"I am apt to show off": exploring the relationship between entrepreneurs' narcissism and start-up innovation

Received
17th December 2018
Revised
24th July 2019
Accepted
22nd October 2019

Simona Leonelli - Federica Ceci - Francesca Masciarelli

Abstract

Purpose of the paper: *In start-ups, innovation strategies are influenced by the entrepreneur's personality. We aim to investigate such influence by exploring how entrepreneurs' narcissism affects start-ups' innovation.*

Methodology: *We integrated survey data on a cross-industry sample of 115 Italian entrepreneurs with secondary data consisting of patents, economic and financial information from a public database. The survey uses the NPI-16 scale to measure entrepreneurs' narcissism.*

Results*: Results showed a non-linear relationship between entrepreneurs' narcissism and start-ups' innovation: high and low levels of narcissism are detrimental to innovation. Moreover, we found a substitution effect between market dynamism and start-ups' innovation; the higher the level of market dynamism, the more negative the effect of entrepreneurs' narcissism on innovation.*

Research limitations: *Being based on an Italian sample, the study does not address the impact of narcissism in other cultures.*

Practical implications: *Our study identifies the mechanisms through which entrepreneurs' narcissism affects start-ups' innovation and explores how the market scenario affects the relationship between entrepreneurs' narcissism and innovation.*

Originality of the paper: *We show that narcissism might be positive for firms and identify how entrepreneurs' narcissism affects start-ups' innovation. We demonstrate that market scenario affects the relationship between entrepreneurs' narcissism and innovation, while also showing that contextual factors can reveal important contingencies. From a methodological viewpoint, we applied the Narcissistic Personality Inventory (NPI) scale to a sample of entrepreneurs. Previous work mainly used secondary data consisting of business reports and interviews, or employed the NPI in samples of MBA students.*

Key words: narcissism; innovation; market scenarios; start-ups; entrepreneurship

1. Introduction

Innovation is crucial for enabling firms' growth and survival because it enhances their ability to face competition, reduces production costs and creates dynamic capabilities (Dahlqvist and Wiklund, 2012; Eisenhardt and Martin, 2000). Start-ups are firms in the early stages of their life cycles, and their small size means that the entrepreneur is often both the founder and Chief Executive Officer (CEO) (DeTienne, 2010; Gatewood

et al., 1995), resulting in the so-called "founder-CEO duality" (He, 2008; Wasserman, 2003). Serving also as CEOs, these founders have formal and informal powers that allow them to devote the necessary resources to explore and implement promising ideas (Abebe and Alvarado, 2013). Previous literature suggests that a firm's innovative performance is strongly influenced by the entrepreneur's personality traits, i.e. extraversion, strategic orientation, and openness to experience (Baron and Markman, 2003; Kickul and Gundry, 2002; Marcati *et al.*, 2008). Scholars have examined the relationship between psychological disorders and entrepreneurship (Wiklund *et al.*, 2018), showing positive associations between entrepreneurship and dyslexia (Logan, 2009), bipolar traits (Johnson *et al.*, 2018), ADHD (Wiklund *et al.*, 2017), and mood disorders (Bogan *et al.*, 2014). However, so far there is no empirical evidence on the relationship between narcissism and the firm's innovative performance.

Drawing on the Upper Echelons Theory (UET), which underlines the importance of the top management team's traits for firm performance (Hambrick and Mason, 1984), this paper explores how entrepreneurs' narcissism affects start-ups' innovation. We consider start-ups to be an ideal empirical context for our study because the entrepreneurs' personality traits will have a direct impact on the start-ups' structure and performance, since the entrepreneur is often the founder and the CEO of the firms in start-ups. Start-ups' routines are less rigid, allowing the firms to adapt more quickly to changes in their operating environment (Bruderl and Schussler, 1990).

The most common definition of a narcissist is an individual who is arrogant, haughty and grandiose, considers him or herself superior and deserving of special treatment, requires admiration, lacks empathy, is authoritarian, takes advantage of others, and overestimates his or her abilities (Campbell *et al.*, 2004; Chatterjee and Hambrick, 2007; Rosenthal and Pittinsky, 2006; Wales *et al.*, 2013). Narcissism encompasses a broad range of entirely negative characteristics and every sort of self-absorbed and self-centered behavior. If the lack of self-knowledge and restraint prevail in the narcissistic leader, there is a danger of unrealistic goals which will be detrimental to the firm's long-run performance (de Vries, 1994; Maccoby, 2003). However, Maccoby (2003) suggests that narcissism can be productive if it involves a desire to change the world, risk taking, independent action and the passionate and persistent independent pursuit of a strategy and a vision.

We focus on entrepreneurs' narcissism for three main reasons. Firstly, narcissism (compared to the other personality traits referred to above) tends to prevail among top management, especially since the mid-1990s (Campbell and Campbell, 2009; Engelen *et al.*, 2016; Grijalva and Harms, 2014). Secondly, it has been shown that the strategic choices of narcissistic CEOs differ systematically from those of non-narcissistic CEOs. This is because the former tend to engage in types of strategic actions that destroy the status quo ante rather than in incremental elaboration (Chatterjee and Hambrick, 2007). Thirdly, narcissistic individuals emerge as leaders within groups and are quickly perceived by others to be effective and influential (Engelen *et al.*, 2016; Judge *et al.*, 2006).

Klotz and Neubaum (2016, p. 11) "encourage entrepreneurship researchers to think deeply about what aspects of the entrepreneurial context (i.e., extreme resource constraints or high market uncertainty) will activate certain dispositional tendencies in entrepreneurs". In line with this, we analyze how some market scenarios can moderate the relationship between entrepreneurs' narcissism and innovative performance.

We chose to analyze markets with different levels of concentration and dynamism, which affects entrepreneurs' managerial discretion and the effects of their personality traits on firm-level outcomes (Engelen *et al.*, 2014; Hambrick and Finkelstein, 1987). Market concentration refers to the degree of competition in one market (Jansen *et al.*, 2006; Miller, 1987). Dynamic markets are linked to unpredictability and rapid change in a start-up's environment (Dess and Beard, 1984; Duncan, 1972). In stable markets, there are fewer price wars and less competition, and firms have greater market power. Stable environments are characterized by minimal changes to customer preferences, technologies and competitive dynamics, while highly dynamic industries are characterized by a high rate of change, instability and decision uncertainty (Jansen *et al.*, 2006; Sørensen and Stuart, 2000; Wallace and Baumeister, 2002).

We based our analyses on a cross-industry sample of 115 Italian entrepreneurs. Our results suggest that there is an inverted U-shaped relationship between entrepreneur narcissism and start-ups' innovation. We considered the moderating effect of market conditions and showed that market concentration has no significant effect on the relationship between entrepreneurs' narcissism and start-ups' innovation. However, we found a substitution effect between market dynamism and start-ups' innovation in relation to entrepreneurs' narcissism.

Our study makes important contributions to research on innovation and narcissism. We investigate into the relationship between entrepreneurs' narcissism and start-ups' innovation. Previous work has only explored the relationship between narcissism and firm innovation in established firms (Wales *et al.*, 2013).

Our contribution to the narcissism literature is twofold. Firstly, we show that narcissism might be positive for firms and identify the mechanisms through which entrepreneurs' narcissism affects start-ups' innovation. Secondly, we demonstrate that the market scenario affects the relationship between entrepreneurs' narcissism and innovation and show that contextual factors can reveal important contingencies. From a methodological viewpoint, we differ from previous studies by measuring narcissism through the application of the Narcissistic Personality Inventory (NPI) scale to a sample of entrepreneurs. Previous work mainly used secondary data consisting in business reports and interviews (Chatterjee and Hambrick, 2007) or employed the NPI in samples of MBA students (Campbell *et al.*, 2004).

2. Theoretical background and hypotheses

2.1 The Upper Echelons Theory

The Upper Echelons Theory (UET) claims that firm performance, organizational change, strategy, and structure are influenced by manager's and entrepreneur's experience and personal traits (Hambrick and Mason, 1984). The proposition underlying UET is that human has bounded rationality, that is the difficulty to access, process, and use information (Hambrick, 2007). Hambrick and Mason (1984) assert that, due to these difficulties, the CEOs' cognitive bases and personality traits impact their abilities to discern (i.e., observe and distinguish the differences), percept (i.e., know reality through the elaboration of external stimuli) and interpret (i.e., give meaning through knowledge). As a result, the CEOs' experience and personality traits impacted on the analysis of the situations they face and consequently on the strategic choices they make (Hambrick, 2007). Those strategic choices refer to the expensive investments that tend to alter the firm's scope because they involve significant risks and are often used to make changes or adjustments to the firm strategy (Wang *et al.*, 2016).

The first studies on UET mainly focused on the composition, characteristics, and behavior of top management teams; however, in recent years, greater attention has been paid to shedding light on how the traits of CEOs and the way they behave impact on strategic and organizational performance (Abatecola *et al.*, 2013). The strategic and organizational outcomes that are most often investigated are diversification, innovation, international alliances and risk propensity or aversion (Abatecola *et al.*, 2013; Carpenter *et al.*, 2004; Finkelstein and Hambrick, 1996; Hambrick, 2007).

Moreover, following the suggestion of Hambrick and Mason (1984), previous studies examine observable characteristics of entrepreneurs as an indicator of their way of behaving (Abatecola and Cristofaro, 2019). Thus, demographic characteristics, such as age, culture, formal education and gender, are used for this purpose (Finkelstein and Hambrick, 1990; Miller and Shamsie, 2001; Westphal and Zajac, 1995). Other demographic characteristics are investigated to display the impact of CEO values (Berson *et al.*, 2008), motivations (e.g., Wallace *et al.*, 2010), cognitive styles (e.g., Miller *et al.*, 1998), and risk propensity (e.g., Kraiczy *et al.*, 2015) on firms performance. Despite the numerous studies that show the importance of CEO demographic characteristics, only recent studies have examined how the impact of non-visible characteristics, such as CEO personality, are related to firm performance (Wallace *et al.*, 2010). The main personality traits that are commonly investigated are the Big Five (Sosik *et al.*, 2012), core self-evaluation (Resick *et al.*, 2009; Simsek *et al.*, 2010), and hubris (Hiller and Hambrick, 2005; Li and Tang, 2010). However, only a few studies have considered the impact of narcissism (Chatterjee and Hambrick, 2007; Chatterjee and Hambrick, 2011; Nevicka *et al.*, 2011; Zhu and Chen, 2015).

2.2 Entrepreneurs' narcissism and start-ups' innovation

Start-ups need entrepreneurs with high levels of innovativeness, proactiveness and willingness to take risks to grow and survive (Piispanen *et al.*, 2017; Wales *et al.*, 2011). Narcissism is one such personal trait. Freud (1914) was the first to discuss narcissism yet he considered it a psychological disorder or pathology. Waelder (1925) suggested that narcissism is a personality trait and defined narcissistic individuals as condescending, absorbed by self-admiration, and prone to experience feelings of superiority and lack of empathy. In the present study, we consider narcissism as a personality dimension that can range between low and high levels, and we do not consider its extreme manifestations due to personality disorder (Emmons, 1987). In fact, we focus on the productive dimension of narcissism and, in line with Maccoby (2003), we define a narcissist a person with a precise vision of how to change the world; a person who acts independently and is competitive and a risk-taker; a person who pursues a vision with passion and perseverance and who has strategic intelligence. Previous papers mostly analyze the impact of entrepreneurs' narcissism on the economic and financial performance of established firms, showing that narcissistic CEOs generally exhibit very positive or very negative performance (Chatterjee and Hambrick, 2007; Ham *et al.*, 2018; Judge *et al.*, 2006; Wales *et al.*, 2013). A few recent papers have begun to tackle the relationship between narcissism and firm innovation. Gerstner *et al.* (2013) illustrate the role of CEOs' narcissism in the context of radical organizational change by considering the adoption of technological discontinuities. They also consider the moderation effect of audience engagement on executive behavior, thus showing that when audience engagement is high, narcissistic CEOs will anticipate widespread admiration for their bold actions and will therefore invest in discontinuous technology. Finally, they consider the effect of executive personality on managerial attention, demonstrating that CEOs' narcissism will influence top managers' attention to discontinuous technology and this is reflected in the firm's investments in the new technological domain. Zhang *et al.* (2017) focus on the relationship between the paradoxical traits of humility and narcissism and firm innovation in China. They show that humility and narcissism interact to enhance CEOs' effectiveness in promoting firm innovation. Kashmiri *et al.* (2017) examine the relationship between CEOs' narcissism and the firm's innovation outcome. In particular, they show that firms that are led by narcissistic CEOs are likely to exhibit a higher rate of new product introduction and a greater proportion of radical innovation in their new product portfolios. However, all these studies focus on established firms, which are different from start-ups, firstly, because in established firms, which are generally very large, the figure of the founder and CEO are not the same person. Secondly, even if they do correspond, the distance between the personality of the decision-making figure and the action that should be undertaken is very high. In fact, the former relationship is mediated by the ideas and personality of the other members of the top management team and can also be influenced by the hierarchical levels that are present in the firm. Moreover, decision-making figures are

more likely to delegate decision authority (Graham *et al.*, 2015). In contrast, in start-ups, which are very small and agile, the entrepreneur is often both the founder and the CEO, and his/her personality has a direct impact on the choices and strategic actions that he/she undertakes (DeTienne, 2010). This because there are very few members in the top management team, or there may not be a top management team, or there may not be any high hierarchical levels that mediate the above relationship. Finally, Smith and Webster (2018) suggest that grandiose narcissism indirectly influences innovation through adaptability (i.e. the emotional control of people in changing environments or in case of crises or ambiguous situations). However, they tested their hypothesis on undergraduate students and working adults, not on entrepreneurs. We therefore claim that there is no empirical evidence of the relationship between narcissism and start-ups' innovative performance.

To explore the role of narcissism in enabling innovation, we identified three mechanisms through which narcissism works: (i) the charisma effect; (ii) the visionary effect; and (iii) the autocratic effect. The charisma effect helps the narcissist to raise capital easily and to obtain reassurance and support from followers. For example, when a narcissist pitches an idea to an investor or to his or her peers, this is invariably rewarded with agreement and support even if it is not particularly outstanding (Goncalo *et al.*, 2010). The audience (e.g., investors) is convinced and reassured by the narcissistic entrepreneur's personal capability (Elsbach and Kramer, 2003; Grijalva and Harms, 2014). This support and the extra financial input in particular, is fundamental in enhancing innovation. Moreover, the charisma effect inspires team members; entrepreneurs intrinsically motivate peers or employees to search for new approaches, solutions and creative ideas (Jung *et al.*, 2003; Keller, 2006; Obschonka and Fisch, 2018; Sosik *et al.*, 1998). However, the charisma effect reaches a turning point when its positive effect turns negative. In particular, risk tolerance and persuasiveness can turn into manipulative behavior, which is detrimental to innovation because being pushed towards a new idea might be negatively perceived by peers and employees, and therefore discourage their innovative activity (Mura *et al.*, 2013). Further, enthusiastic and entertaining behavior can become attention-seeking behavior that distracts both the entrepreneur and the organization from their mission. There is evidence suggesting that narcissists capable of charming their followers become addicted to their devotion and their desire for approval fosters a distortion of reality in order to prolong their "high" (Chamorro-Premuzic, 2012). Finally, extreme creativity, which is revealed when the charismatic effect is exhausted, can allow narcissistic entrepreneurs to think and act in an eccentric manner that can threaten their effective pursuit of business goals (Vergauwe *et al.*, 2018).

The visionary effect refers to how narcissistic entrepreneurs see the future and perceive opportunities. Generally, narcissistic people, since they are creative, are effective at devising novel solutions to complex problems and do not envisage any difficulties (Goncalo *et al.*, 2010). Narcissistic entrepreneurs have a clear vision, which they pursue at any cost; according to Sosik *et al.* (1998), a clear and challenging vision enhances the creative

and innovative output of peers and employees. However, the visionary effect can become negative because high levels of narcissism do not allow for any cessation of entrepreneurs' idea generation. This is detrimental, especially for start-ups, because they need to focus on a single innovative project and too many ideas result in blocked and delayed decisions (Hyytinen *et al.*, 2015; Talaulicar *et al.*, 2005). Moreover, if the ideas of a highly narcissistic entrepreneur are at odds with the start-up's vision, these efforts will focus on different objectives and not on the well-being of the new firm (Maccoby, 2003).

Finally, the autocratic effect refers to the tendency of narcissistic entrepreneurs to act independently and impose their views; a limited form of authority is good for collaborators and employees because it promotes safety and protection. There is evidence that shows that to improve innovation, autonomy should be under managerial control, meaning that managing the interactive relation between autonomy and control is fundamental in improving innovation and also important for controlling employees' motivation and self-esteem (Feldman, 1989; Volmer *et al.*, 2012). However, in this case as well, there is a turning point, in that the higher the level of narcissism, the greater the authority that is exercised, and there is evidence suggesting that high levels of authority, that is, centralization of decisional power, are detrimental to innovation (Damanpour, 1991). The entrepreneur's role is certainly fundamental for start-up growth, but collaboration, knowledge sharing and trust facilitate decision-making and eventual innovation (Talaulicar *et al.*, 2005).

Based on the above, we propose a non-linear (inverted-U shaped) relationship between narcissism and innovation. In particular, at low levels of narcissism we expect this relationship to be negative; at medium levels we expect it to be positive; and at high levels we expect it to become negative again. For these reasons, we hypothesize that:

Hypothesis 1 (H_1): Entrepreneurial narcissism is curvilinearly (inverted U-shape) related to start-up innovation.

2.3 The moderating role of market concentration and market dynamism

The industry is the setting where firms compete and make strategic choices (Yamak *et al.*, 2014). According to the UET, there are some forces inside the industry that may impact on the relationship between CEOs' traits and firm performance. According to Wangrow *et al.* (2015), the environment alters managerial discretion and this is why managers have substantially differing roles in affecting organizational performance across industries. Managerial discretion is the latitude of managerial action that is available to a decision-maker in a given situation (Hambrick and Finkelstein, 1987). Therefore, higher managerial discretion gives CEOs a wider range of options (Campbell *et al.*, 2012) and, at the same time, a greater latitude of action (Hambrick and Abrahamson, 1995). Because CEOs' goals are to sustain and improve firm performance and effectiveness (Barker *et al.*, 2001), it is interesting to investigate the dimensions that could constrain or favor CEOs' influence on organizational outcomes.

Finkelstein (2009) identifies three industry dimensions that impact on the above relationship: complexity, instability (dynamism), and munificence. In this paper, we focus on the impact of the first two dimensions.

In this work, we investigate the first element, industry complexity, by analyzing the market concentration. Market concertation refers to the degree of competition in a single market (Jansen *et al.*, 2006; Miller, 1987). Concentrated markets can affect new entrants' chances of survival due to the associated significant competition (Burke *et al.*, 2007). Firms in concentrated markets have higher margins and are protected by higher barriers to market entry (Hambrick and Finkelstein, 1987; Jansen *et al.*, 2006; Matusik and Hill, 1998). Entrepreneurs with new ventures need to be capable of organizing new, flexible combinations of complementary competencies and exploiting opportunities to cooperate with other (both new and mature) firms in the market (Vickery and Wurzburg, 1996). According to Wangrow *et al.* (2015), highly concentrated and highly regulated markets, as well as powerful external forces such as *competitors*, suppliers, and buyers, may limit managerial discretion. However, narcissists are more sensitive to context, particularly in interactive settings where they have the opportunity to demonstrate their superior performance to others and be acclaimed by their audience (Nevicka *et al.*, 2011). A highly concentrated market allows the entrepreneur to demonstrate his or her abilities to *competitors* (Engelen *et al.*, 2016). In addition, motivating and partnering facilitate innovation in concentrated markets by promoting the forging of strategic alliances and persuading *competitors* to collaborate in the pursuit of a common goal (Dess and Lumpkin, 2005; Wallace and Baumeister, 2002). We can hypothesize a complementarity effect between market concentration and entrepreneurs' narcissism to explain start-ups' innovation according to which, in the presence of a given level of entrepreneur narcissism, higher market concentration will lead to more innovation. We hypothesize that:

Hypothesis 2 (H_2): The inverted-U-shaped relationship between entrepreneur narcissism and start-up innovation is stronger in more concentrated markets compared to less concentrated markets.

Dynamic markets are linked to unpredictability and rapid change in the start-up's environment (Dess and Beard, 1984; Duncan, 1972). Stable environments are characterized by minimal changes to customer preferences, technologies and competitive dynamics, while highly dynamic industries are characterized by high rates of change, instability and decision uncertainty (Jansen *et al.*, 2006; Sørensen and Stuart, 2000; Wallace and Baumeister, 2002). Previous studies on UET have emphasized the role of environmental dynamism and its impact on performance (Henderson *et al.*, 2006; Wallace *et al.*, 2010). According to Ensley *et al.* (2006), start-ups in dynamic environments can achieve high levels of innovation if their entrepreneurs do not want to stand out from the crowd and are able to motivate the firm's employees to work together towards a common goal. Dynamic environments that require extraordinary commitment, focus and effort are well-suited to entrepreneurs who are able to recognize the possible gains of sharing responsibility and rewards with peers.

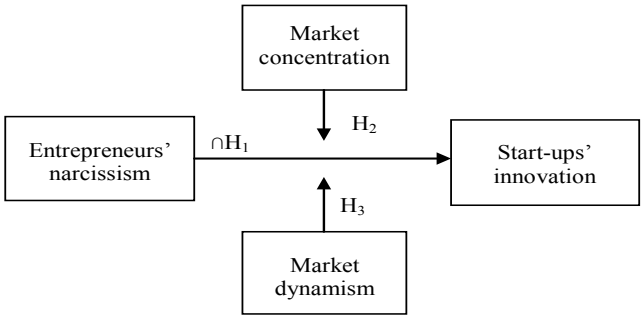
In a context characterized by high market dynamism, we expect the relationship between entrepreneurs' narcissism and innovation to be less productive than in a context of low market dynamism. An entrepreneur with an high level of narcissism motivates and reassures peers and employees while facing high levels of uncertainty in the environment; however, too much security and calmness are not conducive to rapid reactions to market changes and market evolution and can therefore penalize innovation (Baron and Tang, 2011; Judge and Piccolo, 2004). Moreover, independent and systems thinking grants the entrepreneur a high level of discretion in a context of unpredictable outcomes, limited availability of information and uncertainty (Baron and Tang, 2011; Gupta *et al.*, 2004; Judge and Piccolo, 2004); in this case, increased innovation will require team work and the sharing of credit and rewards.

These arguments suggest a substitution effect between market dynamism and the relationship between entrepreneurs' narcissism and innovation, according to which, in the presence of a given level of entrepreneur narcissism, higher market dynamism will lead to lower levels of innovation. Thus, we hypothesize that:

Hypothesis 3 (H_3): The inverted-U-shaped relationship between entrepreneur narcissism and start-up innovation is stronger in less dynamic markets compared to more dynamic markets.

The research model depicted in Figure 1 illustrates the core components of the study and how they are related.

Fig. 1: Research model



Source: Our elaboration

3. Methodology

3.1 Sample and data collection

The data for the analysis consists of survey data and secondary data from a public database, which increases external validity. Our sample is composed of Italian start-ups. The survey data were collected via a questionnaire. The first section in the survey includes the 16 items of the

NPI-16 scale to measure entrepreneurs' narcissism (Ames *et al.*, 2006). The original NPI-16 is in English and we employed a rigorous back-translation technique (Brislin, 1980) to ensure its accurate translation into Italian. The second section asks respondents for personal details such as the entrepreneur's name, age, sex and number of owned firms. We selected start-ups that were listed in the business register of Italian Chambers of Commerce and founded between 2012 and 2015, thus leading to an initial sample of 495 firms.

We contacted the start-up entrepreneurs through two channels. For those registered on LinkedIn, we used our own personal LinkedIn profiles to introduce ourselves and the study: 391 entrepreneurs (79%) responded to our invitation. We sent these 391 entrepreneurs a link to the electronic survey on levels of narcissism. In the case of those with no LinkedIn profile, we contacted them via Facebook or their personal e-mail address. We received 120 responses, 2 incomplete questionnaires, 3 which were anonymous, which meant that we could not link their responses to start-up innovation. We thus obtained 115 usable questionnaires, with a response rate of 23.23%. The survey was administered between January and November 2016; afterwards, we sent three follow-up reminder emails.

Economic and financial information were collected from the Aida database, which is a Bureau Van Dijk database that contains comprehensive information on firms in Italy. Aida data allow the research, consultation, analysis and processing of the financial information, accounts and business of all joint stock companies operating in Italy. We defined each industry using the two-digit ATECO code.

3.2 Measures

Our dependent variable, i.e. innovation, was derived from a different database in order to avoid common method bias. We used secondary data from the Italian register of patents. According to Shan *et al.* (1994), patents are an excellent measure of innovation. We decided to use a dummy variable because start-ups generally have small numbers of patents. Thus, if the value is 1 the start-up has one or more patents and zero otherwise.

We constructed the three independent variables, i.e. narcissism, market concentration and market dynamism, as follows. We measured narcissism using the 16-item NPI-16 scale that was developed by Ames *et al.* (2006) in the five-point Likert scale version (see Gentile, 2013). We conducted a Confirmatory Factor Analysis on the NPI-16 to create a measure for narcissism. To provide an indication of the reliability of our measure of entrepreneur narcissism, we computed Cronbach's Alpha to check the correlation between observed and true values. Cronbach's Alpha is equal to 0.86, above the widely accepted threshold of 0.70 (Nunnally and Bernstein, 1994).

We measured market concentration using the Herfindahl index. The formula is $H = \Sigma^{l}_{i=1} S^{2}_{i}$, where S represents the revenue market share and *i* is the index for the individual firm. Data were gathered from Aida and the Herfindahl index was calculated for each industry in the final sample (μ=1.073, σ=3.181).

Market dynamism was calculated considering the standard deviation of the annual industry (2-digit ATECO code) sales growth rate (Barelds and Dijkstra, 2010). Data for the previous four years were gathered from Aida (μ=0.063, σ=0.096).

We adopted a multilevel control as control variables. At the firm level, we used the start-up's initial capital, age, number of founders and total number of employees. At the individual level we checked the entrepreneur's age, education and previous experience of entrepreneurship. See Appendix A for more information on the control variables.

4. Results

Table 1 presents the means, standard deviations, and Spearman's correlations for the continuous and categorical variables. We checked for multicollinearity by using two important measures: tolerance and the Variance Inflation Factor (VIF). If the variables had all been completely uncorrelated to one another, tolerance and VIF would have both been 1. In our case however, they were close to 1.

Tab. 1: Descriptive statistics and correlation (N=115)

	Variable	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9
1	Entrepreneurs' narcissism	-0.000	0.929	1								
2	Market concentration	1.055	3.156	0.189**	1							
3	Market dynamism	0.062	0.096	-0.187**	-0.776***	1						
4	Start-up initial capital	3.443	0.993	0.060	0.014	-0.046	1					
5	Start-up age	3.817	0.601	0.053	0.243***	-0.284***	0.127	1				
6	Start-up number of founders	2.383	1.405	-0.118	-0.011	0.051	0.200**	0.120	1			
7	Start-up total number of employees	1.139	0.457	-0.111	-0.223**	0.238**	0.194**	-0.135	0.017	1		
8	Entrepreneur age	3.704	0.936	-0.105	0.020	0.041	0.251***	-0.230	0.033	0.098	1	
9	Entrepreneur level of education	3.043	1.252	-0.008	0.149	-0.071	0.065	0.191**	0.281***	0.075	-0.063	1

* p<0.1, ** p<0.05, *** p<0.01

Source: Our elaboration

Since our dependent variable is a dummy variable, we employed logistic regression. Table 2 presents these findings. Model 1 includes the control variables and Model 2 adds the linear and quadratic terms of entrepreneur narcissism. Models 3a and 3b respectively add the effect of market concentration and of market dynamism to Model 2. Models 4a and 4b examine the moderating effects of market concentration and market dynamism on the relationship between entrepreneur narcissism and start-up innovation.

Tab. 2: Results of regression analyses (N=113)

Start-ups' innovation	Model 1	Model 2	Model 3a	Model 3b	Model 4a	Model 4b
Control Variables						
Start-up initial capital	0.481	0.787**	0.732*	0.843**	0.827*	0.870*
Start-up age	0.848	1.325	1.157	0.934	1.045	0.563
Start-up number of founders	0.108	0.026	0.046	0.040	-0.003	0.059
Start-up total number of employees	0.722	0.300	0.546	0.379	0.489	0.718
Entrepreneur age	0.042	0.112	-0.007	-0.003	-0.081	-0.132
Entrepreneur level of education	0.296	0.152	0.242	0.105	0.324	0.357
Entrepreneur previous experience	-0.287	-0.236	-0.057	-0.320	-0.040	0.010
Main effects						
Entrepreneur narcissism		-0.897*	-0.901*	-1.018*	-2.149**	-14.110**
(Entrepreneur narcissism)^2		-1.668**	-1.531**	-1.480**	-2.399**	-7.028**
Market concentration			0.180**		0.187*	
Market dynamism				-1.040*		-15.410***
Two-way interactions						
Market concentration x Entrepreneurs' narcissism					0.308**	
Market concentration x (Entrepreneurs' narcissism)^2					0.114	
Market dynamism x Entrepreneurs' narcissism						-23.270**
Market dynamism x (Entrepreneurs' narcissism)^2						-8.560*
Constant	-8.094**	-9.123**	-9.009**	-7.623	-8.648*	-14.680**
Log likelihood	-48.554	-44.126	-40.877	-41.507	-37.525	-35.300
LR Chi2	11.40*	20.26**	26.76***	25.50***	33.46***	37.91***
Pseudo R^2	0.105	0.187	0.247	0.235	0.308	0.349

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Our elaboration

Model 2 shows that entrepreneur narcissism has both a significant negative linear effect (β=-0.897, $p < 0.1$) and a significant negative quadratic effect (β=−1.668, $p < 0.05$) on start-up innovation. This confirms Hypothesis 1, i.e. that entrepreneur narcissism is curvilinearly related to start-up innovation. To ensure an accurate interpretation of the results, the significance of the inverted U-shaped relationship was assessed by following the three-step procedure proposed in Lind and Mehlum (2010). First, we tested the joint significance of the direct and squared terms of narcissism using the Sasabuchi (1980) inverted U-shape test. Second, we checked whether the slope was sufficiently steep at both ends of the data range; we observed that (i) the effect of entrepreneur narcissism on start-up innovation does not increase at low values of entrepreneur narcissism, and (ii) the effect of entrepreneur narcissism on start-up innovation does not decrease at high values of entrepreneur narcissism. Third, we estimated the extreme point of the effect of entrepreneur narcissism and calculated confidence intervals based on Fieller's standard error and the Delta method (Lind and Mehlum, 2010).

The confidence intervals for both Fieller's standard error and the Delta method indicated that entrepreneurs' narcissism values are within the limits of the data. Table 3 shows that the inverted U-shaped relationship is significant. As a final robustness check, Model 1 includes the cubic term of entrepreneur narcissism to ensure that the quadratic term is of the highest significant to determine the shape of the relationship between entrepreneur narcissism and start-up innovation (results not reported here). However, its inclusion produced no significant results.

Tab. 3: Test of an inverted U-shaped relationship between Entrepreneurs' Narcissism and Start-ups' innovation

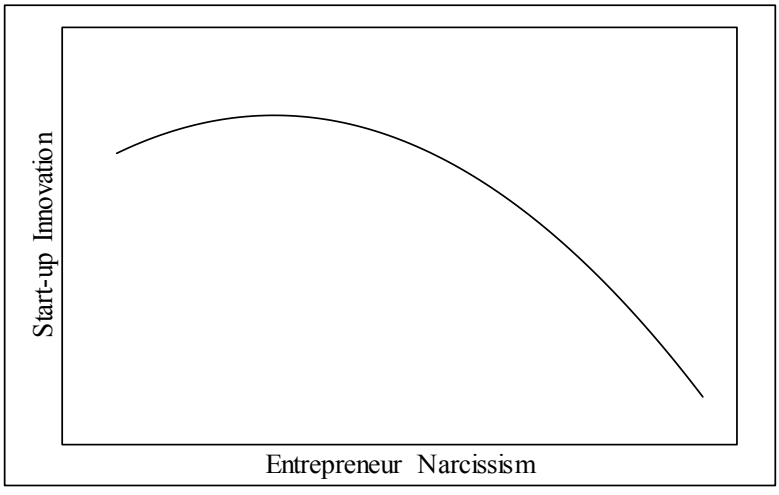
Sasabuchi test for inverse U shape		1.69 [0.0465]
Slope at X_l	$\hat{\beta} + 2\hat{\gamma}X_l =$	7.658 (-2.333) **
Slope at X_h	$\hat{\beta} + 2\hat{\gamma}X_h =$	-59.353 (1.694) **
Extremum point	$-\hat{\beta}/(2\hat{\gamma}) =$	-1.004
95% confidence interval, Fieller method		(-2.067; -0.675)
95% confidence interval, Delta method		(-1.292; -0.717)

Source: Our elaboration

Robust standard errors in parenthesis and p-values in square brackets.

Figure 2 plots the inverse U-shaped effect and shows that both very low and very high levels of narcissism are detrimental to start-ups' innovation, while medium levels of narcissism enhance innovation.

Fig. 2: The nonlinear relationship between entrepreneurs' narcissism and start-ups' innovation



Source: Our elaboration

Model 3a shows a significant positive relationship between market concentration and start-up innovation (β=0.180, $p < 0.05$). This is in line with the frequent finding on the relationship between a more concentrated market and innovation. In particular, it helps small firms to innovate and increase their innovative output because this small size allows these start-ups to react quickly to market demand (Bhattacharya and Bloch, 2004; Van Dijk *et al.*, 1997).

This is an opportunity for small firms to obtain a share of potential market power through innovation (Lind and Mehlum, 2010).

Model 3b shows a significant negative relationship between market dynamism and start-up innovation (β=-1.040, $p < 0.1$). In line with Ensley *et al.* (2006), start-ups achieve high levels of innovation in dynamic markets, depending on the entrepreneur's traits. Entrepreneurs should be outward looking, dedicated and hardworking, characteristics that can transform dynamism from being a threat to being an opportunity for a start-up.

Model 4a shows that market concentration has a non-significant moderating effect on the relationship between the quadratic term of entrepreneur narcissism and start-up innovation. Thus, the complementarity effect between market concentration and the predicted relationship between entrepreneur narcissism and innovation is not confirmed by our data; Hypothesis 2 is therefore rejected.

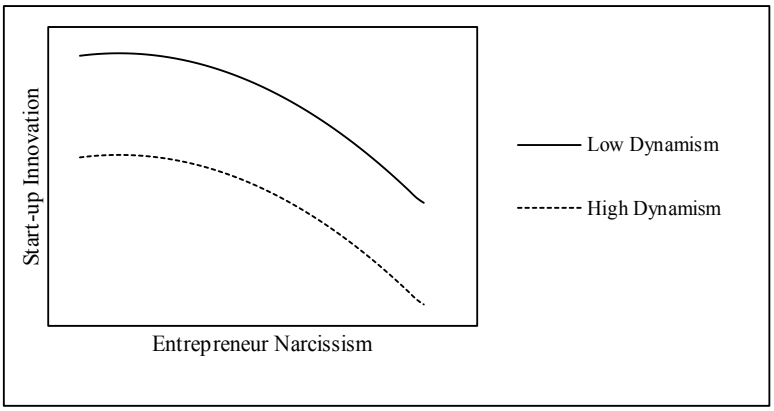
Hypothesis 3 refers to the moderating role of market dynamism on the effects of entrepreneur narcissism.

Model 4b shows that the first-order interaction between market dynamism and entrepreneurs' narcissism negatively (β = -23.270, $p < 0.05$) affects start-up innovation, and the second-order interaction is related negatively (β = -8.560, $p < 0.10$) to start-up innovation, which indicates that market dynamism weakens the effect of entrepreneur narcissism on start-up innovation (Aiken and West, 1991).

This confirms the presence of a substitution effect and the fact that market dynamism negatively moderates the relationship between entrepreneur narcissism and innovation.

To gain further insight into the interaction effects predicted in Hypothesis 3, we followed the procedure in Aiken and West (1991) to decompose the interactive terms and, following Dawson (2014), we plotted the interaction effect to facilitate interpretation (Figure 3). In the test, we split market dynamism into two groups, low (10^{th} percentile) and high (90^{th} percentile), and estimated the effect of entrepreneur narcissism on start-up innovation for both levels. Figure 3 shows a shift in the turning point of the U-shape toward the left-hand side (Haans *et al.*, 2016); this means that in industries with low annual sales growth, high levels of entrepreneur narcissism are associated to a higher probability of patent ownership, compared to high-sales growth industries.

Fig. 3: Moderation of market dynamism on the quadratic relationship between entrepreneurs' narcissism and start-ups' innovation



Source: Our elaboration

5. Discussion and conclusions

This study investigated the relationship between entrepreneurs' narcissism and start-ups innovation and how this varies with the industry context (i.e., market concentration and dynamism). We found support for the hypothesis that the relationship between entrepreneur narcissism and innovation is curvilinear (inverted U-shaped); thus, both low and high levels of narcissism are detrimental to start-up innovation, while medium levels of narcissism can increase innovation in new ventures. In terms of the moderating effect of market conditions, we found that market concentration does not have a significant effect on the relationship between entrepreneur narcissism and start-up innovation, but that market dynamism has an important, significant and negative effect on this relationship. In fact, when market dynamism is high, the relationship between entrepreneur narcissism and innovation is weaker than in the case of low market dynamism.

Our contribution to the literature is twofold. First, we examined unobservable entrepreneur traits. The previous studies investigating the link between CEOs' traits and the firm's innovation are focused on CEOs' age, tenure, and functional background (Finkelstein and Hambrick, 1990; Miller and Shamsie, 2001; Westphal and Zajac, 1995). Only a few papers underline the importance of the personality traits of the CEOs and their impact on the firm's innovation, but they rather generally consider established firms (Gerstner *et al.*, 2013; Kashmiri *et al.*, 2017; Zhang *et al.*, 2017). We fill in these research gaps by investigating entrepreneurs' personality traits, and focusing on the founder-CEOs' duality, as well as their influence on the firm's innovation - particularly in new and small ventures. This is because, in a start-up, the entrepreneur acts as founder-CEO and has a centralized decision-making process, which provides a high level of control over decisions that are made in the firm.

Second, we demonstrated that the importance of the environment in affecting the impact of entrepreneur personality traits on start-up innovation in an effort to enrich previous research. We used a famous paradox to explain our contribution: the "right" people regularly end up in the "wrong" places (Navis and Ozbek, 2016). Therefore, in order to benefit from narcissism, firms that are run by entrepreneurs with medium levels of narcissism should be located in less dynamic markets. Our results show that in the case of high levels of market dynamism, the relationship between entrepreneurs' narcissism and innovation is weaker than those in which the levels of market dynamism are low.

Our findings have some practical implications for the founders-CEOs entrepreneur of start-ups. They should understand how to develop the self-knowledge that is needed to be successful in business and they should realize the importance of forming teams composed of individuals with different and complementary personalities and strengths. Moreover, they should consider the main features of the market in which they operate because innovation can increase or decrease based on the moderating effect of these features on the entrepreneur's personality traits.

Entrepreneurs with high levels of narcissism should be aware that the environment will affect the outcomes of their start-ups: for instance, if the new venture is in a very dynamic market, narcissistic entrepreneurs should curb this personality trait or find a trusted colleague who will help to keep them rooted in reality (Maccoby, 2000). The second practical implication is for executive coaches, principally in helping them develop higher education and teaching methods. We hope that this study will help them to establish a developmental and situational view of narcissism. Although individual traits are relatively stable, life changes or role transitions can change self-views or behavioral tendencies (Caspi *et al.*, 2005; Zhang *et al.*, 2017).

According to Hoyle (2013), individuals can regulate their cognitions, motivations or behaviors when the situation requires it; therefore, coaches can consciously train entrepreneurs to adopt complementary cognitions, motivations and behaviors when necessary. Moreover, to foster innovative propensity, executive coaches should encourage individuals with a high creative inclination to apply and organize their ideas so as to apply them in the new business, while less creative individuals should be challenged to think outside of the box.

The present study has some limitations that suggest avenues for further research. Our results are based on an Italian sample, so the study does not address the impact of narcissism in other cultures. Second, the paper focused on innovation and ignored the relationship between entrepreneurs' narcissism and other measures of performance. Future research could consider the relationship between narcissism and business internationalization or capital raising. Finally, it would be worth investigating how entrepreneurs' narcissism influences or is influenced by other members of the work team.

References

ABATECOLA G., CRISTOFARO M. (2019), "Ingredients of Sustainable CEO Behaviour: Theory and Practice", *Sustainability*, vol. 11, n. 7, pp. 1-15.

ABATECOLA G., MANDARELLI G., POGGESI S. (2013), "The personality factor: how top management teams make decisions. A literature review", *Journal of Management and Governance,* vol. 17, n. 4, pp. 1073-1100.

ABEBE M., ALVARADO D.A. (2013), "Founder-CEO status and firm performance: an exploratory study of alternative perspectives", *Journal of Strategy and Management,* vol. 6, n. 4, pp. 343-357.

AIKEN L.S., WEST S.G. (1991), *Multiple regression: Testing and interpreting interactions,* Sage Publications, California (CA).

AMES D.R., ROSE P., ANDERSON C.P. (2006), "The NPI-16 as a short measure of narcissism", *Journal of Research in Personality,* vol. 40, n. 4, pp. 440-450.

BARELDS D.P., DIJKSTRA P. (2010), "Narcissistic personality inventory: structure of the adapted dutch version", *Scandinavian Journal of Psychology*, vol. 51, n. 2, pp. 132-138.

BARKER V.L.I., PATTERSON JR P.W., MUELLER G.C. (2001), "Organizational causes and strategic consequences of the extent of top management team replacement during turnaround attempts", *Journal of Management Studies*, vol. 38, n. 2, pp. 235-270.

BARON R.A., MARKMAN G.D. (2003), "Beyond social capital: The role of entrepreneurs' social competence in their financial success", *Journal of Business Venturing*, vol. 18, n. 1, pp. 41-60.

BARON R.A., TANG J. (2011), "The role of entrepreneurs in firm-level innovation: Joint effects of positive affect, creativity, and environmental dynamism", *Journal of Business Venturing*, vol. 26, n. 1, pp. 49-60.

BERSON Y., OREG S., DVIR T. (2008), "CEO values, organizational culture and firm outcomes", *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior,* vol. 29, n. 5, pp. 615-633.

BHATTACHARYA M., BLOCH H. (2004), "Determinants of innovation", *Small Business Economics*, vol. 22, n. 2, pp. 155-162.

BOGAN V.L., FERTIG A.R., JUST D.R. (2014), *Self-employment and mental health*, Available at SSRN 2259765.

BRISLIN R.W. (1980), "Translation and content analysis of oral and written material", in *Handbook of cross-cultural psychology: Methodology*, pp. 349-444, Allyn and Bacon, Boston, MA.

BRUDERL J., SCHUSSLER R. (1990), "Organizational mortality: The liabilities of newness and adolescence", *Administrative Science Quarterly*, pp. 530-547.

BURKE A., GORG H., HANLEY A. (2007), "Market concentration, market dynamism and business survival", *RP 9/07*, Cranfield University School of Management.

CAMPBELL J.T., CAMPBELL T.C., SIRMON D.G., BIERMAN L., TUGGLE C.S. (2012), "Shareholder influence over director nomination via proxy access: Implications for agency conflict and stakeholder value", *Strategic Management Journal,* vol. 33, n. 12, pp. 1431-1451.

CAMPBELL W.K., CAMPBELL S.M. (2009), "On the self-regulatory dynamics created by the peculiar benefits and costs of narcissism: A contextual reinforcement model and examination of leadership", *Self and Identity,* vol. 8, n. 2-3, pp. 214-232.

CAMPBELL W.K., GOODIE A.S., FOSTER J.D. (2004), "Narcissism, confidence, and risk attitude", *Journal of Behavioral Decision Making*, vol. 17, n. 4, pp. 297-311.

CARPENTER M.A., GELETKANYCZ M.A., SANDERS W.G. (2004), "Upper Echelons Research Revisited: Antecedents, Elements, and Consequences of Top Management Team Composition", *Journal of Management,* vol. 30, n. 6, pp. 749-778.

CASPI A., ROBERTS B.W., SHINER R.L. (2005), "Personality development: Stability and change", *Annu. Rev. Psychol.,* vol. 56, pp. 453-484.

CHAMORRO-PREMUZIC T. (2012), *The dark side of charisma,* Retrieved from https://hbr.org/2012/11/the-dark-side-of-charisma

CHATTERJEE A., HAMBRICK D.C. (2007), "It's All about Me: Narcissistic Chief Executive Officers and Their Effects on Company Strategy and Performance", *Admnistrative Science Quarterly,* vol. 52, n. 3, pp. 351-386.

CHATTERJEE A., HAMBRICK D.C. (2011), "Executive personality, capability cues, and risk taking: How narcissistic CEOs react to their successes and stumbles", *Administrative Science Quarterly,* vol. 56, n. 2, pp. 202-237.

DAHLQVIST J., WIKLUND J. (2012), "Measuring the market newness of new ventures", *Journal of Business Venturing,* vol. 27, n. 2, pp. 185-196.

DAMANPOUR F. (1991), "Organizational innovation: A meta-analysis of effects of determinants and moderators", *Academy of Management Journal,* vol. 34, n. 3, pp. 555-590.

DAWSON J.F. (2014), "Moderation in management research: What, why, when, and how", *Journal of Business and Psychology,* vol. 29, n. 1, pp. 1-19.

DE VRIES H. (1994), "The leadership mystique", *The Academy of Management Executive,* vol. 8, n. 3, pp. 73-89.

DESS G.G., BEARD D.W. (1984), "Dimensions of organizational task environments", *Administrative Science Quarterly,* vol. 29, n. 1, pp. 52-73.

DESS G.G., LUMPKIN G.T. (2005), "The role of entrepreneurial orientation in stimulating effective corporate entrepreneurship", *The Academy of Management Executive,* vol. 19, n. 1, pp. 147-156.

DETIENNE D.R. (2010), "Entrepreneurial exit as a critical component of the entrepreneurial process: Theoretical development", *Journal of Business Venturing,* vol. 25, n. 2, pp. 203-215.

DUNCAN R.B. (1972), "Characteristics of organizational environments and perceived environmental uncertainty", *Administrative Science Quarterly,* vol. 17, n. 3, pp. 313-327.

EISENHARDT K.M., MARTIN J.A. (2000), "Dynamic capabilities: what are they?", *Strategic Management Journal,* vol. 21, n. 10-11, pp. 1105-1121.

ELSBACH K.D., KRAMER R.M. (2003), "Assessing Creativity in Hollywood Pitch Meetings: Evidence for a Dual-Process Model of Creativity Judgments", *The Academy of Management Journal,* vol. 46, n. 3, pp. 283-301.

EMMONS R.A. (1987), "Narcissism: theory and measurement", *Journal of Personality and Social Psychology*, vol. 52, n. 1, pp. 11-17.

ENGELEN A., NEUMANN C., SCHMIDT S. (2016), "Should entrepreneurially oriented firms have narcissistic CEOs?", *Journal of Management,* vol. 42, n. 3, pp. 698-721.

ENGELEN A., NEUMANN C., SCHWENS C. (2014), ""Of Course I Can": The Effect of CEO Overconfidence on Entrepreneurially Oriented Firms", Entrepreneurship Theory and Practice.

ENSLEY M.D., PEARCE C.L., HMIELESKI K.M. (2006), "The moderating effect of environmental dynamism on the relationship between entrepreneur leadership behavior and new venture performance", *Journal of Business Venturing*, vol. 21, n. 2, pp. 243-263.

FELDMAN S.P. (1989), "The broken wheel: The inseparability of autonomy and control in innovation within organizations", *Journal of Management Studies*, vol. 26, n. 2, pp. 83-102.

FINKELSTEIN S. (2009), "Why is industry related to CEO compensation? A managerial discretion explanation", *Open Ethics Journal,* vol. 3, n. 1, pp. 42-56.

FINKELSTEIN S., HAMBRICK D.C. (1990), "Top-management-team tenure and organizational outcomes: The moderating role of managerial discretion", *Administrative Science Quarterly*, vol. 35, n. 3, pp. 484-503.

FINKELSTEIN S., HAMBRICK D.C. (1996), *Strategic leadership: top executives and their effects on organizations,* West, Minneapolis-St. Paul.

FREUD S. (1914), *On narcissism: an introduction. In Freud's "On narcissicm: An introduction"*, pp. 3-32, Yale University Press, New Haven, CT.

GATEWOOD E.J., SHAVER K.G., GARTNER W.B. (1995), "A longitudinal study of cognitive factors influencing start-up behaviors and success at venture creation", *Journal of Business Venturing*, vol. 10, n. 5, pp. 371-391.

GENTILE B. (2013), *Investingating alternative response sets with the Narcissistic Personality Inventory: Validation of a new Likert version*, (Doctoral dissertation), University of Georgia,

GERSTNER W.C., KÖNIG A., ENDERS A., HAMBRICK D.C. (2013), "CEO narcissism, audience engagement, and organizational adoption of technological discontinuities", *Administrative Science Quarterly*, vol. 58, n. 2, pp. 257-291.

GONCALO F.K. (2010), "Are two narcissists better than one? The link between narcissism, perceived creativity, and creative performance", *Personality and Social Psychology Bulletin*, vol. 36, n. 11, pp. 1484-1495.

GRAHAM J.R., HARVEY C.R., PURI M. (2015), "Capital allocation and delegation of decision-making authority within firms", *Journal of Financial Economics*, vol. 115, n. 3, pp. 449-470.

GRIJALVA E., HARMS P.D. (2014), "Narcissism: An integrative synthesis and dominance complementarity model", *The Academy of Management Perspectives,* vol. 28, n. 2, pp. 108-127.

GUPTA V., MACMILLAN I.C., SURIE G. (2004), "Entrepreneurial leadership: developing and measuring a cross-cultural construct", *Journal of Business Venturing*, vol. 19, n. 2, pp. 241-260.

HAANS R.F., PIETERS C., HE Z.L. (2016), "Thinking about U: Theorizing and testing U-and inverted U-shaped relationships in strategy research", *Strategic Management Journal,* vol. 37, n. 7, pp. 1177-1195.

HAM C.C., SEYBERT N., WANG S. (2018), "Narcissism is a bad sign: CEO signature size, investment, and performance", *Review of Accounting Studies,* vol. 23, n. 1, pp. 234-264.

HAMBRICK D.C. (2007), "Upper echelons theory: An update", *Academy of Management Review*, vol. 32, n. 2, pp. 334-343.

HAMBRICK D.C., ABRAHAMSON E. (1995), "Assessing managerial discretion across industries: A multimethod approach", *Academy of Management Journal*, vol. 38, n. 5, pp. 1427-1441.

HAMBRICK D.C., FINKELSTEIN S. (1987), "Managerial discretion: A bridge between polar views of organizational outcomes", *Research in Organizational Behavior,* vol. 9, pp. 369-406.

HAMBRICK D.C., MASON P.A. (1984), "Upper echelons: The organization as a reflection of its top managers", *Academy of Management Review,* vol. 9, n. 2, pp. 193-206.

HE L. (2008), "Do founders matter? A study of executive compensation, governance structure and firm performance", *Journal of Business Venturing,* vol. 23, n. 3, pp. 257-279.

HENDERSON A.D., MILLER D., HAMBRICK D.C. (2006), "How quickly do CEOs become obsolete? Industry dynamism, CEO tenure, and company performance", *Strategic Management Journal,* vol. 27, n. 5, pp. 447-460.

HILLER N.J., HAMBRICK D.C. (2005), "Conceptualizing executive hubris: the role of (hyper-) core self-evaluations in strategic decision-making", *Strategic Management Journa*l, vol. 26, n. 4, pp. 297-319.

HOYLE R.H. (2013), *Handbook of personality and self-regulation,* John Wiley & Sons, Chichester, West Sussex.

HYYTINEN A., PAJARINEN M., ROUVINEN P. (2015), "Does innovativeness reduce startup survival rates?", *Journal of Business Venturing*, vol. 30, n. 4, pp. 564-581.

JANSEN J.J., VAN DEN BOSCH F.A., VOLBERDA H.W. (2006), "Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators", *Management Science*, vol. 52, n. 11, pp. 1661-1674.

JOHNSON S.L., MADOLE J.W., FREEMAN M.A. (2018), "Mania risk and entrepreneurship: Overlapping personality traits", *Academy of Management Perspectives*, vol. 32, n. 2, pp. 207-227.

JUDGE T.A., LEPINE J.A., RICH B.L. (2006), "Loving yourself abundantly: relationship of the narcissistic personality to self-and other perceptions of workplace deviance, leadership, and task and contextual performance", *Journal of Applied Psychology*, vol. 91, n. 4, pp. 762-776.

JUDGE T.A., PICCOLO R.F. (2004), "Transformational and transactional leadership: a meta-analytic test of their relative validity", *Journal of Applied Psychology,* vol. 89, n. 5, pp. 755-768.

JUNG D.I., CHOW C., WU A. (2003), "The role of transformational leadership in enhancing organizational innovation: Hypotheses and some preliminary findings", *The Leadership Quarterly,* vol. 14, n. 4-5, pp. 525-544.

KASHMIRI S., NICOL C.D., ARORA S. (2017), "Me, myself, and I: influence of CEO narcissism on firms' innovation strategy and the likelihood of product-harm crises", *Journal of the Academy of Marketing Science*, vol. 45, n. 5, pp. 633-656.

KELLER R.T. (2006), "Transformational leadership, initiating structure, and substitutes for leadership: a longitudinal study of research and development project team performance", *Journal of Applied Psychology*, vol. 91, n. 1, pp. 202-210.

KICKUL J., GUNDRY L. (2002), "Prospecting for strategic advantage: the proactive entrepreneurial personality and small firm innovation", *Journal of Small Business Management*, vol. 40, n. 2, pp. 85-97.

KLOTZ A.C., NEUBAUM D.O. (2016), "Research on the Dark Side of Personality Traits in Entrepreneurship: Observations from an Organizational Behavior Perspective", *Entrepreneurship Theory and Practice*, vol. 40, n. 1, pp. 7-17.

KRAICZY N.D., HACK A., KELLERMANNS F.W. (2015), "What makes a family firm innovative? CEO risk-taking propensity and the organizational context of family firms", *Journal of Product Innovation Management*, vol. 32, n. 3, pp. 334-348.

LI J., TANG Y. (2010), "CEO hubris and firm risk taking in China: The moderating role of managerial discretion", *Academy of Management Journal*, vol. 53, n. 1, pp. 45-68.

LIND J.T., MEHLUM H. (2010), "With or without U? the Appropriate Test for a U-Shaped Relationship", *Oxford bulletin of economics and statistics*, vol. 72, n. 1, pp. 109-118.

LOGAN J. (2009), "Dyslexic entrepreneurs: The incidence; their coping strategies and their business skills", *Dyslexia*, vol. 15, n. 4, pp. 328-346.

MACCOBY M. (2000), "Narcissistic leaders: The incredible pros, the inevitable cons", *Harvard Business Review,* vol. 78, n. 1, pp. 68-78.

MACCOBY M. (2003), *The productive narcissist: The promise and peril of visionary leadership*, Broadway Books, New York, NY.

MARCATI A., GUIDO G., PELUSO A.M. (2008), "The role of SME entrepreneurs' innovativeness and personality in the adoption of innovations", *Research Policy*, vol. 37, n. 9, pp. 1579-1590.

MATUSIK S.F., HILL C.W. (1998), "The utilization of contingent work, knowledge creation, and competitive advantage", *Academy of Management Review*, vol. 23, n. 4, pp. 680-697.

MILLER C.C., BURKE L.M., GLICK W.H. (1998), "Cognitive diversity among upper-echelon executives: implications for strategic decision processes", *Strategic Management Journal*, vol. 19, n. 1, pp. 39-58.

MILLER D. (1987), "The structural and environmental correlates of business strategy", *Strategic Management Journal*, vol. 8, n. 1, pp. 55-76.

MILLER D., SHAMSIE J. (2001), "Learning across the life cycle: Experimentation and performance among the Hollywood studio heads", *Strategic Management Journa*l, vol. 22, n. 8, pp. 725-745.

MURA M., LETTIERI E., RADAELLI G., SPILLER N. (2013), "Promoting professionals' innovative behaviour through knowledge sharing: the moderating role of social capital", *Journal of Knowledge Management,* vol. 17, n. 4, pp. 527-544.

NAVIS C., OZBEK O.V. (2016), "The right people in the wrong places: The paradox of entrepreneurial entry and successful opportunity realization", *Academy of Management Review,* vol. 41, n. 1, pp. 109-129.

NEVICKA B., DE HOOGH A.H., VAN VIANEN A.E., BEERSMA B., MCILWAIN D. (2011), "All I need is a stage to shine: Narcissists' leader emergence and performance", *The Leadership Quarterly,* vol. 22, n. 5, pp. 910-925.

NUNNALLY J.C., BERNSTEIN I.H. (1994), *Psychometric theory (3 ed.)*, McGraw-Hill, New York, NY.

OBSCHONKA M., FISCH C. (2018), "Entrepreneurial personalities in political leadership", *Small Business Economics,* vol. 50, n. 4, pp. 851-869.

PIISPANEN V.V., PALONIEMI K., SIMONEN J. (2017), "Entrepreneurs' business skills and growth orientation in business development", *International Journal of Entrepreneurship and Small Business,* vol. 32, n. 4, pp. 515-536.

RESICK C.J., WHITMAN D.S., WEINGARDEN S.M., HILLER N.J. (2009), "The bright-side and the dark-side of CEO personality: examining core self-evaluations, narcissism, transformational leadership, and strategic influence", *Journal of Applied Psychology*, vol. 94, n. 6, pp. 1365-1381.

ROSENTHAL S.A., PITTINSKY T.L. (2006), "Narcissistic leadership", *The Leadership Quarterly,* vol. 17, n. 6, pp. 617-633.

SASABUCHI S. (1980), "A test of a multivariate normal mean with composite hypotheses determined by linear inequalities", *Biometrika*, vol. 67, n. 2, pp. 429-439.

SHAN W., WALKER G., KOGUT B. (1994), "Interfirm cooperation and startup innovation in the biotechnology industry", *Strategic Management Journal,* vol. 15, n. 5, pp. 387-394.

SIMSEK Z., HEAVEY C., VEIGA J.J.F. (2010), "The impact of CEO core self-evaluation on the firm's entrepreneurial orientation", *Strategic Management Journal,* vol. 31, n. 1, pp. 110-119.

SMITH M.B., WEBSTER B.D. (2018), "Narcissus the innovator? The relationship between grandiose narcissism, innovation, and adaptability", *Personality and Individual Differences,* vol. 121, pp. 67-73.

SØRENSEN J.B., STUART T.E. (2000), "Aging, obsolescence, and organizational innovation", *Administrative Science Quarterly,* vol. 45, n. 1, pp. 81-112.

SOSIK J.J., GENTRY W.A., CHUN J.U. (2012), "The value of virtue in the upper echelons: A multisource examination of executive character strengths and performance", *The Leadership Quarterly*, vol. 23, n. 3, pp. 367-382.

SOSIK J.J., KAHAI S.S., AVOLIO B.J. (1998), "Transformational leadership and dimensions of creativity: Motivating idea generation in computer-mediated groups", *Creativity Research Journal*, vol. 11, n. 2, pp. 111-121.

TALAULICAR T., GRUNDEI J., WERDER A.V. (2005), "Strategic decision making in start-ups: the effect of top management team organization and processes on speed and comprehensiveness", *Journal of Business Venturing,* vol. 20, n. 4, pp. 519-541.

VAN DIJK B., DEN HERTOG R., MENKVELD B., THURIK R. (1997), "Some new evidence on the determinants of large-and small-firm innovation", *Small Business Economics,* vol. 9, n. 4, pp. 335-343.

VERGAUWE J., WILLE B., HOFMANS J., KAISER R.B., DE FRUYT F. (2018), "The Double-Edged Sword of Leader Charisma: Understanding the Curvilinear Relationship Between Charismatic Personality and Leader Effectiveness", *Journal of Personality and Social Psychology,* vol. 114, n. 1, pp. 110-130.

VICKERY G., WURZBURG G. (1996), "Flexible firms, skills and employment", *Organisation for Economic Cooperation and Development. The OECD Observer*, vol. 202, pp. 17-19.

VOLMER J., SPURK D., NIESSEN C. (2012), "Leader-member exchange (LMX), job autonomy, and creative work involvement", *The Leadership Quarterly,* vol. 23, n. 3, pp. 456-465.

WAELDER R. (1925), "The psychoses: their mechanisms and accessibility to influence", *International Journal of Psycho-Analysis*, vol. 6, pp. 259-281.

WALES W.J., GUPTA V.K., MOUSA F.T. (2011), "Empirical research on entrepreneurial orientation: An assessment and suggestions for future research", *International Small Business Journal*, vol. 31, n. 4, pp. 357-383.

WALES W.J., PATEL P.C., LUMPKIN G.T. (2013), "In Pursuit of Greatness: CEO Narcissism, Entrepreneurial Orientation, and Firm Performance Variance", *Journal of Management Studies,* vol. 50, n. 6, pp. 1041-1069.

WALLACE H.M., BAUMEISTER R.F. (2002), "The performance of narcissists rises and falls with perceived opportunity for glory", *Journal of Personality and Social Psychology,* vol. 82, n. 5, pp. 819-834.

WALLACE J.C., LITTLE L.M., HILL A.D., RIDGE J.W. (2010), "CEO regulatory foci, environmental dynamism, and small firm performance", *Journal of Small Business Management*, vol. 48, n. 4, pp. 580-604.

WANG G., HOLMES JR R.M., OH I.S., ZHU W. (2016), "Do CEOs matter to firm strategic actions and firm performance? A meta-analytic investigation based on upper echelons theory", *Personnel Psychology,* vol. 69, n. 4, pp. 775-862.

WANGROW D.B., SCHEPKER D.J., BARKER III V.L. (2015), "Managerial discretion: An empirical review and focus on future research directions", *Journal of Management*, vol. 41, n. 1, pp. 99-135.

WASSERMAN N. (2003), "Founder-CEO succession and the paradox of entrepreneurial success", *Organization Science*, vol. 14, n. 2, pp. 149-172.

WESTPHAL J.D., ZAJAC E.J. (1995), "Who shall govern? CEO/board power, demographic similarity, and new director selection", *Administrative Science Quarterly,* vol. 40, n. 1, pp. 60.

WIKLUND J., HATAK I., PATZELT H., SHEPHERD D.A. (2018), "Mental disorders in the entrepreneurship context: when being different can be an advantage", *Academy of Management Perspectives,* vol. 32, n. 2, pp. 182-206.

WIKLUND J., YU W., TUCKER R., MARINO L.D. (2017), "ADHD, impulsivity and entrepreneurship", *Journal of Business Venturing*, vol. 32, n. 6, pp. 627-656.

YAMAK S., NIELSEN S., ESCRIBÁ-ESTEVE A. (2014), "The role of external environment in upper echelons theory: A review of existing literature and future research directions", *Group and Organization Management,* vol. 39, n. 1, pp. 69-109.

ZHANG H., OU A.Y., TSUI A.S., WANG H. (2017), "CEO humility, narcissism and firm innovation: A paradox perspective on CEO traits", *The Leadership Quarterly*, vol. 28, pp. 585-604.

ZHU D.H., CHEN G. (2015), "CEO narcissism and the impact of prior board experience on corporate strategy", *Administrative Science Quarterly,* vol. 60, n. 1, pp. 31-65

Appendix A: Control variables description

Variable Name	Variable Type	Description	Source
Start-up initial capital	Multinomial variable	1= from 1€ to 5,000€; 2= from 5,001€ to 10,000€; 3= from 10,001€ to 50,000€; 4= more than 50,001€	Aida and Italian register of innovative start-ups
Start-up age	Continuous variable	Reference year 2017	Aida
Start-up number of founders	Continuous variable	Number of founders	Aida
Start-up number of employees	Multinomial variable	1= from 0 to 4 employees; 2= from 5 to 9 employees; 3= from 10 to 14 employees	Aida and Italian register of innovative start-ups
Entrepreneur age	Multinomial variable	1= less than 20 years old; 2= between 20 and 29 years old; 3= between 30 and 39 years old; 4= between 40 and 49 years old; 5= between 50 to 59 years old; 6= more than 60 years old	Survey
Entrepreneur level of education	Multinomial variable	1= high school; 2= bachelor's degree; 3= master's degree; 4= MBA; 5= PhD	Survey
Entrepreneur previous experience	Dummy variable	Did you manage or found other firms? 0= No; 1= Yes	Survey

Source: Our elaboration

Academic or professional position and contacts

Simona Leonelli
Research Fellow of Management
University of "Gabriele d'Annunzio" Chieti-Pescara - Italy
e-mail: simona.leonelli@unich.it

Federica Ceci
Associate Professor of Management
University of "Gabriele d'Annunzio" Chieti-Pescara - Italy
e-mail: f.ceci@unich.it

Francesca Masciarelli
Associate Professor of Management
University of "Gabriele d'Annunzio" Chieti-Pescara - Italy
e-mail: f.masciarelli@unich.it

sinergie
italian journal of management

ISSN 0393-5108
DOI 10.7433/s110.2019.02
pp. 39-62