

The Effect of Functional Integration on Operational Performance: The Mediating Role of Customization

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Abstract

This study examines the effect of functional integration on operational performance and investigates the mediating role of customization among kebaya boutique small and medium-sized enterprises (SMEs) in Yogyakarta, Indonesia. Drawing on the Resource-Based View (RBV), the study explores how cross-functional coordination enhances operational capabilities in a make-to-order business environment. A quantitative causal research design was employed using purposive sampling of SME owners operating at least two functional divisions and offering both ready-to-wear and customized products. Data were collected through structured questionnaires and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. The findings reveal that functional integration has a significant positive effect on both operational performance and customization, indicating that effective coordination and information sharing across organizational functions improve operational efficiency and customer responsiveness. However, customization does not significantly influence operational performance and fails to mediate the relationship between functional integration and operational performance. These results suggest that although customization enhances responsiveness to customer needs, its operational benefits may not be realized without efficient processes and effective operational control. The study contributes to operations management literature by providing empirical evidence from culturally based creative SMEs and offers practical implications for improving competitiveness through stronger functional integration.

Keywords : Customization, functional integration, operational performance, resource-based view, small and medium-sized enterprises.

1. Introduction

In an increasingly competitive business environment, companies are required to manage their operational processes effectively, efficiently, and in an integrated manner. Dynamic changes in customer demands and competitive pressures compel organizations to enhance operational flexibility and responsiveness (Ferreira et al., 2019; Turkulainen & Ketokivi, 2012). Technological advancements and globalization have further increased business process complexity, demanding not only internal efficiency but also strong adaptability to external changes. In practice, firms continue to face internal constraints such as human resource quality, managerial capabilities, and technology utilization, as well as external pressures including market dynamics, competition, and policy shifts (Liu et al., 2018; Kim & Lee, 2022).

Operational performance (OP) serves as a critical indicator of operational success, reflecting cost efficiency, delivery timeliness, product quality, and waste reduction (Zhang et al., 2015; Gholami et al., 2023). However, many organizations still struggle to achieve optimal operational performance due to limited resources, weak management systems, and insufficient cross-functional coordination (Liu et al., 2021). Effective improvement in operational performance therefore requires strong process integration and organizational adaptability to the evolving business environment (Kim & Lee, 2022).

Functional integration (FI) refers to the coordination and synergy among core organizational functions such as production, marketing, finance, and customer service (Shen et al., 2023; Sheng et al., 2021). It facilitates faster and more accurate information flows across units, enabling more effective decision-making and goal alignment (Campos Sabioni et al., 2022). Prior studies indicate that functional integration significantly enhances operational efficiency, reduces operational errors, and improves responsiveness to customer needs (Wei & Sun, 2021; Flynn et al., 2010).

Customization represents a firm's ability to produce products or services tailored to individual customer requirements (Wong et al., 2021; Jafari et al., 2022). In make-to-order environments, effective customization strengthens customer satisfaction and competitive advantage (Shi et al., 2022). Existing research suggests that functional integration influences operational performance both directly and indirectly through enhanced customization capabilities. Liu et al. (2012) and Fan et al. (2024) demonstrate that customization acts as a partial mediator in the relationship between functional integration and operational performance, while Xu et al. (2024) highlight that higher functional integration improves customer responsiveness through more effective customization processes.

From a theoretical perspective, the Resource-Based View (RBV) provides a strong foundation for these relationships by emphasizing that competitive advantage stems from the effective management of internal resources and capabilities (Barney, 1991). Nevertheless, several research gaps remain. First, empirical findings on the direct effect of functional integration on operational performance are inconsistent (Liu et al., 2012; Flynn et al., 2010; Huo et al., 2016). Second, most studies focus on large-scale manufacturing firms, with limited attention to small and medium enterprises (SMEs). Third, research integrating functional integration, customization, and operational performance within cultural creative industries remains scarce.

This study addresses these gaps by examining micro, small, and medium enterprises (UMKM), particularly kebaya boutiques in Yogyakarta, Indonesia – a sector that contributes significantly to national GDP and employment but faces substantial operational challenges, especially post-COVID-19. By investigating the direct and indirect effects of functional integration on operational performance

through customization in this unique make-to-order context, the present research aims to enrich the operations management literature and provide practical insights for enhancing the competitiveness of culturally based creative SMEs.

2. Research Method

This study employs a quantitative causal design to examine the effect of functional integration on operational performance with customization as a mediating variable, replicating and extending the conceptual model of Liu et al. (2012). The population comprises Kebaya boutique SMEs in Yogyakarta, with a purposive sample of owners from businesses operating at least two functional divisions (marketing, production, product development) and offering both ready-to-wear and custom-made products. Primary data were collected through a structured closed-ended questionnaire using a 5-point Likert scale, adapted from validated instruments in prior studies.

Data analysis was conducted using SmartPLS 4.0 to perform partial least squares structural equation modeling (PLS-SEM). The evaluation followed a two-step approach: assessment of the outer model (measurement model) through convergent validity (loading factors >0.7 , AVE >0.5), discriminant validity (Fornell-Larcker criterion, HTMT <0.9), and composite reliability (>0.7), followed by assessment of the inner model (structural model) using R^2 , f^2 , and Q^2 values. Hypothesis testing was executed via bootstrapping with 5,000 resamples, evaluating path coefficients, t-statistics (>1.96), and p-values (<0.05), including mediation analysis following the criteria of Baron and Kenny (1986) and Hair et al. (2022).

3. Results and Discussion

3.1 Description of the Characteristics of Research Respondents

Table 1. Characteristics of Respondents (N = 70)

Characteristics	Category	n	%
Gender	Female	70	100
	Male	0	0
Age	25–35 years	35	50
	36–45 years	21	30
	> 45 years	14	20
Education	Senior High School/Equivalent	30	43
	Diploma	12	17
	Bachelor's Degree	21	30
	Postgraduate Degree	7	10
Business Age	3–5 years	39	56
	6–10 years	21	30
	> 10 years	10	14
Number of Employees	< 5	35	50
	5–10	25	36
	> 10	10	14
Production System	Make-to-Order	42	60

Ready Stock	21	30
Combination	7	10

Table 1. presents the demographic and business characteristics of the respondents involved in this study. The results indicate that all respondents were female (100%), reflecting the dominant role of women in the business sector examined. In terms of age, the majority of respondents were between 25 and 35 years old (50%), followed by those aged 36–45 years (30%) and those over 45 years old (20%), suggesting that most business owners or managers were in their productive working years. Regarding educational attainment, senior high school graduates constituted the largest group (43%), followed by bachelor's degree holders (30%), diploma graduates (17%), and postgraduate degree holders (10%). The findings also show that most businesses had been operating for 3–5 years (56%), while 30% had been established for 6–10 years and 14% for more than 10 years, indicating a predominance of relatively young enterprises. In terms of workforce size, half of the businesses employed fewer than five workers (50%), followed by those employing 5–10 workers (36%) and more than 10 workers (14%), highlighting the small-scale nature of most enterprises. Furthermore, the majority of respondents adopted a make-to-order production system (60%), while 30% operated using a ready-stock system and 10% employed a combination of both approaches, suggesting that customized production based on customer demand was the most common business strategy among the surveyed enterprises.

3.2 Outer Model Test Results

3.2.1 Validity Test Results

3.2.1.1 Outer Loading Result

Table 2. Outer Loading Value

Item	Outer Loading	Validity
CT 1	1.000	Valid
FI 1	0.901	Valid
FI 2	0.908	Valid
FI 3	0.887	Valid
FI 4	0.844	Valid
FI 5	0.851	Valid
OP 1	0.751	Valid
OP 2	0.751	Valid
OP 3	0.735	Valid
OP 4	0.791	Valid
OP 5	0.761	Valid
OP 6	0.710	Valid
OP 7	0.839	Valid
OP 8	0.852	Valid
OP 9	0.811	Valid

Based on the results of SmartPLS processing listed in the Table 2 above, it can be concluded that the indicators of each variable (CT1, FI1, FI2, FI3, FI4, FI5, OP1, OP2, OP3, OP4, OP5, OP6, OP7, OP8, OP9) can be declared valid because they have a loading value > 0.70 .

3.2.1.2 Discriminant Validity Result

Table 3. Discriminant Validity Fornell Larcker

Variabel	CT	FI	OP
CT	1.000		
FI	0.834	0.879	
OP	0.442	0.574	0.779

Based on Table 3, the results of the discriminant validity test using the Fornell-Larcker criterion indicate that all constructs in this study meet the required validity standards. This can be observed from the square root of the Average Variance Extracted (AVE) values on the diagonal of the matrix, where CT has a value of 1.000, FI has a value of 0.879, and OP has a value of 0.779. Each of these values is higher than the correlations between constructs, such as the correlation between CT and FI (0.834), CT and OP (0.442), and FI and OP (0.574). These findings demonstrate that each construct is empirically distinct from the others and is able to explain its own indicators better than indicators belonging to different constructs. Therefore, the measurement model exhibits satisfactory discriminant validity, indicating that the constructs used in this study are valid and suitable for further analysis.

3.2.2 Reliability Test

Table 4. Average Variance Extracted, Composite Reliability, and Cronbach Alpha

Variables	Cronbach's alpha (CA)	Composite reliability (CR)	Average variance extracted (AVE)
FI	0.927	0.944	0.772
OP	0.919	0.933	0.607

Based on the results of the reliability analysis in Table 4 above, it can be concluded that all constructs in this study have CA, CR and AVE values that meet the threshold recommended by Hair et al., (2022) with CA and CR values of more than 0.05 and AVE values of more than 0.07.

3.3 Inner Model Result

3.3.1 Inner Model Evaluation

Table 5. The Coefficient of Determination (R^2)

Variabel	R-square	R-square adjusted
CT	0.696	0.692
OP	0.334	0.314

Based on Table 5, the coefficient of determination (R^2) results indicate that FI explains 69.6% of the CT, as reflected by an R-square value of 0.696 and an adjusted R-square value of 0.692. This suggests that functional integration is a strong predictor of customization within the studied SMEs. Meanwhile, the R-square value for OP is

0.334 with an adjusted R-square of 0.314, indicating that the variables included in the model explain 33.4% of the variation in operational performance, while the remaining 66.6% is influenced by other factors not examined in this study. Overall, these findings suggest that the model has substantial explanatory power for customization and a moderate explanatory power for operational performance.

3.4 Direct Effects

Table 6. Direct and Indirect Effects of Functional Integration on Operational Performance

Hypothesis Path	Effect Type	Path Coefficient (β)	Standard Deviation	T-Statistic	P-Value
Functional Integration $\rightarrow$ Operational Performance	Direct Effect	0.675	0.194	3.483	0.000
Functional Integration $\rightarrow$ Customization	Direct Effect	0.834	0.033	24.912	0.000
Customization $\rightarrow$ Operational Performance	Direct Effect	-0.121	0.209	0.578	0.563
Functional Integration $\rightarrow$ Customization $\rightarrow$ Operational Performance	Indirect Effect	-0.101	0.173	0.582	0.561

Based on the results presented in Table 6, Functional Integration was found to have a positive and significant effect on Operational Performance ($\beta = 0.675$; $t = 3.483$; $p < 0.001$). This finding indicates that a higher level of functional integration within an organization is associated with improved operational performance. Functional integration facilitates more effective coordination across organizational functions, enhances information flow, and reduces barriers in operational decision-making processes. Furthermore, Functional Integration was also found to have a positive and significant effect on Customization ($\beta = 0.834$; $t = 24.912$; $p < 0.001$), suggesting that organizations with a higher degree of integration are better positioned to tailor products or services to meet customer requirements. In contrast, the relationship between Customization and Operational Performance was not statistically significant ($\beta = -0.121$; $t = 0.578$; $p = 0.563$), indicating that increased customization does not directly contribute to improvements in operational performance.

Moreover, the indirect effect analysis reported in Table 6 revealed that Customization does not mediate the relationship between Functional Integration and Operational Performance ($\beta = -0.101$; $t = 0.582$; $p = 0.561$). The non-significant indirect effect suggests that the influence of Functional Integration on Operational Performance is primarily transmitted through a direct pathway rather than through enhanced customization capabilities. This finding implies that the principal benefits

of functional integration stem from its ability to improve coordination efficiency, synchronize operational activities, and optimize the utilization of organizational resources. Therefore, although functional integration strengthens an organization's capability to provide customized products or services, such capability is insufficient to translate the effects of integration into significant improvements in operational performance through a mediating mechanism. Consequently, efforts to enhance operational performance should focus primarily on strengthening cross-functional integration, as it represents the key driver of operational effectiveness within the organization.

3.5 Discussion

The results of the hypothesis testing indicate that Functional Integration plays a significant role in enhancing both Operational Performance and Customization among kebaya boutique SMEs in Yogyakarta. The analysis revealed that Functional Integration has a positive and significant effect on Operational Performance, suggesting that stronger coordination among organizational functions, such as design, production, and marketing, contributes to improved operational outcomes. Effective integration facilitates smoother information exchange, better synchronization of activities, and more efficient resource utilization, which ultimately enhance productivity, product quality, and delivery performance. This finding is consistent with Liu et al. (2012), who emphasized that functional integration improves operational performance by strengthening information flows and coordination across organizational units. Similarly, Fan et al. (2024) highlighted that internal integration not only improves operational effectiveness but also contributes to overall organizational performance. In the context of make-to-order kebaya SMEs, where production activities are highly dependent on the alignment of customer requirements, material availability, and production schedules, functional integration becomes a critical factor in achieving operational excellence.

The findings further demonstrate that Functional Integration has a positive and significant effect on Customization. This result suggests that well-integrated organizational functions enable SMEs to respond more effectively to diverse customer preferences and requirements. Through effective coordination among design, production, and marketing functions, customer information can be accurately translated into product specifications and production processes, thereby enhancing customization capabilities. This finding supports the arguments of Liu et al. (2012), who identified cross-functional integration as a key driver of product customization, and Ferreira et al. (2019), who emphasized that successful customization depends on close collaboration among organizational functions. Likewise, Shen et al. (2023) argued that the ability to coordinate customer information and production activities is essential for increasing product flexibility. For kebaya boutique SMEs operating under a make-to-order system, customization is a fundamental business practice

because each product must be tailored to customers' preferences regarding design, size, and materials. Therefore, stronger functional integration enhances the ability of SMEs to provide customized products that better meet customer expectations.

However, a contrasting result emerged regarding the relationship between Customization and Operational Performance. The analysis showed that Customization has a negative and statistically insignificant effect on Operational Performance. This finding indicates that increasing product customization does not necessarily lead to improved operational outcomes and may even create challenges for operational efficiency. Higher levels of customization often require frequent design modifications, individualized production processes, and greater flexibility in resource allocation, all of which can increase production complexity, prolong lead times, and raise operational costs. Consequently, a trade-off may arise between product flexibility and operational efficiency. This result is in line with Liu et al. (2012), who argued that product customization may reduce operational efficiency when organizations lack sufficient operational capabilities to manage production complexity. Similarly, Xu et al. (2024) found that poorly structured customization practices can extend production times and increase operational costs, thereby negatively affecting operational performance. Zhang and Thang (2017) also reported that firms with underdeveloped operational systems often struggle to balance flexibility and efficiency. In the context of Yogyakarta's kebaya boutique SMEs, which generally rely on labor-intensive and relatively simple production systems, extensive customization frequently increases operational burdens and reduces efficiency despite generating greater customer value.

The indirect effect analysis further revealed that Customization does not mediate the relationship between Functional Integration and Operational Performance. Although Functional Integration significantly enhances Customization capabilities, these improvements do not translate into better Operational Performance through a mediating mechanism. This finding suggests that the benefits of Functional Integration are realized primarily through direct improvements in coordination, communication, and operational efficiency rather than through customization activities. The result supports the argument of Liu et al. (2012) that customization capabilities do not automatically improve operational outcomes unless supported by efficient production systems. Xu et al. (2024) similarly noted that unstructured customization may increase operational complexity and reduce production efficiency, while Zhang and Thang (2017) emphasized the importance of maintaining a balance between flexibility and efficiency. For make-to-order kebaya SMEs, the extensive customization required to satisfy customer demands often increases production complexity beyond the capacity of existing resources and operational systems. As a result, the positive effects of functional integration cannot be fully

transformed into enhanced operational performance through customization. These findings highlight the need for SMEs to strengthen operational capabilities through process standardization, production planning improvements, and efficiency enhancement initiatives so that customization can contribute more effectively to operational performance in the future.

4. Conclusion

This study demonstrates that functional integration plays a crucial role in enhancing both operational performance and customization among kebaya boutique SMEs in Yogyakarta. Stronger coordination and information sharing across business functions contribute to improved operational outcomes and greater responsiveness to customer requirements. However, customization was not found to significantly improve operational performance and did not mediate the relationship between functional integration and operational performance. These findings suggest that the benefits of customization may not be fully realized when operational processes lack sufficient efficiency and control.

From a managerial perspective, SME owners should prioritize strengthening functional integration through improved cross-functional communication and coordination while implementing customization practices in a more structured and efficient manner. Efforts to enhance production efficiency, cost control, and operational capabilities are essential to ensure that customization activities generate value without creating excessive complexity. Future research may extend this model by incorporating additional organizational and technological factors, such as process standardization, technological capability, or supply chain integration, and by examining SMEs in different industries to improve the generalizability of the findings.

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