

# EXPLORING THE RELATIONSHIP BETWEEN ENTREPRENEURIAL ORIENTATION, INNOVATION AND FINANCIAL PERFORMANCE: THE MEDIATING ROLE OF ABSORPTIVE CAPACITY AND TECHNOLOGICAL INNOVATION CAPABILITY

Sirinthra Sungthong<sup>1</sup>, Somnuk Aujirapongpan<sup>2,\*</sup>, and Kanokwan Meesook<sup>3</sup>

## Abstract

The purpose of this research was to study the relationship between entrepreneurial orientation, innovation and financial performance, through the mediating role of absorptive capacity and technological innovation capability. The study used a quantitative research method to collect data via questionnaire from the executive officers of 156 startup organizations in Thailand. Respondents were selected using a simple random sampling method and Structural Equation Modeling (SEM). The results demonstrate that entrepreneurship orientation is a variable directly and significantly correlated with innovation and financial performance. However, it was found that entrepreneurship orientation does not correlate indirectly with innovation or financial performance via the mediation of absorptive capacity and technological innovation capacity. The results of the study can enable startup businesses in Thailand to create and pay attention to the behavior of entrepreneurship orientation to improve the organization's innovation and financial performance.

**Keyword:** Entrepreneurship, Innovation Management, Technological Innovation Capability, Absorptive Capacity, Financial Performance, Performance Management

*JEL:* D24 D80 M40 O14 O16 O30

## INTRODUCTION

Currently, there is intense competition amid uncertain business conditions, making it difficult to improve efficiency and maintain a competitive advantage for sustainable growth (Yoo et al., 2018). Additionally, the

consequences of COVID-19 have required every organization to make significant efforts to endure the pandemic's effects (Rapaccini et al., 2020; Kraus et al., 2020). As a result of marketing globalization, technological advancement, shorter product life cycles, and new innovative development, there are

---

<sup>1</sup> Ms. Sirintha Sungthong is currently working as a lecturer in the Faculty of Management Sciences, Phuket Rajabhat University, Phuket, Thailand. She obtained a M.B.A. in General Management of Ramkhamhaeng University, Thailand. She also is a Ph.D. Candidate of the Graduate Study in Innovation Management and Business Development Program, Walailak University, Thailand.

<sup>2 \*</sup> Assoc. Prof. Dr. Somnuk Aujirapongpan (corresponding author) is currently working as a lecturer in the School of Accountancy and Finance, Walailak University, Thailand. He obtained a Ph.D. in Technopreneurship and Innovation Management from Chulalongkorn University, Thailand. Email: [asomnuk@wu.ac.th](mailto:asomnuk@wu.ac.th)

<sup>3</sup> Dr. Kanokwan Meesook is currently working as a lecturer in the School of Accountancy and Finance, Walailak University, Thailand. She obtained a Ph.D. in Regional and Rural Development Planning from Asian Institute of Technology, Thailand.

currently many studies on advantage retention strategies in sustainable competition, including work performance improvement in rapidly changing and unpredictable business conditions (Choi, 2016; Bayraktar, 2016; Teece, 1997). One purpose of these studies was to investigate the ways that each business used entrepreneurship to improve the effectiveness of innovation and financial performance (Sarsah et al., 2020). The resource-based view (RBV) is a popular approach to understand business competitive dynamics. Organizations with full resources and high capabilities can gain a competitive advantage, leading to higher efficiency, by utilizing the RBV, especially if these organizations have valuable resources that are uncommon, unique, and irreplaceable, including the ability to organize and fully utilize those resources and capabilities (Rahim and Zainuddin, 2016).

Entrepreneurial orientation is a type of strategy that represents an organization's plans for innovation, proactive working, and risk-taking (Sarsah et al., 2020). It indicates that entrepreneurs can improve their ability to acquire and absorb external knowledge in order to create new products and processes that are fundamentally different from existing ones (Sarsah et al., 2020). Consequently, the current competitive environment requires entrepreneurs to not only produce new knowledge within their organizations, but also to have absorptive capacities for new technology (Lau and Lo, 2019). Absorptive capacity plays an important role in effectively acquiring external knowledge (Matusik and Heeley, 2005); this knowledge will be transformed into economically valuable outcomes (Murovec and Prodan, 2009). According to Calantone et al. (2002), the absorption of knowledge from outside the organization fosters creativity, stimulates new ideas, and increases the potential of the company to create innovations. Having a highly entrepreneurial orientation may enhance the absorptive capacity to assimilate new essential information from business partners and to transform this information into innovations (Aljanabi, 2017).

Technological innovation capabilities are considered to be key strategic resources that enable organizations to achieve sustainable competitive advantages when facing dynamic environments (Rahim and Zainuddin, 2016). Additionally, technological innovation capabilities represent the acquisition of ideas or the enhancement of knowledge to predict economic advantages that impact positively on the performance of an organization (Zahra and Nielsen, 2002). This shows that the organization is able to implement, develop, suggest, and apply new concepts and technology to products, services, and production processes (Rhodes et al., 2018). The implementation of technological innovation and its strategies requires planning, problem solving, and innovative behavior in the organization (Yoo et al., 2018); these are major characteristics of entrepreneurial orientation.

The present research aims to study startup businesses in Thailand which have been impacted by rapid change, showing how people can be easily connected by using technology. The internet has brought all businesses closer, resulting in a marketing revolution in a variety of businesses. Consequently, the ambitious entrepreneur is a key person in the initiation of new technologies to solve problems and bring out changes in many business sectors. In addition, startup businesses can generate significant income in a short period of time. This business can often be expanded, and the operating costs are not necessarily high. This type of business will strengthen the economy of the country in which it is based, both now and in the future. Therefore, it is helpful to predict the factors affecting technological innovation capabilities and performance of such organizations (Jiraphanumes et al., 2011). This can in turn help executives to realize the value of external knowledge in leveraging innovation capabilities that play a key role in learning new techniques, increasing creativity and proactive enthusiasm, and lowering the level of risk involved in the innovation process (Noor and Aljababi, 2016).

## **THEORETICAL REVIEW AND HYPOTHESIS DEVELOPMENT**

### **Innovation and Financial Performance (IFP)**

The intense competition and uncertainty of modern business circumstances has made it more difficult to improve efficiency and maintain competitive advantages for sustainable growth (Yoo et al., 2018). This also relates to innovation capacities which are increasingly important to business success (Aljanabi, 2017). Innovation performance involves improving existing quality and service. Novel technologies can be used in production or services as customers accept the speed of introducing new products and services, including new features for existing products or services (Nguyen, 2019). An organization's innovation performance reflects the results of the organization's innovative ability to adapt to market changes (Nguyen, 2019). Most studies focus on the financial dimensions of a company's performance, but may use different measurement plans (Brozovic, 2018). Financial performance refers to the financial activities of an organization. It represents the achievement of financial objectives, which involves a process of measuring the policy and operation of the organization in terms of money. This is used to measure overall financial health over a specified period of time. It can also be used to compare similar businesses in the same industry, or to compare industries or sectors as a whole. This provides a true reflection of the return on investment, return on assets, and added value (Al-Mamany et al., 2020). In this challenging time for business, the present study focuses on methods to increase financial performance and innovation. The study aims to measure organizational performance, to examine the efficiency of innovation and financial performance.

### **Entrepreneurial Orientation (EO)**

In the era of modernization and globalization, innovation and creativity play an

important role in business success (Boone et al., 2019). Entrepreneurial orientation is one of the main resources that has a significant impact on the adaptation capacity of organizations to environmental changes through providing different types of innovation (Noor and Aljababi, 2016).

Miller (1983) defined entrepreneurial orientation as a business orientation that emphasizes risk-taking and elevating the business through innovation in order to compete proactively with others. According to Miller's definition, there are three main aspects of entrepreneurial orientation composing of (1) innovativeness, which refers to the inclination of an organization to support new ideas, creative processes, and new products and services (Aljanabi, 2017); (2) risk taking, which is involved with the tendency of an organization to invest large amounts of resources to high-risk projects; and (3) proactiveness, which relates to the capacity of an organization to take advantage of market opportunities and to improve the satisfaction feedback when compared with competitors (Aljanabi, 2017), such as launching new products or services before competitors, and anticipating future needs that will bring about changes (Aljanabi and Noor, 2015). According to the study of Lumpkin and Dess (1996), it was found that there are two other aspects which are essential to entrepreneurial orientation. Firstly, autonomy is the freedom to work independently or in groups to develop ideas or visions, including the freedom to limit organizational constraints, which may result in creativity evolving to become an important driving force for the organization (Lumpkin and Dess, 1996). Secondly, competitive aggressiveness is the effort of the organization to stay ahead of competitors and/or maintain its position in the sector by engaging in directly competitive strategies (Aljanabi, 2017).

Entrepreneurial orientation is thus the behavior that leads to proactive actions when opportunities arise by applying creativity to business changes and dealing with high risks and uncertainties in order to achieve goals (Anderson and Ronteau, 2017). It also

includes the capacity to be aware of the needs of both the market and customers, and to meet those needs through innovation (Mohd Noor et al., 2017). This capacity is an important feature in shaping organizational growth and adaptation to environmental changes (Covin and Miller, 2014; Lumpkin and Dess, 1996). It is a key feature in shaping organizational growth and adaptation to environmental changes (Covin and Miller, 2014; Lumpkin and Dess, 1996) by inventing a variety of innovations and enhancing the organization's capacities to respond to environmental fluctuations (Nguyen et al., 2021). Entrepreneurial orientation is therefore considered as a strategic resource of the organization in increasing the efficiency of finance and innovation (Usman and Mat, 2017; Tang et al., 2015). Thus, the first hypothesis of the study is presented as follows:

Hypotheses 1 (H1): Entrepreneurial orientation positively affects innovation and financial performance.

### **Absorptive Capacity (AC)**

In the face of a highly dynamic business environment, organizations are not only building their own knowledge within the organization, but also absorbing external knowledge to foster innovation and improve productivity (Lau and Lo, 2019). Absorptive capacity is a dynamic ability embedded in organizational practices and culture. It is the capacity to produce and use the knowledge required to develop other competences, such as production, sales, and marketing (Zahra and George, 2002).

Numerous previous studies have classified absorptive capacity as a cognitive ability (Andersén, 2012; Andersén and Kask, 2012; Martinkenaite, 2012; Tseng et al., 2011). The absorption and use of external knowledge (Aljanabi, 2017) as described by Zahra and George (2002) divided the structure of absorbcency into two dimensions. The first dimension represents the potential absorptive capability related to knowledge acquisition and assimilation in order to distribute that knowledge to the company

through marketing and technology (Sarsah et al., 2020). The second dimension is the realized absorptive capability involving knowledge transformation and exploitation, making changes in products and production (Sarsah et al., 2020). Hence, it can be concluded that absorptive capacity is composed of the following four components. Firstly, acquisition shows the ability of the company to identify and acquire external knowledge which is important to the company (Lau and Lo, 2019). Secondly, assimilation represents the ability to interpret, analyze and understand external knowledge (Engelen et al., 2014). Thirdly, transformation improves company practices in order to promote the fusion of existing and new knowledge to develop a new business model based on the new knowledge set (Makhloufi et al., 2021). Finally, exploitation illustrates the ability needed to take advantage of the knowledge set for commercial goals.

The nature of entrepreneurial orientation encourages organizations to consider new ideas, engage in creative investments, accept high risks, and work proactively (Aljanabi, 2017). It also supports the absorptive capacity of the organization to acquire external knowledge (Aljanabi, 2017). Entrepreneurial orientation may be more effective if the organization has knowledge acquisition and exploitation capabilities to increase its innovation capabilities (Sciascia et al., 2014). Meanwhile, the absorptive capability acts as a mechanism to acquire and assimilate only relevant and necessary knowledge, with that knowledge then transformed into valuable outputs (Hodgkinson et al., 2012). Especially in startup businesses, which are characterized by starting the business from a small point but a capacity to grow rapidly, or gradually, while also being a business which arises from ideas to solve everyday problems. A startup business can also arise from seeing business opportunities that no one has ever thought of or implemented before (The Stock Exchange of Thailand, 2016). Absorption capability plays a crucial role as a startup business requires external research and instruction from customers, competitors and stakeholders

to apply existing knowledge and take advantage of that knowledge. Hence, absorptive capacity is a core competency that allows entrepreneurship-oriented companies to access new information and knowledge about business opportunities through various channels (Makhloufi et al., 2021). As a result, the effects of entrepreneurial orientation on innovation outcomes are dependent on the company's absorptive capacity in effectively assimilating external knowledge (Sarsah et al., 2020). This leads to the second hypothesis, presented as follows:

Hypotheses 2 (H2): Absorptive capacity mediates the relationship between entrepreneurial orientation and innovation and financial performance.

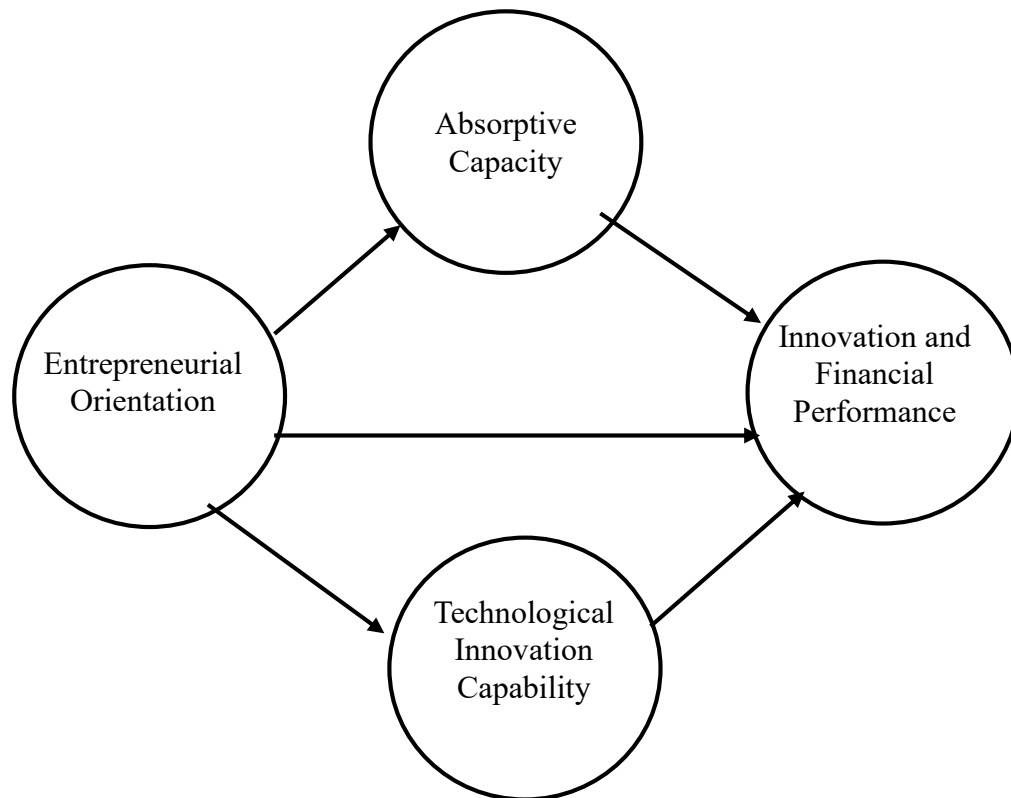
### **Technological Innovation Capability (TIC)**

According to the resource-based view (RBV), organizations who have resources and high capacities can achieve a sustainable competitive position in turbulent markets, while they can also perform better than their competitors (Zhang et al., 2019). Through technological innovation, businesses can make a wide range of new products and services that are important for making them more efficient and making more profits (Camisón and Villar-López, 2014). When it comes to sustaining a company's competitive advantage, technical innovation capability is a key component of organizational competency (Zastempowski and Glabiszewski, 2020), including the implementation of strategies. Technological innovation capability is also vital in maintaining a company's competitive advantage (Burgelman et al., 1996). In the face of a highly competitive business environment, organizations require technological innovation to maintain their continued competitiveness and to face new challenges (Rahim and Zainuddin, 2016).

The concept of technological innovation capability in this study follows Damanpour's (1991) definition: a specialized resource of a company to optimize existing products and production, and to invent new products (Aljanabi, 2017); this can be categorized into

technological innovation and management innovation. Technological innovation refers to new production, products, and services, while management innovation is defined as unconventional procedures and policies that are non-technological innovations (Jiménez-Jiménez and Valle, 2011). The purpose of the present study is to investigate the dimension of technical innovation capability, which is the ability to adapt to unanticipated technological developments, produce new products, and employ new technological processes to meet current and future needs (Adler & Shenbar, 1990). Technical innovation capability consists of two components. The first is the ability for product innovation, which includes processes to differentiate products, such as developing new items and modifying existing ones (Nguyen et al., 2021). The second component is the capacity for production innovation, which involves the use of production technology to enhance innovation capacity and the strategic promotion of new production techniques and procedures (Zawislak et al., 2012). Startups are a new group of enterprises with the potential for rapid growth. This group of entrepreneurs can apply science, technology, and innovation to create a business that grows rapidly. Technology and innovation are at the heart of creating a business (The Stock Exchange of Thailand, 2016). Therefore, technological innovation capability is a capability that reflects the key characteristics that startups should have.

Entrepreneurial-oriented organizations often capitalize on opportunities with passion and effort (Nguyen et al., 2021), to take risks, seize opportunities, innovate products and production, create advantages in competition, and improve their dynamic capabilities (Gupta et al., 2004). The entrepreneurial orientation also helps determine the infrastructure, behaviors, and strategic tools that are adequate and necessary to boost an organization's ability to innovate in technology. Previous studies have shown that companies which use technological innovation are required to develop new procedures, capabilities, and management skills (Chen et al., 2019), which affect organizational outcomes.



**Figure 1** Research Framework

Also, some studies revealed that technological innovation has positive impacts, since it can improve competitiveness, financial efficiency and innovation (Rahim and Zainuddin, 2016). This leads to the third hypothesis as follows.

Hypotheses 3 (H3): Technological innovation capability mediates the relationship between entrepreneurial orientation and innovation and financial performance.

Based on theoretical review and hypothesis development, the study has a research framework as shown in Figure 1.

## **METHODOLOGY**

### **Sample and Data Collection**

The sample used in this study was collected from a population of 467 Startup organizations in Thailand (Startup Thailand Ecosystem, 2022). The recommended number

under the condition of determining the minimum sample size for the structural equation model analysis of Hair et al. (2010) with latent variables of less than or equal to 7, and each latent variable being measured from more than 3 observed variables, states a minimum sample size of 150. Data collection from a sample of the study population involved surveying corporate executives using a simple random sampling method. For this, a randomized table of numbers that listed the entire population was used. Data collection for this study was conducted with a complete sample of 156 organizations, meeting the minimum sample size specified.

### **Survey Instrument**

The instrument used in this study was a questionnaire derived from the literature review which passed examination by experts to determine the consistency index of the questionnaire using the IOC (Index of Item

Objective Congruence) value. Part 1 of the questionnaire dealt with the personal data of the respondents utilizing a single-choice answer form. Part 2 collected data relating to the features of Entrepreneurial Orientation which demonstrates behavior innovativeness, risk taking, proactiveness, autonomy and competitive aggressiveness. Part 3 collected data about the features of Absorptive Capacity which are characterized by acquisition, assimilation, transformation and exploitation. Part 4 of the questionnaire collected data about technological innovation capability, and process innovation capability. Technological innovation capability relates to product innovation capability, the processes used to differentiate a product, such as developing a new product and improving an existing one. Meanwhile, process innovation capability involves using production technology to develop innovation capability. Part 4 also considered the strategic use of these technologies to promote new techniques, processes and methods in manufacturing. Part 5 of the questionnaire collected data on the variables affecting organizational performance in the dimension of innovation and financial performance.

In part 2 – 5, the questionnaire utilized a 5-level Likert Scale, while the questionnaire's reliability was tested via the Internal Consistency Method and Cronbach's Alpha Coefficient.

### **Data Analysis**

Analysis of part 1 of the questionnaire involved descriptive statistics, including frequency and percentage, to analyze personal data of respondents.

Parts 2-5 of the questionnaire which used a Likert rating scale, were also analyzed via descriptive statistics, namely the mean and standard deviation. Inferential statistics were used to study the linear structural equation model (SEM) via the M-Plus program according to the conceptual model which was constructed with covariance-based SEM (CB-SEM) to study the relationship between the variables by applying it to confirmatory factor

analysis (CFA) to verify the validity of the hypothesis test.

Structural Equation Modeling (SEM) is a method of statistical analysis used to test a set of variables in a study to determine whether or not the causal relationship structure is as defined in the assumed model. It is possible to examine multiple relationships at the same time, while some variables in a structure may be both latent and observed variables, such that researchers can answer research questions, understand the purpose of the research, and apply statistics effectively. Therefore, SEM is suitable for this study (Songsraboon, 2018).

## **RESULTS**

### **Demographic and Descriptive Statistics**

The subjects in the study, as shown in Table 1, consisted of 71.80% chief executive officers and 29.20% business owners. The majority of respondents were male (65.40%) while only 34.60% were female. Around 57.70% of respondents were between the ages of 31 and 40, 38.50% were between the ages of 41 and 50, 3.20% were 30 years of age or less, and 0.60% were between the ages of 51 and 60. The vast majority of the subjects ran a startup company in the areas of AgriTech, FoodTech, Business Service, or Online Marketing. However, a sizeable minority of them, accounting for approximately 26.90% of the total, ran a startup company in the areas of IndustryTech, HealthTech, GovTech & EdTech, PropertyTech & UrbanTech, or FinTech & TravelTech respectively. The majority of the subjects had been in business for 5 years or less (64.10%), while a smaller number had experience of 6-10 years (32.70%), or 11-15 years (3.20%).

### **Measurement Model**

Confirmatory Factor Analysis was used in this study to evaluate the measurement tools in order to reduce measurement errors. In the present study, there were four key factors: Entrepreneurial Orientation (EO),

Absorptive Capacity (AC), Technological Innovation Capability (TIC) and Innovation and Financial Performance (IFP). The measurement model was tested, and  $X^2 = 222.359$  with a determined p-value of less than 0.001. The df value was 127,  $X^2/df$  is 1.75, while the acceptable range for  $X^2/df$  is between 1 and 3 (Hair et al., 2014, p. 668). Also, SRMR = 0.072, which was less than 0.08, was within the acceptable range (Hensler et al., 2015). The CFI value was 0.943, while the TLI value is 0.932, both of which were higher than 0.9 (Bollen, 2015). The index value of RMSEA = 0.069, indicating that the model corresponds to the data, as this value should be between 0.03 and 0.08. It can be concluded that the model is consistent with the empirical data.

The confirmation factor analysis of the

four elements is shown in Table 2. There were five indicator questions relating to EO, AC, and IFR, and three indicator questions relating to IEP. The results show that the standard weight value of EO was between 0.540 and 0.700, while the standard weight value of AC was between 0.500 and 0.967, the standard weight value of TIC was between 0.766 and 0.915, and the standard weight value of IFP was between 0.619 and 0.731. Cronbach's Alpha values ranged between 0.700 and 0.920, all of which were not less than 0.700, indicating that the variable has good precision. Construct Reliability (CR) values were between 0.700 and 0.921, all of which were not less than 0.700, indicating that all indicator questions had good structural reliability (Carmines & Zeller, 1988; Hair et al., 2014).

**Table 1** Personal Data

Item	Frequency	Percentage
<b>Gender</b>		
Male	102	65.40
Female	54	34.60
<b>Age</b>		
30 years or less	5	3.20
31 – 40 years	90	57.70
41 – 50 years	60	38.50
51 – 60 years	1	0.60
<b>Position</b>		
business owners	44	28.20
chief executive officers	112	71.80
<b>Business Type</b>		
IndustryTech	37	23.70
FinTech	10	6.40
PropertyTech & UrbanTech	11	7.10
TravelTech	8	5.10
HealthTech	36	23.10
GovTech & EdTech	12	7.70
Other	42	26.90
<b>Business Period</b>		
5 years or less	100	64.10
6 – 10 years	51	32.70
11 – 15 years	5	3.20



**Table 2** Confirmatory Factor Analysis

Factors/Items	Loading	Mean	SD.	Cronbach's Alpha	CR
<b>Entrepreneurial Orientation (EO)</b>		4.341	0.389	0.762	0.726
The organization is aware of research and development, technological leadership, and innovation.	0.573				
The organization invests in high-risk projects. and start a new venture with the uncertainty of the market	0.561				
The organization is frequently the first to introduce new products or services, administrative processes, production technologies, and so on when competing with others.	0.565				
The organization gives staff the freedom to create ideas and visions to implement, which results in creative change.	0.700				
The organization is able to identify competitors' weaknesses in order to implement more effective competitive strategies.	0.540				
<b>Absorptive Capacity (AC)</b>		4.591	0.431	0.893	0.881
The organization is able to analyze and interpret rapidly changing market demands.	0.500				
The organization always thinks about how changing market needs will affect the development of new products and services.	0.562				
The organization is quickly aware of the benefits of supplementing existing knowledge with new external knowledge.	0.862				
The organization applies what it has learned in its daily operations.	0.967				
The company always keeps thinking about new ways to improve how it makes use of existing knowledge.	0.901				
<b>Technological Innovation Capability (TIC)</b>		4.586	0.453	0.920	0.921
The organization is able to use new technologies to improve products/services.	0.829				
The organization has made innovations to upgrade production and internal management systems.	0.822				
The organization is able to effectively control the production time of products/services to meet urgent needs.	0.766				

**Table 2 (continued)**

The organization has a good mechanism for technology transfer from research to product development.	0.915			
The organization has technological capabilities that enable efficient manufacturing of products/services.	0.849			
<b>Innovation and Financial Performance (IFP)</b>		4.209	0.406	0.700
Sales have consistently increased as a result of new technological products and services or improved products.	0.632			
The profits have consistently increased as a result of new technological products and services or improved products.	0.619			
The number of products/commercial services have increased compared to the past 5 years.	0.731			

**Table 3** Pearson Correlation

	1	2	3	4
1. Entrepreneurial Orientation (EO)	1			
2. Absorptive Capacity (AC)	0.457**	1		
3. Technological Innovation Capability (TIC)	0.492**	0.444**	1	
4. Innovation and Financial Performance (IFP)	0.435**	0.338**	0.334**	1

Note \*\*p < 0.01

The correlation test for all variables is shown in Table 3. At the .001 level, there was a statistically significant relationship in the same direction. Also, the values of the Pearson correlation coefficient were between 0.334 and 0.492, all of which were less than 0.70, showing that there was no multicollinearity problem with the components. In addition, the verification of discriminant validity by comparing the  $\sqrt{\text{AVE}}$  value of each variable with the correlation coefficient of other variables (Fornell & Larcker, 1981) shows that the  $\sqrt{\text{AVE}}$  values for all variables displayed in italics diagonally were higher than the correlation coefficients among the variables. This indicates that indicator questions possessed discriminant validity, resulting in the correlation of all variables and the empirical data, while they could also be said to be reliable, valid and suitable to be used in testing the hypotheses.

## Structural Equation Modelling (SEM) Results

### Direct Effect

The statical results,  $X^2 = 223.209$ ,  $p\text{-value} < 0.001$ ,  $df = 128$ ,  $X^2/df = 1.74$ ,  $\text{SRMR} = 0.075$ ,  $\text{CFI} = 0.943$ ,  $\text{TLI} = 0.932$  and  $\text{RMSEA} = 0.069$  were used to find the correlation of the model and the empirical data. The effects of entrepreneurial orientation and innovation and financial performance were analyzed, and direct effects (DE) illustrated in Table 4. The results indicate that EO has a positive influence on IFP ( $= 0.529$ ,  $p\text{-value} 0.01$ ); hence, Hypothesis 1 (H1) was accepted. In addition, the findings show that EO also positively affects AC ( $\beta = 0.567$ ,  $p\text{-value} < 0.001$ ). However, AC and TIC did not have any impact on IFP ( $\beta = 0.071$ ,  $\beta = 0.053$  respectively,  $p\text{-value} > 0.05$ ). The

**Table 4** Direct Effect

	Beta Values	Z Statistics	p Values
EO → TIC	0.653***	10.107	0.000
EO → AC	0.567***	8.076	0.000
EO → IFP	0.529**	3.038	0.002
AC → IFP	0.071	0.602	0.547
TIC → IFP	0.053	3.371	0.711

Note. \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

**Table 5** Indirect Effects

Hypotheses	Beta Values	Z Statistics	p Values
H2: Absorptive capacity mediates between entrepreneurial orientation and innovation and financial performance.	0.040	0.608	0.543
(H3): Technological innovation capability mediates the relationship between entrepreneurial orientation and innovation and financial performance.	0.035	0.374	0.709

Note. \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

variance of AC and TIC explained by EO were 29.8% and 40.8% respectively.

### Mediator Testing

Indirect effects between EO and IFP were analyzed to verify the functions of AC and TIC as mediators of the correlation based on Baron and Kenny (1986). The results as displayed in Table 5 indicate that EO does not affect IFP, so AC ( $\beta = 0.040$ ,  $p\text{-value} > 0.05$ ) and TIC ( $\beta = 0.035$ ,  $p\text{-value} > 0.05$ ) are not able to be mediators between EO and IFO; hence, hypotheses 2 (H2) and 3 (H3) were rejected. The variance of IFP explained by EO was 36.6%.

### DISCUSSION

The findings of the present study show that entrepreneurship orientation positively affects innovation and financial performance, where EO affects IFP by 36.6%. This helps to fulfill the body of knowledge for a better study of the relationship between the two factors. The results of this study are also similar with those of other studies in the SME sectors (Ming Zhai et al., 2018; Isichei et al., 2019) indicating that organizations with an

entrepreneurship orientation can provide more development and profit opportunities in an increasingly competitive environment, especially in intense competitions in the current world. Entrepreneurship orientation will also lead to success by increasing the efficiency of innovation (Iqbal, S. et al., 2021). To do this, the organization must be ready to enhance innovation and launch new products and services as well as fostering new research, new production development, and risk-taking enhancement to enter developing markets by allocating resources to enable organizations to innovate (Lumpkin and Dess, 1996).

However, from the results of the study, it was found that AC and TIC had no direct effect on IFP, unlike previous studies that confirmed that AC and TIC had a direct effect on organizational performance (Kale et al., 2019; Alkatheeri et al., 2021). Startup businesses should be made aware of the importance of absorbing external knowledge and applying it to the internal knowledge that the organization has. Also, startups should focus on TIC so that they can find new and better solutions or services to offer to customers. Startup business-related agencies in Thailand, such as the National Innovation

Agency (NIA), Office of The Permanent Secretary, and Digital Economy Promotion Agency (DEPA), should establish policies to promote the education system in Thailand in line with the ever-evolving Startup business context by supporting knowledge-building activities such as training and the exchange of business experiences. Startups are always there to enable organizations to absorb and order new knowledge from outside, as well as to build an understanding of the structure of the startup business that relies on technological advances. To recognize the importance of TIC building to meet the changing needs of the market, such as successful startups in developed countries.

The findings in this study also show that absorptive capacity does not function as a mediator between EO and IFP in startup businesses in Thailand. This can be explained by the fact that the education system in Thailand is still not aligned with ongoing developments in business. Also, entrepreneurs in Thailand do not absorb and instruct external knowledge to establish new business, which is a significant impediment that makes it difficult for startups to succeed. However, the results in this study found that EO has direct effects on absorptive capacity, where EO affects AC by 29.8%, reflecting that organizations with entrepreneurship orientation will be able to better develop their absorptive capacity. This is because entrepreneurship orientation is a strategy which leads an organization to proactively work when an opportunity arises, and it can be used creatively in business change, including managing risks and uncertainties, in order to achieve organizational goals (Anderson and Ronteau, 2017). With entrepreneurship orientation, an organization is able to anticipate the demands of the market and customers and respond to those needs by using new innovations (Mohd Noor et al., 2017). Entrepreneurship orientation is a strategy that enhances the organization's ability to better absorb new knowledge from outside (Cui et al., 2018).

Further, the findings of this study revealed that TIC does not mediate between

EO and IFP in startups in Thailand. This is because the business sector still lacks an understanding of startups and is unaware of the importance of technological innovation. In developed countries, the structures of startups clearly rely on technology to find better solutions or new services for customers, that are designed to be used without limits, allowing the company to grow rapidly. However, in this study, it was found that EO directly affects TIC, where EO affects TIC by 40.8%. This is because having entrepreneurship orientation provides the organization with opportunities to adapt itself to technological change, develop new products, and use new technologies to respond to needs now and in the future (Aljanabi, 2017). As a result, startups in Thailand must be aware of the use of technology and innovation in enhancing business value to achieve business success (SME Bank, 2017).

Although the findings in this study show that absorptive capacity and technological innovation capability do not mediate EO and IFP, the results confirm that both absorptive capacity and technological innovation capability are dependent variables directly affected by EO. Therefore, these findings can be added to the academic concepts, and they can be more fully implemented in startups. It can be concluded that entrepreneurship orientation is a key part of an organization's ability to grow and adapt to new situations. It is also a key strategic resource for increasing innovation and financial performance. EO also improves the organization's ability to absorb new knowledge from outside sources and properly apply it to its existing knowledge. EO not only helps the organization adapt itself to technological change, but EO also encourages the organization to develop products and make use of new technological procedures to better meet the needs of the market.

## **CONCLUSION**

In the present study, the correlations between entrepreneurship orientation, innovation and financial performance, absorptive

capacity, and technological innovation capability, were tested. The relationships between the antecedents that affect startup innovation and financial performance in Thailand were investigated using the correlations of direct and indirect variables. The results demonstrate that entrepreneurship orientation is a variable directly and significantly correlated with innovation and financial performance, absorptive capacity, and technological innovation capability. The findings in this study also confirm that entrepreneurship orientation helps the organization to increase innovation and financial performance and gain, absorb, and apply external knowledge to create new internal knowledge. In addition, entrepreneurship orientation gives the organization a technological innovation capability that allows it to react to unanticipated technological changes, create new products, and apply new technological techniques to suit both present and future needs.

However, it was found that entrepreneurship orientation does not have an indirect correlation with innovation and financial performance, via the mediation of absorptive capacity and technological innovation capability. This result did not support the hypotheses. This can be explained by the fact that entrepreneurship orientation enables the organization to increase innovation and financial performance without relying on the acquisition, assimilation, and exploitation of external knowledge. It also does not require the ability to adapt to unexpected technological changes, develop new products, or use new technological procedures in order to meet market demands.

## LIMITATIONS AND RECOMMENDATIONS

This study was conducted among Startup organizations in Thailand with the objective of investigating the relationship between entrepreneurial orientation, innovation and financial performance, through the mediating role of absorptive capacity and technological innovation capability. Data were collected via questionnaire from a sample of the target

population. There were a total of 156 completed questionnaires utilized for analysis. According to the conditions for determining the minimum sample size for the analysis of the structural equation model (Hair et al., 2010), the minimum sample size was deemed to be 150. The obtained test was therefore in accordance with the specified minimum sample size. However, the sample used as data for the analysis may still be considered too small. Due to the limitation in the disclosure of startup information to third parties, many startups are quite concerned about maintaining business secrets. This may be a factor that causes the results of the study to find that the variables are not related. Therefore, in future studies, researchers should pay greater attention to clarifying reasons and benefits for collecting data for use in studying startups and may focus on studying other business organizations that can disclose financial and management information to the public, such as those listed on the stock exchange. This will allow the researcher to obtain accurate and sufficient information for use in analyzing the study results.

## ACKNOWLEDGMENTS

This research was approved by the Institutional Review Board (IRB) of the human research ethics committee of Nakhon-ratchasima College (NMCEC-0012/2565). Assoc. Prof. Dr. Somnuk Aujirapongpan is a corresponding author in this article. Dr. Kanokwan Meesook is also a co-corresponding author.

## REFERENCES

- Adler, P. S. & Shenbar, A. (1990). Adapting your technological base: the organizational challenge, *Sloan Management Review*. 1990, 32, 25-37.
- Aljanabi, A. R. A. (2017). The mediating role of absorptive capacity on the relationship between entrepreneurial orientation and technological innovation capabilities. *International Journal of Entrepreneurial*

- Behavior & Research*, 24, 818–841.  
<https://doi.org/10.1108/ijebr-07-2017-0233>
- Aljanabi, A.R.A. & Noor, N.A.M. (2015). The mediating role of market orientation on entrepreneurial orientation, absorptive capacity and technological innovation capabilities. *Asian Social Science*, 11, 219.
- Alkatheeri, H.B., Jabeen, F., Mehmood, K. & Santoro, G. (2021). Elucidating the effect of information technology capabilities on organizational performance in UAE: a three-wave moderated-mediation model. *International Journal of Emerging Markets*.  
<https://doi.org/10.1108/IJOEM-08-2021-1250>
- Al-Mamary, Y. H., Alwaheeb, M. A., Alshammari, N. G. M., Abdulrab, M., Balhareth, H., & Soltane, H. B. (2020). The effect of entrepreneurial orientation on financial and non-financial performance in Saudi SMES: A review. *Critical Review*, 7, 270–278.
- Andersén, J. (2012). Protective capacity and absorptive capacity: managing the balance between retention and creation of knowledge-based resources, *The Learning Organization*, 19, 440–452.
- Andersén, J. & Kask, J. (2012). Asymmetrically realized absorptive capacity and relationship durability, *Management Decision*, 50, 43–57.
- Anderson, A. & Ronteau, S. (2017). Towards an entrepreneurial theory of practice; emerging ideas for emerging economies. *Journal of Entrepreneurship in Emerging Economies*, 9, 110–120.
- Baker, W.E. & Sinkula, J.M. (2009). The complementary effects of market orientation and entrepreneurial orientation on profitability in small businesses. *Journal of Small Business Management*, 47, 443–464.
- Bayraktar C. A., Hancerliogullari, G., Cetinguc, B. & Calisir, F. (2016). Competitive strategies, innovation, and firm performance: an empirical study in a developing economy environment. *Technology Analysis & Strategic Management*, 7325, 1–15.
- Bollen, K.A. (1989). A new incremental fit index for general structural equation models. *Sociology Methods Research*, 17, 303–316.
- Boso, N., Cadogan, J.W. & Story, V.M. (2012a). Entrepreneurial orientation and market orientation as drivers of product innovation success: a study of exporters from a developing economy. *International Small Business Journal*, 31, 57–81.
- Boso, N.; Cadogan, J.W. & Story, V.M. (2012b). Complementary effect of entrepreneurial and market orientations on export new product success under differing levels of competitive intensity and financial capital. *International Business Review*, 21, 667–681.
- Brozovic, D. (2018). Strategic flexibility: a review of the literature. *International Journal of Management Reviews*, 20, 3–31.
- Calantone, R.J., Cavusgil, S.T. & Zhao, Y. (2002). Learning orientation, firm innovation capability, and firm performance. *Industrial Marketing Management*, 31, 515–24.
- Camisón, C. & Forés, B. (2010). Knowledge absorptive capacity: New insights for its conceptualization and measurement. *Journal of Business Research*, 63, 707 – 715.
- Camisón, C. & Villar-López, A. (2014). Organizational innovation as an enabler of technological innovation capabilities and firm performance. *Journal of Business*, 67, 2891–2902.
- Carmines, E. G. & Zeller, R. A. (1988). Reliability & validity assessment. *California: Sage*.
- Chen, Q., C. H. Wang & S. Z. Huang. (2019). Effects of Organizational Innovation and Technological Innovation Capabilities on Firm Performance: Evidence from Firms in China's Pearl River Delta. *Asia Pacific Business Review*, 26, 72–96.  
[doi:10.1080/13602381.2019.1592339](https://doi.org/10.1080/13602381.2019.1592339)
- Cheng, Y. L. & Lin, Y. H. (2012). Performance evaluation of technological

- innovation capabilities in uncertainty. *Procedia-Social and Behavioral Sciences*, 40, 287-314.
- Choi K., Narasimhan R. & Kim S. W. (2016). Opening the technological innovation black box: The case of the electronics industry in Korea. *European Journal of Operational Research*, 250, 192–203.
- Covin, J.G. & Miller, D. (2014). International entrepreneurial orientation: conceptual considerations, research themes, measurement issues, and future research directions. *Entrepreneurship Theory and Practice*, 38, 11–44.
- Cui, L., Fan, D., Guoa, F. & Fan, Y. (2018). Explicating the relationship of entrepreneurial orientation and firm performance: underlying mechanisms in the context of an emerging market. *Industrial Marketing Management*, 71, 27–40.
- Damanpour, F. (1991). Organizational innovation: a meta-analysis of effects of determinants and moderators, *Academy of Management Journal*, 34, 555-590.
- Engelen, A., Kube, H., Schmidt, S. & Flatten, T.C. (2014). Entrepreneurial orientation in turbulent environments: The moderating role of absorptive capacity. *Research Policy*, 43, 1353–1369.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measure. *Journal of marketing research*, 18, 39-50.
- Gebauer, H., Worch, H. & Truffer, B. (2018). Absorptive capacity, learning processes and combinative capabilities as determinants of strategic innovation, *European Management Journal*, 30, 57-73.
- Guan, J. & Ma, N. (2003). Innovative capability and export performance of Chinese firms. *Technovation*, 23, 737-747.
- Gupta, V., MacMillan, I.C. & Surie, G. (2004). Entrepreneurial leadership: developing and measuring a cross-cultural construct. *Journal of Business Venturing*, 241–260.
- Hair, J. F., Anderson, B. W., Babin, B. J. & Anderson, R. E. (2014). Multivariate data analysis with reading. *New Jersey: Prentice-Hall*, 8
- Henseler, J., Ringle, C. M. & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115–135.
- Huang, S.K. & Wang, Y.L. (2011). Entrepreneurial orientation, learning orientation, and innovation in small and medium enterprises, *Procedia Social and Behavioral Sciences*, 24, 563-570.
- Ince, H., Imamoğlu, S. Z. & Türkcan, H. (2016). The Effect of Technological Innovation Capabilities and Absorptive Capacity on Firm Innovativeness: A Conceptual Framework. *Procedia Social and Behavioral Sciences*, 235, 764-770. <https://doi.org/10.1016/j.sbspro.2016.11.078>
- Iqbal, S., Moleiro Martins, J., Nuno Mata, M.; Naz, S., Akhtar, S. & Abreu, A. (2021). Linking Entrepreneurial Orientation with Innovation Performance in SMEs; the ole of Organizational Commitment and Transformational Leadership Using Smart PLS-SEM. *Sustainability*, 13, 4361. <https://doi.org/10.3390/su13084361>
- Isichei, E.E., Agbaeze, K.E. & Odiba, M.O. (2020). Entrepreneurial orientation and performance in SMEs. *International Journal of Emerging Markets*, 15, 1219–1241.
- Jiménez-Jiménez, D. & Valle, R. S. (2011). Innovation, organizational learning, and performance. *Journal of Business Research*, 64, 408-417. <http://dx.doi.org/10.1016/j.jbusres.2010.09.010>.
- Jiraphanumes, K., Aujirapongpan, S. & Chamchang. P. (2011). The Effect of Entrepreneurial and Strategic Orientation on Innovativeness and Performance: The Empirical Study of the Listed Companies in the Market for Alternative Investment

- (MAI), *Journal of management Sciences*, 28, 1-15.
- Kale, E., Aknar, A., & Basar, O. (2019). Absorptive capacity and firm performance: The mediating role of strategic agility. *International Journal of Hospitality Management*, 78, 276–283.
- Kraus, S., Clauss, T., Breier, M., Gast, J., Zardini, A. & Tiberius, V. (2020). The economics of COVID-19: initial empirical evidence on how family firms in five European countries cope with the corona crisis, *International Journal of Entrepreneurial Behavior and Research*, 26, 1067-1092, doi: 10.1108/IJEBR-04-2020-0214.
- Kostopoulos, K., Papalexandris, A., Papachroni, M. & Ioannou, G. (2011). Absorptive capacity, innovation, and financial performance, *Journal of Business Research*, 64, 1335–1343.
- Laforet, S. (2011). A framework of organizational innovation and outcomes in SMEs, *International Journal of Entrepreneurial Behaviour & Research*, 17, 380-408.
- Lang, T.M., Lin, S.H., Vy, T.N.T. (2012). Mediate effect of technology innovation capabilities investment capability and firm performance in Vietnam, *Procedia – Social and Behavioral Sciences*, 40, 817-829.
- Lau, A.K. & Lo, W. (2019). Absorptive capacity, technological innovation capability and innovation performance: an empirical study in Hong Kong, *International Journal of Technology Management*, 80, 107-148.
- Lumpkin, G.T. & Dess, G.G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21, 135–172.
- Makhloufi, L., Laghouag, A., Sahli, A.A. & Belaid, F. (2021). Impact of entrepreneurial orientation on innovation capability: The mediating role of absorptive capability and organizational learning capabilities. *Sustainability*, 13, 5399.
- Martinkenaite, I. (2012). Antecedents of knowledge transfer in acquisitions, *Baltic Journal of Management*, 2012, 7, 167-184.
- Matusik, S. F. & Heeley, M. B. (2005). Absorptive capacity in the software industry: Identifying dimensions that affect knowledge and knowledge creation activities. *Journal of Management*, 31, 549-572.
- Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science*, 29, 770-791.
- Morris, M.H., Coombes, S., Schindehutte, M. & Allen, J. (2007). Antecedents and outcomes of entrepreneurial and market orientations in a non-profit context: theoretical and empirical insights, *Journal of Leadership & Organizational Studies*, 13, 12-39.
- Murovec, N. & Prodan, I. (2009). Absorptive capacity, its determinants, and influence on innovation output: Cross-cultural validation of the structural model. *Technovation*, 29, 859-872.
- Nguyen, P. V., Huynh, H. T. N., Lam, L. N. H., Le, T. B. & Nguyen, N. H. X. (2021). The impact of entrepreneurial leadership on SMEs' performance: the mediating effects of organizational factors. *Heliyon*, 7, 1–13.  
<https://doi.org/10.1016/j.heliyon.2021.e07326>.
- Nguyen, T.O. (2019). The relationship between innovation capability, innovation type and innovation performance in FDI enterprises in Vietnam, *International Journal of Economics and Finance*, 11, 28-34.
- Noor, N.A.M. & Aljababi, A.Q.R.A. (2016). Moderating role of absorptive capacity between entrepreneurial orientation and technological innovation capabilities, *International Review of Management and Marketing*, 6, 704-710  
doi: 10.1108/IJEBR-07-2017-0233.
- Rapaccini, M., Saccani, N., Kowalkowski, C., Paiola, M. & Adrodegari, F. (2020). Navigating disruptive crises through service-led growth: the impact of



- COVID-19 on Italian manufacturing firms?. *Industrial Marketing Management*, 88, 225-237.
- Ren, R. & Yu, Z. (2016). Innovation-orientation, dynamic capabilities and evolution of the informal Shanzhai firms in China: a case study, *Journal of Entrepreneurship in Emerging Economies*, 8, 1-12.
- Rhodes, J., Cheng, V., Sadeghinejad, Z. & Lok, P. (2018). The relationship between management team (TMT) metacognition, entrepreneurial orientations and small and medium enterprises (SMEs) firm performance. *International Journal of Management Practice*, 11, 111-140.
- Sarsah, S. A., Tian, H., Dogbe, C. S. K., Bamfo, B. A. & Pomegbe, W. W. K. (2020). Effect of entrepreneurial orientation on radical innovation performance among manufacturing SMEs: The mediating role of absorptive capacity. *Journal of Strategy and Management*, 13, 551-570.  
<https://doi.org/10.1108/JSMA-03-2020-0053>.
- Sciascia, S., D'Oria, L., Bruni, M. & Larrañeta, B. (2014). Entrepreneurial orientation in low-and medium-tech industries: the need for absorptive capacity to increase performance, *European Management Journal*, 32, 761-769.
- Tang, G., Chen, Y. & Jin, J. (2015). Entrepreneurial orientation and innovation performance: roles of strategic HRM and technical turbulence, *Asia Pacific Journal of Human Resources*, 53, 163-184.
- Teece D. J., Pisano G. & Shuen A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18, 509-533.
- Todorova, G. & Durisin, B. (2007). Absorptive capacity: Valuing a reconceptualization. *Academy of management journal*, 32, 774-786.
- Tsai, W. (2001). Knowledge transfer in intraorganizational networks: effects of network position and absorptive capacity on business unit innovation and performance, *Academy of Management Journal*, 44, 996-1004.
- Tseng, C.Y., Pai, D.C. & Hung, C.H. (2011). Knowledge absorptive capacity and innovation performance in KIBS, *Journal of Knowledge Management*, 15, 971-983.
- Usman, M. & Mat, N. (2017). Assessing the importance of entrepreneurial orientation on innovation in service sector, *International Journal of Business and Management Invention*, 6, 2319-8028.
- Wales, W.J., Gupta, V.K. & Mousa, F.T. (2011). Empirical research on entrepreneurial orientation: an assessment and suggestions for future research, *International Small Business Journal*, 31, 357-383.
- Wiklund, J. & Shepherd, D. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses, *Strategic Management Journal*, 24, 1307-1314.
- Yam, R. C., Guan, J. C., Pun, K. F. & Tang, E. P. (2004). An audit of technological innovation capabilities in Chinese firms: some empirical findings in Beijing, China. *Research policy*, 33, 1123-1140.
- Yoo, W.J., Choo, H.H. & Lee, S.J. (2018). A Study on the Sustainable Growth of SMEs: The Mediating Role of Organizational Metacognition. *Sustainability*, 10, 2829.
- Zahra, S.A. & George, G. (2002). Absorptive capacity: a review, reconceptualization, and extension, *Academy of Management Review*, 27, 185-203.
- Zahra, S.A & Nielsen, A.P. (2002). Sources of capabilities, integration and technology commercialization, *Strategic Management Journal*. 2002, 23, 377-398.
- Zawislak, P.A., Alves, A.C., Tello-Gamarra, J., Barbieux, D. & Reichert, F.M. (2012). Innovation capability: from technology development to transaction capability, *Journal of Technology Management and Innovation*, 7, 14-25.

- Zastempowski, M. & Glabiszewski, M. (2020). Technological innovation capabilities of small and medium-sized enterprises, *European Research Studies Journal*, 23, 460-474.
- Zellweger, T.M., Nason, R.S. & Nordqvist, M. (2011). From longevity of firms to transgenerational entrepreneurship of families: introducing family entrepreneurial orientation, *Family Business Review*, 25, 136-155.
- Zhai, Y.M., Sun, W.Q., Tsai, S.-B., Wang, Z. & Zhao, Y. (2018). An Empirical Study on Entrepreneurial Orientation, Absorptive Capacity, and SMEs' Innovation Performance: A Sustainable Perspective. *Sustainability*, 10, 314.
- Zhang, Y., Khan, U., Lee, S. & Salik, M. (2019). The influence of management innovation and technological innovation on organization performance: a mediating role of sustainability, *Sustainability*, 11, 495.