INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 13, Issue 10, (2023) E-ISSN: 2222-6990

Effects of Innovation Capability and Environmental Dynamism on the Relationship between Entrepreneurial Leadership and Innovation Performance in the SMEs Service Industry

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To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v13-i10/19011 DOI:10.6007/IJARBSS/v13-i10/19011

Published Date: *26 October, 2023*

Abstract

This paper explores the link between entrepreneurial leadership (EL) and innovation performance (IP) in the service industry. Using the resource-based view (RBV) and dynamic capabilities view (DCV) as theoretical foundations, the study examines the mediating role of innovation capability (IC) and the moderating role of environmental dynamism (ED) in this relationship. A survey of 321 middle-level managers in the SME service sector was conducted

to test the hypotheses, employing SMART-PLS structural equation modeling. Results show that EL directly and indirectly affects IP through IC mediation, but no evidence was found for the moderating role of ED. This research contributes to the understanding of how entrepreneurial leaders influence innovation performance and highlights the importance for SME owners and managers to foster and apply entrepreneurial leadership skills.
Keywords: Entrepreneurial Leadership, Innovation performance, Innovation Capability, environmental dynamism, Service Industries, SMEs.

Introduction

Innovation plays a crucial role in driving a country's growth and development and benefits customers, organizations, and the economy as a whole. To achieve and maintain exceptional performance and competitive advantage, businesses require a solid innovation platform (Hogan et al., 2011). Regardless of the size or nature of their products or services, firms need to constantly identify and capitalize on potential opportunities, whether they operate in stable or dynamic environments (Abdalla & Nakagawa, 2022). In dynamic environments, businesses must be adaptable, flexible, risk-takers, and capable of seizing opportunities to gain a competitive edge. The significance of innovation performance has grown in importance over the last decade, given globalization and technological advancements. However, it is the responsibility of top management to participate in innovation activities (Al-Sharif et al., 2023). Business leaders must encourage innovation activities to gain a competitive advantage by focusing on characteristics such as risk-taking, competitiveness building, and initiative-taking (Abdulsamad et al., 2020; Rehman et al., 2021).

The current increase in competitiveness and dynamic transition in the market implies that traditional leadership practices may no longer be adequate for improving organizational performance (Nguyen et al., 2021). As a result, a new paradigm known as entrepreneurial leadership (EL) has emerged in the literature. EL is recognized as an effective form of leadership for businesses that can quickly adapt to dynamic environments (Paudel, 2019). This type of leadership is also linked to superior performance and sustainability, which can help businesses gain a competitive advantage and achieve sustainable development (Gupta et al., 2004; Pauceanu et al., 2021).

Several scholars support the notion that entrepreneurial leadership could impact the way organizations organize resources, utilize these resources to build capabilities, and then use these capabilities to promote innovation activities in the firm (Alsharif et al., 2021; Schoemaker et al., 2018). Studies have shown that EL has a positive impact on organizational outcomes (Al-Sharif et al., 2023; Lin & Yi, 2022; Thongyai & Potipiroon, 2022). However, there is still uncertainty about the correlation coefficients and different levels of leadership effectiveness, making further research on the effects of EL on business outcomes necessary (Hussain & Li, 2022; Pu et al., 2022; Rehman et al., 2021).

Previous studies have not thoroughly investigated the mechanism by which entrepreneurial leadership enhances innovation performance. Mediating factors have been proposed to explain the EL-IP linkage, including exploitative and exploratory innovation (Huang et al., 2014), the innovation process (Fontana & Musa, 2017), organizational innovation (Paudel, 2019), TQM (Sawaean & Ali, 2020b), and strategic flexibility (Yu et al., 2020). However, the mediating role of innovation capability has not been adequately considered in earlier research (Al-kalouti et al., 2020; Saunila, 2019). Although past studies linked entrepreneurial leadership and innovation capability in several contexts, inconsistencies have been reported

(Lin & Yi, 2021; Nguyen et al., 2021; Purwati et al., 2021; Thongyai & Potipiroon, 2022), calling for further research on this connection.

Furthermore, previous research (e.g., Huang et al., 2014; Paudel, 2019; Yu et al., 2020) has examined the link between EL and performance outcomes in relation to environmental conditions. However, these studies have revealed contradicting and inadequate results since entrepreneurial behavior is environment-dependent (Barney et al., 2011). Therefore, more investigation is warranted, as previous studies failed to support environmental dynamism as a moderating factor in the EL-firm innovation performance linkage (Yu et al., 2020).

The current study constructed a model to examine how entrepreneurial leadership is applied to enhance a firm's innovation performance by using data collected from managers working at the service SMEs in Malaysia. As such, this study addresses the identified knowledge gaps and provides several contributions. First, this study contributes to the literature assessing the connections between EL, IC, ED, and IP via the lenses of RBV and DCV. Second, this study contributes to earlier research by emphasizing innovation capability as a mediating factor since the prior literature pays insufficient attention to the function of innovation capability as a distinctive dynamic capability of the firm (Breznik & Hisrich, 2014). Third, the current paper attempted to assess the moderating role of environmental dynamism on EL and IP relationship because entrepreneurship is context-dependent (Barney et al., 2011). Empirical evidence for a contingent effect of ED on EL outcomes was lacking from previous studies. Lastly, the outcome of the current study gave a more thorough knowledge of IC construct and their performance consequences in the Malaysian service SMEs setting, given the dearth of studies on innovation in the service industry context.

Previous research has shown that traditional leadership practices may not be adequate in enhancing a firm's performance due to the increasing competitiveness and dynamic transition in the market (Nguyen et al., 2021). In response, a new paradigm of leadership, known as entrepreneurial leadership (EL), has been introduced in the literature, which is recognized as an effective form of leadership for businesses that can quickly adapt to dynamic environments (Paudel, 2019). EL has been linked to superior performance and sustainability, which can help businesses gain a competitive advantage and promote sustainable development (Gupta et al., 2004; Pauceanu et al., 2021).

However, previous studies have not thoroughly investigated the mechanism of how entrepreneurial leadership enhances innovation performance. While a number of mediating factors have been proposed to explain the EL-IP linkage, such as exploitative and exploratory innovation, the innovation process, organizational innovation, TQM, and strategic flexibility, the mediating role of innovation capability has not been given enough consideration in earlier research (Al-kalouti et al., 2020; Saunila, 2019). Additionally, while past studies have linked entrepreneurial leadership and innovation capability in several contexts, inconsistencies have been reported, which call for more research on this connection.

To address these knowledge gaps, the current study constructed a model to examine how entrepreneurial leadership is applied to enhance a firm's innovation performance by using data collected from managers working at service SMEs in Malaysia. This study contributes to the literature by assessing the connections between EL, IC, ED, and IP through the lenses of RBV and DCV. Furthermore, this study emphasizes innovation capability as a mediating factor, which is a distinctive dynamic capability of the firm that has been insufficiently studied in previous literature (Breznik & Hisrich, 2014). Moreover, the current paper attempted to assess the moderating role of environmental dynamism on the EL-IP relationship since entrepreneurship is context-dependent (Barney et al., 2011). Empirical evidence for a

contingent effect of ED on EL outcomes was lacking from previous studies. Lastly, the outcome of the current study provides a more thorough understanding of IC constructs and their performance consequences in the Malaysian service SMEs setting, given the dearth of studies on innovation in the service industry context.

Literature Review and Hypotheses Development

Entrepreneurial Leadership

EL is commonly acknowledged as a leadership style that encourages subordinates to allocate resources strategically and emphasize opportunity recognition and competitive advantage practice (Bagheri & Harrison, 2020; Harrison et al., 2018). EL refers to the ability of leaders to set a business vision and inspire team members to realize and attain that vision via innovation (Renko et al., 2015). The attention to EL has significantly increased since the 1990s (Leitch & Volery, 2017) in several perspectives, including new ventures, education, sustainability, and employee innovative behavior. Harrison et al. (2016) asserted that entrepreneurial leadership "as a dynamic process in determining the direction of an organization" is crucial for boosting organizational performance and innovation capacities.

Scholars have proposed several attempts to conceptualize entrepreneurial leadership. For instance, Gupta et al. (2004) conceptualized EL in two dimensions, namely scenario enactment and cast enactment. These two dimensions formed five key roles for EL: framing the challenge, absorbing uncertainty, path clearing, building commitment, and specifying limits. Renko et al. (2015) conceptualized EL as a unidimensional construct which includes these characteristics: visionary, problem-solving, risk-taking, and involve in strategic initiative and solid decision making. Previous research on entrepreneurial leadership has been taken from leadership or entrepreneurship perspectives. For some scholars (e.g., Vecchio, 2003), entrepreneurial leadership is considered a leadership style that can be understood through leadership theories and relational influence. Thus, they transferred the concepts from leadership to entrepreneurship. Recent literature on leadership revealed that leadership types affect entrepreneurial activity, precisely opportunity entrepreneurship (Felix et al., 2019). However, most of the studies on this perspective are conceptual and not empirically investigated. In addition, they ignored the development, effect, and attributes of entrepreneurship on entrepreneurial leadership rather than just focusing on the treatment of entrepreneurship as a separate study (Harrison et al., 2016). Clark & Harrison (2018) asserted, "Yet, exploring entrepreneurial leadership from an entrepreneurship perspective could develop a balanced approach and simultaneously enrich the entrepreneurial leadership paradigm and discipline."

Although the effectiveness of entrepreneurial leadership has drawn scholars' attention in recent years, empirical evidence on the association between entrepreneurial leadership and innovative performance is limited, particularly in the service SME industry (Rehman et al., 2021). Several studies linked leadership style with innovation (Afsar & Umrani, 2019; Ding et al., 2019; Khalili, 2016; Prasad & Junni, 2016). However, the role of a typical leadership style in motivating the follower to do innovative tasks has been criticized by some scholars (Gupta et al., 2004; Mehmood et al., 2019; Renko et al., 2015). Moreover, a number of studies have demonstrated that leaders who exhibit entrepreneurial behaviors are better able to encourage innovative activity among workers who already possess high levels of creative self-efficacy (Li et al., 2020; Mehmood et al., 2019; Sawaean & Ali, 2020a). Thus, embracing new leadership capabilities in organizations is necessary, which helps boost innovation (Chen et al., 2014; Swiercz & Lydon, 2002).

Innovation Performance

Innovation is how businesses successfully employ creative ideas from knowledge resources to create new products, services, and technology. An organization's innovation performance can be defined as the degree of success in achieving its innovation goals as an outcome of innovation activities (Feng et al., 2022; Saunila et al., 2019). It typically creates new products/services, upgrades existing products/services, patents, and technologies, obtains market share, and increases sales and profitability. Following the previous literature, this study regarded innovation performance as the effective implementation of ideas, new technologies, and external knowledge, as well as the capability to renew and change the internal process. As such, innovation performance is the extent to which a company's product/service development program is successful (Seo et al., 2020).

Entrepreneurial Leadership and Innovation Performance

Innovation performance refers to the results of a firm's innovation activities which measure how successfully it has achieved its innovation goals. It is an essential factor for an organization's success since it incorporates many elements, including social and environmental effects of the company's operations, fosters employees' creativity, interacts with clients, and collaborates with business counterparts to develop and implement innovative products and services (Susanty et al., 2019). Bringing these elements all together is the firm's leadership responsibility. EL has been suggested by several scholars (e.g., Gupta et al., 2004; Kuratko & Neubert, 2018; Renko et al., 2015) as a means for firms of all sizes, specifically SMEs, to handle unexpected and challenging situations, boost creativity, and spot new opportunities (Koryak et al., 2015; Leitch & Volery, 2017; Mehmood et al., 2019).

RBV provides an explanation for the link between entrepreneurial leadership and innovation performance. Innovation performance is recognized via a variety of resources and capabilities. For this, success in a rapidly changing environment requires a wide range of resources and capabilities (Schoemaker et al., 2018). RBV states that a company's leadership styles are essential assets that affect organizational performance (Barney, 1991). EL conveys the importance of business chances and the way of seizing them, advancing the business's objectives and the individuals involved (Ireland et al., 2003). Prior research has established a positive link between EL on IP. For example, Yu et al (2020) found that EL positively affected IP of new Chinese ventures. This study argues that entrepreneurial Leadership affects innovation performance. Accordingly, the following hypothesis is formulated:

H1: Entrepreneurial leadership is positively related to innovation performance.

Entrepreneurial Leadership and innovation capability

Innovation has become vital to sustaining competitive advantage. In fact, innovation assists businesses in creating and implementing more innovative strategies and developing an innovative business model, which leads to novel products and services (Ali et al., 2021). Innovation capability denotes an organization's ability to innovate (Calantone et al., 2002). According to Saunila et al. (2014), an organization's level of innovation capability vary slightly based on the type is innovation and several other rationalities. According to Perdomo-Ortiz et al. (Perdomo-Ortiz et al., 2006), who used the RBV and DCV theories to support their claim, "a business needs the capacity for innovation to drive innovation." However, the RBV isolates resources from the context in which they are developed in a firm's business model. Contrarily, dynamic capabilities allow the business to preserve and improve its competitive advantage

by matching the resources with the surrounding market environment. Thus, it is anticipated that a company's dynamic capabilities would narrow the gap between its resources and the industrial environment (Pauceanu et al., 2021). Firms can attain higher profits more remarkably than those with little or no innovation capability (Tidd et al., 2001). Similarly, Saunila et al (2014); Hogan et al (2011) argued that an organization's innovation capability allows them to perform better and maintain a competitive advantage. Accordingly, innovation capability is crucial for a firm's sustainability and continuous growth (Arshad & Arshad, 2018).

Previous studies classified innovation capability as a specific type of innovation. Some studies (e.g., Liao et al., 2010; Tsai, 2001) classified innovation capability into a process or product innovation. Wang and Ahmed (2004) classified innovation capability into five dimensions: behavioral, production, process, market, and strategic. Saunila and Ukko (2013) classified innovation capability into seven characteristics: ideation and organizing structures, participatory leadership culture, know-how development, work climate and wellbeing, regeneration, individual activity, and external knowledge. At the same time, Hogan et al. (2011) conceptualized innovation capability based on capability-based theory into three dimensions, namely, client-focused, marketing-focused, and technology-focused innovation capability. This study adopted the conceptualization of Hogan et al. (2011) since the context of this study is the service industry.

Prior literature has established a positive relationship between EL and IC in different settings. Utoyo et al. (2019) revealed a positive impact of EL with capability-driven strategy, which assist organizations in configuring their core innovation capability. Sawaean & Ali (2020a) found that EL indirectly impacts organizational performance via innovation capacity. Similarly, Purwati et al (2021) revealed a significant positive connection between EL and IC in SMEs. In light of the DCV and the findings discussed above, the following hypothesis is developed:

H2: EL has a significant positive impact on IC.

Innovation Capability and Innovation Performance

Organizational innovation enables introducing new products and services, which leads to sustained competitive advantage and higher profitability (Sulistyo & Siyamtinah, 2016). The term "innovative performance" is used to describe how well a company performs in terms of its outputs over time as a result of its efforts to update and improve ideas, products, or services at various points in the innovation system. In this way, a wide range of performance indicators can be used to define innovation performance, including new product launches, organizational structures, initiatives, and processes (Kim-Soon et al., 2017). Therefore, innovation helps to boost the firm’s productivity in several areas (Lau & Lo, 2019).

Previous studies linked organizational capabilities with innovation performance in various contexts. For example, Kim-Soon et al. (2017) revealed that product innovation, process innovation, and organizational innovation are positively related to SMEs' innovation performance, whereas marketing innovation is unrelated. Saunila et al., (2019) found that human and time management capabilities have a positive effect on innovation performance, while marketing capability does not. Lau & Lo (2019) revealed that technological innovation capability positively impacts firms' innovation performance. Andresson et al. (2020) concluded that organizational climate for psychological safety has a positive relationship with innovation performance. These research, however, construed innovation performance as product and process innovation. Since prior research paid little attention to the connection

between innovation capabilities and performance (Saunila, 2019), especially in the service sector (Rajapathirana & Hui, 2018), we hypothesized as follows:

H3: There is a significant positive relationship between IC and IP.

Mediating Role of innovation Capability in EL and IP relationship.

Leadership is critical to the success of innovations since leaders are the ones tasked with facilitating innovation by making the appropriate choices and establishing clear goals for the endeavor (Harborne & Johne, 2003). Several studies found that executives who took an entrepreneurial attitude were better able to help their teams seize opportunities and foster a creative work environment (Cai et al., 2019; Harborne & Johne, 2003).

The concept of innovation has emerged within the dynamic capability view (Teece et al., 1997). Unlike the RBV, which assumes that firms don't fully use their resources and capabilities, the DCV considers innovation a firm's capability (Arshad & Arshad, 2018). As such, a firm's "innovative capability" is the degree to which it is able to optimally use dynamic capabilities for innovation at the organizational level (Daronco et al., 2022). Having this capability is essential to the company's performance since it determines the company's rate of innovation and the consistency with which new ideas are introduced (Li et al., 2019). Consequently, innovation capability could serve as a connecting mechanism between EL and IP in SMEs. Therefore, we hypothesize:

H4: IC mediates the relationship between EL and IP.

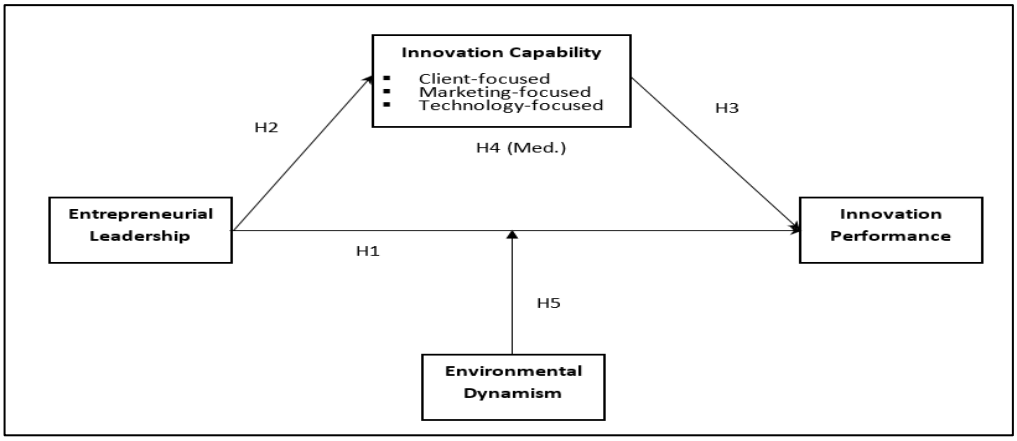
Moderating Role of ED on EL and IP relationship

Past research (e.g., Huang et al., 2014; Yu et al., 2020) implies that EL improv new venture performance from theoretical and empirical perspectives. Scholars argued that a dynamic environment is best suited for leaders with an entrepreneurial mindset who are innovative and risk-taker to achieve superior performance compared to traditional leaders who are less innovative and directive to their subordinates (Gupta et al., 2004; Leitch & Volery, 2017; Renko et al., 2015). In addition, businesses and individuals are having trouble anticipating customers' future needs and preferences in a dynamic environment characterized by fast and unpredictable change (Ensley et al., 2006). According to research by Hmieleski and Ensley (2007), businesses with heterogeneous top management teams thrive when led by directive leaders, whereas startups with more homogeneous management teams do best when guided by empowering leaders. In contrast, in stable industrial contexts, startups with heterogeneous top management teams surpassed those with homogeneous top management teams when led by empowering leaders, while those with homogeneous top management teams outperformed those led by directive leaders. Furthermore, Andersson et al. (2020) revealed that environmental dynamism moderates the organizational climate for psychological safety in the context of radical innovation capacities. In light of this, the current study sought to investigating the moderating effect of environmental dynamism on the correlation between EL and IP. The following hypothesis is derived

H5: Environmental Dynamism moderates the positive relationship between entrepreneurial leadership and innovation performance such that the relationship will be more strongly associated as environmental dynamism increases.

Theoretical Perspective and Research Framework

Figure 1. Research Framework



Methodology

Sample and procedure

This study utilized an online survey method to collect data from Service SMEs firms in Klang Vally, Malaysia. This sector was chosen ~~because~~, in comparison to other sectors, it generates almost 60% of Malaysia's GDP and 63.3% of all employment (DOSM, 2022). SME enterprises operating in this industry face intense competition, which demands new and innovative ways of product and service delivery (Abdul Halim et al., 2019; Al-Sharif et al., 2023). The key respondent to the survey were middle-level managers since they are more knowledgeable on innovation activities and the firm's decision-making process. In addition, they were chosen to assess their top executives to minimize bias from overconfident leaders responding to questions on entrepreneurial leadership. Due to accessibility issues with the sampling frame, a non-probability sampling approach based on convenience sampling was adopted to achieve the targeted samples.

Although 321 sample sizes were achieved, only 313 were retained for further analysis. The results of the demographic profile revealed that females were the majority. The majority of respondents are less than 40 years old. Most have between one and fifteen years of experience in management positions and a bachelor's degree.

Measures

All variables were measured on a 5-point Likert scale, with 1 representing (strongly disagree) and 5 representing (strongly agree).

Entrepreneurial leadership. We adopted the ENTRELEAD scale (Cronbach's alpha = 0.89) from Renko et al (2015), which consists of eight items to measure EL behavior. Sample items such as the "Manager of this company often comes up with radical improvement ideas for the products/services we are selling."

Innovation capability. This construct was measured based on three dimensions: client-focused innovation (Cronbach's alpha = 0.92), marketing-focused innovation (Cronbach's alpha = 0.90), and Technological-focused innovation (Cronbach's alpha = 0.91) adopted from Hogan et al. (2011). This measurement consists of ten items, including 3-items for client-focused innovation, 4-items for marketing-focused innovation, and 3-items for technological-focused innovation. IC items example, "Solve clients problems in very innovative ways."

Environmental Dynamism. This construct was measured with a six-item scale (Cronbach's alpha = 0.91) adopted from Paudel (2019). The items measure the significant shifts in market-related aspects, offering a quantitative measure of market dynamics in the sector. An example of the items "actions of competitors are unpredictable."

Innovation Performance. We measured innovation performance construct based on nine items. Five items were adapted from Andersson et al. (2020), where the Cronbach alpha was (0.84), and four items were adapted from Saunila et al. (2019), where the Cronbach alpha was (0.76).

Data analysis and results

Partial least squares structural equation modelling (PLS-SEM) along with path modelling was used to analyse the survey questionnaire data. PLS path modeling was utilized because it is commonly used in strategic management research (Hair et al., 2019; Hair Jr. et al., 2021; Sarstedt et al., 2019; Sarstedt & Cheah, 2019). Furthermore, the current study intended to predict the dependent variable (innovation performance), and it is known as the "most fully developed and general system" in SEM studies (Hair et al., 2011). The PLS-SEM analysis was conducted in a two-stage process following Hair Jr. et al. (2021) guidelines. Following the established criterion, the measurement model was first evaluated for reliability and validity.

Measurement Model Assessment

The measurement model deals with the relationships between the constructs and the indicator variables.

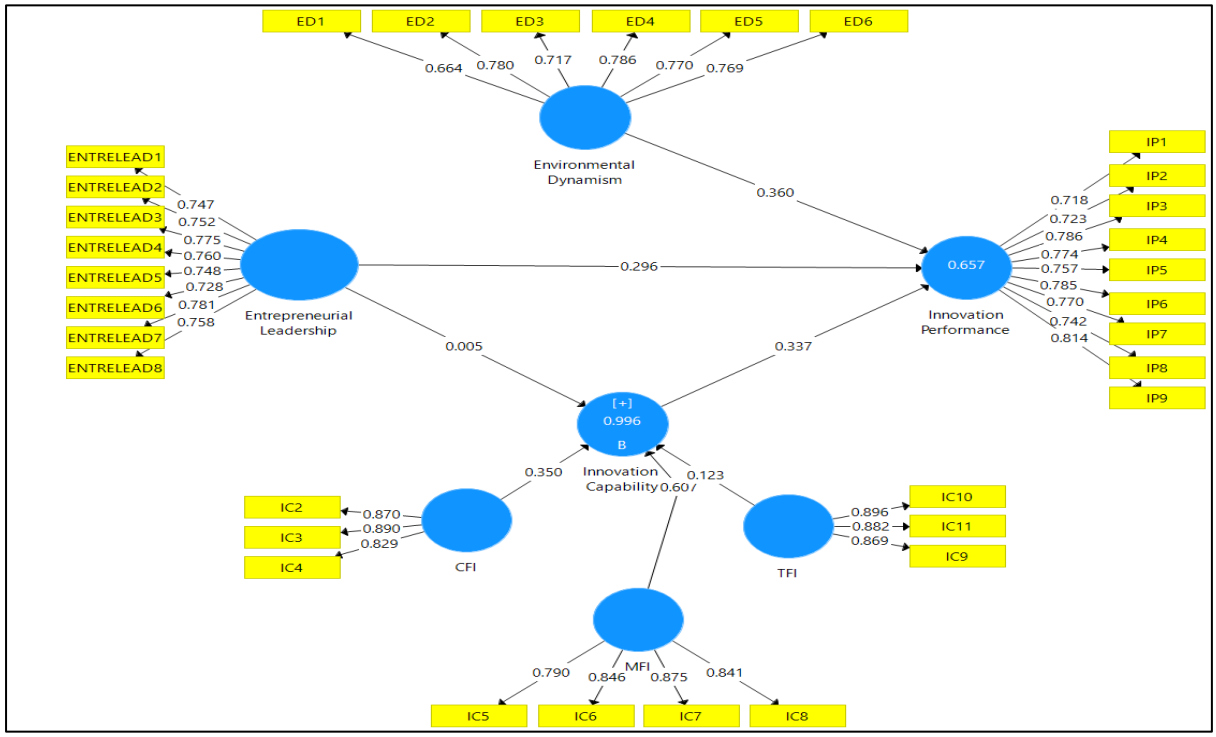


Figure 2: Measurement Model

Reliability and Validity

The measurement model evaluation begins by examining the consistency and validity of the constructs. Tables 1 and 2 display the reliability and validity of the constructs. As shown in

Table 1, most indicators showed factor loadings over the threshold of 0.70 (Hair Jr. et al., 2021). Due to low factor loading, three indicators (ED1, ED3 and IC1) were removed from environmental dynamism and innovation capability constructs. For each construct, Cronbach's alpha (α) scores and composite reliability (CR) scores were higher than the cut-off criteria of 0.70 (Heale & Twycross, 2015). Additionally, the average variance extracted (AVE) scores were above the threshold of 0.50 (Henseler et al., 2015). These results support the measurement model's reliability and convergent validity.

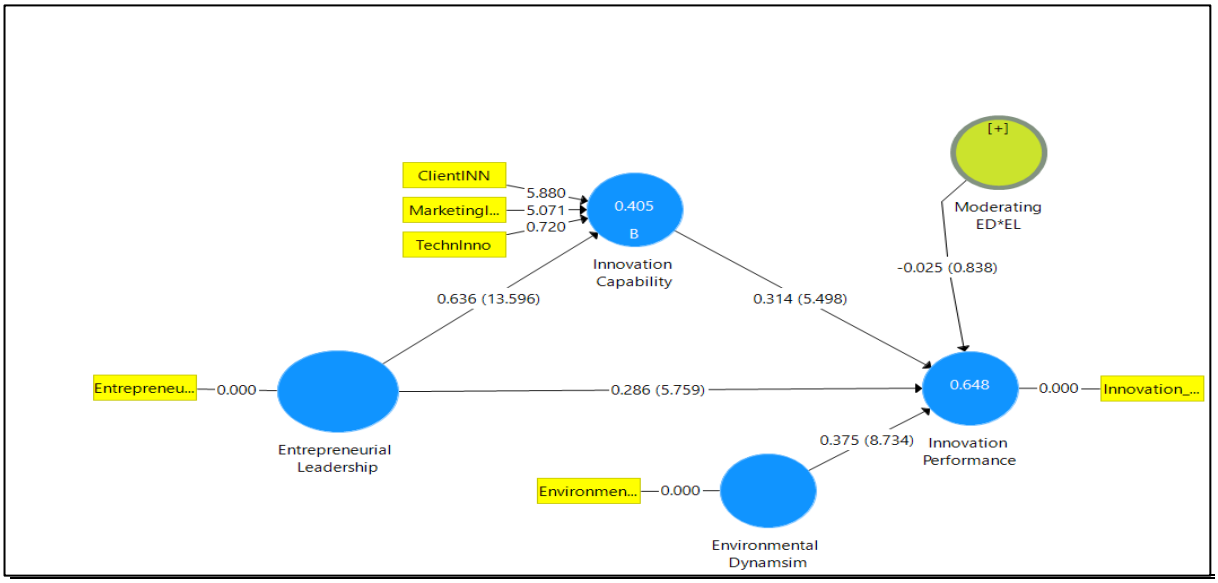
Table 1
Factor loadings, reliability, and validity

Construct	Item	Λ	α	CR	AVE
Entrepreneurial Leadership	EL1	0.747	0.893	0.914	0.572
	EL2	0.752			
	EL3	0.775			
	EL4	0.760			
	EL5	0.748			
	EL6	0.728			
	EL7	0.781			
	EL8	0.758			
Client-focus Innovation	IC2	0.870	0.829	0.898	0.746
	IC3	0.890			
	IC4	0.829			
Marketing-focus Innovation	IC5	0.790	0.859	0.904	0.703
	IC6	0.846			
	IC7	0.875			
	IC8	0.841			
Technology-focus Innovation	IC9	0.869	0.858	0.913	0.778
	IC10	0.896			
	IC11	0.882			
Environmental Dynamism	ED1	0.664	0.845	0.884	0.561
	ED2	0.780			
	ED3	0.717			
	ED4	0.786			
	ED5	0.770			
	ED6	0.769			
Innovation Performance	IP1	0.718	0.910	0.926	0.583
	IP2	0.723			
	IP3	0.786			
	IP4	0.774			
	IP5	0.757			
	IP6	0.785			
	IP7	0.770			
	IP8	0.742			
	IP9	0.814			

5.1.2 Discriminant Validity

The Heterotrait Monotrait (HTMT) ratio is used to evaluate the discriminant validity of the measurement model. The HTMT ratio is a more consistent measure of discriminant validity than the Fornell-Larcker technique or cross-loadings (Henseler et al., 2015; Rönkkö & Cho, 2022). The HTMT results in this study were below the threshold of 0.90. Consequently, discriminant validity is confirmed. The result of discriminant validity is presented in Table 2.

Table 2
Discriminant Validity (HTMT)



Construct	CFI	EL	ED	IP	MFI	TFI
CFI						
EL	0.727					
ED	0.485	0.432				
IP	0.705	0.713	0.713			
MFI	0.888	0.641	0.528	0.750		
TFI	0.760	0.520	0.441	0.621	0.852	

CFI: Client-focused, EL: Entrepreneurial Leadership, ED: Environmental Dynamism, IP: Innovation Performance, MFI: Marketing-focused, TFI: Technological-focused.

Structural model Assessment

After establishing the measurement model's reliability and validity, a systematic process is followed to assess the inner structural model in PLS-SEM, which involves evaluating the model's predictive accuracy and the correlations between the constructs. The main criteria to be considered are the coefficient of determination (R^2) and the size and significance of the path coefficients (Hair et al., 2019). Figure 3 presented the structural model.
Figure 3: Structural Model

Multicollinearity

Finally, the variance inflation factor (VIF) scores of the indicators and constructs were tested to see if there was a multicollinearity problem. The VIF scores were below the threshold value of 5 Hair Jr. et al (2021), confirming the absence of multicollinearity (see Table 3).

Table 3
Collinearity

Construct	Inner Model	Outer Model	
	VIF	Indicator	VIF
Entrepreneurial Leadership	2.063	EL1	1.909
		EL2	1.892
		EL3	1.997
		EL4	1.974
		EL5	1.844
		EL6	1.730
		EL7	1.997
		EL8	1.941
Innovation Capability	1.879	IC2	2.482
		IC3	2.507
		IC4	1.993
		IC5	2.198
		IC6	2.397
		IC7	2.615
		IC8	2.512
		IC9	2.389
		IC10	2.600
		IC11	2.426
Environmental Dynamism	1.331	ED1	1.831
		ED2	1.782
		ED3	2.039
		ED4	1.895
		ED5	1.676
		ED6	1.815
Innovation Performance		IP1	1.851
		IP2	1.892
		IP3	2.297
		IP4	2.146
		IP5	2.085
		IP6	2.229
		IP7	2.018
		IP8	1.987
		IP9	2.401

Note: *VIF<5*

Predictive Accuracy

The initial step involves the evaluation of R^2 for each latent variable to determine the in-sample predictive power of the endogenous construct. In a structural model, the R^2 or coefficient of the determinant value expresses how much of the variance in a targeted variable is explained by the independent variables connected to it. The cut-off score for R^2 is 0.19 (weak), 0.33 (moderate), and 0.67 (substantially) (Chin, 1998). However, in some study

subjects, an R^2 value of 0.10 can be acceptable and is regarded as satisfactory based on the research setting (Hair et al., 2019).

Based on this classification, the model of this study exhibits moderate predictive accuracy as the model explained 64% (R^2 = 0.648, adjusted R^2 = 0.644) of the variance in the endogenous construct innovation performance and 40% (R^2 = 0.405, adjusted R^2 = 0.403) of the variance in the endogenous construct innovation capability.

Effect size (f^2)

The effect size presents the change in the R^2 of the endogenous construct if a certain predictor is removed. As a rule of thumb, f^2 values of 0.02, 0.15, and 0.35, respectively, represent small, medium, and large effects (Cohen 1988), whereas the effect size values of less than 0.02 specify that there is no effect. As shown in Table 4, the F square (f^2) values revealed that entrepreneurial leadership has a large effect size of 0.681 and a small effect size of 0.113 on innovation capability and innovation performance, respectively. Whereas environmental dynamism has a medium effect size of 0.300 and innovation capability has a small effect size of 0.149 on innovation performance.

Table 4
Results of R^2, f^2, and Q^2

Constructs	R^2	f^2		Q^2
		IC	IP	
ED			0.300	
EL		0.681	0.113	
IC	0.405		0.149	0.300
IP	0.648			0.633

5.2.4 Predicative Relevance (Q^2)

Predicative relevance, also known as Stone-Geisser's Q^2, was calculated by using blindfolding (Hair et al., 2021). "In PLS-SEM, a Q^2 value greater than zero for a certain endogenous reflective construct implies the path model's predictive significance for a particular dependent construct. When the structural model displays predictive relevance, it accurately predicts data not used in the model estimate." Although Q^2 incorporates elements of in-sample explanatory power and out of sample predictions, it is not a valid measure of out of sample predictions. According to Sarstedt et al. (2017), as a rule of thumb, Q^2 values of above zero, 0.25, and 0.5 show small, medium, and large predictive relevance, respectively. Table 4 indicates that all endogenous constructs have results of Q^2 value greater than zero (innovation capability 0.300 and innovation performance 0.633); therefore, this indicates the predictive relevance and validity of the model.

5.2.5 Hypothesis Testing

Direct Relationships

To test the hypotheses of this study, the bootstrapping method (5000 resamples) was used to calculate t-value and confidence intervals (CI). The result of the direct relationship is displayed in table 5.

Table 5
Result of Direct Relationships.

Hypothesis	Relationships	Path Coefficient	T statistics	P values	95% CI	Result
H1	EL --> IC	0.636	13.614	0.000	0.559 - 0.713	Supported
H2	IC --> IP	0.314	5.576	0.000	0.225 - 0.412	Supported
H3	EL --> IP	0.286	5.682	0.000	0.199 - 0.366	Supported

Mediation Analysis

The current study utilized the mediation technique because it is deemed to be the best for PLS-SEM (Hair Jr. et al., 2021). Researchers have used the Sobel test to evaluate the significance of the mediation relationships. However, recent studies have drawn attention to the Sobel test's statistical drawbacks and proposed switching to bootstrapping (Igartua & Hayes, 2021). Thus, this study used the bootstrapping method to assess the significance because it offers advantages over traditional methods, including greater flexibility and efficiency (Preacher & Hayes, 2008). Zhao et al. (2010) suggested that a full mediation exists when the exogenous variable has no noticeable impact on the endogenous variable upon introducing the mediator to the model in the test. Meanwhile, partial mediation occurs when the exogenous variable significantly and directly impacts the endogenous variable.

The result of mediation analysis indicated that innovation capability has a complementary partial mediation role ($\beta = 0.200$, $t = 5.064$, $p < 0.05$). Therefore, hypothesis 4 was accepted.

Table 6
Result of Mediation Relationship

Total effect (EL--> IP)			Direct effect (EL--> IP)		
Coefficient	**T value**	**P-value**	**Coefficient**	**T value**	**P-value**
0.486	10.926	0.000	0.286	5.682	0.000

Indirect Effect of EL on IP

Hypothesis	**Coefficient**	**S. E**	**T value**	**P-value**	**Percentile bootstrap 95% confidence interval**	
					Lower	Upper
H4: EL->IC->IP	0.200	0.040	5.064	0.000	0.141	0.270

Moderation Analysis

The product indicator (PI) technique was employed in this study to examine the moderation effect of environmental dynamism. The PI method is a technique for SEM that estimates latent interactions. Cohen (1988) suggested the following criterion to evaluate the moderating effect (f^2): small effect (0.02), medium (0.15), and large effect (0.35).

H5 states that ED moderates the positive linkage between EL and IP, with a higher ED indicating a stronger relationship. The results of the moderating analysis revealed a non-significant relationship (Beta = -0.025, t = 0.840, p = 0.200). Therefore, H5 was not supported. Table 7 displays the moderating analysis outcomes.

Table 7
Moderating assessment results

Hypotheses	Relationship	Beta	Std.	T-value	P values	Decision
H5	ED x EL → IP	-0.025	0.030	0.840	0.200	Not Supported

Discussion and Conclusion

From the perspective of service SMEs, the current paper integrated a theoretical model to examine the relationship between entrepreneurial leadership, innovation capability, environmental dynamism, and innovation performance. Interaction pathways between entrepreneurial leadership and innovation performance were investigated, and it was shown that entrepreneurial leadership might enhance innovation performance. By verifying the suggested hypothesis, both RBV and DCV are validated.

First, this study found a positive effect of entrepreneurial leadership on innovation performance. These outcomes are in line with the previous research findings that have shown a positive relationship between entrepreneurial leadership and performance outcomes (Abdalla & Nakagawa, 2022; Hussain & Li, 2022; Latif et al., 2020; Lin & Yi, 2022; Paudel, 2019; Pu et al., 2022). It can be maintained that owners/managers of SMEs who adopt the characteristics of EL are better equipped to boost their firms' innovation practices. Moreover, SMEs leaders can achieve innovation performance by employing their entrepreneurial capabilities within a competitive setting (Fontana & Musa, 2017; Gupta et al., 2004; Leitch & Volery, 2017). This increased our confidence that EL positively and significantly influences IP.

Second, the results showed that entrepreneurial leadership positively and significantly impacted innovation capability. These findings match and extend previous studies that found EL to be positive to innovation (Fontana & Musa, 2017; Huang et al., 2014; Paudel, 2019; Thongyai & Potipiroon, 2022). Renko et al (2015) argued that entrepreneurial leaders stress their followers' self-efficacy and entrepreneurial passion by inspiring their passion for innovation and creativity.

Third, our study results showed that innovation capability significantly affects innovation performance. These results are in line with earlier studies (e.g., Kim-Soon et al., 2017; Lau & Lo, 2019; Lee & Liu, 2008; Prajogo & Ahmed, 2006; Utoyo et al., 2019; Wang & Lin, 2012; Yeşil & Doğan, 2019) that found an impact of innovation capability on organizational outcomes. Innovation capacity as a unique capability of the firm that originates from a set of interrelated activities (i.e., client-focused innovation, marketing-focused innovation and technological-focused innovation) that are added, developed, and improved over time (Daronco et al., 2022). SMEs in the service sector produce new products and services by updating, integrating, and reconfiguring their existing innovation resources to response to the market changes and opportunities. In this way, achieving higher performance and gaining sustainable competitive advantage (Teece et al., 1997).

Fourth, the finding of this study confirms the mediating impact of innovation capability on the link between entrepreneurial leadership and innovation performance. This conclusion validates previous research on the role of IC as a mediator (e.g., Al-kalouti et al., 2020, p.; Hwang et al., 2020; Imran et al., 2019; Purwati et al., 2021; Thongyai & Potipiroon, 2022). This conclusion is theoretically compatible with RBV and DCV. According to RBV, organizations rely on their resources and capabilities to gain competitive advantage rather than external resources. In contrast, DCV stressed depending on all the firm's internal and external

resources and capabilities to deal with rapidly changing circumstances. Therefore, entrepreneurial leaders, as firm resources, use their competencies to boost innovation capability to increase the firm's innovation level. In the same vein, as a dynamic capability, innovation capability plays a crucial role in establishing innovative performance and a sustainable competitive advantage.

Lastly, the results of this study did not support the moderating effect of environmental dynamism on entrepreneurial leadership and innovation performance correlations. This suggests that in a dynamic environment, company leaders do not use their capabilities, EL capabilities (innovation, creativity, risk-taking, passion, and vision), to improve innovation performance. These results contradicted with theoretical and empirical of prior research, which suggested that entrepreneurial leadership is more effective in a dynamic and highly competitive environment (Bagheri & Harrison, 2020; V. Gupta et al., 2004; Harrison et al., 2018; Renko et al., 2015). According to DCV assertation, the dynamic capabilities of any firm are based on the leader's ability to sense and seize the opportunities happening as a result of the dynamism of the environment (Schoemaker et al., 2018; Teece, 2006). A possible explanation for the insignificant result might be that Malaysian service SME owners are not motivated for entrepreneurial leadership and innovation in a high degree of environmental dynamism, considering the increase of innovative activities, financial cost, and the inability to predict the return of investment in the short-term crisis (Huang et al., 2014). During long-term environmental dynamism, Malaysian service SMEs owners may become trapped in the never-ending invention of new products, services, and processes (Huang et al., 2014). However, SMEs often encounter resource scarcity to monitor environmental challenges and track valuable and timely information (Brush et al., 2008).

The current study suggested several practical implications. The conceptual framework of this study could guide the SMEs owners/managers in the service sector in gaining a better understanding of how EL affects innovation activities in their firms, allowing them to emphasize building these capabilities to improve organizational performance and gain sustainable competitive advantages. Following this model, SME owners/managers should lead with vision, passion, innovation, and risk-taking while handling a dynamic environment and unpredictability. Simply,

In other words, Owners/managers of SMEs should develop and use EL skills to recognize and capture business opportunities and direct their team members toward sustainable objectives.

Limitations and Future Directions

Although this study offers important empirical findings and implications, it has several shortcomings. First, a cross-sectional design was used in this study, which hinders the capacity to draw causal conclusions. However, the survey ensured respondents' anonymity to limit the possibility of response bias. Comparatively to a cross-sectional method, a longitudinal method may illustrate the causal influence more clearly and provide a better understanding of the relation. For a more in-depth examination of innovation-related issues in the SME service industry, qualitative methods may be used. This research may be supported by further qualitatively designed studies and longitudinal sections that analyze the contextual factors of innovation in the SME services industry.

Second, the population of the current study were service SMEs in Klang Valley since the data collection was done during the COVID-19 pandemic considering the implementation of the movement control order (MCO). It would be beneficial for future research to expand this study to include additional Malaysian states, such as Johore and Penang. Additionally,

comparative studies should be undertaken in several countries to examine entrepreneurial leadership extensively practises in service organizations. It is necessary to validate the present research and investigate the overlooked issues. Incorporating more key topics into future studies may help researchers generalize their results throughout service companies.

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