



The University of Tehran Press

## Examining Networking and Learning Capabilities for Ambidextrous Smes in Environmental Dynamism

Tyna Yunita 

Faculty of Economics and Business, Universitas Bhayangkara Jakarta Raya, Jakarta, Indonesia. Email: [tyna.yunita@gmail.com](mailto:tyna.yunita@gmail.com)

### ARTICLE INFO

**Article type:**  
Research Article

**Article History:**  
Received 15 February 2023  
Revised 03 July 2023  
Accepted 02 August 2023  
Published Online 12 June 2024

**Keywords:**  
*strategic ambidexterity,*  
*learning capability,*  
*networking capability,*  
*environmental dynamism,*  
*SMEs.*

### ABSTRACT

This study examines the networking and learning capabilities of small and medium-sized businesses (SMEs), which enable organizations to generate strategic ambidexterity on environmental dynamism. For this purpose, 190 respondents from SMEs in Indonesia were polled and analyzed using SEM PLS. The results show that networking and learning capabilities substantially impacted strategic ambidexterity. Surprisingly, environmental dynamism does not moderate the association between SMEs' capability in networking and strategic ambidexterity. In addition, networking and learning capabilities positively affect ambidexterity in SMEs. Conversely, environmental dynamism moderates the link between learning capabilities and strategic ambidexterity. The study's findings assist SME owners/managers and practitioners in developing and sustain networking and learning capabilities to achieve ambidexterity.

**Cite this article:** Yunita, T. (2024). Examining Networking and Learning Capabilities for Ambidextrous Smes in Environmental Dynamism. *Interdisciplinary Journal of Management Studies (IJMS)*, 17 (3), 701-715. DOI: <http://doi.org/10.22059/ijms.2023.355494.675646>



© Tyna Yunita **Publisher:** University of Tehran Press.  
DOI: <http://doi.org/10.22059/ijms.2023.355494.675646>

## **Introduction**

Small and medium-sized enterprises (SMEs) play a significant role in the economies of most nations and industries (Moeuf et al., 2018; Ragazou et al., 2022; Zacca et al., 2015). Entrepreneurs inside these businesses work as agents of change by producing new products and services, implementing more effective processes, and building new business models (Tang et al., 2011). SMEs' capacity to deploy new technical and scientific knowledge, innovative technological processes, and updates to current technological processes and expertise enables them to meet the needs of competitive situations (Andrade et al., 2020). To adapt to market swings and remain competitive, SMEs must employ dual strategies: exploration and exploitation (Andrade et al., 2020; Soto-Acosta et al., 2018). In addition, March's (March 1991) article on organizational learning introduced the terms exploration of new opportunities and exploitation in quest of certainty. Exploration is associated with search, diversity, taking risks, experimenting, initiating something, adaptability, adventure, and innovation. In contrast, exploitation is associated with enhancement, selection, production, productivity, implementation, and execution. The two statements are contradictory. Raisch & Birkinshaw (Raisch & Birkinshaw, 2008) indicate that the two things can synergize and rely on one another. On the other hand, ambidexterity is a balance between exploration and exploitation activities, which might impact a company's performance (Z. L. He & Wong, 2004).

Gibson & Birkinshaw (2004) outlines the concept of ambidexterity as an organization's ability to pursue/do two different things at the same time, e.g., alignment and adaptation, efficiency and flexibility, and exploitation and exploration. Strategic flexibility is the company's ability to act in response to uncertainty by customizing its objectives with the help of superior knowledge and capabilities (Majid et al., 2021). Scholars have stressed the need for multinational enterprises to develop strategic ambidexterity (Z. Khan et al., 2020). Although most studies on strategic ambidexterity have been undertaken in large firms, there are few studies on this topic in small and medium-sized businesses (Ragazou et al., 2022). The backdrop of small and medium-sized enterprises (SMEs) is less excellent technological, human, and financial resources, presenting academics with more study opportunities (Andrade et al., 2020). When evaluating small and medium-sized firms (SMEs), and their capability for networking and learning, it is evident that the relative importance of exploration and exploitation might vary (Karami & Tang, 2019). The development of employee knowledge and learning capabilities leads to organizational success (Kazmi et al., 2021). When the speed of change exceeds the speed of learning, you are in trouble-both as an individual and an organization and learning without action, and no action without learning (Saabye et al., 2021). Networking capabilities of small and medium-sized enterprises are not only gaining a valuable position in the industry, but more importantly - better use of networking capabilities that are aligned with their strategic goals (Majid et al., 2021). Additionally, prior studies have discussed how environmental dynamism influences the development of ambidextrous small and medium-sized enterprises (SMEs) (Andrade et al., 2020; Mammassis & Kostopoulos, 2019; Martinez-Conesa et al., 2017; Soto-Acosta et al., 2018). Most studies on environmental dynamism have concentrated on wealthy nations, even though environmental dynamism in developing nations can be both an opportunity and a difficulty in its position as a moderator and strategic orientation (Faroque, 2015). Regarding Indonesia's economic development, entrepreneurship has become a pressing concern (Tambunan, 2007). Majid et al. (Majid et al., 2021) share the same view and argue that exploitation will improve short-term performance while exploration will improve long-term performance by exploring new opportunities and responding adequately to future environmental changes.

Entrepreneurship research is essential because small and medium-sized enterprises (SMEs) play an important role in the economic development of any country, employing up to 60 percent of the industrial workforce (Digdowiseiso & Sugiyanto, 2021; Maksun et al., 2020). In Indonesia, where SMEs are more numerous than large corporations, the problems faced by SMEs will have a significant effect on the country (Kumalaningrum et al., 2023).

This research has a dual goal. The research begins by evaluating the impact of networking and learning capability of small and medium-sized firms (SMEs) in strategic ambidexterity. Second, the paper examines the effect of environmental dynamism on strategic ambidexterity and whether environmental dynamism moderates the link between networking capability and learning capability.

The remaining sections of this work are organized as follows. Initially, the literature review and conceptual model are carried out and developed. The study model and hypotheses for data analysis are then developed utilizing the conceptual framework of strategic ambidexterity. The research technique and the essential findings and data analysis are then discussed. The significance of the interpretation of the findings is next evaluated. The conclusion includes the lessons learned, scholarly contributions, implications for practice and policymaking, and future work.

### **Literature Review and Hypothesis Development Networking Capability and Strategic Ambidexterity**

A network is a collection of nodes and connections describing a relationship (Brass et al., 2004). A business network is a collection of activity actors in large or small businesses, organizations, universities, research institutions, and inter-organizational linkages exchanging resources to achieve common objectives (Garousi Mokhtarzadeh et al., 2020). Business networks can generally be centralized, decentralized, or self-organizing (Provan et al., 2007). In addition, the firm's network capability, or its capacity to build, cultivate, and use its relationships (both internal and external) in order to acquire the resources it requires and sustainably improve its performance metrics (Zacca et al., 2015).

Flexibility in implementing organizational activities is one of the exploration activities in constructing ambidexterity (Marabelli et al., 2012; Pellegrinelli et al., 2015). The relational skills not only improves the ability to communicate and cooperate, but also enhances the flexible attitude (Majid et al., 2021). Partner knowledge as a process for knowing the resources and products of partners provides guidelines for rescheduling and reformulating organizational strategies. Internal communication creates flexibility by enabling the absorption and broadcasting of the latest information among organizational members. The structure of a business network consists of one or more companies serving as a hub whose responsibility is to govern relations between other companies (Dhanaraj & Parkhe, 2006). A business is said to have a network if it can develop and distribute the network to meet specific objectives (Tidd et al., 2013). Networking capability is a company's ability to build and use partnerships between organizations to obtain access to resources controlled by others (Karami & Tang, 2019). The company's determination of the orientation of its product development strategy is erroneous because it lacks sufficient networking capability and networking ability to utilize resources in product development projects (Mu et al., 2017). Social networks are closely related to ambidexterity in SMEs, including the ability to manage the diversity of network members and the connections that connect them internally and externally (Kumalaningrum et al., 2023). Furthermore, the company's strategic direction expands based on its dynamic networking and networking capabilities. Accordingly, the following is offered as the initial hypothesis of this study:

**H1:** Networking capability has a positive and significant effect on strategic ambidexterity

### **Learning Capability and Strategic Ambidexterity**

Focusing on systems orientation, climate for learning orientation, knowledge acquisition and utilization orientation, and information sharing and disseminating orientation can increase an organization's learning capacity (Teo et al., 2006). The mix of activities results in learning abilities that enable the company to engage in exploitation and exploration, so providing it with a durable competitive edge (Dhir & Dhir, 2018). Ambidexterity is a learning activity in the context of exploration to generate new ideas. Learning capability in an organization refers to the variables inside the organization that assist the learning process for the organization (Salas Vallina et al., 2019). Although earlier research has evaluated the literature and theory concerning dynamic capabilities, learning, organization, and ambidexterity, there is still a dearth of empirical evidence explicating this link (Souza & Takahashi, 2019). Stability management is an issue for businesses.

Additionally, firms must implement changes to preserve business continuity. Both of these tasks are challenging and necessitate the development of ambidexterity and organizing abilities (O'Reilly & Tushman, 2013; Souza & Takahashi, 2019). However, many argue that ambidextrous skills are acquired in environments where individuals can select where and how to direct their attention (Batt-Rawden et al., 2019). Specifically, building a culture that supports and rewards learning and sharing

information through collaboration with other organizations is essential. Next is offered the potential hypothesis for the current study:

**H2:** Learning capability has a positive and significant effect on strategic ambidexterity

### **Learning Capability and Environmental Dynamism**

Negotiating existing learning with the market and technological expectations is necessary to anticipate changes. Individuals transform knowledge into beliefs, pursue new opportunities, and the comprehension process influences the justification of truth (Simsek, 2009; Souza & Takahashi, 2019). Individuals gain from each other's perspectives and ideas when collaborating to develop and transform information, accelerating the sensemaking process (Brix, 2019). Thus, learning capability is the capacity of an organization to assimilate new information and modify its practices to take advantage of it, aiming to boost its performance (Dhir et al., 2018). Learning capability is the mix of behaviors that stimulate inter-organizational learning among employees, collaborations with external organizations that enable the dissemination of learning, and open culture within the business (Lin et al., 2013).

Innovation ambidexterity is a measure of the success of the company's learning (Lin et al., 2013). A company's learning capability consists of all organizational processes involving the collection, processing, and transfer of ideas among corporate members that directly impact the company's success (Kazmi et al., 2021; Obeidat et al., 2018). According to (Vashdi et al., 2019), learning capability in organizations is acquiring, sharing, and disseminating knowledge among members to enhance organizational capacities. In addition, organizational learning capability is the organization's capacity to assimilate and utilize existing knowledge for organizational development (Chiva et al., 2007). Learning capability is influenced by the internal and external environment, controlled by experimenting with new ideas, enhancing the ability to handle difficult situations, and empowering employees in crucial decision-making (Kazmi et al., 2021). In a setting with low environmental dynamism, the information exchange process becomes sluggish, and the company's requirement for external network connection declines (Schilke, 2013). Organizational improvement requires improvisation based on learning capability (Amitay et al., 2005). The combination of practices leads to learning capability, which helps create sustainable competitive advantage by empowering the firm to be involved both in exploration and exploitation (Dhir et al., 2018). The following hypothesis is therefore offered in light of the evidence above:

**H3:** Environmental dynamism strengthens the positive effect of learning capability on strategic ambidexterity.

### **Networking Capability and Environmental Dynamism**

SMEs possessing network capabilities are able to regularly, flexibly and constructively collaborate with agents, distributors, customers, suppliers and other network members to successfully solve problems together. Developing this network capability occurs through learning from prior experience in network partnerships. Networking capability is an intricate organizational capability aimed at managing commercial partnerships at all phases of development (Mitrega et al., 2012). Due to their lack of market-operating resources and expertise, microbusinesses need networking capabilities (Fayos et al., 2022). When the complexity of the dynamic environment develops, it is necessary to collaborate on networking capability, inter-organizational information sharing, and inter-organizational learning (Garousi Mokhtarzadeh et al., 2020). Interorganizational contacts become increasingly networked as inter-organizational environment uncertainty rises (Garousi Mokhtarzadeh et al., 2021). Firms engage in networking under conditions of uncertainty, and networking activities feature unpredictability, purpose ambiguity, and a dynamic and interactive environment (Martín Martín et al., 2022). Therefore, the hypothesis can construct as follows:

**H4:** Environmental dynamism moderates the relationship between networking capability and strategic ambidexterity

### Environmental Dynamism and Strategic Ambidexterity

Exploration and exploitation are two distinct methods businesses attempt to learn and adapt (Peters & Buijs, 2022). Organization or corporation that is ambidextrous, including the ability to adapt to both external and internal environmental changes (Ragazou et al., 2022). Attention to ambidexterity heightens when two distinct perspectives and tactics are employed simultaneously (H. Khan et al., 2020). This concept is prevalent in innovation management, where researchers investigate the effectiveness of simultaneous exploration and exploitation (Luger et al., 2018). The essential tenet of strategic management theory is that successful businesses can resolve conflicts between satisfying present customer wants and planning for future opportunities (H. Khan et al., 2020).

Environmental dynamism occurs when there is a frequency and wave of environmental changes and situations of uncertainty. Change and dynamism will impact the capacity of businesses to modify the need for new resources as necessary (Yuan et al., 2021). Environmental dynamism is the element of chance (Donaldson, 2001). Exploration activities of SMEs become more reactive toward external influences, whereas exploitation focuses on adaptation and control operations (Andrade et al., 2020). According to contingency theory, a company's chances of success and survival depend on the extent to which its activities are compatible with its environment (Ikhsan et al., 2017).

**H5:** Environmental dynamism has a positive and significant effect on strategic ambidexterity

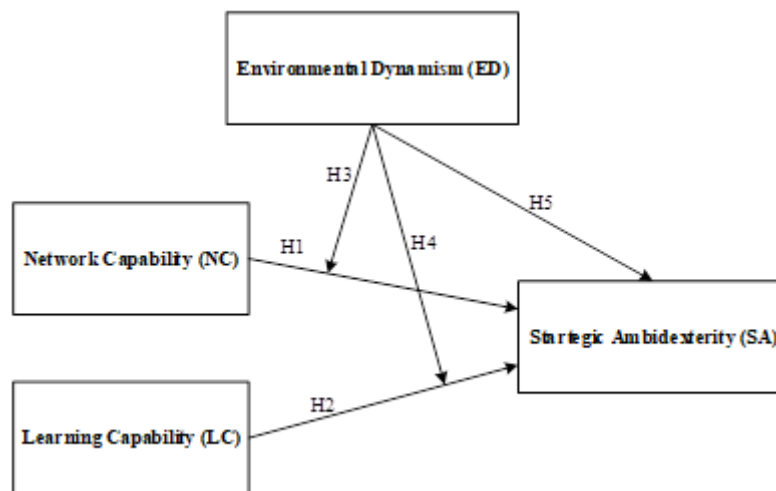


Fig. 1. The Conceptual Model

### Research Methodology

This study engages a population of SMEs in the West Java province of Indonesia. Data obtained from the Ministry of Cooperatives and Small and Medium Enterprises (KEMENKOPUKM) West Java has the highest number of MSMEs in Indonesia (Santika, 2023). In the year 2021, there are 4,664 incorporated SMEs in West Java and 616731 unincorporated SMEs (BPS Jawa Barat, 2023).

This research involves a relatively large number of populations, so the sampling design uses simple random sampling. According to (Sekaran & Bougie, 2016), simple random sampling is an ideal design to generalize the findings or results. Furthermore, in determining the sample size, this study refers to (Krejcie & Morgan, 1970; Sekaran & Bougie, 2016), which have 384 respondents.

The next step is to send questionnaires to the owners or managers of each SME through door-to-door, email, and WhatsApp. The feedback questionnaire sent to 384 respondents is 190 respondents data that is feasible to analyze further. According to (Hair, Jr. et al., 2017), PLS-SEM can process nonnormal distribution data with a small sample size of under 100 samples, so with 190 sample data, this research still meets the required criteria. The study examined four primary constructs: strategic ambidexterity (derived from He & Wong(2004), Voss & Voss (Voss & Voss, 2013)); networking capability (Karami & Tang, 2019); learning capability (Lin et al., 2013); and environmental dynamism (Chen et al., 2015; Zhang & Qi, 2021).

This research consists of 3 (three) variables, namely Networking Capability, Learning Capability, and Strategic Ambidexterity as dependent variables. Networking Capability is calculated using seven

indicators developed by (Karami & Tang, 2019). While Learning Capability is measured using eleven indicators proposed by (Lin et al., 2013). Meanwhile, strategic ambidexterity is organized as a second-order construct with two dimensions: exploration and exploitation. Strategic ambidexterity is translated into twelve indices based on previous research (Z. L. He & Wong, 2004; Voss & Voss, 2013). This research instrument uses a questionnaire distributed via a Google form. The research questions used 7 (seven) Likert scales, with a measurement level of 1. strongly disagree, 2. disagree, 3. tend to disagree, 4. not sure, 5. tend to agree, 6. agree, 7. strongly agree. Table 1 is the operational variable of this study.

**Table 1.** Operational research variables

<b>Strategic Ambidexterity (SAY)</b>		
Product Exploration	PXR1	We created a revolutionary new conceptual approach
	PXR2	We experiment with radically new work.
	PXR3	We challenge traditional artistic boundaries.
Product exploitation	PXL1	We deliver services that are our strengths
	PXL2	We maximize our skills and artistry.
	PXL3	We maintain the quality of our products/services.
Market exploration	MXR1	We provide impressive service on the customer's first visit
	MXR2	We started a planned program to attract new customers.
	MXR3	We are looking for customers in new markets
Market exploitation	MXL1	We are looking for a single buyer but user of all our products
	MXL2	We encourage customers to place repeat orders.
	MXL3	We persuade shoppers to spend more
<b>Networking Capability (NWC)</b>		
	NC1	We analyze what we want to achieve with our partners
	NC2	We build personal relationships to retain employees
	NC3	We determine which partners can cooperate
	NC4	We appoint a manager/employee specifically responsible for cooperation with partners.
	NC5	We always discuss with partners how we can support each other to achieve success.
	NC6	We do business with partners flexibly
	NC7	We always solve problems together with partners
<b>Learning Capability (LNC)</b>		
Open Organizational Culture	OOC1	Knowledge in this business is shared widely
	OOC2	Mutual trust and respect are essential in this business
	OOC3	The business is continuing to look for new opportunities.
	OOC4	This business rewards those who take risks.
	OOC5	This business helps our customers anticipate developments in their markets.
Interorganizational partnering	IEP1	Partnering with other organizations for specific innovation purposes
	IEP2	Perceive the importance of partnering with other organizations for the purpose of innovating
	IEP3	Partnerships have become an important source of innovation for businesses.
Intraorganizational learning	IAP1	Among employees learn from each other
	IAP2	Among employees exchanging ideas with people from different business areas
	IAP3	If I am solving a problem or a new idea, I tend to look for/appoint employees to work with to solve the problem.

## Findings

Table 1 shows the characteristics of the surveyed SME participants. According to the business areas of SME respondents, business location status and years in operation were inquired about to create a good overview of the research findings. The results indicate that the most significant population cluster (93.68 percent) had a permanent business location, whereas 6.32 percent of the sample population had a temporary business location. The results of the investigation indicate that 39.46% of the participants had between 1 and 5 years of business experience, while 26.84% were new to their firm (less than one year), 6 - 10 (21.05%), 11 - 15 (9.47%), and 15 - 20 years (3.18 percent ). Finally, it was found that 60.53 percent of the participants were in culinary business sectors, while 45 percent were in fashion, 14.21 percent were in automotive, and 7.37 percent were in other business areas. Indonesia's economy is dominated by small and medium-sized enterprises (SMEs) in the food and beverage and services sectors (Digdowiseiso & Sugiyanto, 2021).

**Table 2.** Participants' Demographic Information

Profiles	Frequency	%
Business location status		
Permanent	178	93,68
Temporary	12	6,32
Years in business		
< 1 year	51	26,84
1 - 5 years	75	39,46
6 - 10 years	40	21,05
11 - 15 years	18	9,47
15 - 20 years	5	3,18
Business fields		
Culinary	115	60,53
Fashion	34	17,89
Automotive	27	14,21
Others	14	7,37

### Measurement Model

We used SMART PLS based on structural equation modeling to examine the research data and hypotheses. The measurement model investigates and assesses the connection between structures and their measurement indices. This study assessed the reliability and convergent validity using factor loadings, Average Variance Extracted (AVE), and composite reliability. All loadings ( $>0,6$ ) on all constructs are displayed in Table 2, as recommended by Hair Jr et al. (Hair, Jr. et al., 2017); strategic ambidexterity (SA) has outer loadings ranging from 0,625 to 0,828. While learning capability has variable outer loadings ranging from 0,654 to 0,744. Outer loading scores (OL) networking capability range from 0,672 to 0,687, and environmental dynamism range from 0,715 to 0,964.

**Table 3.** Convergent Validity and Composite Reliability

Constructs	Items	Loadings	Alpha	CR	AVE
Strategic Ambidexterity (SA)	MXL1	0,674	0,923	0,934	0,541
	MXL2	0,728			
	MXL3	0,726			
	MXR1	0,701			
	MXR2	0,726			
	MXR3	0,625			
	PXL1	0,823			
	PXL2	0,828			
	PXL3	0,805			
	PXR1	0,711			
	PXR2	0,732			
	PXR3	0,719			
	Learning Capability (LC)	IL1			
IL2		0,655			
IL3		0,654			
IP1		0,718			
IP2		0,749			
IP3		0,712			
OOC1		0,703			
OOC2		0,748			
OOC3		0,720			
OOC4		0,702			
OOC5	0,749				
Networking Capability (NC)	NC1	0,689	0,850	0,884	0,521
	NC2	0,783			
	NC3	0,695			
	NC4	0,687			
	NC5	0,770			
	NC6	0,750			
	NC7	0,672			
Environmental Dynamism (ED)	ED1	0,958	0,901	0,921	0,747
	ED2	0,964			
	ED3	0,794			
	ED4	0,715			

The composite reliability (CR) and Cronbach's alpha are all greater than 0.7, as shown in Figure 2 and Table 2. This score indicates that the relationship between indicator items is typically solid and dependable. In the meantime, all AVE values for variables were more significant than 0.50.

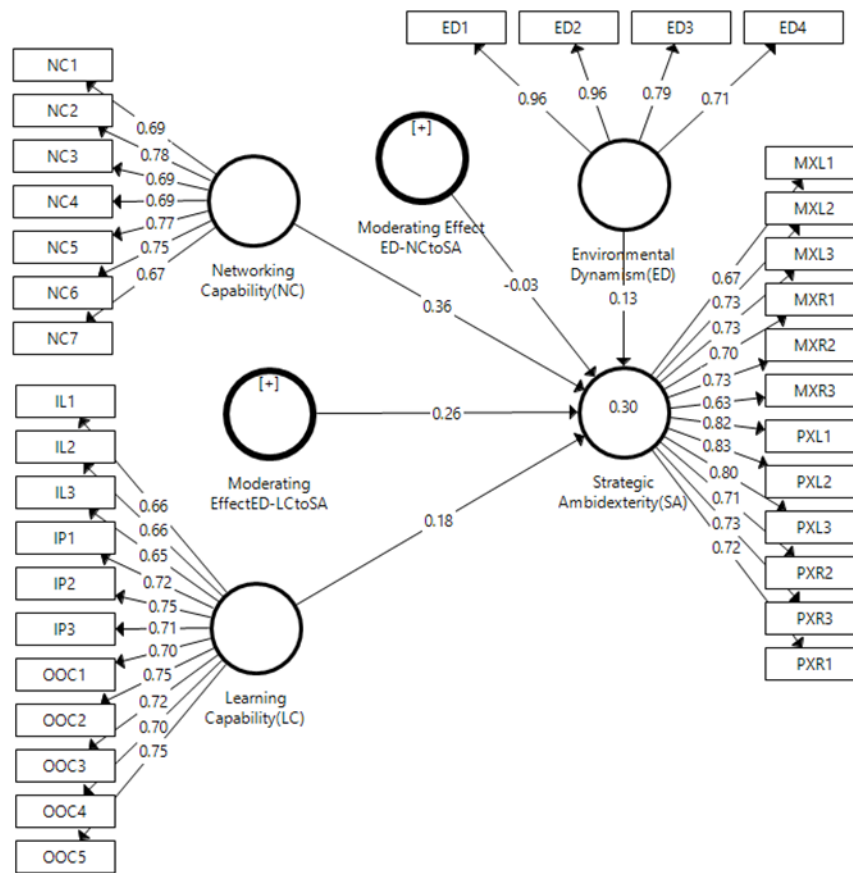


Fig. 2. Confirmatory Factor Analysis

Using Heterotrait-Monotrait Ratio (HTMT) tests, discriminant validity was analyzed. The appropriate HTMT score must be less than 0.9 (Hair, Jr. et al., 2017). As depicted in Table 4, all constructs range from 0,079 to 0,521. HTMT illustrates the validity and correlation between indicator items, so this research model is valid and reliable.

Table 4. Discriminant Validity

	1	2	3	4	5	6
1. Environmental Dynamism (ED)						
2. Learning Capability (LC)	0,521					
3. Moderating Effect ED-NCtoSA	0,027	0,065				
4. Moderating EffectED-LCtoSA	0,040	0,130	0,182			
5. Networking Capability (NC)	0,176	0,255	0,133	0,078		
6. Strategic Ambidexterity (SA)	0,253	0,285	0,079	0,237	0,441	

### Results and discussion

This study seeks to assess the effects of learning and networking capability on strategic ambidexterity and the moderating effect of environmental dynamism on this connection. As expected by hypothesis H1, we established in this study that networking capability considerably benefits strategic ambidexterity. These findings are consistent with past research demonstrating a favorable relationship between network capability and strategic performance (Majid et al., 2021). In contrast to earlier



research by Tsai & Ren (Tsai & Ren, 2019) on Taiwanese SMEs, this study reveals that network capability has no significant effect on strategic ambidexterity. This condition can be explained by the fact that this networking capability supports organizations in acquiring the required resources under uncertain circumstances. Access to resources and opportunities will be significantly facilitated for companies with excellent networking skills. Entrepreneurial businesses are ideally suited for learning how a beginner manager acquires an awareness of network capabilities to preserve existing networks (exploitation) and simultaneously establish long-term networks by exploring new ones (McGrath et al., 2019).

**Table 5.** Results of Model

Hypothesis	Path		STDEV	T Statistics	P Values	Result
H1: NC -> SA	0.364	***	0.054	6.730	0.000	Supported
H2: LC -> SA	0.175	**	0.067	2.620	0.009	Supported
H3: ED*NC -> SA	0.027		0.061	0.445	0.656	Not Supported
H4: ED*LC -> SA	0.263	***	0.070	3.735	0.000	Supported
H5: ED -> SA	0.132	*	0.062	2.130	0.033	Supported

The analysis findings show that hypothesis 2 (t-Statistics =6.730 and p-Values= 0.000) is supported. The findings of this study indicate that strategic ambidexterity increases with the level of learning capability. This conclusion is consistent with the notion that coordination across SMEs enhances coherent and consistent learning paths, promoting organizational flexibility by enhancing its capability to accommodate the essential adjustments to assure long-term performance (Majid et al., 2021). At the same time, a study by (Lin et al., 2013) found that innovation ambidexterity bridges learning capability and commercial success in strategic business units (SBUs) in Taiwan. It was found that strategic learning capabilities influence the relationship between strategic entrepreneurship and explorative innovation (Islam & Munir, 2022). Team learning capability substantially impacts innovation ambidexterity in professional service firms (Batt-Rawden et al., 2019). In Indian e-commerce enterprises, the learning capability is a moderator in the interaction between exploitation t and company performance (Dhir et al., 2018)

H3 (t-Statistics = 0.445 and p-Values = 0.656) is rejected. Environmental dynamism does not have a moderating effect on the relationship between networking capability and strategic ambidexterity. Previous studies have shown that networking capability moderated by organizational ambidexterity positively affects strategic performance (Majid et al., 2021). The results of this study show different results because networking capability is a relationship developed through time and process. According to (Brass et al., 2004), actors are immersed in interconnected networks of social relationships that provide opportunities and limitations for conduct. With the expectation of continued success, companies in today's volatile market work hard to adapt to the needs of their customers (Yousaf & Majid, 2016). In a dynamic environment, Networking capability can face obstacles, especially in winning the competition to win customers' hearts, so companies find it challenging to achieve ambidexterity.

It is assumed in Hypothesis 4 that environmental dynamism moderates the relationship between learning capabilities and strategic ambidexterity. The findings (Table 4) demonstrated the t-Statistics = 3.735 and p-Values= 0,000, thus supporting H4. Similar to prior work, we find that environmental dynamism moderates the indirect effects of balancing strategy for ambidextrous learning (BSAL) on business model design (Yuan et al., 2021). Likewise, we find that environmental dynamism moderates the indirect effects of knowledge management capability on firm performance (Soto-Acosta et al., 2018). The results (Parida et al., 2016) indicate that new entrepreneurial enterprises with a concentration on either exploration or exploitation have a more stable rate of return. Strategic ambidexterity is a practical and recommended approach for firms to innovate and learn in the face of unpredictability (Peters & Buijs, 2022)

The fifth hypothesis test revealed that ED, with a path coefficient of 0.132 and a t-statistic of 2.130, had a significant and positive effect on SA. This study's results corroborate previous studies in the manufacturing sector (Soto-Acosta et al., 2018). Moreover, other research demonstrates that environmental dynamism moderates the association between TMT behavioral integration and strategic

ambidexterity (Halevi et al., 2015). In environmental dynamism, businesses operate ambidextrous, simultaneously combining dynamic capabilities for exploration and exploitation (Frank et al., 2017).

## **Conclusion**

### **Managerial Contributions and Implications**

This study's findings substantially affect policymakers and owners/managers of small and medium-sized enterprises (SMEs). First, this study filled a vacuum in the literature by giving greater clarity and knowledge of networking capability and strategic ambidexterity. According to the findings of this study, owners and managers of SMEs could boost their strategic ambidexterity by utilizing the ability to create internal and external relationships. One strategy for fostering positive relationships with external parties is constructing social networks that enable actors (individuals, departments, or organizations) to share and receive resources (Kumalaningrum et al., 2023).

However, in interactions between networking capability and strategic ambidexterity, the moderating function of environmental dynamism is distinct (Majid et al., 2021; Tsai & Ren, 2019). To enhance strategic ambidexterity, consumer, rival, and supplier alterations in the product/service requirements cannot impact networking capability. Building a network takes time and effort; therefore, SMEs must prioritize strategic and long-term success over short-term performance, such as fulfilling daily or monthly targets.

Second, learning capability positively impacts strategic ambidexterity, both directly and indirectly, via the influence of environmental dynamism. According to the findings of this study, learning capabilities can be produced by inter-organizational collaboration, intra-organizational learning, and open organizational culture. Thus, the study enables SMEs to enhance their knowledge and appropriate skill sets by enhancing their staff's learning capability. Ambidexterity depends on the learning process experienced by managers and the configuration of interactions between individuals (Souza & Takahashi, 2019).

### **Theoretical contribution**

This study contributes in numerous ways. First, these findings contribute to comprehending the interaction between networking and learning capabilities regarding market exploration and product exploitation. Researchers have established full mediation effects of networking capabilities and experiential learning to capture the oblique relationship between Entrepreneurial orientation and international performance (Karami & Tang, 2019). This study demonstrates that networking and learning skills are the propelling forces behind ambidextrous SMEs. Second, these results are consistent with a significant extent argument that knowledge gained by individuals can be shared for the organization's advantage and that knowledge gained from outside the organization can promote learning (Lin et al., 2013). However, these findings surpass those of (Lin et al., 2013) in explaining how businesses use and develop resources and capacities to pursue an ambidextrous strategy despite environmental volatility.

This study explores networking capabilities, learning capabilities, and environmental dynamism as a theoretical investigation incorporating a resource-based perspective (RBV) to achieve organizational ambidexterity. The resource-based view of the company (RBV) conceives the organization as a collection of resources and competencies that have the potential to generate a sustainable competitive advantage (Lin et al., 2013).

Theoretically, this study clarified the beneficial influence of networking capability and learning capability on strategic ambidexterity in the setting of SMEs, as well as the moderating role of environmental dynamism. This expansion is compatible with the contingency theory's expectations (Andrade et al., 2020; Donaldson, 2001). The contingency theory claims that organizations operating in uncertain and unpredictable business settings would exhibit diverse behaviors, processes, and capacities and adapt their management styles to the environment's various contingencies (Tajeddini & Mueller, 2018).

As an application of organizational learning theory, an organizational operational capability is a multilevel integrated organizational learning process involving individual intentions through organizational interactions that require dynamic capacities (Souza & Takahashi, 2019; Teece et al., 2009).

This study contributed to theoretical comprehension by enhancing our knowledge of networking capability's positive impact on strategic ambidexterity, advancing the dynamic capacities theory (Teece et al., 2009). According to network theory, small and medium-sized enterprises (SMEs) get knowledge about how to develop into international markets through their contacts with diverse partners (Handoyo et al., 2021)

### **Limitations and Suggestions for Future Research**

This study expands upon previous studies on small and medium-sized businesses (SMEs). By highlighting the connections between networking capability, learning capability, environmental dynamism, and strategic ambidexterity, this study contributes to the growth and integration of the model. Despite the positive results, specific answers will (or should) necessitate additional research. The following study will be able to analyze the antecedents in greater depth using a qualitative method and case studies. Future researchers will be able to analyze the ambidexterity construct in terms of learning and network capabilities and the influence of various organizational processes on these two elements, which affect company performance. This study provides quantifiable proof that the culinary industry dominates micro-businesses. Still, environmental issues such as pollution, climate change, and the irresponsible use of water and natural resources pose additional risks to SMEs (Ragazou et al., 2022). Additional research is required on the strategic ambidexterity of SMEs in addressing these difficulties. Therefore, it is recommended that additional research be conducted on the connection between this environmental issue and climate change.

## Reference

- Amitay, M., Popper, M., & Lipshitz, R. (2005). Leadership styles and organizational learning in community clinics. *Learning Organization*, 12(1), 57–70. <https://doi.org/10.1108/09696470510574269>
- Andrade, J., Franco, M., & Mendes, L. (2020). Technological capacity and organisational ambidexterity: the moderating role of environmental dynamism on Portuguese technological SMEs. *Review of Managerial Science*, 0123456789. <https://doi.org/10.1007/s11846-020-00416-x>
- Batt-Rawden, V. H., Lien, G., & Slåtten, T. (2019). Team learning capability – an instrument for innovation ambidexterity? *International Journal of Quality and Service Sciences*, 11(4), 473–486. <https://doi.org/10.1108/IJQSS-02-2019-0026>
- BPS Jawa Barat. (2023). *Jumlah Usaha Mikro dan Kecil menurut Kabupaten Kota dan Bentuk Badan Usaha/Badan Hukum/Perijinan (Unit), 2019-2021*. <https://jabar.bps.go.id/indicator/9/753/1/jumlah-usaha-mikro-dan-kecil-menurut-kabupaten-kota-dan-bentuk-badan-usaha-badan-hukum-perijinan-.html>
- Brass, D. J., Galaskiewicz, J., Greve, H. R., & Tsai, W. (2004). Taking stock of networks and organizations: A multilevel perspective. *Academy of Management Journal*, 47(6), 795–817. <https://doi.org/10.2307/20159624>
- Brix, J. (2019). Innovation capacity building: An approach to maintaining balance between exploration and exploitation in organizational learning. *Learning Organization*, 26(1), 12–26. <https://doi.org/10.1108/TLO-08-2018-0143>
- Chen, D. Q., Preston, D. S., & Swink, M. (2015). How the use of big data analytics affects value creation in supply chain management. *Journal of Management Information Systems*, 32(4), 4–39. <https://doi.org/10.1080/07421222.2015.1138364>
- Chiva, R., Alegre, J., & Lapiedra, R. (2007). Measuring organisational learning capability among the workforce. *International Journal of Manpower*, 28(3–4), 224–242. <https://doi.org/10.1108/01437720710755227>
- Dhanaraj, C., & Parkhe, A. (2006). Orchestrating Innovation Network. *Movement Disorders*, 31(3), 659–669.
- Dhir, S., & Dhir, S. (2018). Role of ambidexterity and learning capability in firm performance: A study of e-commerce industry in India. *VINE Journal of Information and Knowledge Management Systems*, 48(4), 517–536. <https://doi.org/10.1108/VJKMS-10-2017-0073>
- Dhir, S., Ongsakul, V., & Batra, I. (2018). Comprehending ambidexterity in the emerging-market context: The moderating role of learning capability and environmental dynamism on e-commerce firms' performance. *Journal for Global Business Advancement*, 11(4), 395–417. <https://doi.org/10.1504/JGBA.2018.097197>
- Digdowiseiso, K., & Sugiyanto, E. (2021). How effective is institutional quality for the creation of small & medium enterprises (Smes) in Indonesia? *Economics and Sociology*, 14(1), 263–274. <https://doi.org/10.14254/2071-789X.2021/14-1/17>
- Donaldson, L. (2001). *The contingency theory of organizations*. Sage.
- Faroque, A. R. (2015). Strategic orientations and international opportunity recognition and development in emerging country born globals: The moderating role of environmental dynamism. *International Journal of Entrepreneurship and Small Business*, 24(2), 163–186. <https://doi.org/10.1504/IJESB.2015.067258>
- Fayos, T., Calderón, H., García-García, J. M., & Derqui, B. (2022). The upcoming rise of SMEs in cross-border public procurement: is it a matter of networking capabilities? *Journal of International Entrepreneurship*, 0123456789. <https://doi.org/10.1007/s10843-022-00310-5>
- Frank, H., Güttel, W., & Kessler, A. (2017). Environmental dynamism, hostility, and dynamic capabilities in medium-sized enterprises. *International Journal of Entrepreneurship and Innovation*, 18(3), 185–194. <https://doi.org/10.1177/1465750317723219>
- Garousi Mokhtarzadeh, N., Amoozad Mahdiraji, H., Jafarpanah, I., Jafari-Sadeghi, V., & Bresciani, S. (2021). Classification of inter-organizational knowledge mechanisms and their effects on networking capability: a multi-layer decision making approach. *Journal of Knowledge Management*, 25(7), 1665–1688. <https://doi.org/10.1108/JKM-07-2020-0579>
- Garousi Mokhtarzadeh, N., Amoozad Mahdiraji, H., Jafarpanah, I., Jafari-Sadeghi, V., & Cardinali, S. (2020). Investigating the impact of networking capability on firm innovation performance: using the resource-action-performance framework. *Journal of Intellectual Capital*, 21(6), 1009–1034. <https://doi.org/10.1108/JIC-01-2020-0005>
- Gibson, C. B., & Birkinshaw, J. (2004). The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of Management Journal*, 47(2), 209–226. <https://doi.org/10.2307/20159573>
- Hair, Jr., J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), Second Edition. In *SAGE Publications, Inc.* (Second Edi). SAGE Publications, Inc.
- Halevi, M. Y., Carmeli, A., & Brueller, N. N. (2015). Ambidexterity in SBUs: TMT behavioral integration and environmental dynamism. *Human Resource Management*, 54(S1), 223–238.

- Handoyo, S., Yudianto, I., & Fitriyah, F. K. (2021). Critical success factors for the internationalisation of small–medium enterprises in Indonesia. *Cogent Business and Management*, 8(1). <https://doi.org/10.1080/23311975.2021.1923358>
- He, Z. L., & Wong, P. K. (2004). Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science*, 15(4), 481–495. <https://doi.org/10.1287/orsc.1040.0078>
- He, Z., & Wong, P. (2004). Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science*, 15(4), 481–495. <https://doi.org/10.1287/orsc.1040.0078>
- Ikhshan, K., Almahendra, R., & Budiarto, T. (2017). Contextual ambidexterity in SMEs in Indonesia: A study on how it mediates organizational culture and firm performance and how market dynamism influences its role on firm. *International Journal of Business and Society*, 18(S2), 369–390.
- Islam, T., & Munir, S. (2022). How important strategic learning capabilities are during COVID-19? A model for innovation ambidexterity. *Journal of Workplace Learning, ahead-of-print*.
- Karami, M., & Tang, J. (2019). Entrepreneurial orientation and SME international performance: The mediating role of networking capability and experiential learning. *International Small Business Journal: Researching Entrepreneurship*, 37(2), 105–124. <https://doi.org/10.1177/0266242618807275>
- Kazmi, S., Kanwal, F., Rathore, K., Faheem, K., & Fatima, A. (2021). The Relationship Between Transformational Leadership and Organisational Learning Capability with the Mediating Role of Perceived Human Resource Effectiveness. *South Asian Journal of Human Resources Management*, 8(1), 133–157. <https://doi.org/10.1177/2322093721997197>
- Khan, H., Freeman, S., & Lee, R. (2020). New product performance implications of ambidexterity in strategic marketing foci: a case of emerging market firms. *Journal of Business and Industrial Marketing*, April. <https://doi.org/10.1108/JBIM-01-2020-0003>
- Khan, Z., Amankwah-Amoah, J., Lew, Y. K., Puthusserry, P., & Czinkota, M. (2020). Strategic ambidexterity and its performance implications for emerging economies multinationals. *International Business Review*, October, 101762. <https://doi.org/10.1016/j.ibusrev.2020.101762>
- Krejcie, R. V., & Morgan, D. W. (1970). *DETERMINING SAMPLE SIZE FOR RESEARCH ACTIVITIES*. 38, 607–610.
- Kumalaningrum, M. P., Ciptono, W. S., Indarti, N., Kumalaningrum, M. P., Ciptono, W. S., & Indarti, N. (2023). Cogent Business & Management Ambidexterity in Indonesian SMEs: A systematic review and synthesis for future research. *Cogent Business & Management*, 10(1). <https://doi.org/10.1080/23311975.2023.2199490>
- Lin, H. E., McDonough, E. F., Lin, S. J., & Lin, C. Y. Y. (2013). Managing the exploitation/exploration paradox: The role of a learning capability and innovation ambidexterity. *Journal of Product Innovation Management*, 30(2), 262–278. <https://doi.org/10.1111/j.1540-5885.2012.00998.x>
- Luger, J., Raisch, S., & Schimmer, M. (2018). Dynamic balancing of exploration and exploitation: The contingent benefits of ambidexterity. *Organization Science*, 29(3), 449–470. <https://doi.org/10.1287/orsc.2017.1189>
- Majid, A., Yasir, M., Yasir, M., & Yousaf, Z. (2021). Network capability and strategic performance in SMEs: the role of strategic flexibility and organizational ambidexterity. *Eurasian Business Review*, 11(4), 587–610. <https://doi.org/10.1007/s40821-020-00165-7>
- Maksum, I. R., Sri Rahayu, A. Y., & Kusumawardhani, D. (2020). A social enterprise approach to empowering micro, small and medium enterprises (SMEs) in Indonesia. *Journal of Open Innovation: Technology, Market, and Complexity*, 6(3), 50. <https://doi.org/10.3390/JOITMC6030050>
- Mammassis, C. S., & Kostopoulos, K. C. (2019). CEO goal orientations, environmental dynamism and organizational ambidexterity: An investigation in SMEs. *European Management Journal*, 37(5), 577–588. <https://doi.org/10.1016/j.emj.2019.08.012>
- Marabelli, M., Frigerio, C., & Rajola, F. (2012). Ambidexterity in Service Organizations: Reference Models from the Banking Industry. *Industry and Innovation*, 19(2), 109–126. <https://doi.org/10.1080/13662716.2012.650881>
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87. <https://doi.org/10.1287/orsc.2.1.71>
- Martín Martín, O., Chetty, S., & Bai, W. (2022). Foreign market entry knowledge and international performance: The mediating role of international market selection and network capability. *Journal of World Business*, 57(2), 101266. <https://doi.org/10.1016/j.jwb.2021.101266>
- Martinez-Conesa, I., Soto-Acosta, P., & Carayannis, E. G. (2017). On the path towards open innovation: assessing the role of knowledge management capability and environmental dynamism in SMEs. *Journal of Knowledge Management*, 21(3), 553–570. <https://doi.org/10.1108/JKM-09-2016-0403>

- McGrath, H., Medlin, C. J., & O'Toole, T. (2019). A process-based model of network capability development by a start-up firm. *Industrial Marketing Management*, 80(November 2017), 214–227. <https://doi.org/10.1016/j.indmarman.2017.11.011>
- Mitrega, M., Forkmann, S., Ramos, C., & Henneberg, S. C. (2012). Networking capability in business relationships - Concept and scale development. *Industrial Marketing Management*, 41(5), 739–751. <https://doi.org/10.1016/j.indmarman.2012.06.002>
- Moeuf, A., Pellerin, R., Lamouri, S., Tamayo-Giraldo, S., & Barbaray, R. (2018). The industrial management of SMEs in the era of Industry 4.0. *International Journal of Production Research*, 56(3), 1118–1136. <https://doi.org/10.1080/00207543.2017.1372647>
- Mu, J., Thomas, E., Peng, G., & Di Benedetto, A. (2017). Strategic orientation and new product development performance: The role of networking capability and networking ability. *Industrial Marketing Management*, 64, 187–201. <https://doi.org/10.1016/j.indmarman.2016.09.007>
- O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *Academy of Management Perspectives*, 27(4), 324–338. <https://doi.org/10.5465/amp.2013.0025>
- Obeidat, B., Nofal, R., & Masa'deh, R. (2018). The Effect of Transformational Leadership on Entrepreneurial Orientation: The Mediating Role of Organizational Learning Capability. *Modern Applied Science*, 12(11), 77. <https://doi.org/10.5539/mas.v12n11p77>
- Parida, V., Lahti, T., & Wincent, J. (2016). Exploration and exploitation and firm performance variability: a study of ambidexterity in entrepreneurial firms. *International Entrepreneurship and Management Journal*, 12(4), 1147–1164. <https://doi.org/10.1007/s11365-016-0387-6>
- Pellegrinelli, S., Murray-Webster, R., & Turner, N. (2015). Facilitating organizational ambidexterity through the complementary use of projects and programs. *International Journal of Project Management*, 33(1), 153–164. <https://doi.org/10.1016/j.ijproman.2014.04.008>
- Peters, K., & Buijs, P. (2022). Strategic ambidexterity in green product innovation: Obstacles and implications. *Business Strategy and the Environment*, 31(1), 173–193. <https://doi.org/10.1002/bse.2881>
- Provan, K. G., Fish, A., & Sydow, J. (2007). Interorganizational networks at the network level: A review of the empirical literature on whole networks. *Journal of Management*, 33(3), 479–516. <https://doi.org/10.1177/0149206307302554>
- Ragazou, K., Passas, I., Garefalakis, A., & Dimou, I. (2022). Investigating the Research Trends on Strategic Ambidexterity, Agility, and Open Innovation in SMEs: Perceptions from Bibliometric Analysis. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), 118. <https://doi.org/10.3390/joitmc8030118>
- Raisch, S., & Birkinshaw, J. (2008). Organizational ambidexterity: Antecedents, outcomes, and moderators. *Journal of Management*, 34(3), 375–409. <https://doi.org/10.1177/0149206308316058>
- Saabye, H., Kristensen, T. B., & Wæhrens, B. V. (2021). Developing a learning-to-learn capability: insights on conditions for Industry 4.0 adoption. *International Journal of Operations and Production Management*, 42(13), 25–53. <https://doi.org/10.1108/IJOPM-07-2021-0428>
- Salas Vallina, A., Moreno-Luzon, M. D., & Ferrer-Franco, A. (2019). The individual side of ambidexterity: Do inspirational leaders and organizational learning resolve the exploitation-exploration dilemma? *Employee Relations*, 41(3), 592–613. <https://doi.org/10.1108/ER-02-2018-0050>
- Santika, E. F. (2023). *Jumlah UMKM di Indonesia Sepanjang 2022, Provinsi Mana Terbanyak?* <https://databoks.katadata.co.id/datapublish/2023/02/02/jumlah-umkm-di-indonesia-sepanjang-2022-provinsi-mana-terbanyak>
- Schilke, O. (2013). On The Contingent Value Of Dynamic Capabilities for Competitive Advantage: The Nonlinear Moderating Effect of Environmental Dynamism. *Strategic Management Journal*, 35, 179–203. <https://doi.org/10.1002/smj>
- Sekaran, U., & Bougie, R. (2016). Research Methods for Business. In J. and S. Wiley (Ed.), *John Wiley & Sons Ltd. All* (Seventh Ed, Issue September). [https://doi.org/10.1007/978-94-007-0753-5\\_102084](https://doi.org/10.1007/978-94-007-0753-5_102084)
- Simsek, Z. (2009). Organizational ambidexterity: Towards a multilevel understanding. *Journal of Management Studies*, 46(4), 597–624. <https://doi.org/10.1111/j.1467-6486.2009.00828.x>
- Soto-Acosta, P., Popa, S., & Martinez-Conesa, I. (2018). Information technology, knowledge management and environmental dynamism as drivers of innovation ambidexterity: a study in SMEs. *Journal of Knowledge Management*, 22(4), 824–849. <https://doi.org/10.1108/JKM-10-2017-0448>
- Souza, C. P. da S., & Takahashi, A. R. W. (2019). Dynamic capabilities, organizational learning and ambidexterity in a higher education institution. *Learning Organization*, 26(4), 397–411. <https://doi.org/10.1108/TLO-03-2018-0047>
- Tajeddini, K., & Mueller, S. (2018). Moderating Effect of Environmental Dynamism on the Relationship between a Firm's Entrepreneurial Orientation and Financial Performance. *Entrepreneurship Research Journal*, 1–13. <https://doi.org/10.1515/erj-2018-0283>

- Tambunan, T. (2007). Entrepreneurship Development: SMEs in Indonesia. *Journal of Developmental Entrepreneurship*, 12(01), 95–118. <https://doi.org/10.1142/s1084946707000575>
- Tang, K., Robinson, D. A., & Harvey, M. (2011). Sustainability managers or rogue mid-managers? A typology of corporate sustainability managers. *Management Decision*.
- Teece, D. J., Pisano, G., & Shuen, A. (2009). Dynamic capabilities and strategic management. *Knowledge and Strategy*, 18(April 1991), 77–116. <https://doi.org/10.1093/0199248540.003.0013>
- Teo, H.-H., Wang, X., Wei, K.-K., Sia, C.-L., & Lee, M. K. O. (2006). Organizational Learning Capacity and Attitude Toward Complex Technological Innovations: An Empirical Study. *Journal of the American Society for Information Science and Technology*, 57–2(July), 264–279. <https://doi.org/10.1002/asi>
- Tidd, J., Bessant, J., & Pavitt, K. (2013). *Managing innovation: Integrating technological, organizational and market change*.
- Tsai, H. T., & Ren, S. (2019). Antecedents of strategic ambidexterity in the context of internationalisation: a panel study of Taiwan Small and median-sized enterprises. *Technology Analysis and Strategic Management*, 31(8), 986–1001. <https://doi.org/10.1080/09537325.2019.1582764>
- Vashdi, D. R., Levitats, Z. S., & Grimland, S. (2019). Which transformational leadership behaviors relate to organizational learning processes? *Learning Organization*, 26(2), 176–189. <https://doi.org/10.1108/TLO-04-2018-0065>
- Voss, G. B., & Voss, Z. G. (2013). Strategic ambidexterity in small and medium-sized enterprises: Implementing exploration and exploitation in product and market domains. *Organization Science*, 24(5), 1459–1477. <https://doi.org/10.1287/orsc.1120.0790>
- Yousaf, Z., & Majid, A. (2016). Strategic performance through inter-firm networks: strategic alignment and moderating role of environmental dynamism. *World Journal of Entrepreneurship, Management and Sustainable Development*, 12(4).
- Yuan, C., Xue, D., & He, X. (2021). A balancing strategy for ambidextrous learning, dynamic capabilities, and business model design, the opposite moderating effects of environmental dynamism. *Technovation*, 103(February), 102225. <https://doi.org/10.1016/j.technovation.2021.102225>
- Zacca, R., Dayan, M., & Ahrens, T. (2015). Impact of network capability on small business performance. *Management Decision*, 53(1), 2–23. <https://doi.org/10.1108/MD-11-2013-0587>
- Zhang, J., & Qi, L. (2021). Crisis preparedness of healthcare manufacturing firms during the covid-19 outbreak: Digitalization and servitization. *International Journal of Environmental Research and Public Health*, 18(10). <https://doi.org/10.3390/ijerph18105456>