

## Post-COVID-19 Organizational Resilience in the Manufacturing and Service Industries

*(Ketahanan organisasi pasca-COVID-19 dalam industri pembuatan dan perkhidmatan)*

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### ABSTRACT

*COVID-19 has shaken the business industry and forced a revisit of the resilience literature. Though organizations' management have adopted measures prescribed by the literature, these measures have been unable to provide a fit-for-all solution. This has motivated this study to re-examine the organizational resilience factors driving operational performance in the post-pandemic era, specifically in consideration of the role of firm industry orientation and firm size. Thus, the present study aims to identify to what extent the organizational resilience (ability, adaptability, agility and flexibility) effects the operational performance; and, to determine how the firm size influence the relationship between organizational resilience and the operational performance of the manufacturing and service sectors. Data was collected from 85 organizations in the Malaysian manufacturing and services industries and analyzed using PLS-SEM. The results show that the agility and flexibility dimensions of resilience have a significant positive effect on operational performance, while the ability and adaptability dimensions have no such effect. Additionally, firm size was found to be insignificant in the relationship between organizational resilience and operational performance. The findings reveal that resilience is vital for the sustainability of an organization in this turbulent and complex business climate. Therefore, managers should thus consider incorporating appropriate resilience strategies in both opportunities and operations to embrace different strategies to leverage organizational resilience post COVID. Ultimately, the government should utilize these findings for policymaking when leading post-COVID-19 projects and initiatives.*

*Keywords: Organizational resilience; operational performance; post-COVID-19; manufacturing and services industries; PLS-SEM*

### ABSTRAK

*COVID-19 telah menggegarkan industri perniagaan dan memaksa pengajian semula literatur ketahanan. Walaupun pengurusan organisasi telah menerima pakai langkah-langkah yang ditetapkan oleh literatur, langkah-langkah tersebut tidak dapat memberikan penyelesaian yang sesuai untuk semua. Ini telah mendorong kajian ini untuk meneliti semula faktor-faktor ketahanan organisasi yang memacu prestasi operasi dalam era pasca pandemik, khususnya dengan pertimbangan peranan orientasi industri firma dan saiz firma. Oleh itu, kajian ini bertujuan untuk mengenal pasti sejauh mana daya tahan organisasi (keupayaan, kebolehsuaian, ketangkasan dan fleksibiliti) memberi kesan kepada prestasi operasi; dan, untuk menentukan bagaimana saiz firma mempengaruhi hubungan antara daya tahan organisasi dan prestasi operasi sektor pembuatan dan perkhidmatan. Data dikumpul daripada 85 organisasi dalam industri pembuatan dan perkhidmatan Malaysia dan dianalisis menggunakan PLS-SEM. Keputusan menunjukkan bahawa dimensi ketahanan ketangkasan dan fleksibiliti mempunyai kesan positif yang signifikan terhadap prestasi operasi, manakala dimensi keupayaan dan kebolehsuaian tidak berkesan. Selain itu, saiz firma didapati tidak signifikan dalam hubungan antara ketahanan organisasi dan prestasi operasi. Penemuan mendedahkan bahawa ketahanan adalah penting untuk kemampanan organisasi dalam iklim perniagaan yang bergelora dan rumit ini. Oleh itu, pengurus harus mempertimbangkan penggabungan strategi ketahanan yang sesuai dalam peluang dan juga operasi. Oleh itu, pengurus harus mempertimbangkan penggabungan strategi ketahanan yang sesuai dalam peluang dan juga operasi supaya ia*

*dapat memanfaatkan daya tahan organisasi terutamanya dalam pada masa pasca COVID. Manakala, pihak kerajaan pula harus menggunakan penemuan ini untuk membuat dasar semasa menerajui projek dan inisiatif di pasca COVID-19.*

*Kata kunci: Ketahanan organisasi; prestasi operasi; pasca-COVID-19; industri pembuatan dan perkhidmatan; PLS-SEM*

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## INTRODUCTION

COVID-19 has caused a significant fall in businesses across many industries. The contagious virus infection has changed the business landscape due to uncertainties stemming from countries' various countermeasures, such as lockdowns, border closures, limited international exchange of goods and services, shutdown of ports and airports, nationwide quarantines, strict manpower norms, limits on imports and exports, and more (Ali et al. 2021). The after-effects of these countermeasures have shaken the business and marketplace environment, causing high unemployment and major layoffs in addition to reducing industrial profits. In fact, many businesses in industries such as healthcare, aviation, tourism, and transportation have been badly affected or even forced to close due to their inability to resist and be resilient against the impacts of COVID-19 (Vanany et al. 2021). While many organizations teeter on the edge of survival, studies prove that the organizations that have managed to survive this situation are those that possess resiliency in dealing with uncertain conditions like COVID-19 (Yousuf et al. 2019).

Resilience has been diversely defined as a capability, characteristic, capacity, approach, strategy, process, or a mix of these. Regardless of its myriad conceptualizations, resilience is unanimously considered essential for organizational survival because it embodies how firms deal with complexities and environmental instability (Acciarini et al. 2021). It is thus seen as one of the solutions to overcome the challenges arising from COVID-19 (Koh et al. 2020). Studies have shown that organizational resilience improves firms' overall effectiveness and efficiency and can amplify performance in the long run (Umoh et al. 2013). Although improving organizational resilience had been gaining attention among practitioners even before COVID-19, it was not a topic of academic interest at the time. Nonetheless, the turbulence caused by COVID-19 has urgently pushed scholars and policymakers to give high importance to resilience. Thus, considering the current scenario, post-COVID-19 organizational resilience awareness should be re-examined in multiple contexts.

To this end, this article compares two key firm typologies: manufacturing vs. service orientation and firm size. There is a substantial difference between the manufacturing and service industries; in service organizations, knowledge skills are given importance while in manufacturing organizations, technical skills take the lead. During the COVID-19 pandemic, service industries survived with remote services while

manufacturing industries faced more serious challenges and difficulties (Vanany et al. 2021) due to their varying mode of work. Firm size is also considered vital in determining organizational resilience (Polyviou et al. 2019; Sullivan-Taylor & Branicki 2011). In general, small- and medium-sized enterprises (SMEs) expect quick results with an unstructured supply chain, while large organizations with a well-defined structure perform better in the long run as they have more sustainability options. Consequently, COVID-19 has impacted SMEs more severely, leading to layoffs and bankruptcy (Carroll & Conboy 2020). Nonetheless, McKibbin and Fernando (2020) stated that all companies across the world, irrespective of their size, have experienced countless challenges not only during the pandemic but after it as well.

Thus, this article focuses on firms' manufacturing vs. service orientation and firm size in a single study, which has rarely been done in prior research. Additionally, this article examines the impact of four dimensions of organizational resilience (i.e., agility, adaptability, flexibility, and ability) on operational performance among manufacturing and service due to COVID-19. Organization resilience necessitates modifications to effectively overcome challenges coming from new changes and implementation of appropriate ideas and commands (Koerniadi et al. 2014). Such modifications are important in altering and revamping a firm's response to change in operations, which will achieve a better state after the pandemic. Thus, this study aim to identify to what extent the organizational resilience (ability, adaptability, agility and flexibility) effects the operational performance; and, to determine how the firm size influence the relationship between organizational resilience and the operational performance of the manufacturing and service sectors. The structure of this paper is as follows. First, the research framework is presented based on the literature. This is followed by research methodology and analysis results. Finally, the study's implications and limitations are discussed.

## LITERATURE REVIEW

### ORGANIZATIONAL RESILIENCE AND MANUFACTURING-SERVICE ORIENTATION

Organizational resilience is seen as the capability of an organization in expecting hostile incidents and resisting them through the adaptation of potential

solutions (Burnard & Bhamra 2011). It also represents the readiness of the organization for unpredicted circumstances or threats (Al-jawazneh 2012). As a complex blend of behaviors, organizational resilience is therefore essential to enable organizations to adapt to disruptions and build adaptive capacity (Aldianto et al. 2021) after the pandemic. This study concentrates on four types of resilience which is ability, agility, flexibility, and adaptability. Lengnick-Hall et al. (2011) determined ability is one part of having a resilience capability. While, Richtner and Löfsten (2014) explain that ability and capacity when put together into action in the organization operation can yield organizational capability'. Acquah et al. (2011) affirmed that resilience is understood as ability in manufacturing as the alignment between operation strategies and competitive strategies, hence it can be seen how ability dimension in the resilience is highly connected to the operational performance. While, according to Wanasida et al. (2021), agility is the process of proactive responses to unexpected environmental changes. In the long term, continuous agility is translated into a competitive advantage that increases organizations operational performance and inventiveness. She also revealed that companies that responded well during the COVID-19 pandemic had higher agility levels than other organizations. Flexibility also equally vital for organizations to accomplish performance in an unstable and uncertain environment (Fantazy et al. 2009; Eckstein et al. 2015) Adaptability is the company's readiness to modify operations' design to accommodate changes in the market, hence adjust the structure in line with strategies, technologies and products (Aslam et al. 2020). Christian et al. (2017) stated that there are times instances when adapting is not in the best choice for resilience. Resilience aids in adapting swiftly to impulsive events by reducing instabilities constantly rather than dealing with one-time crises (Adobor & McMullen 2018)

Manufacturing and service firms have unique characteristics; manufacturing uses intense labor resources which necessitate physical labor (Shani 2020), while services are relatively easier because processes and procedures can be changed according to environmental changes (Duchek 2020). With regard to resilience, disruptions and prolonged travel restrictions during the pandemic have made it difficult for manufacturing firms to endure because their workforce's inability to move stalled their overall activity (Vanany et al. 2021), preventing them from being flexible in their product offering and meeting customers' expectations. On the other hand, service firms were able to survive and even generate more profit than usual. The pandemic opened the pathway for service industries to operate in a simpler manner while creating more networks and shifting to a more sustainable outlook (Jones & Comfort 2020). Specifically, ideas to reduce human-to-human interaction have been recommended, while new standard operating procedures (SOPs), robot-based services, internet of things (IoT), and contact-free receptions have been regulated and reworked (Xiang et al. 2021).

From the theoretical perspective, the dynamic capabilities theory or known as DCT (Teece 2007) is significant for organizational resilience research. An expansion of the resource-based view or RBV (Barney 2001; Pisano 1994), the DCT has been applied to explain organizational resilience, organizational transformation, organizational coping, and entrepreneurial behavior (Vogel & Güttel 2012). According to this theory, different firms operate differently despite being from the same industry because of their distinct resources and capabilities (Priem & Butler 2001). In this regard, Baghersad and Zobel (2022) suggested that organizational resilience is a dynamic capability that allows organizations to bounce back faster amid challenges regardless of the type of industry.

#### ORGANIZATIONAL RESILIENCE AND FIRM SIZE

The COVID-19 pandemic brought substantial changes to organizations; whereby different sized organizations faced varying degrees of difficulties during the outbreak. Among these challenges were low customer demand, disruptions in the supply chain, cancellations of exports and imports, insufficient resources, and more. Indeed, organizational size plays a significant role in determining how fast an organization regains control amid such issues. Notably, some researchers found that the major victim of the pandemic has been smaller rather than large organizations (Bartik et al. 2020; Shafi et al. 2020). The two main categories of companies are SMEs and large companies. These companies are classified based on the number of employees and in some references on the amount of revenue, however in this study the number of employees was used as the determinant for company type. SMEs usually have less than 250 employees, although this number can change from industry to another and from country to country (McAdam & Reid 2001).

SMEs have a simple structure and are less prepared to encounter uncertain environmental changes (Shah et al. 2013) compared to large organizations with stable and well-defined organizational structures that help them bounce back faster (Bartik et al. 2020). SMEs generally face challenges in sustaining resources and infrastructure (Papadopoulos et al. 2020) and were not prepared to encounter disruptions till the COVID-19 wave hit them. They are also dependent on their daily routine jobs and a small group of customers (Williams & Schaefer 2013), leading many of them to cease operations or shut down entirely during the pandemic (Kuntz 2021; Queiroz et al. 2021). They could not cope with their losses during the pandemic and could only withstand the crisis for a few months, especially in sectors such as tourism, transportation, customer service, and culture which faced supply chain disruptions and decreased customer demand. In terms of leadership style, small organizations possess more autocratic leadership styles compared to large ones due to the latter's diversity. However, SME leaders are more able to explore new opportunities due to their size and flexibility (Manfield & Newey 2018), and

can opt for emergent strategies for sustainable business operations (Papadopoulos et al. 2020). Accordingly, many have adopted digital technologies, including IoT, artificial intelligence (AI), and mobile and collaborative technologies. For SMEs, adopting such technologies is believed to secure business continuity and make it easier to deal with the consequences of COVID-19 (Papadopoulos et al. 2020).

Meanwhile, business continuity is well within the capacity of large organizations, whose organizational resilience has been vital in preventing and recovering from COVID-19's potential threats (Aldianto et al. 2021). Large organizations generally have sufficient resources, notably managerial and financial resources (Bartik et al. 2020). In terms of organizational resilience, they are prepared to face uncertain circumstances, including natural disasters (Aldianto et al. 2021). Overall, according to the DCT, organizations from all industries can continuously achieve and sustain competitive advantage in the changing environment by adopting, implementing, and accepting changes. Hence, organizational resilience should be strengthened across all sectors in facing the post-COVID-19 era.

ORGANIZATIONAL RESILIENCE AND OPERATIONAL PERFORMANCE

Organizational resilience is the ability of an organization to anticipate, organize, and respond to sudden changes for survival and business continuity (Vogus & Sutcliffe 2007). Along the same lines, Beuren and Santos (2019) described organizational resilience as the capability to bounce back from unanticipated, tense, and unfavorable situations. It permits organizations to face their competitors, meet customer demands, improve product and service quality, and enhance operational competence (Hung et al. 2010; Lam & Bai 2016; Yang & Hsu 2018).

Multiple studies proved the effect of resilience on firms' performances (Fathi et al. 2021; Lengnick-

Hall & Beck 2005; McAdam & Reid 2001). (Comfort et al. 2001) found that performance declines when organizational complexity increase. To reduce the risk of complex and uncertain environments in organizations the study suggests creating a system combining anticipation and resilience. (Corey & Deitch 2011) indicated that recovery strategies post-pandemic impact the performance of an organization. Hence, resilience is vital for an organization's long-term performance (Lam & Bai 2016), especially in the process of adapting and reacting to a new environment (Kwak et al. 2018; Yang & Hsu 2018). Specifically, it provides firms the greater ability, flexibility, adaptability, and agility to respond to changes in customer preference and customer demand (Annarelli & Nonino 2016; Ong & Tan 2021). In short, in the post-COVID-19 period, resilience is seen as a critical factor for organizations' long-term performance in the face of turbulence and uncertainty.

Figure 1 presents the framework of this research, which proposes that organizational resilience, as embodied by the four dimensions of ability, flexibility, adaptability, and agility, enhances post-pandemic operational performance among manufacturing and service firms in relation to their size.

METHODOLOGY

DATA COLLECTION

Malaysia is an upper middle-income country which has a diverse economy and strong manufacturing and service industries. This study was not limited to any state in Malaysia; rather, the focus of data collection was the type and size of companies in both sectors. A questionnaire survey was distributed to senior managers with a wide understanding of their designated position and at least a year of working experience in their current company. The managers' responses were considered to

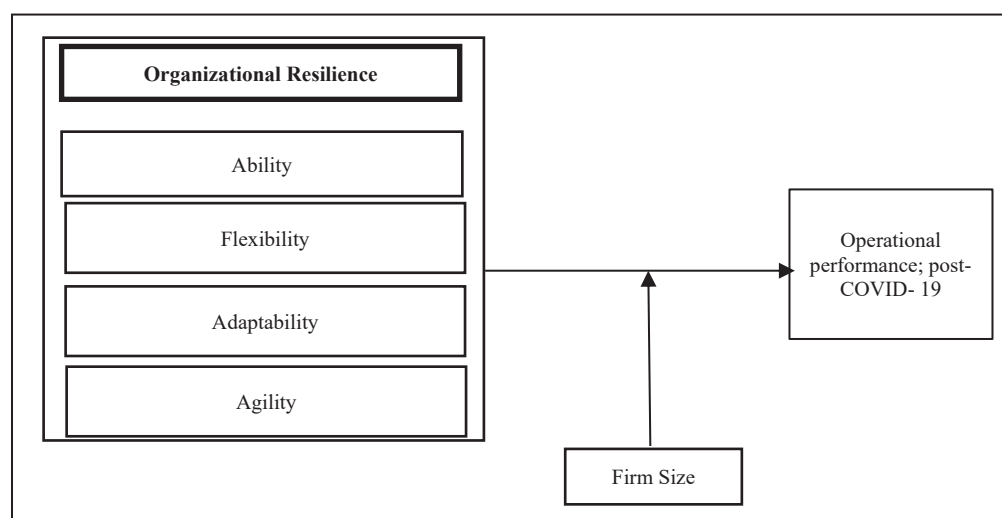


FIGURE 1. Research framework

TABLE 1. Description of sample

		Number of firms
Firm orientation	Manufacturing firms	41
	Service firms	44
Firm size	SME firms	47
	Large firms	38
Firm age	< 5 years	10
	6-10 years	19
	11-20 years	19
	21-30 years	12
	> 30 years	25
Employees in the firm	< 100	24
	101-250	16
	251-500	07
	501-1000	14
	> 1000	24
Annual sales turnover (Malaysian Ringgit)	< 100,000	11
	100,001-500,000	46
	> 500,000	28
Total		85

TABLE 2. Measurement Items

Agility	Our organization quickly responds to changes in overall consumer demand.	Chu 2015
	Our organization quickly reacts to new products or service launches by competitors.	
	Our organization quickly introduces new pricing schedules in response to changes in competitors' prices.	
	Our organization quickly changes (i.e., expands or reduces) the variety of products/services available for sale.	
	Our organization quickly adopts new technologies to produce better, faster, and cheaper products/services.	
	Our organization quickly expands into new regional or international markets.	
Ability	Our organization regularly monitors changes in our markets.	Chu 2015
	Our organization regularly monitors competitors' actions.	
	Our organization regularly monitors consumer preference changes.	
	Our organization regularly monitors regulatory/legal changes.	
	Our organization regularly monitors economic shifts.	
	Our organization regularly monitors technological advancements.	
Flexibility	Our organization is flexible in allocating marketing resources to market a diverse line of products/services.	Chu 2015
	Our organization is flexible in allocating production resources to manufacture various products/services.	
	Our organization is flexible in product design to support many potential products/services.	
	Our organization redeploys organizational resources effectively to support our firm's intended strategies.	
	Our organization modifies the resources we can use in developing, manufacturing, and delivering its intended products/services to targeted markets.	
Adaptability	Our organization frequently adopts new techniques.	Chu 2015
	Our organization frequently introduces new products/services.	
	Our organization frequently modifies our products/services.	
	Our organization frequently adopts new technologies and skills.	
Operational Performance	Our organization has the lowest total production cost.	Jabbour et al. 2013
	Our organization takes the shortest time to place a product/service in a market, that is, from conception to availability at the final point of sale.	
	Our organization is a leader in introducing new products/services to attract new or current consumers.	
	Our organization is known for quality of manufacturing and offering durable products/services.	
	Our organization is flexible in product design and production volume.	
	Our organization is known for its timely deliveries.	



represent their organization as the unit of analysis in this study. The sample is collected from the manufacturing service firms via convince sampling. Convenience sampling is a technique to collect research data from a conveniently available pool of respondents (Henseler et al. 2009). It is highly used for its speed, simplicity, and economical aspects. In this approach the respondents are approachable to be a part of the sample. The population for this study includes companies of different sizes in both manufacturing and services sector in Malaysia. A total of 150 questionnaires were sent out. A total of 85 responses were received. The response rate is 56.0 percent. The sample of 85 responses represent a total of 85 companies. Each response represents a distinct company with one manager per company. The companies comprising 41 manufacturing firms (48 percent) and 44 service firms (52 percent). Of the 85 firms, 47 were SMEs (55 percent) and 38 were large firms (45 percent). In terms of number of employees, 24 (28 percent) firms had more than 1000 employees and less than 100 employees, respectively. Finally, a majority of firms were over 30 years old (29 percent) and reported an annual turnover from 100,001 to 500,000 Malaysian Ringgit (54 percent). The size of the company has been determined based on the number of employees in the companies. Company with fewer than 100 employees considered as small, 100 to 1000 as medium while more than 1000 has been classified as large firms in the questionnaire. A description of the sample is presented in Table 1.

#### SURVEY INSTRUMENT

The distributed survey questionnaire consisted of five essential constructs, namely the four constructs of resilience (i.e., ability, adaptability, flexibility, and agility) and operational performance. The items were rated on a five-point Likert scale ranging from 1 (totally disagree) to 5 (totally agree). The items for agility (6 items), ability (6 items), flexibility (5 items), and adaptability (4 items) were adapted from Chu (2015), while the items for operational performance (6 items) were adapted from Jabbour et al. (2013). The measurement items are listed in Table 2. The items were expected to assess the current respondents' personalities, characteristics, and competencies, which may vary based on firm type and size. For example, the stress level in the banking sector (service industry) (Oliveira & Roth 2012) is different from that in automobile companies (manufacturing industry) (Prause & Atari 2017). Likewise, the respondents' personalities, characteristics, and competencies may exhibit differences based on firm size due to resource constraints and organizational structure.

#### RESULTS

PLS path modelling approach for data analysis has been adopted for the present study. Prior to testing,

the reliability, validity, and structure paths, various assumptions relating to normality and multicollinearity and common method bias assessed (Tabachnick & Fidell 2007; Podsakoff & Organ 1986). Two-step process, which is (1) assessment of measurement model and (2) assessment of structural model used in the present study for evaluating and reporting results (Hair et al. 2010, 2014; Henseler et al. 2009). It was first confirmed that the data had no common method bias before assessing the data's reliability, validity, and structural path (Hair et al. 2012; Podsakoff et al. 2003). Then, assessment of the measurement and structural models were conducted to report the results. First, to establish the measurement model, the researcher evaluated the constructs' reliability, internal consistency, convergent validity, and discriminant validity (Hair et al. 2012; Henseler et al. 2009). Reliability was assessed using outer loadings for each item, which should be between 0.5 and 0.7 to be acceptable (Hair et al. 2011, p. 201). If the loading is less than 0.5 but contributes to an average variance extracted (AVE) score above 0.5, it can be accepted. If the outer loading is more than 0.708 (Hair et al. 2012), it indicates the latent variable achieved at least 50 percent of the indicator's variance. In the present study, the outer loadings met each latent variable item's reliability criterion of 0.5 and more (refer to Table 3). Meanwhile, the internal consistency reliability (CR) values for each of the latent variables ranged from 0.913 to 0.973; this suggests that all the indicators measured the same phenomenon and had internal consistency (Hair et al. 2011). Next, convergent validity was measured using AVE, which should achieve a minimum cutoff of 0.50 (Fornell & Larcker 1981). The results in Table 3 demonstrate that the constructs attained adequate convergent validity with AVE scores above 0.50 (Fornell & Bookstein 1982). In terms of discriminant validity, Table 4 shows that the square root of each construct's AVE was higher than its correlations with other constructs, while Table 5 indicates that the HTMT criterion was also met. Therefore, the constructs exhibited a sufficient level of discriminant validity.

To analyze the structural model, the present study used 500 bootstrap samples and 85 cases (companies), which is the standard bootstrapping procedure to identify the significance of path coefficients (Hair et al. 2011; Henseler et al. 2009). Table 6 and Figure 2 present the full statistical results of the structural model with the moderating role of size. As shown in Table 6, ability ( $b=-0.080$ ,  $t=1.160$ ,  $p>0.01$ ) and adaptability ( $b=0.091$ ,  $t=0.691$ ,  $p>0.01$ ) had no significant effect on operational performance. On the other hand, agility ( $b=0.532$ ,  $t=4.859$ ,  $p<0.000$ ) and flexibility ( $b=0.300$ ,  $t=3.134$ ,  $p<0.001$ ) demonstrated a significant positive impact on operational performance. Lastly, the product indicator approach was applied. The product indicator approach is used to estimate the latent interaction effects in the structural equation modeling, where indicators of a latent factor are multiplied with that of a second one to generate

the (product) indicators of the interaction term, which is represented by a new latent factor. The approach estimates the moderating effect of size on the relationship between organizational resilience and operational performance,

since the proposed moderating variable was continuous (Rigdon 1998). The two main categories of companies are SME's and large companies. These companies are classified based on the number of employees and in

TABLE 3. Measurement model results

Latent constructs and indicators	Standardized loadings	AVE	CR
Agility			
AG 1	0.879	0.797	0.959
AG 2	0.804		
AG 3	0.914		
AG 4	0.943		
AG 5	0.916		
Flexibility			
FX1	0.914	0.880	0.973
FX2	0.962		
FX3	0.958		
FX4	0.944		
FX5	0.912		
Adaptability			
AD1	0.912	0.856	0.959
AD2	0.941		
AD3	0.924		
AD4	0.924		
Ability			
AB1	0.789	0.693	0.931
AB2	0.886		
AB3	0.823		
AB4	0.834		
AB5	0.839		
AB6	0.821		
Operational Performance			
OP1	0.567	0.643	0.914
OP2	0.812		
OP3	0.832		
OP4	0.769		
OP5	0.923		
OP6	0.862		

Note: AG = Agility; FX= Flexibility; AD = Adaptability; AB = Ability; OP = Operational Performance

TABLE 4. Discriminant validity using Fornell and Larcker Criterion

Constructs	1	2	3	4	5	6
AB	<b>0.832</b>					
AD	0.590	<b>0.925</b>				
AG	0.536	0.867	<b>0.893</b>			
FX	0.646	0.772	0.756	<b>0.938</b>		
OP	0.542	0.745	0.810	0.727	<b>0.802</b>	

Note: AG = Agility; FX= Flexibility; AD = Adaptability; AB = Ability; OP = Operational Performance

TABLE 5. Discriminant validity using Heterotrait-Monotrait Ratio (HTMT)

	AB	AD	AG	FX	OP
AB					
AD	0.625				
AG	0.573	0.916			
FX	0.685	0.807	0.786		
OP	0.501	0.812	0.879	0.783	
Size	0.093	0.146	0.237	0.100	0.250

Note: AG = Agility; FX= Flexibility; AD = Adaptability; AB = Ability; OP = Operational Performance

TABLE 6. Structural model analysis with the moderator (full model)

Relationship	Beta	SE	t-value	p-value	Decision
Ability>Operational Performance	-0.080	0.069	***1.160	0.123	<b>Not Supported</b>
Adaptability>Operational Performance	0.091	0.131	***0.691	0.245	<b>Not Supported</b>
Agility>Operational Performance	0.532	0.109	***4.859	0.000	Supported
Flexibility>Operational Performance	0.300	0.096	***3.134	0.001	Supported
Resilience>Size	0.066	0.071	***0.933	0.176	<b>Not Supported</b>

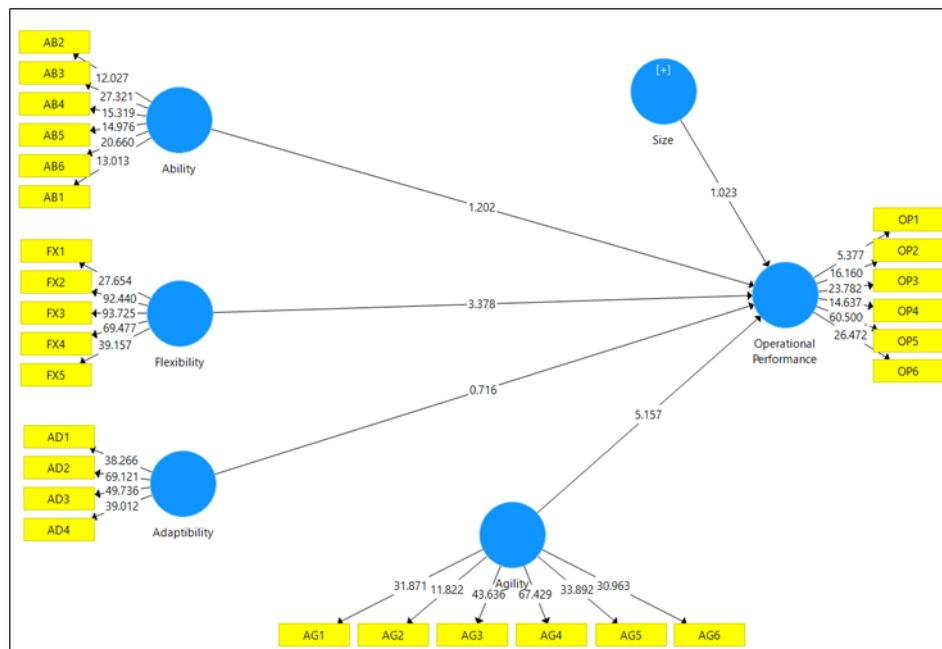


FIGURE 2. Structural model

TABLE 7. Coefficient of determination

Endogenous Latent variable	R <sup>2</sup>		
	Included	Excluded	Effect-size
Operational Performance	0.695	<b>0.676</b>	substantial



some references on the amount of revenue, however in this study the number of employees was used the determinant for company type. SME's usually have less than 250 employees, although this number can change from industry to another and from country to country (McAdam & Reid 2001). The interaction term, then, is treated as a separate factor predicting the outcome variable. Based on the results, the moderating effect of size was found to be insignificant ( $b = 0.066$ ,  $t = 0.933$ ,  $p > 0.176$ ).

The structural model suggests an additional criterion called the  $R^2$  (coefficient of determination) which represents the amount of variance in the endogenous constructs explained by the exogenous constructs linked to it (Cohen 1988; Henseler et al. 2009). Since various disciplines embrace  $R^2$ , scholars are advised to rely on a "rough" rule-of-thumb regarding an acceptable  $R^2$ . The present study followed Chin's (1998) guideline that 0.67, 0.33, and 0.19 describe substantial, moderate, and weak levels of predictive accuracy, respectively. Table 7 shows that the value of  $R^2$  for the present study was 0.676, representing substantial predictive accuracy. That is, 68 percent of the variance in operational performance was explained by the organizational resilience dimensions in this study.

## DISCUSSIONS

The findings from this study revealed that agility and flexibility significantly improve the operational performance of Malaysian manufacturing and service industries. The finding on agility corresponds with previous studies (Ashrafi et al. 2019; Eckstein et al. 2015; El-Khalil & Mezher 2020; Shin et al. 2015; Zhu & Gao 2021) that better agility implementation engenders higher operational performance. According to Wanasida et al. (2021), agility is the process of proactive responses to unexpected environmental changes. In the long term, continuous agility is translated into a competitive advantage that increases an organization's operational performance and inventiveness. Wanasida et al. (2021) also revealed that companies that responded well during the COVID-19 pandemic had higher agility levels than other organizations. This study thus concluded that agility has a substantial impact on operational performance after the pandemic. The organization's ability to alter among various sides of operations is seen as a significant dimension of resilience (Zahari et al. 2022). Organizations with strong management strategies and operational control systems can achieve higher levels of leadership values in the organization, and hence higher operational performance (Zahari et al. 2022). In this study path modeling analysis revealed an insignificant relationship between ability and operational performance. This study result is inconsistent with the prior finding of Huang et al. (2020) that prior experience is of utmost importance as a resilience dimension in

accomplishing the strategy and performance of an organization. (Corey & Deitch 2011) proved that able managers is the most important resilience dimension to both operational and strategical performance of the organizational. Next, flexibility is vital for organizations to accomplish performance in an unstable and uncertain environment like the pandemic (Fantazy et al. 2009; Eckstein et al. 2015). The organization flexibility is the ability of to deploy resources promptly efficiently and effectively to address and unanticipated changes in the demand and is less focused on using current data to conclude insights (Dubey et al. 2021). The flexibility enables the organization to modify its operations to face any conditions (Dubey et al. 2021). (Corey & Deitch 2011) emphasized that flexibility result in multiple day to day operations, hence investing in the build of flexibility without forming redundancy help reduce cost. The present finding supports prior studies (Yousuf et al. 2019; Yu et al. 2018) which found that flexibility has a significantly positive effect on operational performance. Flexibility contributes to organizations' competitive advantage in an ambiguous market setting. As such, the higher the level of flexibility, the greater the operational performance. Notably, this study focused more on resource flexibility for operational performance, as it has the highest impact on the cost and quality of products and services. Meanwhile, Al-jawazneh (2012) mentioned that strategic and operational flexibility are key to high economic performance.

Likewise, the relationship between adaptability and operational performance was not supported, which disagrees with the finding of Duchek (2020) that adaptability is vital for functional performance. However, adaptive capability does not always result in better performance; instead, performance is determined by how a firm utilizes its resources (Sheel & Nath 2019). Based on the RBV, the characteristics of resources (tangible or intangible) solely depend on the formulation and implementation of strategy (Majid et al. 2021). Hence, adaptive capabilities should be directed towards enhancing the efficiency of other resources to meet performance goals.

Finally, the size of the organization did not moderate the relationship between organizational resilience and the operational performance of the manufacturing and service sector.

## THEORETICAL CONTRIBUTIONS

Many organizations have been affected by the disaster of COVID-19, and it remains the biggest challenge for them throughout this post-pandemic era. Research on how organizations have developed resilience during the pandemic have offered few answers (Pedersen et al. 2020). Even though organizational resilience has been researched since 1997, the extent to which it affects performance has not been fully addressed (Teece 2007). To close this gap, this study applied the DCT to identify organizational

resilience as a dynamic capability that enhances post-pandemic operational performance. The integration of the DCT promotes high-order capabilities which enable an organization to utilize its current internal and external resources effectively and efficiently by responding to rising challenges and opportunities (Teece et al. 1997; Teece 2007). Apart from this contribution, this study offers evidence that both the manufacturing and service industries, regardless of firm size, need organizational resilience to resolve post-pandemic challenges, which has yet to be established in the literature. Next, this study differentiates the dimensions of organizational resilience, i.e., ability, adaptability, agility, and flexibility, and identifies their distinct relevance in the manufacturing and service industries. Specifically, the findings add knowledge that ability, adaptability, and firm size do not contribute to operational performance, while agility and flexibility play a vital role in performance when dealing with a crisis like COVID-19. Agility enables the organization to proactively respond to the changing environment (Beuren & Santos 2019) in line with its size, organizational structure, and type of business (Burnard & Bhamra 2011; Sullivan-Taylor & Branicki 2011). Lastly, this study contributes evidence that flexibility can significantly improve operational performance. This aligns with the assertion of Nayak and Choudhary (2022) that organizations should be flexible in offering new or modified products and services to generate new opportunities during difficult times like COVID-19.

#### MANAGERIAL IMPLICATIONS

This study carries two different managerial implications in building strong organizational resilience. First, manufacturing and service companies should pay attention to the agility process, which significantly affects their operational performance and sustainability. Managers should include agility as one of the strategies to align with current market conditions and requirements. Since proper agility practices lead to superior performance, managers should apply comprehensive agility practices for the long run instead of focusing on the short run. The adoption of agility also should be driven by every member of an organization. Employers should educate employees on the agility process for greater awareness and less uncertainty. Adopting agility also reshapes the organization's resources promptly. Thus, organization leaders should not wait for agility to happen from the bottom-up; rather, they need to take charge of it.

The second implication for both manufacturing and service organizations is to be open-minded in practicing a flexible system in response to uncertain circumstances caused by the environment (Vanany et al. 2021). An organization's level of flexibility determines its ability to adapt to changes in the background (Wanasida et al. 2021). Implementing flexible practices at all levels consequently improves the resilience of organizations. Thus, managers should give room for the acceptance and adoption of flexibility practices.

#### CONCLUSION

The present post-COVID-19 era is rife with anxiety about handling the future in a risky environment that cannot be predicted. Numerous challenges are faced by individuals, societies, and organizations in their daily routines. Though it has been acknowledged that prevention and readiness are vital in facing such difficulties in future circumstances, this study's findings posit that organizational resilience is also essential in handling natural disasters, economic downturns, and business transformation to foster sustainability. In other words, organizational resilience is the backbone of organizations' sustainability. This present study aim to evaluate how resilience affects operational performance and moderating effect between resilience and operational performance. The present finding supports prior studies (Yousuf et al. 2019; Yu et al. 2018) which found that flexibility and agility has a significantly positive effect on operational performance while ability and flexibility don't have significance effect on operational performance. Adding on, this study also emphasis that size has no moderating effect on resilience and operational performance. However, organizational resilience cannot happen overnight; it takes significant preparation and anticipation, which then turns into adaptation to uncertain environments. Therefore, providing appropriate training and development today is imperative to support and encourage employees to face a crisis in the future. Organizations must further cultivate employees' passion and diligence in demonstrating kindness and genuineness during trying times to boost their resilience. This study's limitation is that it focused only on Malaysian manufacturing and service companies, ranging from SMEs to large firms. Future research can add more value by examining and comparing post-pandemic organizational resilience and performance across various countries and cultures. Future studies can be concentrated on ecological dimensions, where most organizations emphasize economic (survival) dimensions and social (employee) dimensions while neglecting the environmental dimension. Ecological dimensions should not be forgotten in ensuring sustainability efforts. As such, managers should think about transforming crises such as COVID-19 into an opportunity to create organizational sustainability. In doing so, ecological rebound effects can be prevented, and organizations can be ready to face challenges such as COVID-19. An environmental focus will also support the sustainability of organizations and the world for the current and upcoming generations.

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