

# Exploring the Impact of Employee Competencies on Firm Performance in Manufacturing SMEs in Malaysia: A Dynamic Capabilities View

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## Abstract

Organizational agility (OA) is a crucial capability for SMEs to respond to the ever-changing external business environment. Although the human side is one of the key enablers of OA, especially competencies possessed by employees, which seems to be rarely explored in SMEs context. This study investigates the relationship between employee competencies (EC), OA, and firm performance (FP) through the lens of the dynamic capabilities view. Using data from 313 manufacturing SMEs in Malaysia and employing PLS-SEM, the proposed model was tested. The findings support the proposed hypotheses, confirming the positive impact of EC on FP and the mediating role of OA in the EC-FP relationship.

**Keywords:** Employee Competencies, Organizational Agility, Firm Performance, Manufacturing SMEs

**Introduction**

Organizational agility (OA), defined as the ability to anticipate or rapidly respond to external changes, is crucial for SMEs to survive and compete in today's turbulent environment (Troise et al., 2022). Agility is generally considered beneficial to organizational performance. Agile organizations, possessing dynamic capabilities to cope with rapid changes and turbulence, are believed to achieve better outcomes (Liu & Huo, 2024; Nguyen et al., 2024). Previous study indicated that firms with high levels of OA outperform their peers in the market (Cho et al., 2022). Moreover, a report from PricewaterhouseCoopers International Limited (PwC) suggested that firms that successfully become agile recognize the critical role of employees in achieving agility, surpassing the importance of information technology in practice (Siegel & Booth, 2020). Therefore, when integrating advanced information technology to enhance connections among organizational members, suppliers, customers, and other partners to foster agility, it is essential to fully consider the human aspect (Appelbaum et al., 2017; Crocitto & Youssef, 2003).

Many studies suggest that agility requires competencies from employees (Çetin & Tolay, 2022; Nijssen & Paauwe, 2012; Saha et al., 2017; Wageeh, 2016). Employee competencies (EC) refer to traits, skills or attributes that employees need to perform their jobs more effectively (Potnuru et al., 2019). If firms can effectively leverage EC to cope with the constantly changing environment, this will have a positive impact on OA (Zighan & Dwaikat, 2023). However, there is a scarcity of research exploring the impact of EC on OA. As shown in Table 1, there are currently seven studies focusing on EC and OA (Abdelhamid & Sposato, 2019; Ali et al., 2021; Bueechl et al., 2021; Hassan & Hassan, 2022; Lai et al., 2021; Nadzim & Halim, 2022; Zhou et al., 2018). Additionally, these studies primarily focus on the impact of professional competencies (e.g. IT and business) on OA, while EC is a construct encompasses various forms of soft and hard competencies (Salman et al., 2020b). Past study posited that crucial competencies underpinning OA, such as teamwork adaptability, cognitive flexibility, and vigor, etc (Çetin & Tolay, 2022), extend significantly beyond professional competencies. Therefore, it is necessary to explore the impact of EC on OA from a broader perspective.

Current research has extensively documented the significant and positive relationship between EC and firm performance (FP) (Atan & Mahmood, 2019; Huang et al., 2019; Kaur & Kaur, 2020, 2022; Otoo, 2019; Salman et al., 2020a). However, the mechanisms through which EC influence FP remain to be elucidated. By investing in EC, firms empower employees to acquire new skills and enhance their qualifications. This adaptability to technological and market shifts increases OA and ultimately yields a competitive advantage (Joiner, 2019). Effective leveraging of EC may represent a viable mechanism for enhancing performance in SMEs by fostering OA, which subsequently contributes to improved firm FP. Therefore, this study proposes that OA could mediate the relationship between EC and FP. However, there has not yet been research to further explore this mediating effect, which leaves a research gap.

Thus, this study will explore the connection between EC, OA, and FP in manufacturing SMEs in Malaysia. This study addresses four main research questions:

1. Is there any positive relationship between EC and FP?
2. Is there any positive relationship between EC and OA?
3. Is there any positive relationship between OA and FP?

#### 4. Does OA mediate the relationship between EC and FP?

This study, framed within the dynamic capabilities view (DCV), investigates the mediating role of OA in the relationship between EC and FP within Malaysian manufacturing SMEs. This study will illuminate the influence of the human element on OA, revealing a potentially viable mechanism through which EC impact FP. This will contribute to a refined understanding of the DCV and offer valuable insights for managerial practice. The rest of this study discusses the literature review and hypotheses development, followed by methodology, data analysis and findings. Then, a discussion will further explain the findings. Finally, the rest presents theoretical and managerial implications, limitations, and future research directions. The study investigates the mediating role of OA between EC-FP relationship.

**Table 1**  
*Past Studies on the EC-OA Relationship*

Author/Year	Research strategy	Industry	Firm size	Country	Focus	Related findings
Zhou et al. (2018)	Quantitative	Mixed	Mixed	China	business and IT competence	Employee competencies positively related organizational agility
Abdelhamid and Sposato (2019)	Qualitative	Manufacturing	SMEs	UAE	General competencies	Employee competencies are one of the main factors that shape organizational agility
Ali et al. (2021)	Quantitative	Mixed	Mixed	Pakistan	business and IT competence	There is a direct significant impact of IT competence and business competence on organizational agility.
Lai et al. (2021)	Quantitative	Mixed	Mixed	China	IT competence	Task interdependence/autonomy mediate the link between IT competency and employee agility.
Bueechl et al. (2021)	Qualitative	Mixed	SMEs	Germany	General competencies	Competent employees are agility providers.
Hassan and Hassan (2022)	Quantitative	Manufacturing	N/A	Malaysia	IT competence	The enhancement of organizational agility is closely related to the employees' technological capabilities and competencies.
Nadzim and Halim (2022)	Qualitative	High education	N/A	Malaysia	Digital competence	Employee agility can mediate the relationship between digital competence of employees and employee performance

## Literature Review and Hypotheses Development

### *Theoretical Background*

The dynamic capabilities view provides a theoretical lens to investigate the relationship between EC, OA, and FP. Dynamic capabilities refer to the firm's ability to integrate, build, and reconfigure internal and external resources/competences to address and shape rapidly changing business environments (Teece et al., 1997). Dynamic capabilities as high-level organizational capabilities, that contain a set of capabilities, they are (1) sensing new opportunities in the changing environment, (2) seizing the identified opportunities, and (3) transforming to better exploit the new opportunities (Teece et al., 2007).

Employees are crucial factor influencing the development of an organization's dynamic capabilities (Bieńkowska & Tworek, 2020; Wohlgemuth et al., 2019). The skills, knowledge, and resources possessed by employees enable them to introduce new ideas, contribute to informed strategic decision-making, and effectively implement these decisions through the distribution of power and information, as well as the creation of incentives. These actions support not only the sensing process but also the seizing and transforming processes (McKelvie & Davidsson, 2009). Therefore, this study posits that highly competitive employees, equipped with extensive skills and knowledge, can better assist SMEs in sensing opportunities and threats in a dynamic business environment. Moreover, by proposing new ideas and innovative solutions, they help the organization seize market opportunities and actively support organizational transformation, ultimately making the organization more agile.

OA, as a higher-order dynamic capability, is a key factor for maintaining a competitive advantage in a dynamic environment (Felipe et al., 2016). OA represents a firm's capacity to effectively and efficiently reconfigure its resources, processes, and strategies in response to environmental changes, in order to maintain or enhance its competitive advantage (Lu & Ramamurthy, 2011). Strong dynamic capabilities are a crucial prerequisite for promoting OA (Teece et al., 2016). Essentially, the value of dynamic capabilities can be assessed based on the OA they achieve (Mikalef & Pateli, 2017). Therefore, this study suggests that EC can enhance OA, ultimately improving FP. The conceptual framework of this study is shown in Figure 1.

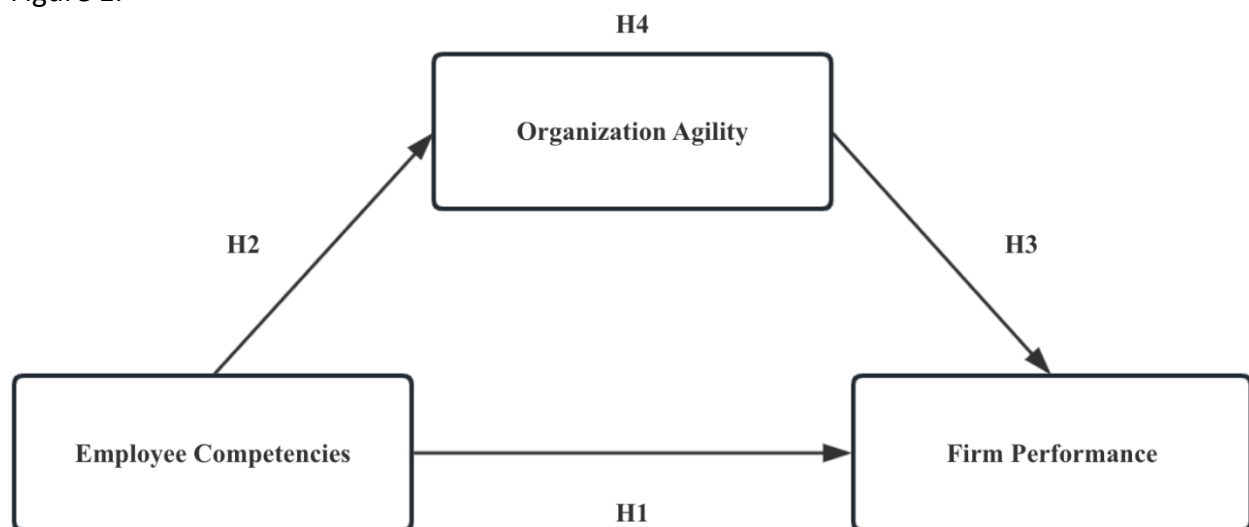


Figure 1 Conceptual framework

#### *Employee Competencies and Firm Performance*

EC is a decisive factor influencing FP (Abbaszadeh et al., 2023). Competence is an essential attribute that significantly contributes to success in the job. Thus, it is imperative for organizations to ensure that their employees possess the requisite knowledge, skills, and attitudes aligned with the business's goals, objectives, and values (Calhoun et al., 2008; Irfan et al., 2022). Employees with competencies can propose innovative ideas and implement them to enhance products and processes. Evidence shows that firms with employees who have knowledge, skills, and business development capabilities outperform their competitors (Todericiu, 2021). High levels of competencies are reflected in taking responsibility for one's performance and results, continuously learning and enhancing one's skills, and effectively organizing one's work. Sensitivity to new professional knowledge, possessing analytical and

decision-making abilities, having expertise in one's field, and exhibiting managerial and communication skills are crucial for career advancement (Chreptavičienė & Starkutė, 2012). Therefore, firms need to continuously motivate employees to demonstrate these competencies in their work, thereby improving FP and driving organizational success. Based on the discussion, the following hypothesis was proposed:

H<sub>1</sub>: There is a positive relationship between EC and FP.

#### *Relationship between Employee Competencies, Organizational Agility and Firm Performance*

OA refers to the capability of a company to rapidly change or adapt in response to changes (Tallon & Pinsonneault, 2011). Agile organizations require employees to possess both the ability and the willingness to adapt to continuously changing business environments (Friedman & Gerstein, 2018). Employees must possess a high level of competencies to effectively respond to changes in the business environment, thereby enhancing overall FP (Sabuhari et al., 2020). Employee adaptability is a fundamental competency, representing the ability to respond effectively to new environmental conditions and adapt to changes (Federici et al., 2021). Employees possessing adaptability competence exhibit flexibility in managing diverse situations. Consequently, this competence is increasingly recognized as a critical performance dimension in dynamic environments, surpassing other individual competencies (Kim & Jung, 2022). Adaptability competence significantly contributes to enhanced work performance and career advancement. This skill also promotes organizational achievements, including effective learning, proficient change management, and the ability to meet evolving customer demands (Park & Park, 2019). Additionally, competent employees excel in collaborating with various departments, thereby enhancing internal operational efficiency. This improvement aids in better serving customers, ultimately increasing OA (Zhou et al., 2018).

Moreover, by strategically managing human resources, firms cultivate competencies among employees. These competent employees effectively absorb uncertainties and adopt adaptive behaviours to manage potential threats (Santoro et al., 2021). This implies that EC can help SMEs quickly adapt to changing business environments, thereby making the firms more agile and ultimately contributing to their performance. Therefore, this study proposes the following hypothesis:

H<sub>2</sub>: There is a positive relationship between EC and OA.

H<sub>3</sub>: There is a positive relationship between OA and FP.

H<sub>4</sub>: OA can mediate the EC-OA relationship.

## **Methodology**

### *Sample and Data Collection*

This study employed systematic sampling. Systematic sampling is a statistical technique that entails selecting elements from a sequentially arranged sampling frame (Levy & Lemeshow, 2013). As shown in Figure 2, this study confirmed through G\*Power that at least 107 samples needed to be collected to achieve valid statistical inferences, with parameter settings referenced from (Memon et al., 2020). The sample was randomly selected from 2,121 manufacturing SMEs listed in the 52<sup>nd</sup> edition of Federation of Malaysian Manufacturers (FMM) directory, based on the proportion of SMEs in 14 states in Malaysia. The questionnaire was distributed via Google Forms to the owners/managers of manufacturing SMEs through

email. A total of 1,635 questionnaires were sent out, but only 320 responses were received over a period of more than six months. Of these, 313 were valid, resulting in a response rate of 19.63%, meeting the required sample size.

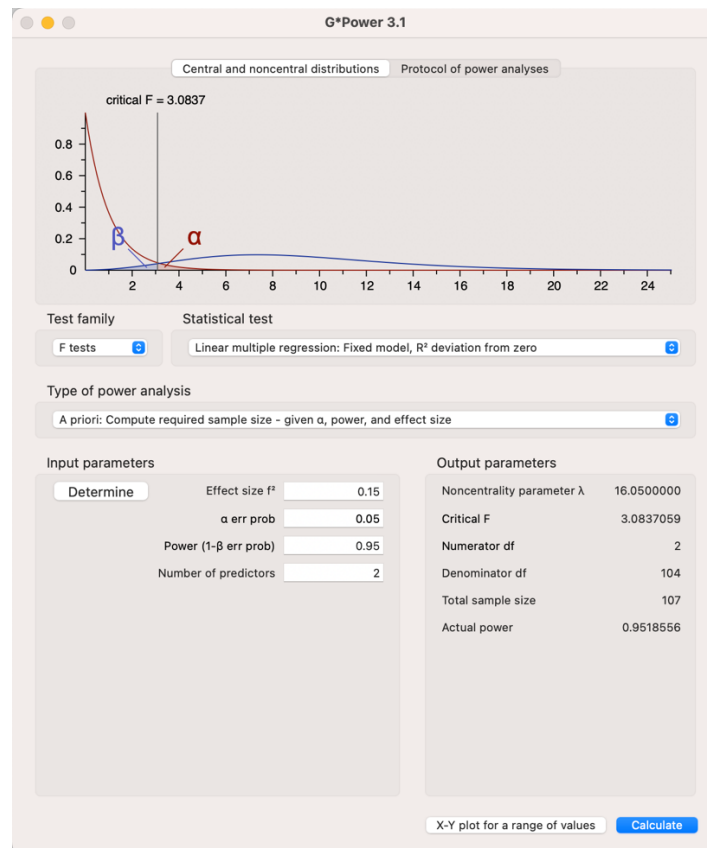


Figure 2 Sample size estimation

## Measurements

The questionnaires used in this study was modified based on previous research to suit the Malaysian context. This study employs a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The measurement items used in this study are presented in the 'Appendix.' Moreover, all constructs were confirmed to be reflective. EC is operationalized as the analysis of employee's technical expertise, adaptability, innovation, teamwork and cooperation, conceptual thinking and self- confidence (Potnuru et al., 2019). EC assessed with six items was adapted from (Potnuru et al., 2019). OA is operationalized as market capitalizing agility (a firm's ability to quickly respond to capitalize on changes through continuously monitoring and quickly improving product/service to address customers' needs) and operational adjustment agility (a firm's ability in its internal business processes to physically and rapidly cope with market or demand changes) (Lu & Ramamurthy, 2011). OA assessed with six items was adapted from (Lu & Ramamurthy, 2011). FP is operationalized as financial and non-financial performance (Anwar & Shah, 2021). FP assessed with six items was adapted from (Anwar & Shah, 2021).

## Analysis and Findings

This study employs PLS-SEM to test all hypotheses. PLS-SEM is suitable when the research aims to test theoretical frameworks or explore theoretical extensions, especially when the

sample size is small, the data is non-normally distributed, the constructs are formative, and the research model is complex (Hair et al., 2019). PLS-SEM includes both the measurement model and the structural model. In this study, the measurement model is reflective, and to evaluate it, we used indicator reliability, internal consistency (Cronbach's  $\alpha$  and composite reliability), convergent validity (average variance extracted), and discriminant validity (cross-loading, Fornell-Larcker criterion, and Heterotrait-Monotrait ratio). For the evaluation of the structural model, we used path coefficients, coefficient of determination ( $R^2$ ), effect size ( $f^2$ ), and predictive relevance ( $Q^2$ ). Additionally, the bootstrapping method with 5000 resamples is employed to test path analysis and mediating effect analysis (Hair et al., 2021).

### Assessment of Common Method Variance

Common Method Variance (CMV) refers to variance that is attributable to the measurement method rather than to the constructs the measures are assumed to represent (Podsakoff et al., 2003). This study employs self-reported questionnaires, which are likely to result in CMV. In order to assess CMV in PLS-SEM, this study uses the confirmatory factor analysis applied recommended by (Gong et al., 2022; Mossholder et al., 1998), and full collinearity assessment approach proposed by (Kock, 2015). According to the results in Table 2, the baseline model is significantly better than single factor model. And compared with CMV model, the differences in **GFI**, **AGFI**, **NFI**, **TLI**, and **CFI** between the baseline model and the CMV model are all below 0.01, and the differences in RMR and RMSEA are below 0.05. Therefore, it can be concluded that there is no significant common method bias in this study. As per Kock (2015), a model can be deemed free from CMV if the variance inflation factors (VIFs) in the inner model, derived from a full collinearity test, are 3.3 or below. Our findings indicated that VIFs are less than 3.3, confirming that CMV is not a concern in this study.

Table 2

#### *Assessment of common method variance*

	$\chi^2/df$	GFI	AGFI	NFI	TLI	CFI	SRMR	RMSEA
Criteria	< 5.000	> 0.900	> 0.900	> 0.900	> 0.900	> 0.900	< 0.05	< 0.08
Baseline model	1.404	0.926	0.909	0.954	0.984	0.986	0.028	0.036
Single factor model	8.593	0.532	0.433	0.712	0.708	0.736	0.125	0.156
CMV model	1.342	0.929	0.912	0.956	0.987	0.988	0.030	0.033
$\Delta^a$	-7.189	0.394	0.476	0.242	0.276	0.250	-0.097	-0.120
$\Delta^b$	0.062	-0.003	-0.003	-0.002	-0.003	-0.002	-0.002	0.003

Note: <sup>a</sup> Baseline model vs. Single factor model; <sup>b</sup> Baseline model vs. CMV model.

### Assessment of Measurement Model

Table 3 presented the results of indicator loadings, Cronbach's  $\alpha$ , composite reliability (CR), average variance extracted (AVE) of this study. Moreover, all indicator loadings for the variables exceed 0.7, indicating good reliability of the measurement indicators in this study (Hair et al., 2019). The Cronbach's  $\alpha$  values for all constructs are around 0.95 (Hair et al., 2019), and the CR values are above 0.7 (Diamantopoulos et al., 2012), demonstrating good internal consistency of the constructs. Additionally, AVE values for all constructs are greater than 0.5, indicating good convergent validity for this study (Hair et al., 2019).

Table 3

*Assessment of measurement model*

Construct	Indicator	Loading	Cronbach's a	CR	AVE
Employee competencies	EC1	0.812	0.906	0.908	0.681
	EC2	0.831			
	EC3	0.832			
	EC4	0.815			
	EC5	0.822			
	EC6	0.839			
Organizational agility	OA1	0.876	0.941	0.941	0.771
	OA2	0.874			
	OA3	0.879			
	OA4	0.882			
	OA5	0.88			
	OA6	0.878			
Firm performance	FP1	0.874	0.964	0.964	0.755
	FP2	0.882			
	FP3	0.861			
	FP4	0.858			
	FP5	0.862			
	FP6	0.865			
	FP7	0.851			
	FP8	0.894			
	FP9	0.876			
	FP10	0.862			

Table 4 showed the cross-loadings criteria matrix, indicating that the outer loadings of the constructs in this study (bolded on the diagonal) are greater than the cross-loadings with other constructs (regular font) (Chin, 1998). Table 5 showed the Fornell-Larcker criterion matrix, demonstrating that the square roots of the AVEs of the constructs in this study (bolded on the diagonal) are greater than their correlations with other constructs (regular font) (Fornell & Larcker, 1981). Table 6 further displays the Heterotrait-Monotrait ratio (HTMT) matrix, showing that all HTMT values are below 0.85 (Henseler et al., 2015). Based on these results, the validity of this study is successfully established.



Table 4

*Cross loadings*

	EC	OA	FP
EC1	<b>0.812</b>	0.285	0.367
EC2	<b>0.831</b>	0.365	0.409
EC3	<b>0.832</b>	0.360	0.396
EC4	<b>0.815</b>	0.329	0.398
EC5	<b>0.822</b>	0.314	0.373
EC6	<b>0.839</b>	0.252	0.374
OA1	0.332	<b>0.876</b>	0.641
OA2	0.320	<b>0.874</b>	0.605
OA3	0.370	<b>0.879</b>	0.598
OA4	0.347	<b>0.882</b>	0.648
OA5	0.351	<b>0.88</b>	0.624
OA6	0.327	<b>0.878</b>	0.606
FP1	0.450	0.609	<b>0.874</b>
FP2	0.388	0.599	<b>0.882</b>
FP3	0.385	0.571	<b>0.861</b>
FP4	0.425	0.643	<b>0.858</b>
FP5	0.412	0.607	<b>0.862</b>
FP6	0.386	0.602	<b>0.865</b>
FP7	0.405	0.631	<b>0.851</b>
FP8	0.420	0.638	<b>0.894</b>
FP9	0.424	0.617	<b>0.876</b>
FP10	0.377	0.616	0.862

Table 5

*Fornell-Larcker Criterion*

	EC	OA	FP
EC	<b>0.825</b>		
OA	0.389	<b>0.878</b>	
FP	0.469	0.707	<b>0.869</b>

Table 6

*HTMT*

	EC	OA	FP
EC			
OA	0.417		
FP	0.500	0.741	

**Assessment of Structural Model**

This study uses VIF to detect collinearity issues among constructs. As shown in Table 7, all VIF values are less than 3 (Hair et al., 2011). Table 7 presents the results of the path analysis. EC is positively correlated with FP ( $\beta = 0.229$ ,  $p$ -value  $< 0.001$ ), thus supporting **H<sub>1</sub>**. EC is positively correlated with OA ( $\beta = 0.389$ ,  $p$ -value  $< 0.001$ ), thus supporting **H<sub>2</sub>**. OA is positively correlated with FP ( $\beta = 0.618$ ,  $p < 0.001$ ), thus supporting **H<sub>3</sub>**. Furthermore, Table 8 showed the results of the mediation analysis. OA mediates the relationship between EC and FP ( $\beta = 0.24$ ,  $p$ -value  $< 0.001$ ), thus supporting **H<sub>4</sub>**.

Table 7

*Assessment of Structural Model*

Hypothesis	Path	VIF	$\beta$	STDEV	T-value	Decision
H1	EC → FP	1.178	0.229***	0.051	4.501	Supported
H2	EC → OA	1.000	0.389***	0.063	6.213	Supported
H3	OA → FP	1.178	0.618***	0.056	10.979	Supported

Note: \*\*\*  $p < 0.001$

Table 8 presented the values of  $R^2$ ,  $F^2$ , and  $Q^2$ . The results indicate that EC explains 54.4% of the variance in FP, suggesting that EC has a moderate explanatory power for FP. But it has a small effect size ( $F^2 = 0.098$ ) on FP. And EC has a small predictive relevance for FP ( $Q^2 = 0.208$ ). Although EC has a weak explanatory power for OA ( $R^2 = 0.151$ ), it still exhibits a medium effect size ( $F^2 = 0.178$ ). And EC has a small predictive relevance for FP ( $Q^2 = 0.139$ ). Moreover, OA has a large effect size ( $F^2 = 0.710$ ) on FP. This study utilized the method proposed by (Gaskin et al., 2023) to obtain the specific  $F^2$  value corresponding to the indirect effect. According to the threshold recommended by Gaskin et al. (2023), the indirect effect size for OA is classified as medium.

Table 8

*Assessment of Mediating Effect*

Path	$\beta$	STDEV	T-value	$R^2$	$F^2$	$Q^2$
<i>Direct effect</i>						
EC → FP	0.469***	0.058	8.109	0.544	0.098	0.208
EC → OA	0.389***	0.063	6.213	0.151	0.178	0.139
OA → FP	0.618***	0.056	10.979	N/A	0.710	N/A
<i>Indirect effect</i>						
EC → OA → FP	0.240***	0.042	5.678	N/A	0.074 <sup>a</sup>	N/A

Note: \*\*\*  $p < 0.001$ ; <sup>a</sup> Obtain from Stats Tools developed by Gaskin et al. (2023)

**Discussions**

This study investigates the relationships among EC, OA, and FP. Regarding direct relationships, the results first reveal that EC has a positive impact on FP, consistent with previous studies (Atan & Mahmood, 2019; Huang et al., 2019; Kaur & Kaur, 2020, 2022; Otoo, 2019; Salman et al., 2020a). Although EC has a strong explanatory power for FP, the effect size is small, suggesting that there may be mediators that either strengthen or weaken their relationship. Second, the results show that EC positively influences OA, aligning with prior findings (Abdelhamid & Sposato, 2019; Buechl et al., 2021). The explanatory power of EC on OA is weak, while the effect size is moderate. This suggests that EC is one of the crucial conditions

for the development of OA within a firm. The knowledge, skills, and experience possessed by highly competitive employees can help firms respond swiftly and effectively to the ever-changing external business environment, which is key to OA. Finally, the results demonstrate that OA positively impacts FP, aligning with the prior findings (Devie et al., 2023; Motwani & Kataria, 2024; Nguyen et al., 2024). From the perspective of dynamic capabilities, OA represents a firm's ability to successfully manage uncertainties, which is crucial for maintaining competitive advantage and achieving long-term success.

Regarding indirect relationships, the study found that OA mediates the relationship between EC and FP. This might be the first discovery of its kind in human resource research concerning SMEs. OA has a moderate effect size on the EC-FP indirect relationship, indicating that OA can strengthen their connection. In the mediation relationship, EC has a moderate effect size on OA, while OA has a large effect size on FP. This implies that the management of SMEs needs to consider how to cultivate employees' competencies and motivate them to apply these competencies to their tasks, thereby promoting agile development. When a firm demonstrates a certain level of agility, the firm can benefit from it, such as improved FP.

### **Theoretical and Practical Implications**

The findings of this study offer several theoretical implications for the dynamic capabilities view, particularly within the context of manufacturing SMEs in Malaysia. Firstly, compared to previous studies that focused on specific aspects of EC (such as IT and business) and their impact on OA, this study broadens the scope of EC. This expansion enhances the understanding of how EC facilitate OA, emphasizing that employees are crucial for developing OA. Secondly, the discovery of the mediating role of OA in the relationship between EC and FP provides theoretical support for the dynamic capabilities view. Firms can leverage employees' competencies to develop OA (a higher-order dynamic capability) to respond to the volatile business environment, thereby achieving superior performance.

The results of this study also offer valuable insights for managers and practitioners in manufacturing SMEs seeking to enhance FP. Firstly, firms need to invest in human resource practices by enhancing employees' diverse skills through training programs. These skills include technical skills, teamwork, creativity, and problem-solving abilities, which can significantly improve OA. Additionally, implementing comprehensive training plans and career development opportunities enables employees to continuously learn and acquire the skills necessary to adapt to ever-changing market conditions. Secondly, firms should prioritize agility as a strategic goal. Although SMEs have simpler organizational structures that facilitate agility, managers need to involve highly competent employees in the decision-making process. Engaging employees in strategic discussions can enhance their understanding of organizational goals and how their capabilities contribute to achieving these goals. This involvement can lead to more proactive behaviours and a stronger ability to anticipate and respond to environmental changes. Finally, enterprises need to foster a culture that encourages rapid adaptation and responsiveness to change. Managers should create an environment that supports innovation, tolerates calculated risks, and values employees' contributions to innovation and process improvement.

### **Limitations and Future Directions**

This study inevitably has its limitations. Firstly, although the FMM directory is widely used by scholars, it only includes a portion of manufacturing SMEs and does not cover all of them. Therefore, we call for future studies to collaborate with government agencies or professional business survey companies to collect more diverse data to validate the conclusions of this study. Secondly, this study employs a questionnaire survey method. In order to gain a deeper understanding of EC, we suggest that future studies adopt qualitative research methods, such as conducting in-depth interviews with practitioners to obtain more detailed information. The findings of this study also provide potential directions for future research. Firstly, there may be other predictors of agility in the current literature, such as innovation capabilities and digital transformation, so we recommend that future research continues to focus on these areas. Secondly, according to the resource-based view, the resources owned or controlled by each firm are different. Therefore, we suggest that future research examines the relationship between EC, OA, and FP at different levels of firm resources. Finally, given that the service sector accounts for a significant proportion of Malaysia's GDP, we recommend that future research focuses on the issue of EC in the service industry. Furthermore, future research could consider employing bibliometric analysis to systematically review the development of EC in SMEs (Zhang et al., 2023, 2024; Zhang & Quoquab, 2022).

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