

Entrepreneurial passion, orientation and behavior: the moderating role of linear and nonlinear thinking styles

Linear and nonlinear thinking styles

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Abstract

Purpose – The purpose of this paper is to unpack the underlying mechanisms of entrepreneurs' passion, orientation and behavior by investigating the role of rational and nonrational cognitive elements. Building on dual process theory and sociointuitionism, a conceptual model is proposed in order to explore the relationship between entrepreneurial passion, entrepreneurial orientation (EO) and strategic entrepreneurship behavior (SEB). Specifically, entrepreneurs' linear thinking styles (System 2) and nonlinear thinking styles (System 1) are hypothesized as being significant moderators of such a relationship.

Design/methodology/approach – Covariance-based structural equation modeling (CB-SEM) is used to empirically validate the proposed conceptual model and test the moderating hypotheses on a sample of 300 entrepreneurs actively involved in European small and medium enterprises (SMEs).

Findings – Entrepreneurial passion is shown to be a significant antecedent of EO, which, in turn, strongly influences SEB. Moreover, entrepreneurs' linear thinking style positively moderates the EO-SEB relationship, but not the link between passion and EO. Instead, a nonlinear thinking style positively moderates the relationship between passion and EO, but not the links between EO and SEB.

Practical implications – Entrepreneurs should trust their nonlinear thinking style – related to affective/emotive and intuitive information processing systems – to foster the effect of their entrepreneurial passion on EO. Furthermore, entrepreneurs should rely on a linear thinking style, namely the rational and deliberative cognitive processes, to enhance the impact of their EO on SEB.

Originality/value – Dual process theory and sociointuitionism are integrated to simultaneously investigate the effect of nonrational and rational cognitive mechanisms on entrepreneurs' orientation and behavior. Moreover, the proposed model is empirically tested on a sample of entrepreneurs working in SMEs located in Europe, which have received little attention from entrepreneurship scholars in comparison to their US counterparts. The authors' findings suggest important implications for entrepreneurs, policymakers and entrepreneurial universities educators.

Keywords Entrepreneurial passion, Entrepreneurial orientation, Strategic entrepreneurship behavior, Intuition, Emotion, SMEs

Paper type Research paper

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1. Introduction

Small businesses with less than 50 employees make up the vast majority of enterprises in the 28 [1] EU countries. Accordingly, they represent more than the 98% of enterprises in most European economic industries. Similar figures can also be seen in EFTA (European Free Trade Associations) countries, such as Switzerland, where they account for 95% of enterprises, and in extra EU countries such as the United States, which has more than 30m small enterprises (representing 99.5% of the total business industry). Medium enterprises – comprised of between 50 and 249 employees – represent between the 0.5% and the 2% of the number of organizations in developed countries (Caputo *et al.*, 2018). These enterprises impact national economies as they usually account for around 60% of total employment and, furthermore, contribute to around 35–50% of the total value added. As a result, small and medium enterprises (SMEs) are extremely important to the economic growth of countries worldwide (Adomako *et al.*, 2016). In light of this importance, academic research has traditionally placed a lot of emphasis on these types of businesses (Biraglia and Kadile, 2017). In particular, scholars have focused on which factors allow SMEs to innovatively defend their competitive advantage in highly competitive markets (Dabić *et al.*, 2019). Apart from organizational factors, such as ambidexterity, agility and the ability to adapt to changing environments (Rialti *et al.*, 2019), a general consensus exists regarding the crucial role of the entrepreneurs in charge of most of these businesses (Pellegrini *et al.*, 2020). Entrepreneurs, indeed, are characterized by their high capacity when it comes to stress resistance, risk tolerance and persuasiveness by virtue of their creativity and long-range orientation (Gartner, 1990; Davidsson *et al.*, 2006; Laudano *et al.*, 2019). They are scrupulous owners, eager to invest their own economic resources in order to succeed in value generation. As such, entrepreneurs frequently represent the strategic differential between successful and prospering businesses and unprofitable ones, which seem to resist change (Lechter, 2001; Futterer *et al.*, 2018).

Notwithstanding the importance of entrepreneurs when it comes to SME success, the current economic environment poses an increasingly growing number of threats. The simple assumption that “good” entrepreneurs are directly related to the success of a business is insufficient. In contemporary organizations, as a result of the dynamic and unstable changes affecting highly competitive markets (Pellegrini *et al.*, 2016), one of the most challenging aspects for entrepreneurs is how to improve the development of successful entrepreneurial activities, creating socioeconomic value for the community in general. Specifically, scholars have analyzed the antecedents of *strategic entrepreneurship behavior* (SEB) – namely the ability to exploit and innovatively generate opportunities – to identify the main levers through which to improve the creation, success, longevity and survival of entrepreneurial firms (Kantur, 2016). According to various authors, entrepreneurial orientation (EO) represents one of the main antecedents of SEB, encompassing an entrepreneur’s degree of innovativeness, their proactiveness and their propensity to take risks (Anderson *et al.*, 2015; Covin and Slevin, 1988; Lumpkin and Dess, 1996). As a result, decision-makers showing enhanced EO are more capable of acting strategically and effectively identifying opportunities and threats (Zollo *et al.*, 2017a).

Despite this, the scholarly literature on entrepreneurial decision-making – and the consequent literature on SEB – is still fragmented (Ireland and Webb, 2009) and, at least, is limited in the following points. Firstly, few scholars have assessed the elements affecting the relationship between EO and SEB, especially with regard to the possible antecedents and predictors of such a link. In this context, entrepreneurial passion (EP) could be considered fundamental support when it comes to the success of entrepreneurial activities as this positive feeling enhances the persistence and motivation that are often associated with the role and identity of being an entrepreneur (Cardon *et al.*, 2009, 2013). As such, it seems relevant to investigate the role of EP as a possible significant predictor of the relationship between EO and SEB. Secondly, while pertinent academic literature has mainly focused on the positive

outcomes of EO, such as the aforementioned SEB (Anderson *et al.*, 2015), less is known about the underlying micromechanisms that might influence links between entrepreneurial attitudes and behavior, at either a rational or a nonrational level. Such a limitation could be addressed through reliance on modern cognition science (Haidt, 2001; Kahneman, 2003; Stanovich and West, 2000), which increasingly stresses the key role of both conscious and unconscious information processing systems. While entrepreneurship scholars have traditionally focused on linear thinking styles, related to rational, deliberative and fully conscious cognitive processes, such a rationalist and positivist perspective is extremely reductive (Zhong, 2011; Zollo *et al.*, 2017b). Though entrepreneurs need to think rationally in everyday strategy-making decisions, nonlinear elements, such as emotive, intuitive and unconscious information processing systems, also significantly impact upon the effectiveness of entrepreneurs' strategic decision-making behavior (Vance *et al.*, 2007; Groves *et al.*, 2008, 2011; Orlandi and Pierce, 2019). This is particularly true nowadays, when cognitive rational mechanisms often fail to satisfy an entrepreneur's need to successfully exploit new market opportunities (Pellegrini *et al.*, 2016; Zollo, 2020). To fill these gaps, this research aims to answer the following research question: *how do entrepreneurs' linear and nonlinear thinking styles affect the relationship between entrepreneurial passion, orientation and strategic behavior?*

To these ends, we build on dual process theory (Kahneman, 2003) and sociointuitionism (Haidt, 2001) in order to propose and empirically test a conceptual model that unpacks the existing micromechanisms describing entrepreneurial decision-making and behavior formation. Specifically, entrepreneurs' linear and nonlinear thinking styles are hypothesized as being moderators of these links. The model is tested on a sample of 300 entrepreneurs actively involved in European SMEs. Covariance-based structural equation modeling (CB-SEM) is used to validate the model and test the hypothesized relationships. As a result, a linear thinking style emerges as a positive mediator of EO–strategic behavior links, but not of the EP. Instead, a nonlinear thinking style can be seen to enhance the relationship between EP and EO, but not the relationship between EO and SEB. This relevant interplay between rational (or linear) and nonrational (or nonlinear) thinking styles in entrepreneurship formation is relevant to both theory and practice.

In the next section, the theoretical background is introduced through the reviewing of historical and recent studies on EP, EO and SEB. The hypothesized relationships between these variables, the moderating effects of linear and nonlinear thinking styles and our conceptual model are also presented. The third section of the paper provides the research methodology used to empirically test the proposed framework. In the fourth section, the analysis and results are illustrated. Finally, the fifth section of the paper discusses the theoretical and practical implications resulting from the empirical evidence, and in the last section, limitations of the paper and suggestions for future research are presented.

2. Theoretical background and hypotheses development

2.1 Entrepreneurial passion

Seminal research on entrepreneurship has assessed the relationship between entrepreneurship and economic growth (Wright and Stigliani, 2013). Accordingly, entrepreneurship has been identified as (1) a factor nurturing the economical sustainability of lesser developed countries; (2) an element influencing regional GDPs' growth through the creation of new jobs (Fayolle, 2007); (3) a response to unemployment (Baptista and Thurik, 2007); (4) a key driver of innovation (Audretsch, 2012); and (5) a means of female empowerment (Laudano *et al.*, 2019; Ramadani *et al.*, 2015). Entrepreneurship is therefore a social phenomenon characterized by a social function. Scholarly attention has increasingly turned toward the "person" behind entrepreneurship-related phenomena, namely the *entrepreneur* (Zollo *et al.*, 2016). According to Knight (1921), an entrepreneur is someone that

is willing to tolerate economic risk in order to commercialize something new to the market and thus obtain a profit. Moving on from these assumptions, research has been refined over the years in order to include the multifaceted traits of entrepreneurs while observing the drivers influencing their success or lack of success. For example, successful entrepreneurs commonly share several personality characteristics, such as a willingness to make business-related risks, openness toward new ideas and innovation, consciousness with regard to duties and tasks and high levels of empathy (Greenwood and Suddaby, 2006). Among the personal elements linked to entrepreneurial success, a pivotal role has been recently attributed to EP. According to Cardon *et al.* (2009, p. 517), passion is “consciously accessible, intense positive feelings experienced by engagement in entrepreneurial activities associated with roles that are meaningful and salient to the self-identity of the entrepreneur.” EP is then a powerful and positive feeling deriving from strong identification with specific entrepreneurial activities (Cardon *et al.*, 2013). Thus, passion within the entrepreneurial realm encompasses two main dimensions: affect and self-identity. With regard to the first, affect includes positive feelings, such as joy, zeal, deep longing and the willingness to succeed in an entrepreneurial venture (Cardon and Kirk, 2015). Passion, therefore, derives from intense cause-related emotions that encourage entrepreneurs to think and act. Instead, the self-identifying concept is related to entrepreneurs’ inner identification with entrepreneurial activities and their cognitive understanding of the personal meaning of being an entrepreneur (Bao *et al.*, 2017). Such a subjective perception of oneself as an entrepreneur – in spite of a white-collar worker or a manager – arises as a key factor arousing passion (Vignoles *et al.*, 2006). As a result, it is possible to observe the ways in which passion might significantly influence an entrepreneur’s active involvement in their job. This intense feeling is capable of generating motivational energy in entrepreneurs, stirring their tenacity, initiative and determination amidst difficulties (Cardon *et al.*, 2017). From this perspective, Breugst *et al.* (2012) and Cardon *et al.* (2013) have identified that passion (1) influences entrepreneurs to improve what they are doing during their daily routines; (2) keeps them focused on the success of their ventures, even when they are not working; and (3) makes them feel positive about the future.

EP manifests itself through three main domains, which correspond to three different identities that entrepreneurs can assume from the inception of their venture (Cardon and Kirk, 2015). According to Gartner *et al.* (1999), depending on the diverse life stages of a venture, entrepreneurs self-recognize themselves differently. During the early phases of a venture, entrepreneurs commonly identify themselves as “founders” and, as such, passion for founding is the first typology of passion that entrepreneurs usually experience (Vignoles *et al.*, 2006). Passion, in such a case, is the feeling that influences the intention to establish a new venture, including the willingness to complete all of the documentation required for its incorporation and the willingness to seek funding from external sources (Cardon *et al.*, 2013). Passion then stands behind the decision to take risks and face the uncertainty and stress associated with a new venture. Recently, scholars have observed that subjects with previously successful entrepreneurial experiences tend to show higher levels of passion when it comes to founding (Newman *et al.*, 2019). The second identity that entrepreneurs usually assume is the “inventor,” which corresponds to the second typology of passion: the one for inventing. This kind of passion manifests during the initial growth of the venture, when entrepreneurs need to innovate and identify new possibilities for success. The feeling that entrepreneurs experience in this moment is related to the excitement deriving from the recognition of new opportunities emerging in the market and the joy deriving from the accessible ability to exploit them (Cardon and Kirk, 2015). Contextual factors, such as creative surroundings, might nurture a passion for inventing. These environments could indeed potentially provide individuals with new ideas when it comes areas that could be exploited. The final identity of the entrepreneur is the “developer,” which pertains to the passion that an entrepreneur might have when it comes to investing time and resources into growing his/her

business (Cardon *et al.*, 2009). Indeed, passion is a feeling that may help entrepreneurs to develop and grow their business. Among the dynamics triggering this last type of passion, Newman *et al.*, (2019) have highlighted the fundamental importance of previous business and management expertise. Thus, EP could be considered to be a harmonious and intense positive feeling, deeply influencing the founding and subsequent growth of a business by generating stimuli through which to identify and propose new opportunities (Milanesi, 2018).

In terms of outcomes, recent research on entrepreneurship and emotions, such as passion, shows that entrepreneurs characterized by higher than average levels of passion have larger networks (Davis *et al.*, 2017) and are more capable when it comes to gathering and motivating their employees (Breugst *et al.*, 2012; Newman *et al.*, 2019). In addition to this, optimism and the persistent desire (i.e. “persistence”) to succeed at one’s own ventures have been shown to be common outcomes (Milanesi, 2018). Passion is, in fact, a driver of entrepreneurial willingness when it comes to acquiring the new competencies needed to run a venture’s day-to-day operations (Biraglia and Kadile, 2017). As a result, passion can impact entrepreneurial capability with regard to reacting to change, entrepreneurial creativity and willingness to take risks.

2.2 The role of passion in entrepreneurial orientation and behavior

Consistently, pertinent scholarly literature has investigated the ways in which passion might foster EO (Wang, 2008). EO is the ability to identify new entrepreneurial opportunities and then turn them into new growth trajectories (Cardon *et al.*, 2013; Montiel Campos, 2017). This construct has been thoroughly explored at an organizational level, that is, how processes, practices and internal decision-making activities allow for the exploitation of creativity by virtue of an increased awareness, allowing entrepreneurs to generate new opportunities (Lumpkin and Dess, 1996; Kantur, 2016). However, EO also exists at an individual level, constituting the individual’s ability to adapt to new situations and reap the emerging benefits while not underscoring risks. The relationship between EO and entrepreneurial behavior has traditionally been explored through social cognitive theory (SCT; Bandura, 2012), which explains how personal traits and emotions can influence behavior, as well as inputs from the environment. Individual EO derives from a set of emotions, beliefs and willingness to succeed and is typically associated with EP. In particular, alertness deriving from passion may foster entrepreneurs’ proactiveness and their ability to detect new possibilities emerging in the market (Cardon *et al.*, 2013). Therefore, passion could affect individual EO through enhanced “entrepreneurial alertness,” which is their capacity to identify treats to the venture (Montiel Campos, 2017), and entrepreneurs’ dynamism, which is the speed at which an entrepreneur can develop new solutions to new problems or exploit new situations (Adomako *et al.*, 2016). Gerschewski *et al.* (2016) stressed that EP is related to entrepreneurs’ perseverance, which could influence their willingness to succeed, which is typical of individuals displaying EO. Building on this, we propose:

H1. EP positively influences EO.

In turn, literature has widely observed the relationship between EO and SEB, which is a set of behaviors implemented by strategy-prone entrepreneurs through their firms (Anderson *et al.*, 2019). Usually, strategic behaviors of entrepreneurs consist of the intensive pursuit of innovation through research of and reactivity to change and rapidly evolving environments, by taking greater risks than their nonstrategical counterparts. Strategic entrepreneurs are then more capable of identifying emerging opportunities and reaping any benefits from their environment, even in complex situations. Similarly, entrepreneurs are more capable of capitalizing on their own innovations (Biraglia and Kadile, 2017). According to Kollmann *et al.* (2007). According to Kollmann *et al.* (2007), EO could influence SEB, as

individuals with high levels of EO are more autonomous, proactive, competitive, aggressive and thus have the propensity to identify and exploit new opportunities.

Therefore, we propose the following hypothesis:

H2. EO positively influences SEB.

2.3 Entrepreneurs' linear and nonlinear thinking styles

The academic literature on entrepreneurial behavior, orientation and decision-making has traditionally relied on a rationalist–positivist perspective, which stresses the role of entrepreneurs' rationality when making a decision or choice or behaving in a certain way (Sonenshein, 2007; Zhong, 2011). In this way, the current conceptualization of entrepreneurial decision-making is almost fully rational, consequential, deliberative and utilitarian in nature (Pellegrini *et al.*, 2016; Zollo *et al.*, 2017b). This emphasis on logical, empirical and analytical cognitive processes has led scholars to refer to entrepreneurs' thinking style as "linear" decision-making (Vance *et al.*, 2007, p. 233; see also Groves *et al.*, 2011). However, scholars are increasingly recognizing the uncertain, unpredictable, unexpected and highly dynamic nature of the contexts in which entrepreneurs usually make decisions and choices (Groves *et al.*, 2008; Orlandi and Pierce, 2019; Pellegrini *et al.*, 2016). In such contexts, managers' and entrepreneurs' nonlinear "thinking patterns as intuition, emotional assessments, creativity, holistic evaluation, imagination and visualization, and insight" assume a key role (Vance *et al.*, 2007, p. 233; see also Sadler-Smith and Shefy, 2004). In fact, according to Vance *et al.* (2007, p. 168), the linear thinking style, composed of reason, logic and rationality, "is less useful for understanding complex and unpredictable nonlinear systems."

As a consequence, scholars agree that modern socioeconomic circumstances require entrepreneurs and managers to rely heavily on their emotions and intuitions, also known as "gut feelings" and "hunches" (Zollo, 2020, p. 2). Pertinent scholarly literature defines intuition as "thoughts and preferences that come to mind quickly and without much reflection" (Kahneman, 2003, p. 697). Hence, decision-makers' nonlinear thinking emerges quickly, effortlessly and automatically. Moreover, intuition has been defined as a cognitive conclusion, resulting from decision-makers' "previous experiences and emotional inputs" (Burke and Miller, 1999, p. 92), thus stressing the affective/emotive component of nonlinear thinking (Zollo *et al.*, 2018). On the contrary, linear thinking is mainly characterized by slow, thoughtful and deliberative cognitive information processing (Haidt, 2001). Furthermore, linear thinking is typically used by decision-makers to rationally re-evaluate and justify their decisions and behavior (Sonenshein, 2007; Woiceshyn, 2011). This "dual" process model of decision-making (Kahneman, 2003; Stanovich and West, 2000) has thus acquired more and more acknowledgment in literature on entrepreneurial cognition (Dane and Pratt, 2007; Zhong, 2011). On the one hand, decision-makers' rational and deliberative cognitive processes play an important role in making decisions, influencing behavior and being intentional, controllable and consciously accessible. At the same time, decision-makers' emotive and intuitive cognitive processes represent a key counterpart in these information processing systems, being fast, effortless, automatic and unconscious (Dane and Pratt, 2007; Sonenshein, 2007). This perspective – "two minds in one brain" (Evans, 2008, p. 268) – is consistent with what cognition scientists call the "systems framework" (Haidt, 2001; Kahneman, 2003; Stanovich and West, 2000). *System 2* refers to the *linear*, rational and deliberative information processing system of decision-makers, while *System 1* refers to the *nonlinear*, emotive and intuitive cognitive system of decision-makers (for a review see Zollo *et al.*, 2017b). Specifically, System 1 might be interpreted as "An experiential and unconscious system of innate, rapid, parallel, automatic, instinctive behaviors, and information processing," and System 2 as "The slow, controlled, logical, and sequential general purpose reasoning system of conscious, abstract, hypothetical, and algorithmic thinking" (Zollo, 2020, p. 6).

Consistent with the aforementioned, one of the most widely acknowledged psychological theories stressing the importance of intuition and emotion in decision-making is Haidt's (2001) sociointuitionism. Haidt stressed the *a priori* role of emotive and intuitive cognitive processes, resulting in a judgment, which will be *post hoc* deliberated by rational cognitive processes. Although these mechanisms of cognition are simultaneous and work in parallel (Kahneman, 2003; Stanovich and West, 2000), the sociointuitionist model emphasizes the importance of nonrational and unconscious information processing systems, namely emotive and intuitive processes leading to "affect-laden intuitions" (Haidt, 2001). Thus, the "emotional unconscious" represents one of the main drivers of a decision-maker's information processing system (Zollo, 2020). Furthermore, the sociointuitionist framework also suggests that a decision-maker's judgments, resulting from emotive and intuitive insights, will significantly impact upon other decision-makers' choices and behaviors (Haidt, 2001). Building on this, Zollo (2020) recently theorized that emotions and intuition – decision-makers' System 1 – are key drivers of interpersonal persuasion and social influence in ethical decision-making. Such a psychological perspective has been increasingly used by business scholars interested in better investigating the role of emotion and intuition in decision-makers, managers and entrepreneurs (Dedeker, 2015; Schwartz, 2016; Woiceshyn, 2011). Through this, the role of the nonlinear thinking style of entrepreneurs and managers has been increasingly emphasized by recent scholars (Orlandi and Pierce, 2019; Zollo *et al.*, 2018).

Building on this, we attempt to unpack entrepreneurs' decision-making by hypothesizing that it is not only the linear thinking style (System 2) that is a significant underlying mechanism of entrepreneurs' cognition, but also that the nonlinear thinking style (System 1) might represent an important cognitive counterpart able to explain how EP, EO and behavior work together. Specifically, we hypothesize that the conditional effect of passion on EO and, in turn, conditional effect of EO on SEB differ depending on different levels of an entrepreneur's linear and nonlinear thinking style. In fact, the aforementioned definition of EP (Cardon *et al.*, 2009) significantly stresses the role of feelings and experience in motivating entrepreneurs' decision-making, orientation and behavior. Hence, it seems reasonable to hypothesize that key elements of nonlinear thinking – such as emotions and intuition – have a significant effect on the relationships between EP, EO and consequent strategic behavior. According to Dane and Pratt (2007), intuition is composed of two subelements: intuiting and emotional processing. "Intuiting allows decision makers to unconsciously and holistically elaborate external stimuli to make rapid and intuitive judgments when facing dynamic, uncertain, and fast-changing situations requiring immediate cognitive holistic associations" (Zollo, 2020, p. 6), and emotional processing expresses the experiential state of decision-makers by channeling intuition toward conscious reasoning. As a result, the passion, EO and SEB of entrepreneurs are all likely to be highly impacted by nonlinear thinking during unpredictable and unstable socioeconomic situations (Pellegrini *et al.*, 2016). Because System 2 represents the simultaneous and parallel cognitive counterpart to System 1 (Haidt, 2001), it is also plausible to hypothesize a significant moderating influence of entrepreneurs' key elements of linear thinking, such as logical, analytical, hypothetical and rational deliberation, on their passion, their orientation and ultimately their behavior. Specifically, linear thinking allows entrepreneurs to intentionally and consciously deliberate critical situations by making rational decisions (Zollo, 2020). As a result, an interplay (Woiceshyn, 2011; Zollo *et al.*, 2017b) between linear and nonlinear cognitive mechanisms influences the underlying links between entrepreneurs' passion, orientation and resulting behavior.

Hence, the following hypotheses are proposed:

H3a. Entrepreneurs' linear thinking style significantly moderates the relationship between EP and EO.

- H3b. Entrepreneurs' linear thinking style significantly moderates the relationship between EO and SEB.
- H4a. Entrepreneurs' nonlinear thinking style significantly moderates the relationship between EP and EO.
- H4b. Entrepreneurs' nonlinear thinking style significantly moderates the relationship between EO and SEB.

2.4 Hypothesized model

In order to answer to our research questions – which concern the impact of linear and nonlinear entrepreneurial thinking styles on the relationships between EP, EO and SEB – we have developed the conceptual model illustrated in Figure 1.

As shown in Figure 1, EP is hypothesized to be a predictor of EO, which, in turn, is considered to be an antecedent of SEB. Specifically, entrepreneurs' linear (System 2) and nonlinear (System 1) thinking styles are proposed to be moderators of these relationships. In this way, we attempt to unpack the cognitive underlying mechanisms of entrepreneurs' decision-making, orientation and behavior.

3. Research methodology

3.1 Sampling

The *Prolific* data collection online platform (Rialti *et al.*, 2019) was used to distribute an electronic link to our survey, which was directed to entrepreneurs actively involved in European SMEs. The respondents returned 300 completed and useable questionnaires, a response rate of 36.8%, in line with previous studies' entrepreneur response rates. 156 (52%) were men and 144 (48%) were women. Most were 30–40 years old (56.2%), and most were from the most “entrepreneurial countries” of Europe [3], such as the United Kingdom (19.5%), the Netherlands (18.8%), Scandinavia (14.2%) and Germany (12.6%). The sample demographics are reported in Table 1.

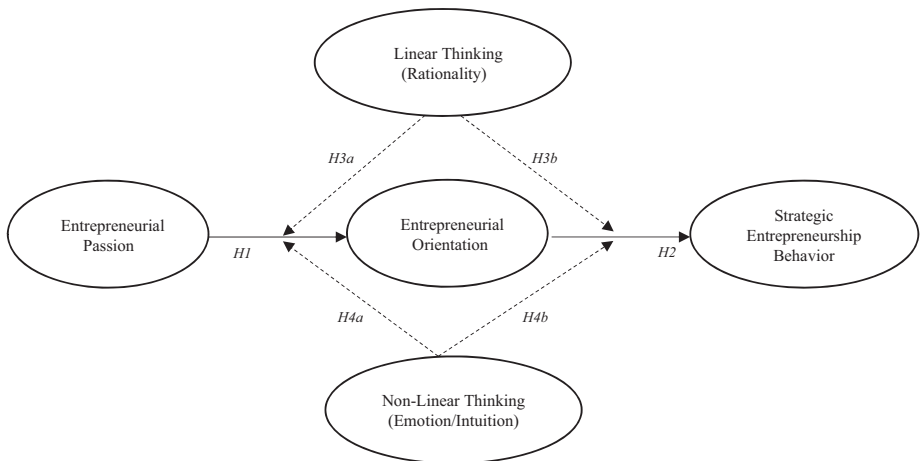


Figure 1. Conceptual model

Note(s): Dotted lines indicate the hypothesized moderating effects in the conceptual model

Nationality	UK	Netherlands	Scandinavia	Germany	France	Italy	Austria	Spain
	19.5%	18.8%	14.2%	12.6%	9.6%	8.9%	8.4%	8.0%
Industry	Construction	Education	Finance	Healthcare	IT	Manufacturing	Retail	Transport
	6.3%	15.5%	13.0%	16.2%	15.8%	16.3%	9.5%	7.4%
Company dimension (million €)	< Mln	1 < Mln < 5	6 < Mln < 9	10 < Mln < 49	50 < Mln < 99	>100 Mln		
	35.9%	22.5%	4.9%	16.2%	3.6%	16.9%		
Company longevity (years)	Start-up (<1 y)	1 < y < 5	6 < y < 10	11 < y < 15	16 < y < 20	>20 y		
	15.5%	18.6%	19.2%	14.2%	10.3%	22.5%		

Table 1.
Sample demographics

3.2 Measures

We developed a structured questionnaire composed of 40 items (observed variables) related to our five main latent variables, namely EP, EO, SEB and linear and nonlinear thinking styles. All of the items sought to capture “individual-level” entrepreneurial characteristics (either cognitive or attitudinal/behavioral) and were previously validated by pertinent academic literature. Seven-point Likert scales were used, ranging from completely disagree (1) to completely agree (7). In addition to this, we also used control variables, such as gender, age, country of origin, firm size and so on, in an attempt to alleviate potential demophysiological differences in our respondents.

EP was measured using the 13-item scale used by [Cardon et al. \(2013\)](#) (e.g. “It is exciting to figure out new ways to solve unmet market needs that can be commercialized”).

EO was captured using the original subdimensions of [Lumpkin and Dess, \(1996\)](#): innovativeness, proactiveness and risk-taking propensity (see also [Covin and Slevin, 1988](#)). Specifically, we used the recently adapted scale of [Laskovaia et al. \(2019\)](#): EO–innovativeness was thus a three-item scale (e.g. “In general, I favor a strong emphasis on R&D, technological leadership, and innovations in my firm”); as was EO–proactiveness (e.g. “In dealing with my competitors, I am very often one of the first to introduce new products/services, administrative techniques, operating technologies, etc. in my business”); and EO–risk-taking (e.g. “When confronted with decision-making situations involving uncertainty, I typically adopt a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities of my firm”).

We measured SEB using the methods used by [Kantur \(2016\)](#): this nine-item scale directly assesses the actual entrepreneurial behavior of the respondents (e.g. “I adopted new strategies to exploit new opportunities in my firm” or “I adopted flexible organizational structures to foster innovation in my firm”).

Finally, to measure entrepreneurs’ linear and nonlinear thinking styles, we used the ten-item method developed by [Vance et al. \(2008\)](#), which aims to assess the importance given by respondents to cognitive elements such as intuition/emotion (System 1) and rationality/logic (System 2) in decision-making. Linear thinking style was measured on a five-item scale (e.g. “I primarily weigh quantitative factors when making a decision about a large purchase or investment, such as my age, budget needs, or future earnings”); as was nonlinear thinking style (e.g. “I primarily rely on my feelings when making career decisions”).

4. Analysis and results

4.1 Means, scale reliabilities and correlation analysis

In [Table 2](#) we present the scales’ means, standard deviation and reliabilities values, as well as the correlation analysis results.

Variable	M	SD	CR	AVE	1	2	3	4	5
1. Ent passion	4.88	1.26	0.865	0.700	(0.93)				
2. Ent orientation	3.90	1.46	0.798	0.680	0.399*	(0.89)			
3. SEB	3.96	1.59	0.720	0.625	0.474*	0.615*	(0.91)		
4. Linear thinking	5.34	1.13	0.677	0.510	0.330*	0.176*	0.235*	(0.70)	
5. Nonlinear thinking	4.51	1.35	0.688	0.515	0.222*	0.152*	0.092	−0.203*	(0.83)

Table 2. Correlation matrix, validity and reliability of the constructs

Note(s): * $p < 0.01$

Cronbach’s alpha values on the diagonal. CR: composite reliability; AVE: average variance extracted
M = Mean; SD: standard deviation; Ent passion: entrepreneurial passion; Ent orientation: entrepreneurial orientation; SEB: strategic entrepreneurial behavior

As Table 1 shows, linear thinking style had the highest mean ($M = 5.34$; $SD = 1.13$), followed by non-EP ($M = 4.88$; $SD = 1.26$) and nonlinear thinking ($M = 4.51$; $SD = 1.35$). All variables were acceptable in terms of reliability, showing Cronbach alpha's values ranging between 0.70 (linear thinking) and 0.93 (EP). Hence, all variables were retained in the following analyses. As expected, in the correlation analysis, linear and nonlinear thinking styles were negatively correlated ($r = -0.203$; $p < 0.01$). The highest Pearson's r values were between EO and SEB ($r = +0.615$; $p < 0.01$) and EP and SEB ($r = +0.474$; $p < 0.01$), thus confirming the positive linear correlation between our entrepreneurship-related variables. Interestingly, there was no significant correlation between SEB and nonlinear thinking ($p > 0.10$), which, instead, was significantly correlated with EP ($r = +0.222$; $p < 0.01$).

4.2 Measurement model and confirmatory factor analysis

For the first step of the CB-SEM analysis, we assessed the validity and psychometric properties of our hypothesized model by conducting a confirmatory factor analysis (CFA) with the AMOS software (v.25; Arbuckle, 2011). The maximum likelihood function of AMOS was used to estimate parameters, such as the factor loadings and covariances of the proposed five-construct (EP, EO, SEB and linear and nonlinear thinking styles) model. Firstly, we built a measurement model and examined the goodness-of-fit measures to verify the acceptable parsimony of the analyzed model (Bagozzi and Yi, 1988). In terms of absolute fit indexes, the relative Chi-square suggests a good fit with a T -test of $\chi^2/df = 2.55$ (lower than 3, as required). In addition, the goodness-of-fit index (GFI) (0.951) suggests a good fit. Finally, the root mean square error of approximation (RMSEA) of 0.046 suggests an acceptable model fit of less than 0.07, as required. In terms of the relative fit indexes, the most commonly used were the comparative fit index (CFI), the incremental fit index (IFI), the normed fit index (NFI) and the Tucker–Lewis index (TLI), also known as the nonnormed fit index. As a result, the model indicates acceptable fit indexes (CFI = 0.972; IFI = 0.958; NFI = 0.950; TLI = 0.961), all above 0.90.

The measurement model showed that all factor loadings – the path coefficients between the indicators and the latent variable – were significant ($p < 0.01$). To assess the internal consistency of the indicators, we estimated the composite reliability (CR) for each latent construct. CR values higher than 0.6 are required (Bagozzi and Yi, 1988). As shown in Table 2, all of our variables showed acceptable CR values ranging from 0.677 (linear thinking style) to 0.865 (EP). Convergent validity was assessed through the average of variance extracted (AVE), which estimates the indicators' amount of variance accounting for the latent construct (Fornell and Larcker, 1981). AVE values higher than 0.5 indicate good convergent validity (Bagozzi and Yi, 1988). All constructs show acceptable values of AVE, higher than 0.7, as reported in Table 2. Moreover, to assess the models' discriminant validity, the square root of the constructs' AVEs had to be greater than the correlations between the model constructs (Fornell and Larcker, 1981). The square roots of all constructs' AVEs are greater than the correlations reported in Table 1, thus indicating acceptable discriminant validity. The overall fit indexes of the model and the reliability and validity analysis suggest an acceptable model fit (Jamali *et al.*, 2019; Zollo *et al.*, 2019).

Finally, we considered the presence of common method bias (CMB) following the procedures suggested by Podsakoff *et al.* (2003). Firstly, we pretested the scales to delete unclear items from the questionnaire. Secondly, we conducted Harman's one-factor test, which failed to identify a general factor that accounted for the majority of the total variance, although this was equal to 28.65%. Next, we conducted a CFA to compare our proposed model with a model loading all items onto a common method factor: the "one-factor model" (Podsakoff *et al.*, 2003). The comparison yielded a significant change in Chi-square. As

required, the χ^2 difference test with one degree of freedom was greater than 3.84, which is the critical value associated with $p = 0.05$. Our proposed model showed a superior fit to the data with regard to the “one-factor model” (Podsakoff *et al.*, 2003), thus suggesting that CMB was unlikely to be a significant threat (Faraoni *et al.*, 2019; Nosi *et al.*, 2020; Rialti *et al.*, 2020; Zollo *et al.*, 2017c).

4.3 Hypotheses testing

In the second step of the CB-SEM analysis, AMOS (v.25; Arbuckle, 2011) was used to estimate a structural model through which to assess the hypothesized path coefficients between the constructs. Firstly, we assessed the absolute and relative fitting indexes of our proposed structural model (Figure 1). For the absolute fit indexes, the relative Chi-square (χ^2/df) = 2.42 was below the cutoff value of 3.0, as required. The GFI (0.962) was higher than 0.90, as required. The RMSEA of 0.040 was satisfactory as a value below 0.07 is expected for an acceptable fit. In addition to this, the relative fit indexes were above 0.90 (CFI = 0.979; NFI = 0.974; IFI = 0.960; TLI = 0.968), suggesting an adequate model fit (Bagozzi and Yi, 1988). We could therefore proceed with our estimation of the hypothesized relationships and the moderation analysis.

Figure 2 reports the results of the estimated coefficients of the structural equation model analysis.

Firstly, we assessed the relationships between EP, EO and SEB (H1 and H2). As shown in Figure 2, EP had a significant and positive effect ($\beta = +0.38, p < 0.01$) on EO, thus providing statistical support for H1. Similarly, EO had a strong and positive effect ($\beta = +0.75, p < 0.01$) on SEB, thus confirming H2. The explanatory power of the model was high, as illustrated by the multiple squared correlation value (R^2), which was equal to 68%. This means that the model was able to account for two-thirds of the variance of the dependent variable.

Next, we proceed with the moderation analysis (Hayes, 2017). To empirically test the moderating effect of linear and nonlinear thinking styles, we created several “interaction variables” using SPSS (v.25; Field, 2013). The moderation analysis required us to compute the

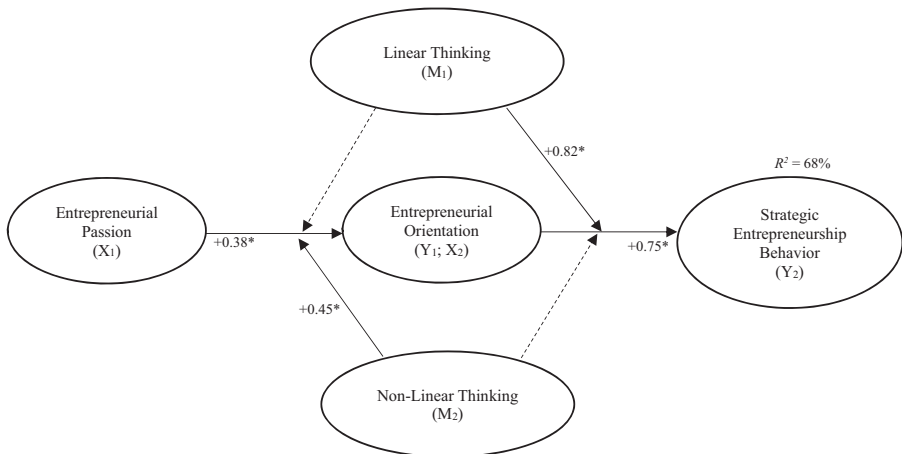


Figure 2. Results of the moderation analysis

Note(s): * $p < 0.01$
Dotted lines indicate non-significant paths. Standardized beta coefficients are reported
 R^2 : this indicates the multiple square correlation referring to the % of variance explained of the dependent variable
X: independent variable; Y: dependent variable; M: moderating variable

interaction/joint effect of the antecedent/predictor (variable X) and the moderating variable (variable M) on the dependent/outcome variable (variable Y) (Hayes, 2017; Field, 2013) [2]. We computed two interaction variables by combining EP (X_1) with linear thinking style (M_1) (ENT_PASSxLINEAR) and EP (X_1) with nonlinear thinking style (M_2) (ENT_PASSxNON_LINEAR). In this way, it was possible to calculate the hypothesized conditional effect of EP on EO (Y_1), moderated by linear thinking style and nonlinear thinking style, respectively. Next, we computed two interaction variables by combining EO (X_2) with linear thinking style (M_1) (EOxLINEAR) and EO (X_2) with nonlinear thinking style (M_2) (EOxNON_LINEAR). In this way, we could assess the hypothesized conditional effect of EO on SEB (Y_2) moderated by linear and nonlinear thinking style, respectively.

As a result of the moderation analysis, linear thinking style (M_1) had no significant moderating effect ($p > 0.10$) on the relationship between EP and EO, thus not confirming H3a; instead, linear thinking style (M_2) positively moderated the relationship between EO and SEB, which increased at $\beta = +0.82$ ($p < 0.01$). Hence, H3b was confirmed. For nonlinear thinking style (M_2), we observed an oppositional situation: this variable positively moderated the relationship between EP and EO, which increased at $\beta = +0.45$ ($p < 0.01$), but had no significant moderating effect ($p > 0.10$) on the EO/SEB relationship. Thus, H4a was confirmed, but not H4b. Overall, the results indicated a significantly higher impact of EP on EO for high levels of nonlinear thinking style (but not linear thinking) and a significant higher impact of EO on SEB for high levels of linear thinking style (but not nonlinear). In other words, entrepreneurs' System 1 cognitive processes positively moderated the relationship between EP and EO, but had no significant effect on the EO/SEB relationship, while entrepreneurs' System 2 positively moderated the relationship between EO and SEB, showing no significant effect on the relationship between EP and EO.

5. Discussion and implications

5.1 Theoretical implications

This research contributes to entrepreneurship literature in several ways. Our empirical results expand the stream of literature concerning positive emotions – such as EP – and entrepreneurship. In fact, while extant literature has already explored the existing relationship between EO and SEB, scholars have largely neglected the possible antecedents of such a link (Ferreira *et al.*, 2015). Our findings show that EP is a relevant predictor of EO and, in turn, of SEB. It is then possible to conclude that the passion an entrepreneur shows toward their job and their enterprise might significantly influence the formation of EO and the consequent formation of SEB. In line with recent findings (Montiel Campos, 2017), entrepreneurs characterized by high levels of passion are more autonomous, innovative and proactive and are characterized by higher risk-taking propensities. Passion is truly a motivational construct that characterizes highly committed entrepreneurs in their business life with high locus of control, thus attributing meaning to their working life. These individuals will thus do their best to make their business succeed, even amidst difficulties. Consequently, passionate entrepreneurs are more prone to behave strategically and are more prone to scan the environment for new opportunities in which to invest their time and resources and pursue potential profits.

Secondly, our findings allow us to extend the field of literature on entrepreneurial thinking styles (Abatecola *et al.*, 2018). Indeed, while theoretically investigations have been conducted questioning whether or not an interplay between rational and nonrational thinking styles exists, this has been scantily tested in an empirical setting (Pellegrini and Ciappei, 2015; Laudano *et al.*, 2019; Zollo *et al.*, 2017b). With this in mind, our research extends the existing knowledge on micromechanisms driving EO and behavior both in a “conscious” and in an “unconscious” way. Building on the dual process theory (Kahneman, 2003; Stanovich and

West, 2000) and the sociointuitionist model (Haidt, 2001), our empirical findings show that a nonlinear/intuitive/emotive thinking style (or System 1) is fundamental to the transformation of EP into EO. Linear/rational thinking (or System 2) is shown to be what instigates the transformation of EO into SEB. Thus, the results show that entrepreneurs think nonrationally when passion matters more than strategy and they start to think rationally when focused on emerging opportunities and when figuring out how to exploit these in order to overcome competitors.

Findings from this research show how the process that facilitates the transition from EP to SEB is mediated by EO. Particularly, our evidences highlight the significant role of both linear and nonlinear styles in entrepreneurial decision-making and behavior formation (Pellegrini and Ciappei, 2015). Entrepreneurs, then, unconsciously change their thinking style in different phases of their decision-making. As stressed before, these results could shed some light on the understanding of which enterprises may succeed and which may experience more entrepreneur-related difficulties during their life cycle.

5.2 Practical implications

With regard to managerial and practical contributions, our results have significant implications for entrepreneurs and policymakers. Specifically, because of the emergence of entrepreneurship education among entrepreneurial universities and training education programs (Ciappei *et al.*, 2016; Laudano *et al.*, 2019), our findings stress the key role of educational investments in EP, not only on rational entrepreneurial thinking styles (Rialti *et al.*, 2017) but also on nonlinear thinking styles. These results are of relevance to universities and educators who can emphasize the need for “potential entrepreneurs” – such as students of entrepreneurial universities – to learn how to foster their passion, intuition and emotion in order to “handle uncertain and unpredictable situations, reflecting the actual modern economic scenario, thus involving students in real entrepreneurial decision-making processes” (Zollo *et al.*, 2017b, p. 281). Consistent with Franke and Lüthje (2004), a set of practical entrepreneurial courses, training and real applications should be set in university programs, with the intention of stressing – through entrepreneurs’ real cases and examples – how passion and nonrational cognitive mechanisms assume a role of key importance in modern markets, which are increasingly characterized by unpredictable, dynamic and fast-changing circumstances (see also Lüthje and Franke, 2003; Pellegrini *et al.*, 2016). Given the importance of fostering the formation of entrepreneurial mind-sets, orientations and behavior when it comes to a country’s economic growth, social innovation and general development (Etzkowitz, 2003; Laudano *et al.*, 2019), policymakers need to know what the strategic levers that most effectively impact upon these elements are. Our study sought to highlight the importance of passion and nonlinear thinking styles as new and promising cognitive and attitudinal mechanisms enabling such an entrepreneurial path.

6. Limitations and future research

In spite of our findings, this research is limited in some ways. Firstly, our results may be context-dependent as we focused on a sample composed of European entrepreneurs only. Thus, it may be prudent to replicate this research in a different country or to run a cross-country analysis (Barnard *et al.*, 2019). As stressed in existing literature, Eastern and Western people make their decisions according to different cultural values; therefore, it would be interesting to observe whether or not a different subject might yield different results. Secondly, we employed a survey-based methodology. Our responses are therefore self-reported perceptions from entrepreneurs. Accordingly, we suggest that future researchers try to adopt qualitative methodologies in order to obtain a more in-depth understanding of what may stimulate the

interplay between the two styles (i.e. external factors). It may also be useful to extend the proposed model by including a performance variable. Such an addition could provide direct insights regarding successful businesses. Another useful avenue for future researchers might be to replicate similar research by considering gender differentiation as a factor that may play a role. Gender-related differences in decision-making behavior have indeed been observed in the past (e.g. Henrich *et al.*, 2001; Buchan and Croson, 2004; Caputo *et al.*, 2016); however, the question of whether or not gender variation affects decision-making behavior is still a relatively new research field – one to which this study aims to contribute. Researchers are increasingly interested in whether or not the decision-making style typically associated with women – broadly defined as more nurturing and less authoritarian – should become a more popular style as the workplace shifts to a more team-oriented atmosphere that seems to thrive on a less direct approach (Laudano *et al.*, 2019). Business organizations should consider the possibility that a gender-based bias may not only hinder them personally but also have a detrimental effect on the organization. According to prevailing scholarly literature (Carli and Eagley, 2001; Eagly *et al.*, 2003), while men and women are equally effective in some settings, more often than not their effectiveness depends on the fit between the setting and the gender of management. The decision-making style attributed to women is favorably received in female-dominated professions and the “command and control” style typical of men is well-received in male-dominated professions. Thus, when all things are equal, men and women are equally effective. However, given the variation in work settings and workplaces, whose top managers are still more likely to be male, all things are rarely equal. Women are slightly more likely to be “transformational” leaders, serving as role models. This approach may actually be more effective in the current less hierarchical organizations, but not all workplaces are alike. The participatory style may backfire in traditional male-dominated settings, such as the military or organized sports. Conversely, the “command and control style” more typical of men may backfire in a social-service agency or retail outlet (Watson *et al.*, 1993; Walters *et al.*, 1998). Thus, the exploration of this phenomenon from this point of view may extend academic literature and provide implications for policies seeking to reduce the gender gap in entrepreneurship.

Notes

1. This study occurred before Brexit, thus including the United Kingdom in the EU.
2. As illustrated in Figure 2, the variables in the moderation analysis were labeled as follows: entrepreneurial passion = X_1 ; entrepreneurial orientation = Y_1 and X_2 ; strategic entrepreneurship behavior = Y_2 ; linear thinking style = M_1 ; non-linear thinking style = M_2 .
3. GEM 2015/2016 Global Report: <https://www.gemconsortium.org/report/gem-2015-2016-global-report>.

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Further reading

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Appendix

Linear thinking (LT)
(Vance *et al.*, 2008)

LT1) I primarily rely on logic when making career decisions
 LT2) I primarily weigh quantitative factors when making a decision about a large purchase or investment, such as my age, budget needs or future earnings
 LT3) When making important decisions, I pay close attention to when a number of people with well-justified expertise give me the same advice
 LT4) The most important factor in making life-altering changes is knowing that the change is based on objective, verifiable facts
 LT5) When my analysis and intuition are in conflict, I give precedence to my analytical reasoning

Nonlinear thinking (NLT)
(Vance *et al.*, 2008)

NLT1) I primarily rely on my feelings when making career decisions
 NLT2) I primarily weigh qualitative factors when making a decision about a large purchase or investment, such as my gut feelings or a sense that the decision is right for me
 NLT3) When making important decisions, I pay close attention when I experience a “knowing in my bones,” chills, tingling or other physical sensations
 NLT4) The most important factor in making life-altering changes (such as a career change, marriage or major relocation) is feeling it is right for me
 NLT5) When my analysis and intuition are in conflict, I give precedence to my intuitive insights

Entrepreneurial orientation (EO)

1. *EOi: innovativeness*
 2. *EOp: proactiveness*
 3. *EOr: risk-taking*
- (Covin and Slevin, 1988; Laskovaia *et al.* 2019; Lumpkin and Dess, 1996)

EOi1) In general, the top managers of my firm favor a strong emphasis on R&D, technological leadership and innovations
 EOi2) My firm has marketed very many new lines of products or services in the past five years
 EOi3) Changes in product or service lines have usually been quite dramatic
 EOp1) In dealing with its competitors, my firm typically initiates actions, which competitors then respond to
 EOp2) In dealing with its competitors, my firm is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.
 EOp3) In general, the top management of my firm has a strong tendency to be ahead of other competitors in introducing novel ideas or products
 EOOr1) In general, the top managers of my firm have a strong proclivity for high-risk projects (with chances of very high returns)
 EOOr2) In general, the top managers of my firm believe that owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm’s objectives
 EOOr3) When confronted with decision-making situations involving uncertainty, my firm typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities

Table A1.
Scales and items of the questionnaire

(continued)

Strategic entrepreneurship behavior (SEB)
(Kantur, 2016)

SEB1) Introduced new product/service lines
SEB2) Changed the rules of competition
SEB3) Adopted new strategies to exploit new opportunities
SEB4) Reorganized to foster innovation
SEB5) Adopted flexible organizational structures to foster innovation
SEB6) Moved the competition to a new platform
SEB7) Spending on new product development
SEB8) Introduced team work to foster innovation
SEB9) Introduced new product/service lines in new industries

Entrepreneurial passion (EP)
(Cardon *et al.*, 2013)

EP1) It is exciting to figure out new ways to solve unmet market needs that can be commercialized
EP2) Searching for new ideas for products/services to offer is enjoyable to me
EP3) I am motivated to figure out how to make existing products/services better
EP4) Scanning the environment for new opportunities really excites me
EP5) Inventing new solutions to problems is an important part of who I am
EP6) Establishing a new company excites me
EP7) Owning my own company energizes me
EP8) Nurturing a new business through its emerging success is enjoyable
EP9) Being the founder of a business is an important part of who I am
EP10) I really like finding the right people to market my product/service to
EP11) Assembling the right people to work for my business is exciting
EP12) Pushing my employees and myself to make our company better motivates me
EP13) Nurturing and growing companies is an important part of who I am

Table A1.

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