

An overview of the empirical research on entrepreneurial alertness using a systematic literature review method

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Abstract

PURPOSE: In the last two decades, the concept of entrepreneurial alertness (EA) has been considered a key element in investigating how individuals recognize entrepreneurial opportunities. Consequently, research on entrepreneurial alertness has grown considerably, attracting researchers' attention from not only the field of entrepreneurship, but also other academic disciplines through which this concept has been studied from a variety of perspectives. Therefore, it is time to document researchers' cumulative knowledge on entrepreneurial alertness. The present study aims to provide a comprehensive qualitative review and evaluation of the empirical entrepreneurial alertness research. **METHODOLOGY:** Based on a multi-step approach used in previous studies, which guarantees a systematic, transparent, and replicable literature review, this study identified a final sample of 84 articles published in scientific journals between 2005 and 2021 that empirically tested the concept of EA. The publications were sourced from the Web of Science database. Their analysis involved the evolution of published articles, the journals that have published the most articles, the countries where the research was undertaken, the measurement scales that have been used, and the research models in which entrepreneurial alertness has been hypothesized and examined through empirical research. **FINDINGS:** The results show that empirical research on entrepreneurial alertness grew significantly from 2016 to 2021, during which period almost 11 articles per year were published. Seven of the journals that published the articles contributed 28 percent of the total publications. Also, the results confirm that most of the empirical research on alertness has been carried out in developing economies, from which China stands out with 14 publications, representing 16 percent of the total. Additionally, the results confirm the growing consensus regarding the conceptualization and measurement of entrepreneurial alertness. Finally, the review resulted in the identification of five broad research models in which EA has been hypothesized and examined

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through empirical research: antecedents, consequences, mediation, moderation, and moderated mediation. The model examining the consequences or outcomes of entrepreneurial alertness has received the most attention, with 59 articles in this context. **IMPLICATIONS FOR THEORY AND PRACTICE:** The identification of concepts and the type of relationship they have with entrepreneurial alertness help evaluate the advances of empirical research as well as the areas of opportunity. In this way, future studies can strengthen research and thus advance the general knowledge of alertness. The most studied topics are also a reflection of the contribution of entrepreneurial alertness toward practice, both at the individual and organizational levels. In addition, researchers interested in entrepreneurial alertness are encouraged to consider the progress made in the measurement of this aspect, which offers alternatives for investigation. **ORIGINALITY AND VALUE:** Based on the review of the literature, this study organizes the empirical research of entrepreneurial alertness in different research models, which provide important insights into its process. Moreover, this study uncovers potential areas to be addressed and thereby contributes to the study of entrepreneurial alertness.

Keywords: entrepreneurial alertness, systematic literature review, entrepreneurial opportunity, research models, opportunity recognition, alertness, entrepreneurship

INTRODUCTION

Among the various areas of research in the field of entrepreneurship, entrepreneurial opportunity recognition has become a key topic in the contemporary entrepreneurship literature, because it is considered as a critical first step in the entrepreneurial process (Ardichvili, Cardozo, & Ray, 2003; Eckhardt & Shane 2003; George et al., 2016; Short, Ketchen, Shook, & Ireland, 2010). At the same time, significant entrepreneurship frameworks have considered the importance of individuals' ability to recognize opportunities (e.g., Shane & Venkataraman, 2000; Gaglio & Katz, 2001; Hsieh, Nickerson, & Zenger, 2007). Despite this focus, most research about opportunity recognition has been fragmented and empirically underdeveloped (George et al., 2016). A stream of research has examined the concept of entrepreneurial alertness (EA), which has shown to be more promising as it is recognized as one of the key components determining opportunity recognition (Ardichvili et al., 2003; Zhu, Tang & Murphy, 2009). In the last decade, EA has not only stood out in the opportunity recognition literature in the field of entrepreneurship, but has also aroused great interest in other academic disciplines (Chavoushi et al., 2021; Daniel, Adeel, & Botelho, 2021).

EA is seen as a state or quality of the individuals, defined in terms of several behavioral dimensions (Sharma, 2019). Although EA has a conceptual variability, an apparent consensus arises that EA refers to an individual's ability to see opportunities that have not been discovered in the market (Gaglio

& Katz, 2001). Another point of convergence is that alert individuals have a greater capability to sense and anticipate entrepreneurial opportunities associated with their current and futures states in the market than do others, so such alertness requires a creative act, which may influence the further development and improvement of the entrepreneurial opportunity (Kirzner, 2009). Prior research has related EA to variables of nature that differ from entrepreneurship in an effort to understand more clearly its contribution to opportunity recognition. This study carries out a literature review on EA in order to create an overview of the ways in which its relationships with other variables are hypothesized in previous research.

Literature review studies help to evaluate and reflect on existing knowledge in a specific area (Popay et al., 2006). Previous studies of this nature have already shown significant advances in the study of EA by identifying its central components (Sharma, 2019), its integration with psychological theories (Chavoushi et al., 2021), and the conceptual approaches that have sustained the research of this concept (Daniel et al., 2021). The purpose of this study is not to offer an extensive interpretation of previous studies on elements of EA, but to identify the research models applied and the directions that this research has taken using a rigorous and transparent methodology.

In order to contribute to the development of EA knowledge and assist the research in identifying gaps and study opportunities, this study analyzes a sample of articles to identify the relationships that have been examined through empirical research. This analysis uses a well-established procedure to shortlist articles so that this study can be replicated in a constructive way (Hammersley, 2001). Unlike bibliometric or meta-analytic research, which applies minimum sample size requirements, this study identifies and discusses a more comprehensive set of variables explored as antecedents, consequences, mediators, moderators, or a combination of these elements.

In summary, the present study aims to provide an overview of empirical literature on the EA concept. It focuses specifically on studies testing hypothesized relationships because these kind of studies have helped evaluate and test the core tenets of EA. Consequently, by reviewing the empirical EA literature, this study contributes insights about topics that have attracted the attention of scholars and at the same time provides recommendations for future studies.

This article proceeds as follows. The next section provides a brief theoretical background of the EA concept. Then, the method used to select the empirical studies for analysis is explained. Next, it reports the results and discusses their implications. Finally, the article offers a conclusion with some final considerations of the study.

THEORETICAL BACKGROUND

The seminal works of Knight (1921), Hayek (1945), and Mises (1949) illuminated the uncertain environment that entrepreneurs faced and the difficulty of perceiving and exploiting contingencies, thus requiring special talent to interpret market events. However, the works of Kirzner (1973, 1979, 1985), who took advantage of this foundation, was first to make this special talent known as EA. Through his theory, Kirzner introduced the concept of EA, which was considered as an ability that helps some individuals be more aware of changes, shifts, opportunities, and overlooked possibilities due to market changes (Kirzner, 1973, 1979).

According to Kirzner, EA refers to “the ability to notice without search opportunities that have hitherto been overlooked” (Kirzner, 1979, p. 48), “a motivated propensity of man to formulate an image of the future” (Kirzner, 1985, p. 56), or “an attitude of receptiveness to available, but hitherto overlooked, opportunities” (Kirzner, 1997, p. 72). More recently, Kirzner (2009) argued that recognition requires the momentary perception of the opportunity, whereas exploitation requires an individual to effectively and creatively steward the process of EA into exploitation. In this perspective, Valliere (2013) commented that EA is presented as conceptually different from the subsequent development of the opportunity and from the activities that correspond to its exploitation. Therefore, EA has been conceived more as a state of mind, which is open to opportunities at all times (Busenitz, 1996).

Building upon Kirzner’s theoretical contributions, other authors continued to make significant contributions that strengthened the EA concept. For example, Kaish and Gilad (1991) saw alert individuals as having a “unique preparedness” in consistently scanning the environment to recognize opportunities within a complex flow of information. Later, and with a different focus, Gaglio and Katz (2001) invoked schema theory to explain that EA is a distinctive set of perceptual and information-processing skills. For these authors, alert individuals, prompted by a schema emphasizing objectivity, recognize the changing environmental conditions and consequently reassess the situation. In addition to schema theory, Valliere (2013) also considered decision theory to suggest that EA is the application of unique schemata that allow the individual to attribute meaning to environmental change that would not be attributed by other individuals.

Baron (2006) used what he called pattern recognition to describe EA. According to Baron, what makes individuals alert is their cognitive ability to recognize that one situation is similar to another in some meaningful way and that, from this recognition, opportunity emerges. Hence, EA helps individuals “identify new solutions to market and customer needs in existing

information, and to image new products and services that do not currently exist” (Baron & Ensley, 2006, p. 1331). In this order of ideas, opportunity recognition is more a spontaneous result derived from EA, than the result of a deliberate search (Tang, 2009), which suggests that opportunities can be recognized even when they are not actively sought (Baron, 2006).

Using a different approach, Minniti (2004) argued that more alert individuals have higher probabilities of exhibiting entrepreneurial behavior, which strengthened the proposal to consider EA as a process that typically involves personal initiative (Ardichvili et al., 2003; Tang, Kacmar & Busenitz, 2012). According to McMullen and Shepherd (2006), alertness is not entrepreneurial unless it involves judgment and a movement toward action. Therefore, EA was widely seen as a key ability not only for entrepreneurial thinking, but also for entrepreneurial behavior, an assumption supported by a growing body of research. More recently, Tang et al. (2012, p. 78), argued that “alertness is a concept that has the potential to add substantially to our understanding of how new ideas get initiated and pursued.” They proposed that EA has three behavioral components: a proclivity to scan and search for new information, an ability to connect disparate information, and an inclination to evaluate whether a new piece of information represents an opportunity.

Initial insights from Kirzner (1973, 1979, 1985) positioned EA as a key component of an increasingly dynamic and competitive entrepreneurial process. After individuals seize an opportunity, they carry out entrepreneurial activities, and the individual’s capabilities are formed through these activities. Alertness to opportunities, therefore, is one of the first steps in the entrepreneurial process (Shane & Venkataraman, 2000; Short et al., 2010). However, the scope and importance of EA are not limited within an entrepreneurial process alone, as EA was originally conceptualized as a characteristic that can manifest in broad areas of human decision-making (Kirzner, 1973). For example, from an organizational behavior perspective, previous studies have found that EA differs between entrepreneurs and managers when they must respond to changes in the market (e.g., Kaish & Gilad, 1991; Busenitz, 1996; Busenitz & Barney, 1997; Allinson, Chell, & Hayes, 2000). Similarly, more recent studies have advanced the argument that EA has effects or consequences at the organizational level too, such as entrepreneurial orientation or corporate entrepreneurship (e.g., Lee, Kim & Koh, 2016; Urban, 2017), innovation (e.g., Jiao, Cui, Zhu, & Chen, 2014; Tang et al., 2012) and firm performance (e.g., Amato, Baron, Barbieri, Bélanger, & Pierro, 2017; Adomako, Danso, Boso, & Narteh, 2018).

Based on a systematic literature review, Sharma (2019) summarized the different approaches that have increased understanding of EA as well as its core components, namely sensing and searching information, cognitive

ability, personality factors (like creativity and self-efficacy), environment, social networks, knowledge, and experience. From this growing interest and diversity of approaches, Chavoushi et al. (2021) confirmed that the scope of EA is not limited to opportunity recognition alone, so it has been related to other concepts.

EA can be confused with similar concepts within the entrepreneurial literature, such as entrepreneurial mindset (Asenge, Diaka & Soom, 2018), entrepreneurial awareness (Aviram, 2010), and market awareness (Bonney, Davis-Sramek & Cadotte, 2016). Unlike entrepreneurial mindset, which is considered a holistic perception of generating novel ideas, evaluating risks, or starting and running a business (Asenge et al., 2018), and entrepreneurial awareness, which is an individual's ability to evaluate a chosen opportunity (Aviram, 2010), EA refers to how new business ideas get initiated and pursued (Tang et al., 2012).

On the other hand, EA also differs from market awareness, which has foundations in the marketing literature and refers to the capability to interpret broad market information accurately without it necessarily leading to opportunity recognition (Bonney et al., 2016). Thus, by facilitating a separate understanding of a key entrepreneurial cognitive ability and how it influences an individual's behavior, EA provides an important conceptual framework through which can be explored the dynamics of the opportunity recognition process with business potential (Daniel et al., 2021).

METHOD

According to Popay et al. (2006), a literature review comprehensively selects the existent scientific knowledge in a specific field. Furthermore, its process must be transparent and replicable to decrease the bias of the researcher (Hammersley, 2001). In order to review the empirical literature on EA, this study followed the multi-step approach suggested by Newbert (2007), which is outlined below.

First, the search was restricted to scholarly journal publications, therefore book chapters and conference proceedings were not included, as they undergo a less rigorous peer review process (Wales, Gupta & Mousa, 2013).

Second, the database chosen for this study was Web of Science (WoS), which contains high quality multidisciplinary research information from more than 3,300 world-leading journals in the sciences, social sciences, arts, and humanities (Clarivate, 2021). In addition, WoS is more demanding in terms of quality content compared to other databases (e.g., Scopus

and Google Scholar), so WoS covers a more limited range of journals and consequently has fewer articles (Adriaanse & Rensleigh, 2013).

Third, to identify the articles from the database, the terms “entreprene*” and “alert*” were used, where “*” indicates that variations on the ending of the word were permitted. It was necessary that both terms be present in at least titles, abstracts, or keywords of publications. A time period for the research was not defined, because the study sought to map all productions available in WoS through November 2021. The initial survey returned 192 articles available without restrictions for areas of knowledge.

Fourth, a reading/checking of title, abstract, and keywords of each article was carried out in order to exclude those that did not correspond with the purpose of the study (Newbert, 2007). This action excluded 57 articles that, although they might have mentioned the search terms, did not discuss the specific concept of alertness by entrepreneurs (e.g., Bonney et al., 2016; Sun, 2015).

Fifth, the next key condition for retaining an article depended on whether it was empirical and ensured the theoretical relevance of the EA construct. A deep exploratory study of the 135 remaining articles was carried out, and this action facilitated the exclusion of 31 theoretical or literature review articles (e.g., Sharma, 2019; George et al., 2016; Ardichvili et al., 2003; Gaglio & Katz, 2001; Sambamurthy, Bharadwaj & Grover, 2003; Tang et al., 2012) as well as 10 qualitative or case studies articles (e.g., Liu & Liang, 2021; Fiet, Norton, & Clouse, 2013). This screening produced 94 publications potentially relevant to the scope of this study.

Finally, the 94 articles were fully read to enhance reliability. The criteria for retaining articles were that the articles must be empirical, and at least one hypothesis in the research model was tested on the EA construct. After this step, 10 articles were excluded, because either the EA concept was not clear enough in the research model (e.g., Sambasivan, Abdul & Yusop, 2009), or the study was eminently qualitative (e.g., Arnold, 2019). In short, this study followed a six-step procedure to identify 84 articles that empirically tested the concept of EA in a research model, and the results were published in scholarly journals.

RESULTS

Overview of results

Figure 1 shows that the first empirical study in the sample was published in 2005. The period between 2005 and 2015 was a period of very little

production, in which practically one article was published per year. From 2016 to 2021, a higher level of scientific production was observed. During this period, almost 11 articles, on average, were published per year. This result is similar to that obtained by Chavoushi et al. (2021) and Daniel et al. (2021), who also identified an increase in scientific production about EA from 2013.

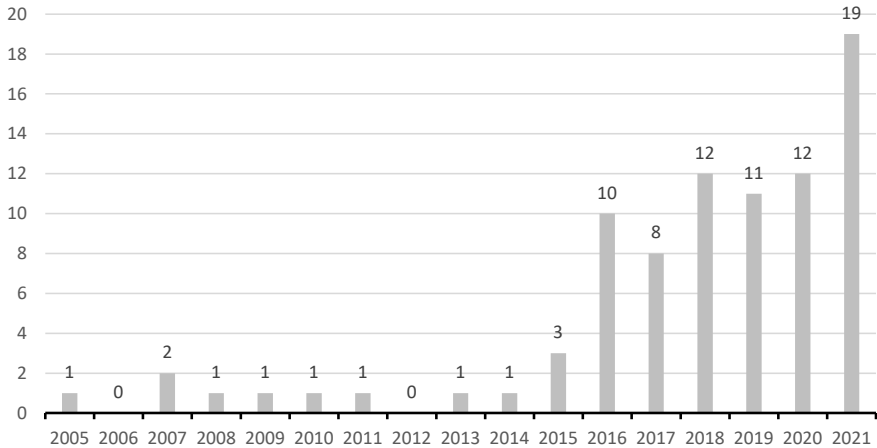


Figure 1. Number of publications per year (2005-2021)

Regarding the journals that published articles on EA, the 84 articles were published in 56 different journals. Table 1 shows the journals that published four or three articles and their respective subject areas, among which management and business were predominant. These seven journals contributed 28 percent of the publications. The journals *Entrepreneurial Business and Economics Review*, *Frontiers in Psychology*, *Journal of Business Venturing*, *Journal of Developmental Entrepreneurship*, *Journal of Small Business and Enterprise Development*, *Journal of Vocational Behavior*, *Management Decision*, and *Technology Analysis & Strategic Management* published two articles each. Each of the remaining articles were published in different journals.

Regarding the focal country of the research, 77 articles involved a single country, while in 7 articles, at least two countries participated (Table 2). China was the country with the highest percentage of publications (16 percent), followed by Iran (9 percent) and the United States and South Africa (8 percent each). Table 2 shows the scientific production organized according to the scheme of cultural clusters of the GLOBE study (Wales et al., 2013). The Confucian cultural cluster was the most productive with 22 articles, followed by the African with 13 and the South-East Asian with 12.

Table 1. Journals that most published on entrepreneurial alertness

Scientific journals	Subject area	Articles
International Entrepreneurship and Management Journal	Business and management	4
Journal of Small Business Management	Management	4
Social Behavior and Personality	Business, economics, and management	4
International Journal of Entrepreneurial Behavior & Research	Psychology	4
International Small Business Journal	Business and management	3
Journal of Business Research	Business	3
Sustainability	Environmental sciences, environmental studies, and green & sustainable science & technology	3

Table 2. Production of scientific articles on entrepreneurial alertness by country

Cultural Cluster	Country	Articles
African (13)	Ghana	2
	Nigeria	3
	South Africa	7
	Uganda	1
Anglo-Saxon (7)	USA	7
Confucian (22)	China	14
	South Korea	2
	Singapore	1
	Taiwan	5
Eastern European (3)	Croatia	1
	Slovenia	1
	Ukraine	1
German (1)	Germany	1
Latin-American (6)	Mexico	6
Latin-European (8)	France	2
	Italy	4
	Romania	1
	Spain	1
Middle Eastern (2)	Tunisia	1

Cultural Cluster	Country	Articles
Nordic (3)	United Arab Emirates	1
	Finland	1
	Sweden	2
South-East Asian (12)	Iran	8
	India	1
	Pakistan	3
Multinational (7)		7

Measurement of entrepreneurial alertness

An important aspect in research on EA is its measurement. Among the first authors to comment on and experience these challenges were Kaish and Gilad (1991) and Busenitz (1996). According to these authors, progress in EA research depended on having a sufficiently reliable measurement scale for the scientific community to adopt and consequently accumulate knowledge. As seen in Table 3, the measurement scale developed by Tang et al. (2012) was used in 56 articles, which represented 67 percent.

The scale created by Tang et al. (2012) is made up of three dimensions. The first is called scanning and search, which reflects the first interpretations that the individuals make of their environment as well as the first search for information. Six items are used to evaluate this dimension. One example is, “I have frequent interactions with others to acquire new information.” The second dimension, association and connection, refers to the fact that individuals put their creativity into practice to identify patterns in a new order of things, for which it is necessary to adapt their knowledge schemes. An example of the three items that measure this dimension is, “I see links between seemingly unrelated pieces of information.” Lastly, the evaluation and judgment dimension is measured on a four-item scale, and it refers to the discernment that the individuals make of the business opportunity in order to decide whether or not it is worth continuing to work on it. A sample items is “When facing multiple opportunities, I am able to select the good ones.”

Table 3. Entrepreneurial alertness construct measures

Research sources	Article count
Tang <i>et al.</i> (2012) - Aggregated (SS + AC + EJ) ^a	39
Tang <i>et al.</i> (2012) - Multidimensional (SS, AC, EJ) ^a	13
Tang <i>et al.</i> (2012) - Unidimensional (SS) ^a	4
Global Entrepreneurship Monitor	5

Research sources	Article count
Miao (2006)	4
Sambamurthy <i>et al.</i> (2003)	3
Kaish and Gilad (1991)	2
Other	14

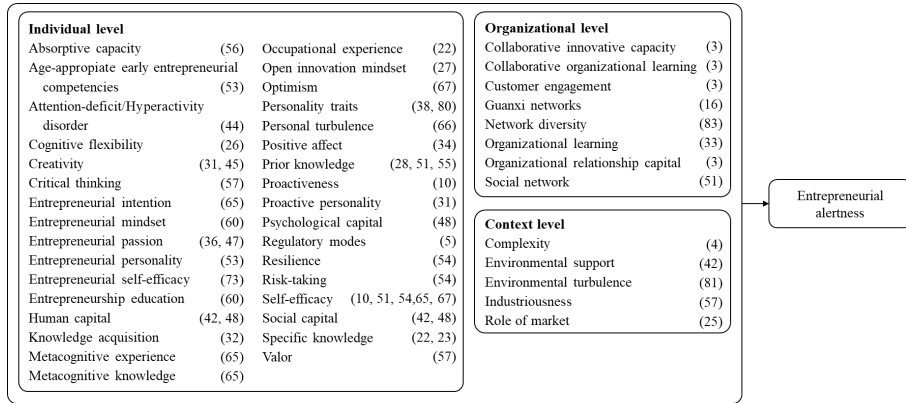
Note: SS = Scanning and search dimension; AC = Association and connection dimension; EJ = Evaluation and judgment dimension. ^a Of the sample of 84 articles, 39 articles examined entrepreneurial alertness combining the three dimensions (aggregated), 13 examined the dimensions separately (multidimensional), and 4 examined only one dimension (unidimensional).

The three distinct elements that comprise Tang *et al.*'s (2012) measurement proposal showed their versatility to be used according to the objectives of each investigation. Table 3 shows that 39 articles required an aggregate EA score, so they combined the 13 items of the three dimensions to obtain an overall score (e.g., Gill, Bencheva, Karayel & Usman, 2021; Urban & Msimango-Galawe, 2020). Thirteen articles used a multidimensional assessment; that is, these studies wanted to know the behavior of each dimension of EA, so they were separately evaluated (e.g., Edigbo, Ogbo, Onwe, Igwe & Okafor, 2021; Liang, 2019). Finally, four articles focused on only one dimension, specifically scanning and search, since they considered it to be the trigger for the process of identifying opportunities (e.g., Sasseti, Cavaliere & Lombardi, 2022).

Other measurement proposals were presented, such as the Global Entrepreneurship Monitor (GEM), which is based on knowing the expectation of others regarding the existence of a business opportunity. The GEM measures EA with a single item (Reynolds *et al.*, 2005). Specifically, respondents are asked, "In the next six months, will there be good opportunities for starting a business in the area where you live?" This proposal, as seen in Table 3, was used in five articles (e.g., Zhao, Li, Li, & Schott, 2020; Boudreaux, Nikolaev & Klein, 2019). Similarly, the scale developed by Miao (2006) was used in four studies (e.g., Sang & Lin, 2019; Li, Wang & Liang, 2015). It contains seven items, which considers aspects such as sensitive foresight, explorative prospecting, and redefining framework. A sample item of this scale is "I will gain new business information through my social network."

Table 3 also shows that three studies used Sambamurthy, Bharadwaj, and Grover's (2003) proposal (e.g., Tsou & Cheng, 2018; Agarwal & Selen, 2009). This scale contains four items, including two factors: strategic foresight and systematic insight. A representative item is "Working in partnership gives us an ability to anticipate discontinuities arising in the future." The Kaish and Gilad (1991) measurement scale was also used, although only in two studies (e.g., Biswas & Verma, 2021; Fiet, Norton & Clouse, 2007). This scale reflects the dedication to remain updated with respect to trade related information,

propensity to reflect on innovative business ideas, and the skills to identify them. An example of the five items that make up this scale is “I think about delivered lectures and practical sessions in my free time to grab on the market opportunities.” Lastly, a group of 14 articles (e.g., Roundy, Harrison, Khavul, Pérez-Nordtvedt, & McGee, 2018; Cui, Sun, Xiao, & Zhao, 2016) developed their own measurement scales based on significant previous work such as Busenitz (1996), Kaish and Gilad (1991), and Kirzner (1973, 1979, 1985).



Note: The numbers in parentheses indicate the article in which the variable was tested in a hypothesis. The articles are numbered in the appendix.

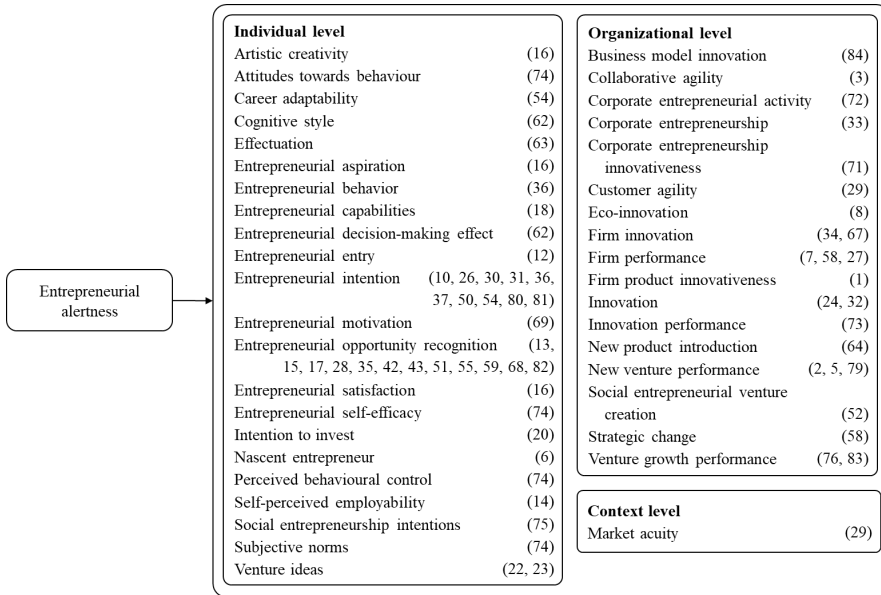
Figure 2. Antecedents in prior research on EA

Antecedents of entrepreneurial alertness

The results show that a research stream on EA has been focused on knowing its antecedents, that is, the aspects that contribute to a greater manifestation of alertness in individuals. In general, as can be seen in Figure 2, the results show a diversity of variables, of which the abilities or capacities at the individual level are the ones that have most attracted the attention of the researchers. For example, a group of studies explored the influence of self-efficacy on EA (e.g., Biswas & Verma, 2021; Stanic, 2020). Similarly, some variants of knowledge, such as prior knowledge (e.g., Roundy et al., 2018), metacognitive knowledge (Stanic, 2020), or specific knowledge (e.g., Fiet & Patel, 2008), have also attracted the attention of researchers.

At the organizational level, the study developed by Agarwal and Selen (2009) stands out, as it studied the influence of collaborative innovative capacity, collaborative organizational learning, customer engagement, and organizational relationship capital on EA. Finally, a few studies investigated the influence of context on EA. For example, Aimar, Bouhdaoïu, Mateu

and Sutan (2020) analyzed its complexity, while Pirhadi, Soleimanof and Feyzbakhsh (2021) explored its industriousness.



Note: The numbers in parentheses indicate the article in which the variable was tested in a hypothesis. The articles are numbered

Figure 3. Consequences in prior research on EA

Consequences of entrepreneurial alertness

Tang et al. (2012) argued the importance of knowing the outcomes of EA. As Figure 3 shows, the outcomes or consequences of EA have been predominantly analyzed at the individual level, but there is a considerable group of studies at the organizational level. Among the dependent variables at the individual level that have most caught the attention of researchers are entrepreneurial intention and entrepreneurial opportunity recognition, which represent 50 percent of the studies. For example, Neneh (2019) and Li et al. (2020) stated that individuals that are alert to entrepreneurial opportunities will be more inclined to have a high level of entrepreneurial intention. In a similar way, a large group of studies has looked at what appears to be a natural relationship between EA and opportunity (e.g., Tominc & Rebernik, 2007; Hajizadeh & Zali, 2016). Accordingly, this group of studies predicts that individuals' EA can influence their ability to recognize entrepreneurial opportunities.

Regarding the consequences of EA at the organizational level, several studies have established the influence of EA with different manifestations

of innovation; for example business model innovation (Zhao, Yang, Hughes & Li, 2021), firm product innovativeness (Adomako, 2021), and corporate entrepreneurship innovativeness (Urban, 2017).

Similarly, researchers have been interested in the influence of EA on different kinds of performance; for example, firm performance (e.g., Roundy et al., 2018), new venture performance (e.g., Xie & Lv, 2016), and venture growth performance (e.g., Urban & Msimango-Galawe, 2020). Finally, only one study considered the influence of EA at context level. In this study, Hosseini, Khoddami, Moshabaki and Azar (2011) said that managers' EA increases their visibility of opportunities and choice of feasible opportunities. Hence, EA has a positive effect on market acuity.

Entrepreneurial alertness in mediation models

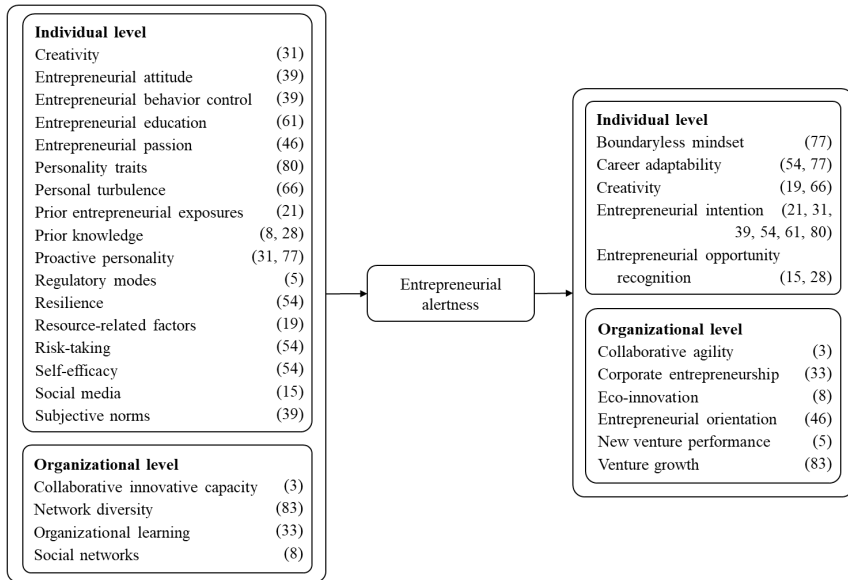
According to MacKinnon, Fairchild, and Fritz (2007), the mediation models help unravel the causal chain between two related variables. In other words, a mediation analysis acknowledges the need to elucidate the causal process by decomposing the relationship into its constituent parts (Baron & Kenny, 1986). Figure 4 shows that researchers have been interested in three different mediation models.

The studies included in Model A of Figure 4 have declared EA as the moderating variable in a hypothesis. For example, Tang (2016) proposed that EA mediates the relationship between entrepreneurs' turbulence (negative and positive) and their creativity. Similarly, Hu, Wang, Zhang, and Bin (2018) suggested that creativity and proactive personality influence students' EA, which positively affects entrepreneurial intention.

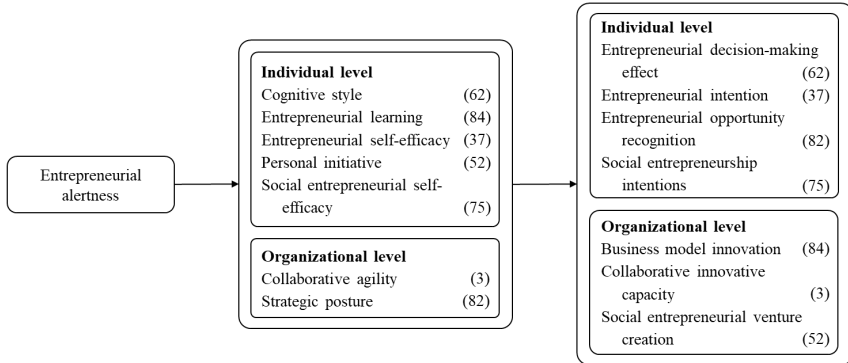
Unlike the studies included in Model A, the EA in Model B plays a different role. The studies in this model show that EA leads to a mediating variable that then leads to outcomes. For example, Liang and Chen (2021) established that EA indirectly influences entrepreneurial intention through the mediation of entrepreneurial self-efficacy. In this sense, Zhao et al. (2021) proposed that entrepreneurial learning mediates the relationship between EA and business model innovation.

Finally, the four studies of Model C show the chain of influence that other variables have on EA. That is, the EA is the outcome. For example, Saadat, Aliakbari, Majd and Bell (2021) proposed that entrepreneurship education with the mediating role of entrepreneurial mindset influences EA. In a combination of variables at the individual and organizational levels, Ma and Huang (2016) posited that knowledge acquisition mediates the relationship between strategic orientation and EA.

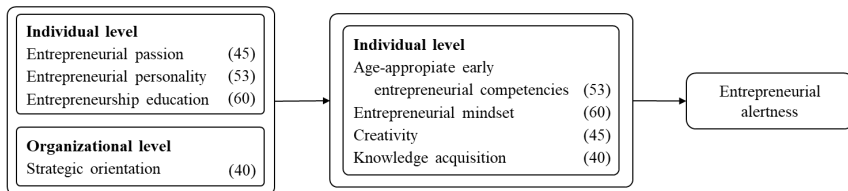
Model A)



Model B)



Model C)



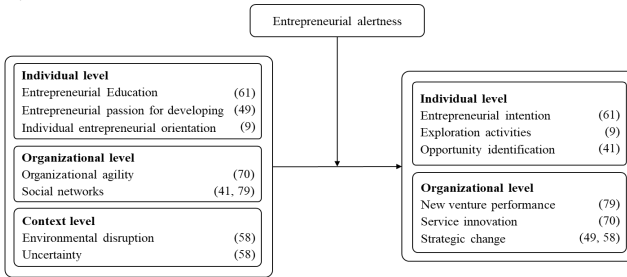
Note: The numbers in parentheses indicate the article in which the variable was tested in a hypothesis. The articles are numbered in the appendix.

Figure 4. Mediation models in prior research on EA

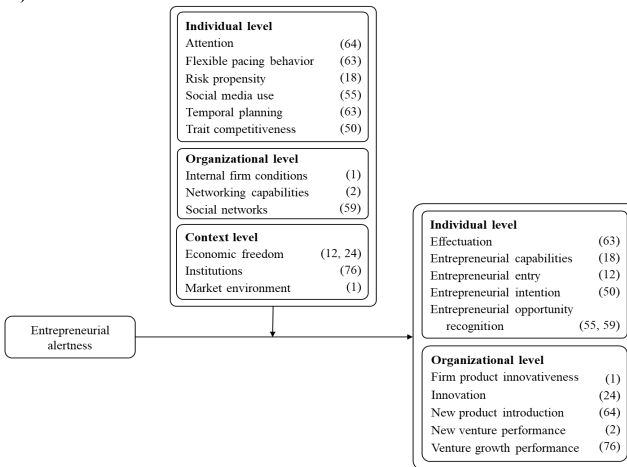
Entrepreneurial alertness in moderation models

According to James and Brett (1984), a variable is a moderator when it influences the relationship between other two variables.

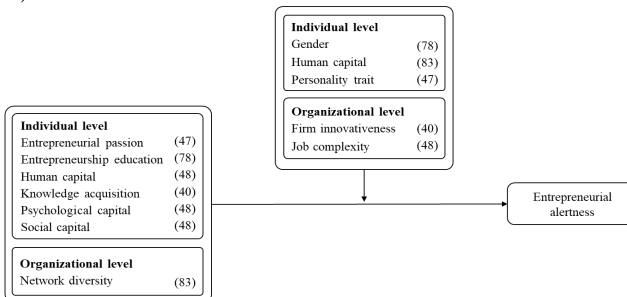
Model A)



Model B)



Model C)



Note: The numbers in parentheses indicate the article in which the variable was tested in a hypothesis. The articles are numbered in the appendix.

Figure 5. Moderation models in prior research on EA

Baron and Kenny (1986) stated that, in a moderation analysis, statistically there is no difference when analyzing the joint effect of the moderating variable and independent variable on the dependent variable. In other words, statistically, there is no difference if EA is the moderator or the independent variable, since the joint effect is the same. However, there is a difference in how the variables are related theoretically, which is established in the hypotheses. Figure 5 summarizes the moderation models in which EA has been examined in prior research.

In Model A of Figure 5, EA is considered a moderating variable, that is, the relationship between two variables is a function of the level of EA. For example, Xie and Lv (2016) hypothesized that female tech-entrepreneurs' EA positively moderates the relationship between social networks and new venture performance. On the other hand, Roundy et al. (2018) suggested that EA positively moderates the negative relationship between perceptions of uncertainty and the magnitude of strategic change decisions. The studies in Model B show that the influence of EA on the outcome depends on the intensity of another moderating variable. In this line of reasoning, Adomako (2021) suggested that the positive effect of EA on firm product innovativeness becomes more positive when the market environment is greater. Another example is the study by Cui et al. (2016), who proposed that EA has a greater effect on the entrepreneurial capabilities of an entrepreneur with a higher level of risk propensity.

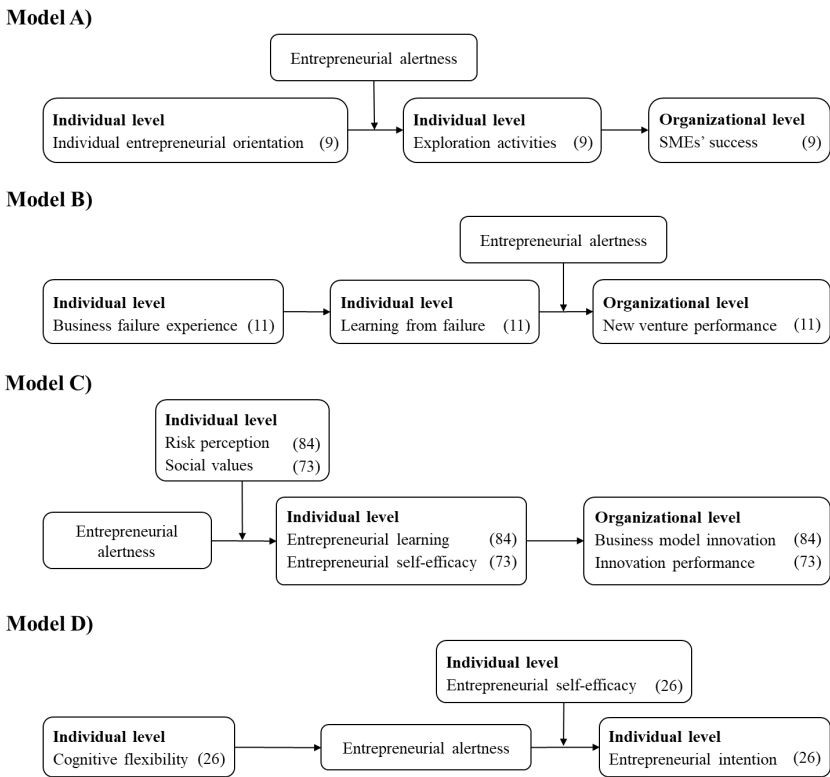
In another group of studies, the EA can be identified as the dependent variable (Model C of Figure 5). In these studies, the interaction of two variables is what leads to EA as an outcome. Zhao et al. (2020), for example, proposed that the positive effects of network diversity on EA diminish with the increase of some elements of human capital. Similarly, Montiel-Campos (2019) established that the positive relationship between female middle managers' human capital and EA is moderated by job complexity.

Entrepreneurial alertness in moderated mediation models

Five studies have examined the role of EA in moderated mediation models, whose objective of this kind of study is to identify indirect conditional effects (Hayes, 2013). The five studies can be organized into four different models, as can be seen in Figure 6. Models A and B show EA in a moderating variable role. For example, Bilal and Fatima (2021) posited that EA strengthens the indirect relationship of individual entrepreneurial orientation and SMEs' success mediated by exploration activities. In a similar way, Boso, Adeleye, Donbesuur and Gyensare (2019) proposed that, with a greater ability to learn

from business failure and with a stronger EA, an entrepreneur is more likely to develop a new venture.

The role of EA in Model C is no longer a moderator, but rather part of the chain of sequences. For example, Zhao et al. (2021) stated that entrepreneurs with different risk perceptions tend to achieve business model innovation through different types of learning. Finally, the only study in Model C assumed that entrepreneurial self-efficacy moderates the mediated relationship between cognitive flexibility and entrepreneurial intentions by EA (Gill et al., 2021). This group of studies represents a more sophisticated relationship between EA and other variables. Therefore, these studies, although in smaller quantity than the studies presented in the other models (i.e., antecedents, consequences, mediation, and moderation), also make a significant contribution to the study of EA.



Note: The numbers in parentheses indicate the article in which the variable was tested in a hypothesis. The articles are numbered in the appendix.

Figure 6. Moderated mediation models in prior research on EA

DISCUSSION

Descriptive analysis and directions

Although the first article identified in the sample of this study is from the year 2005, this does not mean that there are no previous empirical studies. The studies of Kaish and Gilad (1991) and Busenitz (1996) are examples of earlier articles; however, they were not included in the sample because in the year of publication, their journals were not yet members of the WoS database. This aspect is also latent in the first years of the period analyzed, since scientific production was scarce. However, the findings show a sharp increase in the number of publications from 2016. A possible explanation of this can be found in the comments of Gaglio and Katz (2001), who argued that, to the extent that the initial problems in the study of EA were overcome, the research would be more productive. Then, it seems that EA has shown to be a useful construct through which a wide range of phenomena related to topics beyond opportunity recognition can be examined.

Additionally, the interest in studying EA was accompanied by a variety of journals, not only focused on entrepreneurship or business areas, but also on other subject areas. According to Baskerville (2003), as theoretical constructs are used in areas in which they fulfill particular needs, the increase in articles empirically exploring EA in non-entrepreneurship-focused journals indicates broad acceptance and application within the scholarly community. In other words, this construct is gaining acceptance in outlets with broad managerial scope, suggesting that it is not emerging as a parochial construct, but of interest to a wide audience (Wales et al., 2013).

The growing interest in EA has motivated researchers to examine its core tenets in different cultural contexts. The findings show that the majority of empirical research has been conducted in developing and emerging market contexts, in which China has received the most attention in the EA literature. On the other hand, with the exception of the United States, developed economies represent an opportunity to promote research on EA.

Research implications and directions

Although varying measurement proposals of EA have been suggested, it appears that knowledge accumulated around the conceptualization has already begun. Roughly 47 per cent of the empirical studies adopted the aggregated approach by Tang et al. (2012), suggesting strong convergence toward this approach. Furthermore, research adopting the multidimensional or unidimensional approach by Tang et al. (2012) has been increasing since

2016, which means that opportunities exist for a better understanding of the influence of each dimension of EA. Definitely, future research should consider these three approaches without neglecting that the choice should be driven by the research question being investigated.

Regarding antecedents of EA, Kirzner (1997) suggested the need to know the factors that trigger or motivate it. The findings show that variables at individual levels dominated the studies that located EA as the dependent variable (see Figure 2). Despite EA's strong cognitive component, the findings reveal that an important part of this research has barely begun to be focused on these components, without neglecting that variables at the organizational level have aroused the interest of researchers. Future research could contribute by adopting a small set of variables emanating from a well-developed theoretical framework that helps predict EA.

Following Tang et al. (2012), who suggested exploring the variables influenced by EA, the findings show that their suggestion has enriched the study of EA. The results show that both individual- and organizational-level variables have been frequently studied. However, the most popular variables that have been studied as a consequence of EA are entrepreneurial skills or abilities at the individual level, such as entrepreneurial intention and entrepreneurial opportunity recognition. As Figure 3 presents, EA has also been shown to influence behaviors at the organizational level, at which the issues of innovation and performance are the ones that have attracted the most attention. In essence, the literature that analyzes the consequences of EA confirms that it can be associated with different aspects of the operation of a firm, which opens up a variety of future lines of research at the organizational level.

The progress made in studying the antecedents and consequences of EA may have encouraged researchers to examine causal processes in which EA was involved (see Figure 4). In this sense, previous studies were interested in knowing how EA contributed to specific outcomes. Curiously, little attention has been paid to mediation models in which the outcome is the recognition of opportunities, which is an important part of entrepreneurship (George et al., 2016).

Although previous EA research has investigated mediation models of variables at both the individual and organizational levels, relating the variables in a causal process without understanding their underlying generative mechanisms will not help to better understand the relationship among them. Therefore, future research could benefit from analyzing more specifically the components of the main variables in mediation relationships. Hence, the multidimensional approach of EA can make interesting contributions.

The growing interest in EA motivated researchers to examine contingent relationships. According to Donaldson (2001), contingent approaches help to better understand the influence of organizational aspects on the dependent variable; however, the results show that variables at the organizational level did not predominate (see Figure 5). In addition, three types of moderation between the predictor and the moderating variables were identified in the studies reviewed. Future studies could focus their research models according to the classification by Frazier, Tix and Barron (2004), who identified enhancing relationships, antagonistic relationships, and buffering relationships. This proposal could help to compare results among studies and to know the relative influence that some variables have on the dependent variable, which could be at the organizational or contextual level.

Finally, the study of the relationship between EA and other variables has become increasingly complex, which is evident in the moderate mediation models (Figure 6). The five articles identified in this study appeared in the last three years of the analyzed period (2019-2021). This may indicate the beginning of a new stage in the study of EA; however, the same risks as with contingent models may arise. An interesting contribution of future research is that results can be compared between the same research designs. This would help to identify the most favorable position of EA in these models. So far, as Figure 6 shows, four different positions have been identified.

CONCLUSION

The aim of this study was to conduct a qualitative review of the empirical EA literature. In response, a sample of EA-grounded empirical articles was analyzed in order to provide a summary of the prior research areas. The results showed that the growing interest in this topic in the last decade is not limited to the field of entrepreneurship, but has attracted the attention of researchers from different fields of research. As a consequence, three main contributions to the empirical research on EA can be derived from this study.

First, this study confirms the prevalence and breadth of the empirical research on EA by identifying the articles performed on the subject over time and by grouping them according to the scope of the publishing journal and the focal country of the research. This study identifies that the subject area of some journals that have been published on EA is not business and management related (e.g., general psychology, environment, education) and that most research has been carried out in less developed countries. Second, this study helps to make sense of the diversity of the variables that have been connected to EA, thus overcoming one of the drawbacks of

individual studies that consider a reduced number of variables to examine this concept. This study proposed five distinct classifications to characterize the empirical research resulting from almost two decades of research in EA. Third, the growing interest in EA has evolved from a diversity of approaches (Sharma, 2019), which has motivated debate about its conceptualization and measurement (e.g., McCaffrey, 2013). This study sheds light on the growing popularity of the proposal by Tang et al. (2012), which can help to overcome these problems.

It is important to note that the suggestions presented in the discussion section in response to the findings are intended to be neither exhaustive nor absolute; rather, this study seeks to create awareness about past research on EA and to encourage future empirical studies on this topic. The present paper has highlighted several fruitful areas of research and pointed out important aspects that researchers should consider when conducting EA research. The results show that EA studies are not only interested in knowing about its antecedents and consequences, but interest has also arisen in knowing how it behaves in causal processes and contingent relationships. Undoubtedly, these research models improve the knowledge about EA, but they also represent a research stream that requires further study on this type of relationships.

As practical implications, the results show that EA not only contributes at the individual level, but also at the organizational level, especially when it stimulates the development of innovation and its impact on performance. Managers can take advantage of these findings and provide an organizational environment that not only encourages but also recognizes the practice of EA by employees. One limitation of the study is that it is only based on the WoS database. It is recommended that future research include other databases. Finally, the results of this study could stimulate further productive new directions in terms of future research.

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Appendix. Summary of articles in the sample by author/year/journal

*Adomako (2021) <i>International Journal of Innovation Management</i>	(1)
Adomako et al. (2018) <i>International Small Business Journal</i>	(2)
*Agarwal and Selen (2009) <i>Decision Sciences</i>	(3)
*Aimar et al. (2020) <i>Strategic Change</i>	(4)
Amato et al. (2017) <i>Journal of Small Business Management</i>	(5)
Arenius and Minniti (2005) <i>Small Business Economics</i>	(6)
Asenge et al. (2018) <i>International Journal of Innovation</i>	(7)
Ben Amara et al. (2020) <i>Business Strategy and Development</i>	(8)
*Bilal and Fatima (2021) <i>Journal of Entrepreneurship in Emerging Economies</i>	(9)
*Biswas and Verma (2021) <i>Journal of Entrepreneurship</i>	(10)
*Boso et al. (2019) <i>Journal of Business Research</i>	(11)
*Boudreaux et al. (2019) <i>Journal of Business Venturing</i>	(12)
Boumedjaoud and Messeghem (2020) <i>Revue Internationale PME</i>	(13)
Cavaliere et al. (2021) <i>Personnel Review</i>	(14)
Ceptureanu et al. (2020) <i>Entropy</i>	(15)
Chen and Tseng (2021) <i>International Journal of Entrepreneurial Behavior & Research</i>	(16)
Chen et al. (2020) <i>Technology Analysis & Strategic Management</i>	(17)
*Cui et al. (2016) <i>Technological Forecasting and Social Change</i>	(18)
Dayan et al. (2013) <i>Creativity and Innovation Management</i>	(19)
Drnovsek et al. (2018) <i>Zbornik Radova Ekonomskog Fakulteta u Rijeci</i>	(20)
*Edigbo et al. (2021) <i>Entrepreneurial Business and Economics Review</i>	(21)
*Fiet and Patel (2008) <i>Small Business Economics</i>	(22)
Fiet et al. (2007) <i>Journal of Engineering and Technology Management</i>	(23)
Fuentelsaz et al. (2018) <i>International Small Business Journal</i>	(24)
Ghasemi and Rowshan (2016) <i>Journal of Intelligence Studies in Business</i>	(25)
*Gill et al. (2021) <i>Entrepreneurial Business and Economics Review</i>	(26)
Gomezal and Rangus (2018) <i>Management Decision</i>	(27)
*Hajizadeh and Zali (2016) <i>International Journal of Entrepreneurial Behavior & Research</i>	(28)
*Hosseini et al. (2011) <i>African Journal of Business Management</i>	(29)
Hu and Ye (2017) <i>Social Behavior and Personality</i>	(30)
Hu et al. (2018) <i>Frontiers in Psychology</i>	(31)
Jiao et al. (2014) <i>Technology Analysis & Strategic Management</i>	(32)
Lee et al. (2016) <i>Asian Journal of Technology Innovation</i>	(33)
Levasseur et al. (2020) <i>Asia Pacific Journal of Management</i>	(34)
Li et al. (2015) <i>Social Behavior and Personality</i>	(35)

*Li et al. (2020) <i>Frontiers in Psychology</i>	(36)
*Liang and Chen (2021) <i>Asia Pacific Business Review</i>	(37)
*Liang (2019) <i>Journal of Entrepreneurship Management and Innovation</i>	(38)
Lu and Wang (2018) <i>Journal of Asian Finance Economics and Business</i>	(39)
*Ma and Huang (2016) <i>Journal of Small Business Management</i>	(40)
Ma et al. (2020) <i>Social Behavior and Personality</i>	(41)
Mehdizadeh et al. (2021) <i>Journal of Applied Research in Higher Education</i>	(42)
Miao and Liu (2010) <i>Social Behavior and Personality</i>	(43)
Moore et al. (2021) <i>Entrepreneurship Theory and Practice</i>	(44)
Montiel-Campos (2016) <i>Revista Brasileira de Gestao de Negocios</i>	(45)
Montiel-Campos (2017) <i>Journal of Small Business and Enterprise Development</i>	(46)
Montiel-Campos (2018) <i>Serbian Journal of Management</i>	(47)
*Montiel-Campos (2019) <i>International Journal of Gender and Entrepreneurship</i>	(48)
Montiel-Campos (2021) <i>Journal of Organizational Change Management</i>	(49)
*Neneh (2019) <i>Personality and Individual Differences</i>	(50)
Nikraftar and Hosseini (2016) <i>Tourism Review</i>	(51)
Nsereko et al. (2021) <i>Journal of Enterprising Communities</i>	(52)
Obschonka et al. (2017) <i>Small Business Economics</i>	(53)
Obschonka et al. (2018) <i>Journal of Vocational Behavior</i>	(54)
Park et al. (2017) <i>Sustainability</i>	(55)
Patel (2019) <i>International Entrepreneurship and Management Journal</i>	(56)
*Pirhadi et al. (2021) <i>Journal of Small Business Management</i>	(57)
*Roundy et al. (2018) <i>Strategic Organization</i>	(58)
Ruiz-Arroyo et al. (2015) <i>Investigaciones Europeas de Dirección y Economía de la Empresa</i>	(59)
*Saadat et al. (2021) <i>Education and Training</i>	(60)
Sang and Lin (2019) <i>International Journal of Emerging Technologies in Learning</i>	(61)
*Sasseti et al. (2022) <i>International Entrepreneurship and Management Journal</i>	(62)
Siren et al. (2019) <i>Journal of Business Research</i>	(63)
Srivastava et al. (2021) <i>Journal of Business Venturing</i>	(64)
*Stanic (2020) <i>Zagreb International Review of Economics & Business</i>	(65)
*Tang (2016) <i>Journal of Business Research</i>	(66)
Tang et al. (2021) <i>Journal of Small Business Management</i>	(67)
*Tominc and Rebernik (2007) <i>Small Business Economics</i>	(68)
Troise and Tani (2021) <i>Management Decision</i>	(69)
*Tsou and Cheng (2018) <i>Journal of Business & Industrial Marketing</i>	(70)
*Urban (2017) <i>Journal of Developmental Entrepreneurship</i>	(71)
Urban and Wood (2017) <i>European Journal of Innovation Management</i>	(72)
Urban (2019) <i>SA Journal of Human Resource Management</i>	(73)
Urban (2019) <i>South African Journal of Higher Education</i>	(74)
Urban (2020) <i>Journal of Small Business and Enterprise Development</i>	(75)
*Urban and Msimango-Galawe (2020) <i>Journal of Developmental Entrepreneurship</i>	(76)
Uy et al. (2015) <i>Journal of Vocational Behavior</i>	(77)
Westhead and Solesvik (2016) <i>International Small Business Journal</i>	(78)
*Xie and Lv (2016) <i>International Entrepreneurship and Management Journal</i>	(79)
Yan et al. (2018) <i>Sustainability</i>	(80)
Yasir et al. (2017) <i>Journal of Management Development</i>	(81)
Zanella et al. (2019) <i>International Journal of Entrepreneurial Behavior & Research</i>	(82)
*Zhao et al. (2020) <i>Sustainability</i>	(83)
*Zhao et al. (2021) <i>International Entrepreneurship and Management Journal</i>	(84)

Abstrakt

CEL: *W ciągu ostatnich dwóch dekad koncepcja przedsiębiorczej czujności (EA) była uważana za kluczowy element w badaniu, w jaki sposób jednostki rozpoznają możliwości przedsiębiorcze. W rezultacie badania nad czujnością przedsiębiorczą znacznie się rozwinęły, przyciągając uwagę badaczy nie tylko z dziedziny przedsiębiorczości, ale także innych dyscyplin akademickich, w ramach których tę koncepcję badano z różnych perspektyw. Dlatego nadszedł czas, aby udokumentować skumulowaną wiedzę badaczy na temat czujności przedsiębiorczej. Niniejsze badanie ma na celu zapewnienie kompleksowego przeglądu jakościowego i oceny empirycznych badań czujno-*

ści przedsiębiorczej. **METODYKA:** W oparciu o wieloetapowe podejście zastosowane w poprzednich badaniach, które gwarantuje systematyczny, przejrzysty i powtarzalny przegląd literatury, w tym badaniu zidentyfikowano ostateczną próbę 84 artykułów opublikowanych w czasopismach naukowych w latach 2005-2021, które empirycznie przetestowały koncepcję EA. Publikacje pochodzą z bazy Web of Science. Ich analiza obejmowała ewolucję opublikowanych artykułów, czasopism, które opublikowały najwięcej artykułów, krajów, w których przeprowadzono badania, zastosowanych skal pomiarowych oraz modeli badawczych, w których postawiono hipotezę czujności przedsiębiorczej i zbadano ją poprzez badania empiryczne. **WYNIKI:** Wyniki pokazują, że badania empiryczne dotyczące czujności przedsiębiorczej znacznie wzrosły od 2016 do 2021 roku, w którym to okresie publikowano prawie 11 artykułów rocznie. Siedem czasopism, które opublikowały artykuły, przyczyniło się do 28 procent wszystkich publikacji. Wyniki potwierdzają również, że większość badań empirycznych nad czujnością została przeprowadzona w krajach rozwijających się, z których Chiny wyróżniają się 14 publikacjami, co stanowi 16 proc. całości. Ponadto wyniki potwierdzają rosnący konsensus dotyczący konceptualizacji i pomiaru czujności przedsiębiorczej. Ostatecznie przegląd zaowocował identyfikacją pięciu szerokich modeli badawczych, w których postawiono hipotezę EA i zbadano ją poprzez badania empiryczne: poprzedniki, konsekwencje, mediacja, moderacja i moderowana mediacja. Najwięcej uwagi poświęcono modelowi badającemu konsekwencje lub skutki czujności przedsiębiorczej, który zawiera 59 artykułów w tym kontekście. **IMPLIKACJE:** Identyfikacja pojęć i rodzaju ich związku z czujnością przedsiębiorczą pomaga ocenić postęp badań empirycznych, a także obszary możliwości. W ten sposób przyszłe badania mogą wzmocnić i pogłębić ogólną wiedzę na temat czujności. Najczęściej badane tematy są również odzwierciedleniem wkładu czujności przedsiębiorczej w praktykę, zarówno na poziomie indywidualnym, jak i organizacyjnym. Ponadto badacze zainteresowanych czujnością przedsiębiorczą zachęca się do rozważenia postępów poczynionych w pomiarze tego aspektu, który oferuje alternatywy dla badań. **ORYGINALNOŚĆ I WARTOŚĆ:** W oparciu o przegląd literatury niniejsze badanie organizuje badania empiryczne czujności przedsiębiorczej w różnych modelach badawczych, które dostarczają ważnych informacji na temat tego procesu. Ponadto niniejsze badanie odkrywa potencjalne obszary, którymi należy się zająć, a tym samym stanowi wkład w badanie czujności przedsiębiorczej.

Słowa kluczowe: czujność przedsiębiorcza, systematyczny przegląd literatury, szansa przedsiębiorcza, modele badawcze, rozpoznawanie szans, czujność, przedsiębiorczość

Biographical note

Héctor Montiel-Campos holds a Doctorate in project engineering from Polytechnic University of Catalonia. Since 2011, he has worked as a full-time professor at the School of Business and Economics, Universidad de las Americas Puebla in Mexico. His primary research interest lies in entrepreneurship, particularly the discovery of entrepreneurial opportunities and its impact at the individual and organizational levels.

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Conflicts of interest

The author declares no conflict of interest.

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