning, weak operational control systems, and a lack of oversight of the digitalization process (Indriyani et al., 2024). As a result, MSMEs often struggle to fulfill orders, face increased customer complaints, and experience a decline in reputation. Therefore, it is important to further examine the impact of operational planning, control, and oversight on e-commerce order management performance in MSMEs, particularly in the Yogyakarta region.

This study aims to analyze how operational planning, control, and supervision influence the effectiveness of order management in an e-commerce system. The researcher will use a quantitative approach using the Structural Equation Modeling Partial Least Squares (SEM-PLS) method. The results are expected to provide important contributions, both theoretically and practically. This contribution is expected to help develop more efficient and adaptable digital operational strategies for the MSME sector.

LITERATURE REVIEW

Operational Management

According to (Heizer et al., 2017) Operational management is a management function related to the production of goods and services, encompassing planning, organizing, directing, and controlling resources to produce products or services efficiently and effectively. The primary goal of operational management is to improve productivity, quality, and service by managing the processes and resources used.

The objectives of Operational Management according to (Utama et al., 2019) is to achieve targets that include punctuality, quantity, and quality, with efficient and effective cost allocation. This aims to create products with added value and thus be competitive in the market.

Operational Planning

According to (Saputra & Malabay, 2022) Implementing strategic planning for a digital-based sales system can provide a significant competitive advantage for Micro, Small, and Medium Enterprises (MSMEs) transforming to online platforms. This planning includes the integration of inventory management, customer relationship management, and transaction recording systems, which collectively support operational efficiency and enhance adaptive capabilities in an e-commerce environment (Rosida et al., 2024). He added that strategic planning is a crucial element for MSMEs in determining business direction and mapping operational needs. This planning encompasses aspects such as logistics, human resource management, and digital marketing strategies. Furthermore, the effectiveness of strategic planning is also supported by thorough financial planning and optimal use of technology.

Operational Control

According to Sahabuddin et al., (2023) Economic order quantity (EOQ)-based inventory control can improve raw material efficiency and reduce waste. This is crucial in dealing with fluctuating demand on e-commerce platforms. The importance of internal control systems is also emphasized by Sukarnasih et al., (2024), which states that its effectiveness can increase consumer confidence and operational cost efficiency. This is possible due to the system's capability to monitor and report transactions in real time.

Operational Supervision

According to (Waruwu, 2021) Supervision is an essential managerial function to ensure that activities align with established plans and standards. This function is not merely reactive, meaning it corrects deviations after they occur, but also proactive, anticipating potential deviations before they occur.

Order Management Performance

Order management performance refers to the extent to which the Company is able to carry out the entire customer order fulfillment process effectively and efficiently, from the order receipt stage to the delivery of the final product. (Zaieda et al., 2016) explains that the order fulfillment process includes a series of specific stages in the supply chain flow, including the process of creating, recording, processing, producing, documenting, selecting, sending orders, and handling activities after the product is sent to the customer.

E-commerce

E-commerce, or electronic commerce, is a modern form of commerce that has experienced rapid growth since its introduction in 1995. Initially serving only as a platform for online retail sales, e-commerce has now evolved into a strategic tool encompassing a wide range of digital services, media, and unique innovations that do not exist in the physical world, such as social media and internet-based entertainment platforms. This change has had a significant impact on consumer behavior, business patterns, and global markets, with digital companies like Amazon and Google and traditional companies like Tesco integrating their operations to create more efficient and sustainable business models. In today's business world, e-commerce is not only a means of transaction, but also a key pillar in building brands, increasing efficiency, and creating better customer experiences (Laudon & Traver, 2016).

Research Framework

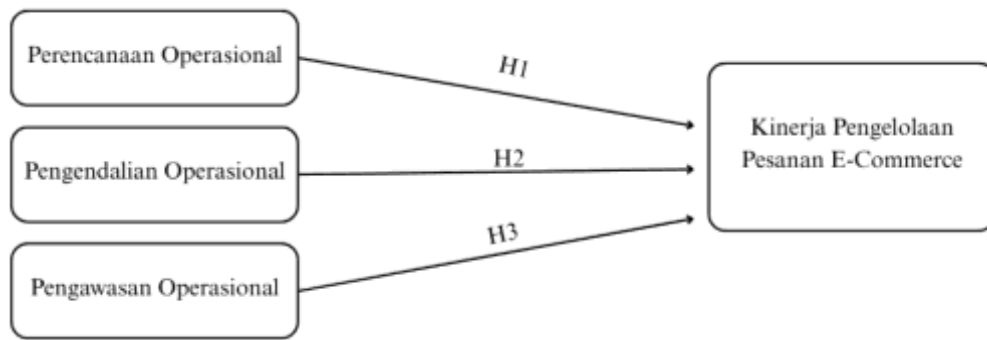


Figure 1. Research Framework

METHODOLOGY

This study uses a quantitative approach to test the formulated hypotheses regarding the influence of operational planning, control, and supervision on the performance of e-commerce order management in MSMEs in Yogyakarta. The analysis was conducted using Structural Equation Modeling-Partial Least Squares (SEM-PLS) because this method is suitable for testing causal relationships between latent variables with a relatively large sample size and Likert-scale questionnaire-based data.

The research focused on e-commerce-based MSMEs in the Yogyakarta region, given that this region has a rapidly growing small and medium enterprise ecosystem driven by digitalization programs. The study population included all MSMEs, while the sample was determined purposively, with respondents being owners, operational managers, or staff directly involved in managing online orders.

The sample size used was 232 respondents, based on the calculation of multiples of the research variable indicators. The primary instrument was a questionnaire with a five-point Likert scale (strongly agree to strongly disagree). Prior to distribution, respondents were provided with an explanation of the research objectives to ensure the validity of their responses. The collected data was primary, collected directly through questionnaires completed by MSMEs.

The research variables were divided into three independent variables and one dependent variable. The independent variables included operational planning, operational control, and operational supervision, while the dependent variable was e-commerce order management performance. Each variable was measured using indicators adapted from previous research, such as operational goal setting, process efficiency monitoring, SOP compliance, and performance indicators such as delivery timeliness and order accuracy.

The data analysis technique was conducted through two main stages. First, the outer model was tested to measure the validity and reliability of the instrument through convergent validity and discriminant validity tests, as well as indicator reliability tests. Second, the inner model was tested to evaluate the relationships between latent variables, using collinearity tests, R-square values, predictive relevance (Q-square) tests, and hypothesis testing using the

bootstrapping method. With this approach, the research is expected to produce valid, reliable, and generalizable results for the MSME population in Yogyakarta.

RESEARCH RESULTS AND DISCUSSION

Hypothesis Analysis Results Using SmartPLS

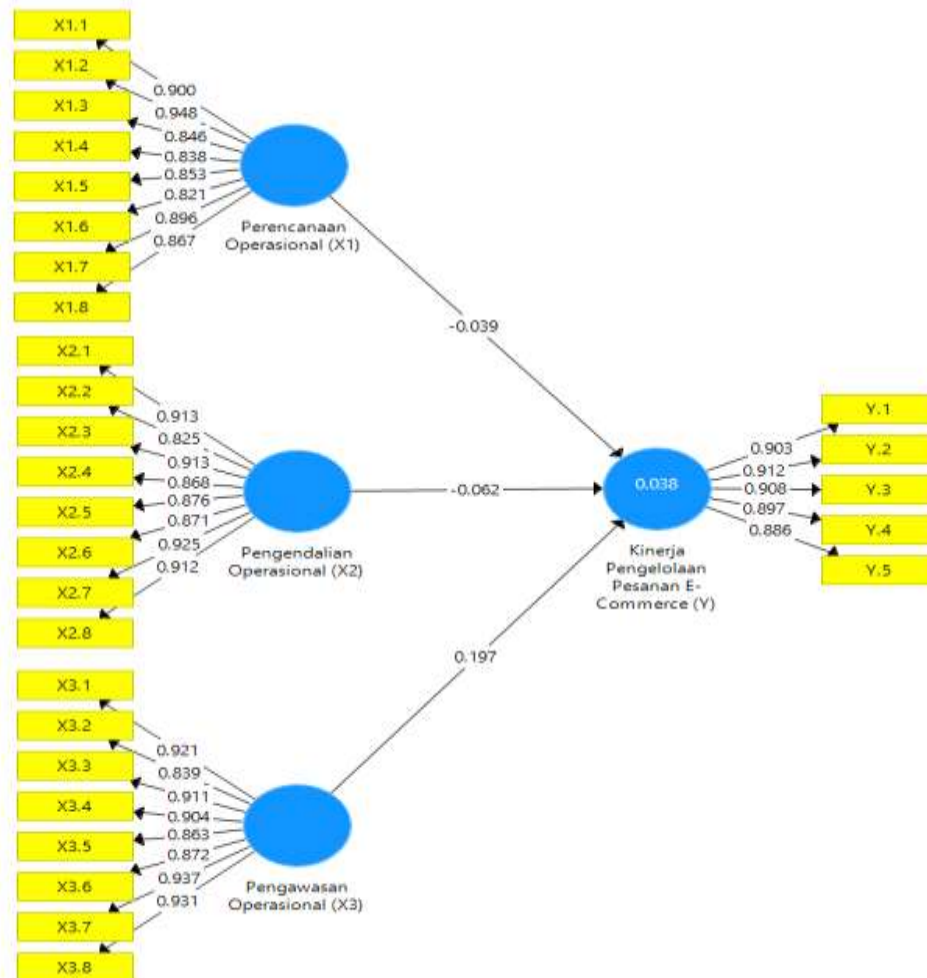


Figure 2. SmartPLS Outer Model Research Model

Data analysis in this study was conducted using SmartPLS software. This application allows researchers to conduct tests using two approaches: outer model and inner model measurements. The following presents the results of the data analysis for outer model measurements using SmartPLS. The research model shown in Figure 4.1 is a visual representation of the structure of relationships between variables in this study. The model shows the interrelationships between variables and the relationship paths between the indicators that make up each research variable.

Outer Model

1. Validity Test Results

Table 1. Test Results of Convergent Validity

Variables	Indicator	Outer Loading Value	AVE	Information
Operational Planning (X1)	X1.1	0.900	0.760	Valid
	X1.2	0.948		Valid
	X1.3	0.846		Valid
	X1.4	0.838		Valid
	X1.5	0.853		Valid
	X1.6	0.821		Valid
	X1.7	0.896		Valid
	X1.8	0.867		Valid
Operational Control (X2)	X2.1	0.913	0.790	Valid
	X2.2	0.825		Valid
	X2.3	0.913		Valid
	X2.4	0.868		Valid
	X2.5	0.876		Valid
	X2.6	0.871		Valid
	X2.7	0.925		Valid
	X2.8	0.912		Valid
Operational Supervision (X3)	X3.1	0.921	0.806	Valid
	X3.2	0.839		Valid
	X3.3	0.911		Valid
	X3.4	0.904		Valid
	X3.5	0.863		Valid
	X3.6	0.872		Valid
	X3.7	0.937		Valid
	X3.8	0.931		Valid
E-Commerce Order Management Performance (Y)	Y.1	0.903	0.812	Valid
	Y.2	0.912		Valid
	Y.3	0.908		Valid
	Y.4	0.897		Valid
	Y.5	0.886		Valid

Based on Table 1 above, the researcher has conducted a large-sample convergence validity test. In this analysis, two values were used: the outer loading value and the Average Variance Extracted (AVE). If the outer loading value is greater than 0.70, the indicator is considered valid.

Table 2. Test Results of *Discriminant Validity*

	Operational Planning (X1)	Operational Control (X2)	Operational Supervision (X3)	E-Commerce Order Management Performance (Y)
X1.1	0.900	0.169	0.074	-0.016
X1.2	0.948	0.197	0.050	-0.040
X1.3	0.846	0.159	0.061	-0.032
X1.4	0.838	0.167	0.029	-0.046
X1.5	0.853	0.170	0.032	-0.042
X1.6	0.821	0.174	0.039	-0.030
X1.7	0.896	0.192	0.046	-0.038
X1.8	0.867	0.182	0.050	-0.025
X2.1	0.167	0.913	0.239	-0.011
X2.2	0.165	0.825	0.191	-0.013
X2.3	0.158	0.913	0.239	-0.009
X2.4	0.172	0.868	0.205	-0.021
X2.5	0.208	0.876	0.201	-0.026
X2.6	0.176	0.871	0.211	-0.019
X2.7	0.198	0.925	0.225	-0.027
X2.8	0.152	0.912	0.246	-0.013
X3.1	0.047	0.222	0.921	0.167
X3.2	0.061	0.212	0.839	0.150
X3.3	0.019	0.214	0.911	0.160
X3.4	0.068	0.215	0.904	0.156
X3.5	0.076	0.234	0.863	0.147
X3.6	0.043	0.212	0.872	0.156
X3.7	0.046	0.232	0.937	0.167
X3.8	0.014	0.214	0.931	0.182
Y.1	-0.040	-0.023	0.160	0.903
Y.2	-0.052	-0.026	0.171	0.912
Y.3	-0.051	-0.024	0.165	0.908
Y.4	-0.002	-0.012	0.155	0.897
Y.5	-0.037	-0.014	0.157	0.886

The table above displays the cross-loading values for each indicator of the research variables. Each indicator exhibits the highest cross-loading value on its original construct compared to the values on other constructs. This indicates that each indicator meets the criteria for discriminant validity, as measurements based on the cross-loading factor indicate that the indicator more accurately represents the variable it is intended to measure.

2. Reliability Test Results

Table 3. Test Results of Cronbach's Alpha and Composite Reliability Values

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
E-Commerce Order Management Performance (Y)	0.942	0.945	0.956	0.812
Operational Planning (X1)	0.956	0.972	0.962	0.760
Operational Control (X2)	0.963	1,004	0.968	0.790
Operational Supervision (X3)	0.965	0.968	0.971	0.806

Table 3 above presents the results of the reliability test using Cronbach's Alpha and Composite Reliability values, where all values obtained exceeded 0.70. Thus, it can be concluded that all variables in this study meet reliability criteria and are considered consistent and trustworthy instruments.

Inner Model

1. Multicollinearity Test Results

Table 4. Multicollinearity Test Results

	VIF
E-Commerce Order Management Performance (Y)	
Operational Planning (X1)	1,043
Operational Control (X2)	1,106
Operational Supervision (X3)	1,063

Based on Table 4 above, it can be seen that all variable indicators in this study have Variance Inflation Factor (VIF) values below the threshold of 5.00. This indicates no indication of multicollinearity among these variables. Therefore, it can be concluded that all variables in this study are in ideal condition and free from multicollinearity issues.

2. Results of the Coefficient of Determination (R Square) Test

Table 5 Output Results Values R Square

	R Square	R Square Adjusted
E-Commerce Order Management Performance (Y)	0.038	0.026

Referring to Table 5 above, the R Square value obtained was 0.038 for the variable E-Commerce Order Management Performance (Y). This indicates that 22.5% of the variation in Micro, Small, and Medium Enterprises (MSMEs) Development (Y) can be explained by the independent variables in this study. Meanwhile, the remaining 77.5% is influenced by other factors not included in this research model. Technically, it is in the weak category in explaining endogenous variables.

3. Q Square Test Results

Table 6. Output Value Results Q Square

	R-Square	Q-Square (1 - (1 - R ²))	Category
E-Commerce Order Management Performance (Y)	0.038	0.038	Small

Based on the calculation results in the table above, the Q-Square value obtained is 0.038. This value is greater than zero, so it can be concluded that the model has predictive relevance to the endogenous variables. However, when compared to the interpretation criteria (0.02 = small, 0.15 = medium, and 0.35 = large), the Q-Square value obtained is in the small category.

4. T-Test Results

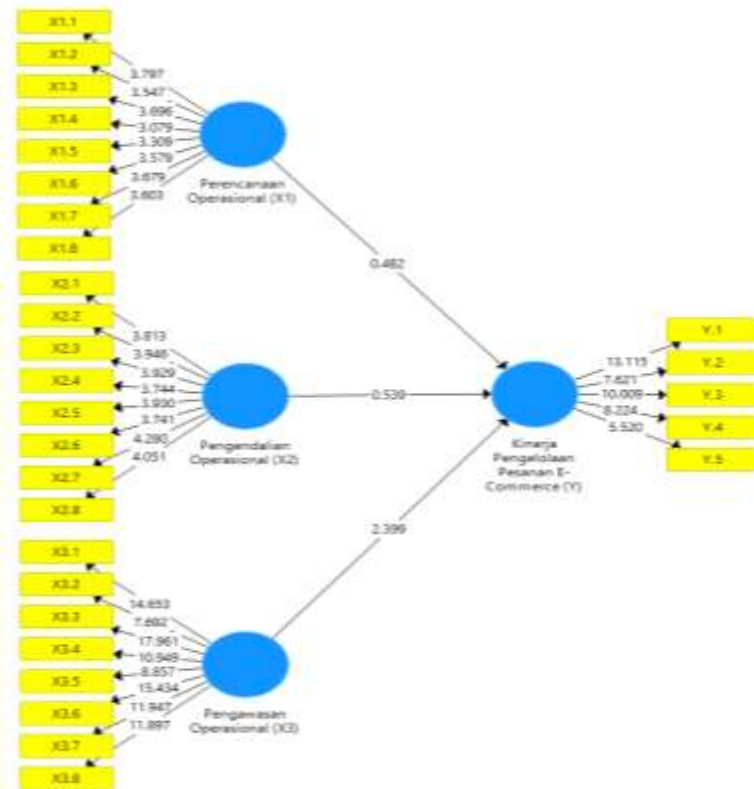


Figure 3. SmartPLS Inner Model Research Model

In this study, hypothesis testing was conducted using the bootstrapping method with the help of SmartPLS software. This process involved analyzing the path coefficient and t-statistic values, which measure the relationship between variables in the research model. Testing was performed by comparing the calculated t-value from the SmartPLS output with the t-table value at a significance level of 0.05. Since the sample size in this study was 232 respondents, the t-table value used was 1.96.

Table 7. Hypothesis Test Results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Operational Planning (X1) -> E-Commerce Order Management Performance (Y)	-0.039	-0.043	0.081	0.482	0.630
Operational Control (X2) -> E-Commerce Order Management Performance (Y)	-0.062	-0.058	0.116	0.539	0.590
Operational Supervision (X3) -> E-Commerce Order Management Performance (Y)	0.197	0.196	0.082	2,399	0.017

Based on the results of the t-statistic test in Table 7, the results of the research hypothesis with a direct effect were obtained, which tested three hypotheses. The three hypotheses tested included the direct effect of the independent variable on E-Commerce Order Management Performance (Y).

Table 8. Summary of Hypothesis Test Results

Hypothesis		Sig.	T Statistics (O/STDEV)	Conclusion
H1	Operational Planning (X1) -> E-Commerce Order Management Performance (Y)	0.630	0.482	H1 is rejected
H2	Operational Control (X2) -> E-Commerce Order Management Performance (Y)	0.590	0.539	H2 is rejected
H3	Operational Supervision (X3) -> E-Commerce Order Management Performance (Y)	0.017	2,399	H3 is accepted

DISCUSSION

The Influence of Operational Planning on E-Commerce Order Management Performance

The results of the SmartPLS analysis show that operational planning (X1) does not significantly influence the performance of e-commerce order management (Y), with a p-value of $0.630 > 0.05$ and a t-statistic of $0.482 < 1.96$. This means that the first hypothesis (H1) is rejected. This finding indicates that although planning is an important aspect in operational management, in practice many MSMEs in Yogyakarta have not optimally implemented planning

systematically, so it does not contribute significantly to improving order management performance.

These results differ from those of Nudurupati et al. (2021) and Zhang et al. (2025), who asserted that thorough operational planning—such as goal setting, scheduling, and inventory optimization—can improve order fulfillment efficiency. This discrepancy may be due to the characteristics of MSMEs in Yogyakarta, which are mostly small-scale and relatively new (<5 years old), resulting in simplistic and poorly documented planning processes. This supports the statement by Putri Nurliani et al. (2024) that digitalizing inventory planning only has a significant impact if implemented consistently through an integrated stock management system.

The Influence of Operational Control on E-Commerce Order Management Performance

Operational control (X2) was also shown to have no significant effect on order management performance (p -value $0.590 > 0.05$; t -statistic $0.539 < 1.96$). Thus, the second hypothesis (H2) was rejected. These findings indicate that control efforts such as cost monitoring, efficiency evaluation, and control over order returns have not been able to consistently improve customer satisfaction or delivery timeliness in MSMEs in Yogyakarta.

These results are inconsistent with the research of Li et al. (2022), which emphasized the importance of warehouse control and order picking systems in increasing productivity. Similarly, Sahabuddin et al. (2023) found that implementing the Economic Order Quantity (EOQ) method can reduce waste. However, this difference in results can be explained by the fact that most MSME respondents only have <5 employees (66%), so control mechanisms are not yet digitally based and rely more on manual supervision. This is in line with the findings of Sukarnasih et al. (2024) that weak internal control is a common obstacle for MSMEs in managing orders efficiently.

The Influence of Operational Supervision on E-Commerce Order Management Performance

Unlike the previous two variables, operational supervision (X3) was proven to have a significant effect on order management performance with a p -value of $0.017 < 0.05$ and a t -statistic of $2.399 > 1.96$. Thus, the third hypothesis (H3) was accepted. These results confirm that the implementation of intensive supervision, such as monitoring SOP implementation, real-time order tracking, and service quality evaluation, significantly contributed to improving order accuracy and customer satisfaction.

These findings are consistent with research by Waruwu (2021) and Ayu & Boromeus (2024), which states that supervision functions not only as a corrective mechanism but also as a preventive mechanism in preventing operational deviations. Furthermore, these results align with the findings of Mueller & Swoboda (2025) and Wang et al. (2022), which emphasize that real-time data- and technology-based monitoring systems can improve service consistency and delivery accuracy. The fact that Yogyakarta MSMEs emphasize supervision over

planning and control suggests that business owners are more focused on practical fieldwork than long-term strategies.

The Influence of Planning, Control, and Supervision on E-commerce Order Management Performance in MSMEs

The results of the fourth hypothesis test (H4) indicate that operational management, consisting of planning, control, and supervision, does not have a fully positive and significant effect on e-commerce order management performance in MSMEs. Of the three dimensions tested, only operational supervision proved to have a positive and significant effect, while operational planning and control had no significant effect and even had a negative coefficient.

These findings indicate that in the context of MSMEs, operational oversight plays a more dominant role in improving order management performance. Consistent oversight, such as monitoring the ordering process, product quality, and adherence to service standards, can have a direct impact on increasing customer satisfaction and smooth order fulfillment. This aligns with Heizer & Render's (2017) view that operational oversight serves as a continuous evaluation mechanism to ensure processes are running according to established standards and objectives.

In contrast, operational planning and control did not significantly impact MSME performance. This can be explained by the characteristics of MSMEs, which are generally still managed simply, with limited human resources, technology, and capital. Many MSMEs implement business planning only in the form of informal plans without systematic calculations, so their contribution to order performance is insignificant. Similarly, the control function, which is often still carried out manually and is limited, has not been able to provide a tangible effect on improving performance. This is in line with previous research which states that MSMEs tend to emphasize practical operational aspects over complex administrative controls (Ghozali, 2018).

This finding also confirms that the low R-Square value for order management performance (0.038) indicates that many other factors are more dominant in influencing performance, such as digital technology adoption, marketing strategy, and human resource quality. Thus, although operational management theoretically encompasses planning, control, and supervision as a unified, integrated system (Stevenson, 2021), in practice, supervision is a more significant aspect in the MSME sector, significantly impacting performance compared to the other two dimensions.

Therefore, the results of this study provide practical implications: MSMEs need to strengthen their monitoring systems in managing e-commerce orders, for example through the use of simple applications to track order status, notification systems, and customer service evaluations. Furthermore, improving the quality of planning and control remains crucial, particularly with the support of digital literacy and modern management, so that all three dimensions of operational management can contribute equally to MSME performance in the digital era.

CONCLUSION

1. Operational planning has no significant impact on e-commerce order management performance. This indicates that most MSMEs in Yogyakarta have not implemented operational planning systematically, thus, its existence has not been able to improve delivery accuracy or order accuracy.
2. Operational control also had no significant impact on e-commerce order management performance. This finding indicates that control mechanisms, such as cost monitoring, returns control, and process efficiency evaluation, are not functioning optimally because most MSMEs still rely on manual methods with limited human resources and technology.
3. Operational oversight has a positive and significant impact on e-commerce order management performance. This demonstrates that intensive oversight practices, both in the form of SOP monitoring and real-time order tracking, can increase customer satisfaction and reduce the risk of errors in order processing.
4. Operational management, consisting of planning, control, and supervision, has a positive and significant effect on e-commerce order management performance in MSMEs, but this is not fully proven. Of the three operational management dimensions tested, only operational supervision demonstrated a positive and significant effect on performance, while operational planning and control did not. This indicates that in MSME practice, order management success is largely determined by consistent supervision, while the contribution of planning and control remains limited.
5. Overall, this study confirms that among the three aspects of operational management, supervision is the most dominant factor influencing the performance of e-commerce order management in MSMEs in Yogyakarta. This suggests that a direct supervision approach is easier for MSMEs to implement than more complex planning and control strategies.

RECOMMENDATION

1. For MSMEs
 - a. Improve the quality of operational planning by utilizing simple applications such as digital stock recording systems, production schedule planning, and demand projections based on sales data.
 - b. Develop operational control mechanisms through the use of monitoring dashboards or e-commerce applications that are capable of providing automatic cost, return, and efficiency reports.
 - c. Strengthen operational oversight functions by enforcing consistent SOPs, utilizing order tracking features, and conducting regular evaluations of customer service quality.
2. For the Government and Institutions Supporting MSMEs
 - a. Providing training and technical assistance to improve the managerial competency of MSMEs, especially in the field of technology-based planning and control.

- b. Encourage collaboration with major e-commerce platforms to introduce more efficient and user-friendly operational management features for MSMEs.

ADVANCED RESEARCH

- a. This research only focuses on MSMEs in Yogyakarta, so for future research it is recommended to expand the scope of the region to obtain a more comprehensive picture.
- b. Further research could add other variables, such as the use of digital technology, human resource capacity, or marketing strategy, which are also likely to influence order management performance.

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