

# Entrepreneurial Alertness, Innovation Modes, And Business Models in Small- And Medium-Sized Enterprises: An Exploratory Quantitative Study

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**Abstract:** Entrepreneurial alertness refers to the ability to process information and signals from the environment so that individuals can recognize business opportunities, whereas innovation modes depict the variation in firms' approaches to innovation. Innovation modes have important implications in the way firms compete; however, little research has been done about the relationship among entrepreneurial alertness, innovation modes, and business model in firms. This study explores whether entrepreneurial alertness dimensions influence business models through their effect on firms' innovation modes. Using survey data from analysis of 119 manufacturing small and medium-sized enterprises in Mexico using structural equation modelling, this study shows that entrepreneurs' entrepreneurial alertness dimensions have different impacts on innovation modes, which thus have different effects on the efficiency and novelty of business models.

**Keywords:** entrepreneurial alertness; innovation modes; business model; entrepreneurship

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## Introduction

Entrepreneurs have increased their attention toward their business models so that their firms will remain competitive in the current markets (Velu & Jacob, 2014). A business model describes the way in which a firm operates internally and interacts with external actors (Casadesus-Masanell & Ricart, 2010), so a business model suitable to the resources and capabilities of the firm can represent better performance (Spieth *et al.*, 2016). Despite the importance that a business model has for the firm, research on what influences or precedes a business model remains scarce (Amit & Zott, 2015). By integrating literature on entrepreneurial alertness, innovation modes, and business models, this study explores how entrepreneurs' alertness dimensions determine the business models of small- and medium-sized enterprises (SMEs) through choosing the mode in which the entrepreneurs undertake innovation.

Entrepreneurial alertness is a concept that has recently received wide attention in entrepreneurial opportunity research to explain opportunity recognition (Sharma, 2019). According to Kirzner (1973), who developed the first ideas about this concept, entrepreneurial alertness is both a process and a perspective that enables individuals to become more aware of changes, opportunities, and overlooked possibilities. Therefore, entrepreneurial alertness helps individuals to understand how opportunities are initiated and pursued (Tang *et al.*, 2012). Furthermore, entrepreneurial alertness has become related to other variables regarding recognizing influence at the organizational level, such as innovation (Urban, 2017), strategic decisions (Roundy *et al.*, 2018), firm performance (Adomako *et al.*, 2018), and business models (Zhao *et al.*, 2020). Consequently, entrepreneurial alertness can not only help to understand the process of opportunity recognition, but also its effects on organizational processes.

Alert entrepreneurs are likely to discover something new and to increase the innovations of their firms (Tang *et al.*, 2012). The evolutionary theory of the firm suggests that the ability of firms to innovate depends on their resource base (Teece, 2007, 2012). Considering that SMEs differ in their resource base to innovate, they can follow different approaches to innovation and consequently differ in their performance (Sahut & Peris-Ortiz, 2014). According to Clausen *et al.* (2012), the way in which innovation is undertaken within a firm is known as innovation modes. This study follows the taxonomy developed by Clausen *et al.* (2013), which distinguishes between four modes of innovation to determine how firms innovate. These innovation modes can have important implications for the operation of the firm and its way of competing, that is, its business model (Teece, 2010; Casadesus-Masanell & Ricart, 2010). For example, Amit and Zott (2015) argued that technological advances allow entrepreneurs to consider innovative designs for commercial exchanges and activities, which are captured in the business model. Likewise, Spieth *et al.* (2016) mention that a properly designed business model provides the firm with new opportunities to obtain a competitive advantage.

This study uses the concept of entrepreneurial alertness to analyze the ways in which alert entrepreneurs conveniently deal with different innovation modes to incorporate both efficiency and novelty elements into the business model of their firms. In summary, this study contributes by showing empirically that the entrepreneurial alertness process is useful in researching how firms innovate and thereby the way in which activities are organized both inside and outside the firm, an aspect that until now has been largely overlooked by research on entrepreneurship and innovation.

The next section of this paper presents the theory and hypotheses and is followed by sections describing methodology and results. The paper then provides a discussion of the findings and concludes with recommendations for future research.

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## Theory and hypotheses

### Entrepreneurial alertness

The concept of entrepreneurial alertness has assumed an important role in the study of entrepreneurial cognition. Entrepreneurial alertness refers to the ability to identify entrepreneurial opportunities that others have overlooked (Kirzner, 1973). Sharma (2019) showed that some studies have approached entrepreneurial alertness as a process and that the work of Tang *et al.* (2012) is one of the most representative in this sense. Tang *et al.* (2012) conceived entrepreneurial alertness as a process of three stages or dimensions. In each of these dimensions, individuals improve the originally conceived business idea by making the necessary changes and adjustments.

According to Tang *et al.* (2012), in the first dimension, called scanning and search, individuals are attentive to the information that surrounds them, but they also take the initiative to search for new information that complements their initial mental schemes. In the second dimension, individuals mainly work with the analysis of the information they have previously obtained. Tang *et al.* (2012) mention that, in this dimension, individuals apply their entrepreneurial creativity to practice, since they must analyze the information from different perspectives to identify coincidences or differences that allow them to create value. This dimension is known as association and connection. Finally, there is the dimension of evaluation and judgment. In essence, when individuals reach this dimension, they must determine based on what has been done in the previous dimensions whether or not they are facing a commercially worthwhile opportunity. Tang *et al.* (2012) emphatically state that this stage does not imply the exploitation of the opportunity only to conclude whether or not it is worth it.

This study adopted the alertness proposal as a process of different dimensions, since it helps to better identify the preference of the cognitive processes of individuals in the context of recognizing entrepreneurial opportunities. Likewise, previous studies have shown that entrepreneurial alertness also has implications regarding the behavior or performance of the firm (e.g., Adomako *et al.*, 2018; Roundy *et al.*, 2018). However, there are few studies that have suggested any kind of relationship between alertness and innovation, or more specifically, how entrepreneurial alertness impacts innovation at the firm level.

### Innovation modes

In today's competitive environment, firms must resort to innovation to achieve or maintain good performance, especially those that compete in markets characterized by the use of technology. Previous studies have argued that firms innovate to respond to a problem or unmet need in the market and that they differ in their approaches to innovation and in the strategies applied (Teece, 2007; Clausen *et al.*, 2012).

In the literature, different taxonomies are identified about innovation modes, or in other words, how firms innovate (e.g., Hull & Covin, 2010; Clausen *et al.*, 2012). Based on the literature on open and closed innovation and the literature on exploration and exploitation, Clausen *et al.* (2013) proposed four innovation modes: open exploration,

closed exploration, open exploitation, and closed exploitation. Through open exploration, the firm searches in its external environment for new technological ideas, information, and knowledge that will help it solve customer problems or meet market needs in a more innovative way, but at the same time, it must take into account the costs associated with this. In contrast, in closed exploration, the search for information and knowledge is local, which enables the firm to strengthen the processes that allow it to generate knowledge and consequently increase its inventive capacity (Clausen *et al.*, 2013). Closed exploration, unlike open exploration, gives the firm more autonomy in its decision making, but at the same time it might not fully understand some aspects of the market.

With regard to open exploitation, Clausen *et al.* (2013) suggest that external actors, for example suppliers and customers, help the firm significantly in the commercial exploitation of its innovations. To achieve this, the firm must allow external actors to get involved in its innovation processes. On the other hand, in closed exploitation, the firm uses its own routines and practices to develop its innovations. To do so, the firm must achieve a deep knowledge of its internal processes and identify those elements that can be modified to achieve innovative results without the support of external actors.

### Entrepreneurial alertness and innovation modes

Innovation modes represent the different ways in which a firm can innovate, and some studies suggest that it is possible to identify the relationship between dimensions of the entrepreneurial alertness and the innovation modes (e.g., Urban, 2017; Jiao *et al.*, 2014). In this sense, Tang *et al.* (2012) had already suggested that entrepreneurial alertness could be a precursor of innovation.

The scanning and search dimension refers to individuals' alertness to the information that surrounds them. This information can be available both inside and outside the firm, and individuals can access it through their networking capabilities (Adomako *et al.*, 2018). According to Urban (2017), a flexible organization facilitates the transfer of information between the firm and its external environment, as well as among its different functional areas, which helps entrepreneurs make faster decisions. Furthermore, previous studies have suggested that the interaction between internal and external factors to the firm creates valuable information that enriches entrepreneurs' knowledge (Haynie *et al.*, 2010). Therefore, this study proposes the following hypothesis:

Hypothesis 1: The scanning and search dimension of entrepreneurs' entrepreneurial alertness has different impacts on the innovation modes of their firms, including open exploration, closed exploration, open exploitation, and closed exploitation.

The association and connection dimension enables entrepreneurs to reconfigure and recombine the different resources they identify, which can have a positive impact on innovation (Jiao *et al.*, 2014). Roundy *et al.* (2018) suggest that it is easier for alert entrepreneurs to understand changes in the environment, since they can recognize patterns and connections between apparently unrelated aspects.

This dimension of entrepreneurial alertness enables entrepreneurs to recognize the opportunities that are generated by changes in the environment. This capability, combined with the skill to quickly fine-tune the routines or processes of the firm by relying on internal and external actors, can positively influence innovation at the firm level (Teece, 2012). Therefore, the following hypothesis is stated:

**Hypothesis 2:** The association and connection dimension of entrepreneurs' entrepreneurial alertness has different impacts on the innovation modes of their firms, including open exploration, closed exploration, open exploitation, and closed exploitation.

Research has shown that, when entrepreneurs perceive an alignment between an opportunity in the market and the possibility of taking advantage of it, their intentions to exploit it increase (Gregoire *et al.*, 2010). In this sense, Patel (2019) also mentions that, to exploit an entrepreneurial opportunity, it is necessary to apply new knowledge and that entrepreneurs' absorptive capacity plays an important role. The absorptive capacity allows entrepreneurs to recognize the value of new information, assimilate it into the firms' processes and routines, and apply it for commercial purposes (Zahra & George, 2002). Patel (2012) recognizes the entrepreneurial alertness as a recursive process, in which the entrepreneur exchanges and evaluates new knowledge in a way that increases the commercialization potential of the opportunity. From this perspective, Foss *et al.* (2013) found a positive relationship between the use of external sources of knowledge and the decision to exploit an opportunity. Consequently, it is anticipated that:

**Hypothesis 3:** The evaluation and judgment dimension of entrepreneurs' entrepreneurial alertness has different impacts on the innovation modes of their firms, including open exploration, closed exploration, open exploitation, and closed exploitation.

### **Business model**

In general terms, a business model represents the way in which a firm creates value, in such a way that it is convenient for itself as well as for its stakeholders (Teece, 2010). More specifically, Amit and Zott (2015, p. 331) argued that "the business model describes the system of interdependent activities performed by a focal firm and its partners and the mechanisms that link these activities to each other." According to Casadesus-Masanell and Ricart (2010), a business model represents the architecture and logic of a business. Within this architecture and logic, previous studies highlight the important role that entrepreneurs play because they are responsible for the proper function of the business model, making the necessary adjustments to the value-creating and value-capturing activities (Amit & Zott, 2015; Velu & Jacob, 2014; Spieth *et al.*, 2016).

According to Zott and Amit (2007), the business model of a firm can be focused on both efficiency and innovation, since both approaches are not mutually exclusive. In fact, the authors mention that the interaction between efficiency and innovation allows entrepreneurs to create more value under uncertainty. The essence of a business model focused on efficiency is the reduction of transaction costs, which means simplifying and streamlining economic transactions and

reducing costs, among other actions (Zott & Amit, 2007). While a business model focused on efficiency means doing the same thing as others but more efficiently, a model focused on innovation means performing functions differently. Zott and Amit (2007) mention that a novel business model can create a new market or innovate transactions in the existing markets by adopting or designing new ways of carrying out economic transactions.

### **Innovation modes and business models**

Previous studies have discussed the relationship between strategy and business model (e.g., Casadesus-Masanell & Ricart, 2010; Teece, 2010; Spieth *et al.*, 2016). Mostly, these studies recognize that strategy and business model are different but complementary concepts. For example, Casadesus-Masanell and Ricart (2010) mentioned that the strategy is responsible for choosing the business model through which the firm will compete in the market. In this order of ideas, the innovation process should be chosen from the strategy, and in this sense, Clausen *et al.* (2013) assert that firms differ in their approaches to innovation or the way they put it into practice. Casadesus-Masanell and Ricart (2010) refer to this as the tactic, that is, as the set of residual managerial options on how the business model should operate. There are several aspects that disrupt the process of carrying out the activities within the business model, since it must organize the knowledge, capacities, and resources in value-creating and value-capturing activities (Teece, 2010). Spieth *et al.* (2016) mention that the business model, either in response to or anticipation of changes in the environment, must be adjusted to the innovation process. Furthermore, a well-designed business model enables the firm to be in a better position to take advantage of the opportunities that arise in its environment (Amit & Zott, 2015). Within this set of initiatives, entrepreneurs must evaluate which activities the firm should execute internally and which ones to execute externally in order to keep its value proposition updated. Based on the previous arguments, the following hypotheses are established:

**Hypothesis 4:** The innovation modes of the firm, including open exploration, closed exploration, open exploitation, and closed exploitation, have different effects on the novelty-focused business model.

**Hypothesis 5:** The innovation modes of the firm, including open exploration, closed exploration, open exploitation, and closed exploitation, have different effects on the efficiency-focused business model.

## **Methodology**

### **Sample and data collection**

The hypotheses were tested using survey data that were collected from Mexican SMEs that were registered in the National Statistical Directory of Economic Units (NSDEU). The economic activity of the firms that participated in the study was the manufacture of electronic equipment, components, and accessories. The size and economic activity of these firms were considered adequate to examine the relationship between the variables involved in this study due to the use of technology that they require to maintain their competitiveness. Care was taken that the people who answered the survey were among the

most informed in the firm. Thus, the respondents were distinguished among the following roles: entrepreneur, founder-manager, owner-manager, general manager, or other. Any survey that was answered with the option “other” was not considered in the final sample.

A total of 665 SMEs were registered with the NSDEU. After three requests to complete the survey, a total of 119 valid questionnaires were received, which represented a response rate of 17.8%. 21 percent of those surveyed identified themselves as entrepreneurs, 64 percent as founder-managers, eleven percent as owner-managers, and four percent as general managers. Of those surveyed, 81 percent were men. In terms of academic background, 28 percent had a high school degree, 67 percent a bachelor’s degree, and 5 percent a master’s degree.

**Measure of variables**

**Entrepreneurial alertness.** Entrepreneurial alertness was measured using the scale developed by Tang *et al.* (2012). This scale has 13 items, of which six correspond to the scanning and search dimension (Cronbach’s alpha = 0.79), three to the association and connection dimension (Cronbach’s alpha = 0.81), and four to the evaluation and judgment dimension (Cronbach’ alpha = 0.88). Items were measured on a 5-point Likert scale, which ranged from 1 = “completely disagree” to 5 = “completely agree.”

**Innovation modes.** The measurement of innovation modes was carried out with the proposal developed by Clausen *et al.* (2013). The proposal measures four different approaches through which a firm can achieve innovation, namely open exploration, closed exploration, open exploitation, and closed exploitation. Following the proposal by Clausen *et al.* (2013), each innovation mode was measured using three items whose Cronbach’s Alphas were 0.85, 0.79, 0.83, and 0.75. All items were evaluated on a 5-point Likert scale that ranged from 1 = “completely disagree,” to 5 = “completely agree.”

**Business model.** To measure the business model, this study adopted items from the scale developed by Zott and Amit (2007). Originally, the scale measured innovation and efficiency in the business model. Specifically, the innovation of the business model was measured with six items (Cronbach’s alpha = 0.70), and the efficiency with seven items (Cronbach’s alpha = 0.84). The survey respondents did so on a 5-point Likert scale, ranging from 1 = “strongly disagree” to 5 = “strongly agree.”

**Reliability and validity**

A confirmatory factor analysis (CFA) was used to verify the reliability and validity of the scales that were used to measure the different variables. Table 1 shows that all standardized factor loadings were between 0.56 and 0.85 in the factor to which they were assigned. Additionally, the composite reliability (CR) of the variables ranged between 0.63 and 0.82, which satisfies the minimum level of 0.60 as recommended by Bagozzi and Yi (1988). Furthermore, the average variance extracted (AVE) of each variable was greater than 0.5, varying between 0.55 and 0.81, which also indicates good convergent validity (Fornell &

Larcker 1981). Based on the criteria of Fornell and Larcker (1981), the square roots of all AVE values were greater than the correlations between variables, which suggests a good discriminant validity (see the italics values on the main diagonal of Table 2). Finally, this study followed the recommendations of Podsakoff *et al.* (2003) regarding the design of the procedures to obtain the information and to control, at least partly, the common method bias. The results suggested that common method variance was not a concern in this study.

**Table 1.** Confirmatory factor analysis

Variable	Item	Factor loading	Cronbach’s α	CR	AVE
Scanning & search	SS_1	0.63	0.79	0.69	0.59
	SS_2	0.59			
	SS_3	0.72			
	SS_4	0.77			
	SS_5	0.81			
	SS_6	0.83			
Association & connection	AC_1	0.56	0.81	00.75	0.63
	AC_2	0.66			
	AC_3	0.60			
Evaluation & judgment	EJ_1	0.81	0.88	0.82	0.77
	EJ_2	0.77			
	EJ_3	0.57			
	EJ_4	0.72			
Open exploration	OEr_1	0.85	0.85	0.67	0.68
	OEr_2	0.72			
	OEr_3	0.79			
Closed exploration	CEr_1	0.59	0.79	0.63	0.57
	CEr_2	0.57			
	CEr_3	0.60			
Open exploitation	OEi_1	0.77	0.83	0.80	0.81
	OEi_2	0.80			
	OEi_3	0.73			
Closed exploitation	CEi_1	0.58	0.75	0.64	0.58
	CEi_2	0.63			
	CEi_3	0.74			
Novelty-focused model	Novel_1	0.58	0.70	0.67	0.55
	Novel_2	0.60			
	Novel_3	0.63			
	Novel_4	0.66			
	Novel_5	0.80			
	Novel_6	0.78			
Efficiency-focused model	Effi_1	0.82	0.84	0.74	0.76
	Effi_2	0.79			
	Effi_3	0.84			
	Effi_4	0.65			
	Effi_5	0.71			
	Effi_6	0.73			
	Effi_7	0.80			



**Table 2.** Descriptive statistics and correlations

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9
Scanning & search	4.32	0.51	0.76								
Association & connection	3.89	0.88	0.12*	0.79							
Evaluation & judgment	4.42	0.30	0.17*	0.15*	0.87						
Open exploration	4.50	0.24	0.17**	0.20**	0.23**	0.82					
Closed exploration	3.28	1.03	0.11	0.04*	0.15	-0.23	0.75				
Open exploitation	4.37	0.49	0.13*	0.16	0.20*	0.13*	-0.22	0.90			
Closed exploitation	3.56	0.96	0.19	0.10*	0.24	-0.17	0.28	-0.16	0.76		
Novelty-focused model	3.28	0.75	0.16	0.24	0.15	0.16**	0.08	0.02*	0.12	0.74	
Efficiency-focused model	4.20	0.33	0.12*	0.18**	0.28	0.08*	0.04*	0.11*	0.17	0.05*	0.87

*p* < 0.05; \*\* *p* < 0.01

**Analysis**

This study followed the two-step approach recommended by Anderson and Gerbing (1988). First, the measurement model was tested using CFA, and according to Hu and Bentler (1999), the model had a good fit to the data ( $\chi^2/df = 2.88$ , IFI = 0.93, CFI = 0.91, TLI = 0.91, and RMSEA = 0.03). Based on the results obtained from the measurement model, the structural equation modelling was performed to evaluate the fit of the hypothesized model to the empirical data and test the hypotheses of the study. The results of the structural model suggest that the hypothesized model fit the data well ( $\chi^2/df = 2.41$ , IFI = 0.90, CFI = 0.92, TLI = 0.92, and RMSEA = 0.04).

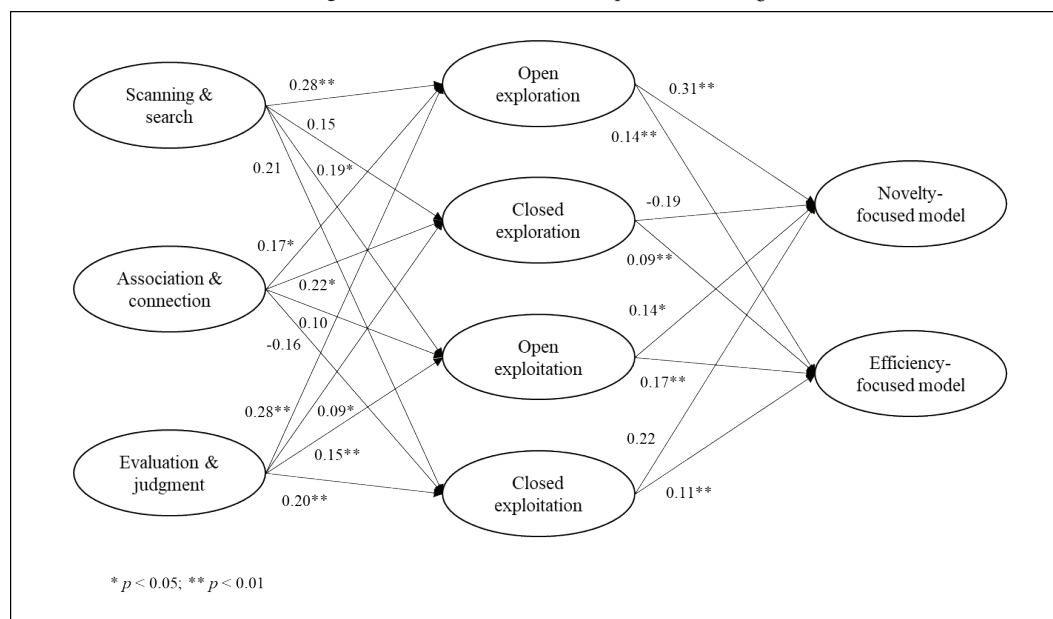
**Results**

Figure 1 shows the overall structural model with path coefficients. Hypothesis 1 stated that the scanning and search dimension of entrepreneurs' entrepreneurial alertness had different impacts on the innovation modes of their firms. The hypothesis is partially supported, since the scanning and search dimension was only positively related to open exploration ( $\beta = 0.28$ ,  $p < 0.01$ ) and open exploitation

( $\beta = 0.19$ ,  $p < 0.05$ ). Hypothesis 2 predicted that the association and connection dimension had different impacts on innovation modes and is also partially supported, since only association and connection had a positive and significant impact with open and closed exploration ( $\beta = 0.17$  and  $\beta = 0.22$ , respectively; both with  $p < 0.05$ ). Hypothesis 3 postulated that the evaluation and judgment dimension was related to the different innovation modes. This hypothesis is fully accepted, since evaluation and judgment was related to open exploration ( $\beta = 0.28$ ,  $p < 0.01$ ), closed exploration ( $\beta = 0.09$ ,  $p < 0.05$ ), open exploitation ( $\beta = 0.15$ ,  $p < 0.01$ ), and closed exploitation ( $\beta = 0.20$ ,  $p < 0.01$ ).

The results regarding Hypothesis 4, which stated that the four innovation modes of the firm had different effects on the novelty-focused business model, is partially supported, since open exploration ( $\beta = 0.31$ ,  $p < 0.01$ ) and open exploitation ( $\beta = 0.14$ ,  $p < 0.05$ ) were related to the business model. Finally, the results for Hypothesis 5 showed that the four innovation modes, open exploration ( $\beta = 0.14$ ), closed exploration ( $\beta = 0.09$ ), open exploitation ( $\beta = 0.17$ ), and closed exploitation ( $\beta = 0.11$ ), were significantly related to the efficiency-focused business model (all with  $p < 0.01$ ). Therefore, Hypothesis 5 is completely accepted.

**Figure 1.** Results of the structural equation modelling



## Discussion and conclusions

The study of the recognition of entrepreneurial opportunities has secured an important place within the entrepreneurship research, and some studies highlight the contributions that have been made in this regard due to the concept of entrepreneurial alertness (e.g., Sharma, 2019). However, recent studies have begun to go beyond the study of opportunity recognition by considering the effect of entrepreneurial alertness at the organizational level (Adomako *et al.*, 2018; Roundy *et al.*, 2018).

Although the three main topics that are involved in this study—entrepreneurial alertness, innovation modes, and business model—have their own research streams, there are studies that find a relationship between some of them (e.g., Sahut & Peris-Ortiz, 2014; Spieth *et al.*, 2016; Teece, 2010). In the integration of these topics, the contribution of this study is located by proposing a research model in which, based on the existing literature, it explores how individuals' entrepreneurial alertness influences the business model of their firms through the different alternatives or modes they must innovate.

One of the advantages of studying the entrepreneurial alertness as a process is that the relationship of each of its dimensions with other variables can be analyzed. The results confirm that the scanning and search dimension is related to an open mode of innovation, both exploration and exploitation, but not to a closed mode of innovation. This result could be consistent with the work of Sahut and Peris-Ortiz (2014), who argued that, since small firms have limited resources, they seek their complementarity in the external environment. Previously, Urban (2017) had suggested that a flexible organization facilitates faster decision-making to take advantage of opportunities. In this sense, the results of this study also suggest that, if SME entrepreneurs have a more developed and focused scanning and search dimension towards the external environment, they could make decisions more quickly and easily, and their firms can develop innovation.

The association and connection dimension is related in different ways to the innovation modes. Specifically, this dimension only positively impacted exploration, both open and closed. According to Tang *et al.* (2012), in this dimension, entrepreneurs seek information that helps them to better understand the situation surrounding the opportunity, so they might need more specific information. The results of this study indicate that entrepreneurs can find this kind of information inside and outside their firms. In addition, the fact that the association and connection dimension has not been related to either of the two forms of exploitation, could indicate that, at this stage of entrepreneurial alertness, entrepreneurs analyze both the external environment and the adjustments to the processes or routines of their firms so that innovation can be carried out (Teece, 2010).

Regarding the evaluation and judgment dimension, the results are interesting since the dimension is related to all innovation modes. This result could confirm that entrepreneurs, when they reach this stage of entrepreneurial alertness, evaluate the different alternatives that are presented to their firms, both internally and externally. Furthermore,

this result is consistent with the study elaborated by Shepherd *et al.* (2015, p. 23), who in their review of the literature on the judgment and decision-making of entrepreneurs comment that “individuals are heterogeneous in their knowledge and experiences, and these differences have an impact on the entrepreneurial decision to internalize or externalize opportunity-exploitation decisions.” From this same perspective, Gregoire *et al.* (2010) and Foss *et al.* (2013) concluded that the more benefits entrepreneurs perceive for their firms, the more likely they will be to take advantage of it.

Overall, this study shows the benefits of analyzing entrepreneurial alertness as a process. The results indicate that the stages or dimensions of alertness are related differently to the innovation modes. In other words, innovation modes require entrepreneurs to use different cognitive mechanisms at different moments in order to materialize the entrepreneurial opportunity they have identified.

Zhao *et al.* (2020) mention that entrepreneurial alertness helps entrepreneurs to recognize the needs of customers, to identify new activities in the markets, and to determine the constraints in the external environment. All of these aspects, according to the authors, represent stimuli and challenges for innovation, and consequently, entrepreneurs explore new business models. The results of this study show that the four innovation modes were better related to the efficiency-focused business model than the novelty-focused business model. From the sample that was selected for the study, this result could represent two aspects that deserve further explanation. First, the size of the firm could play a decisive role for the results obtained. Given that the sample consisted of SMEs, the result could suggest that these kind of firms prefer efficiency instead of innovation in their business model to compete in their respective markets (Amit & Zott, 2015). In other words, SMEs could have limitations in their resources and capacities, in such a way that this conditions their competitiveness in the market and consequently their business model (Sahut & Peris-Ortiz, 2014). Second, although firms compete in a market characterized by technology, they probably do not develop it, but rather adopt it to make their products, or they might only be manufacturing the technology. The firms in this study could exhibit some innovative aspects in the form of marketing, customer relationships, and new channels, among others, but the results show that efficiency is more predominant in their business models. This result is consistent with Zott and Amit (2007), who mention that it is desirable to have a balanced business model, but it is not always possible, since a firm, depending on various aspects, might favor a model focused on innovation or efficiency.

In sum, the results of this study contribute to the literature by identifying how entrepreneurial alertness, innovation modes, and business model are related. More specifically, the study confirms that entrepreneurs through their entrepreneurial alertness use different cognitive mechanisms at different moments to recognize if an opportunity is worthwhile (Tang *et al.*, 2012). Likewise, it is confirmed that the innovation modes are not mutually exclusive (Clausen *et al.*, 2013) and that designs focused on efficiency and novelty can be present in any given business model (Zott & Amit, 2007).

## Limitations and future research

The results of this study must be viewed in light of the study's limitations. First, this study only considered SMEs that are manufacturers of electronic equipment, components, and accessories. Future studies could consider other productive sectors to confirm whether the results obtained in this study are maintained in a more diversified sample. Second, future studies could consider the possibility of a longitudinal research design, which would enrich the results obtained here. Collecting data over a period of time can improve the understanding of the sequential influence of entrepreneurial alertness dimensions and how recurrent their relationship is to innovation modes (Tang *et al.*, 2012). Third, a study of a qualitative nature, through in-depth interviews with entrepreneurs, could provide more points of view, justifications, and even implications on the business model of SMEs. In-depth interviews can further inform the decision-making of entrepreneurs that relates the different innovation modes and the business model. In summary, a qualitative longitudinal study like the one suggested above would facilitate a decision-making trajectory, thereby enabling researchers to identify causes and effects, something that would make a valuable contribution to the literature on entrepreneurship and innovation (Shepherd *et al.*, 2015).

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