



Does entrepreneurs' psychology affect their business venture success? Empirical findings from North Africa

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Abstract

This paper discusses the effect of psychological traits on success. We empirically explore the effect of entrepreneurs' psychological biases on their venture success. Using a sample of Tunisian entrepreneurs and the cognitive mapping technique, our results indicate that psychology does affect business venture success. Especially, the entrepreneurial overconfidence and optimism biases can largely affect the new venture success. However, other variables, such as capital and social networks, also have strong effects on new venture success in this country. We control for gender differences and their effects on our empirical findings. For this purpose, we divide our full sample to constitute two sub-samples using the entrepreneur's gender. We find that the behavioral factors, especially overconfidence, optimism and hope, have a great impact on new venture launched by female entrepreneurs compared to male entrepreneurs. In fact, the success of new venture launched by male entrepreneurs is less affected by behavioral factors and only the overconfidence bias can have an influence and their new venture success remains dependent to their age, experience and education.

Keywords Entrepreneur psychology · Business venture success · Cognitive maps

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Introduction

The study of new venture success is of interest because entrepreneurship is a key feature of economic development, innovation and job creation (Urbano et al. 2019; Audretsch et al. 2006; Baumol 2002; Carree and Thurik 2010; Reynolds 1994). In fact, the field of new ventures' success is crucial because entrepreneurship matters for individuals, organizations and countries (Minniti and Levesque 2008).

Entrepreneurship is also a key feature in emerging markets because it can help increase the economic growth rate (Dana 2000). Although entrepreneurs act in pursuit of their own profits, they may generate benefits to the broader society in the process, for example, in terms of creating new jobs, intensifying competition, introducing innovation and increasing productivity, and entrepreneurship is considered an engine for sustainable local economic growth in emerging countries (Thurik 2013; Szirmai et al. 2011; van Stel et al. 2005).

Entrepreneurship has a great impact on the economies of developing countries, where it plays an important role over time in poverty alleviation and economic growth (Dahri and Omri 2018; Landes 1998). In fact, over 400 million individuals are owners or managers of new ventures in developing countries. However, until recently, we have understood little about entrepreneurship in developing countries (Lingelbach et al. 2005), especially the determinants of new venture success.

Creating a new venture is a process fraught with difficulty and failure (Reynolds and Miller 1992; Venkataraman et al. 1990). Studies on entrepreneurship in these countries should be oriented to investigate the factors affecting new ventures' success. In Tunisia, entrepreneurial firms represent 91% of the total number of Tunisian firms (Omri and Frikha 2014). However, according to a study by the National Institute of Statistics, the survival rate is only approximately 50%. Of a sample of 45,631 new ventures created in 2000, only 22,702 still existed by the end of 2013. Given the high failure rate of new Tunisian ventures, it is crucial to identify the factors that lead to the success of these ventures, so that policy makers can exploit these factors to devise policies and strategies for new ventures' success and development.

In Tunisia, the government plays a very important role in order to reduce failure rates among newly created business. In fact, it considers that the development of human capital is the key to entrepreneurial success. For this, the government has implemented a whole course of entrepreneurship in the various programs of Tunisian universities and even those, which are not school of business. Its objective is to make students aware in all Tunisian universities of the importance of entrepreneurship, and how to launch their own projects. As well, the government has launched training courses, which are provided by experts in entrepreneurship, and it has created business centers. A bank specialized in the financing of small projects has been created. According to official statistics and even efforts made by the government, the success rate remains low.

Research has been carried out on this problem, notably the studies by Omri and Frikha (2014) and Omri et al. (2015). The researchers concluded that entrepreneurial success is conditioned not only by the existence of financial capital but also of human and social capital. Another study by Ben Fatma et al. (2015) corroborates these results. In fact, they show that the social network is a key factor for the success of micro projects in Tunisia. This is because if an entrepreneur has enough social connections with suppliers, he can reduce the costs of purchasing raw materials and therefore reduce

the costs of these products and increases his profit margin. Thanks to its social connection with banks, it can reduce the financing costs. Even to advertise these products, in Tunisia the social network is essential to do that.

As is the case in most developing countries, capital is an important factor in entrepreneurship in Tunisia (Ben Fatma et al. 2015). It is a very influencing factor for the success of SMEs in Tunisia (Omri et al. 2015). The literature review around the determinants of new venture success in Tunisia show that the number of studies concerned with this field is very limited and the existing literature neglects the entrepreneurial psychology and the extent of its impact on new ventures success. This may contribute to explaining the high rates of failure of entrepreneurship despite all the efforts made by the Tunisian government.

The current entrepreneurship literature does not offer much insight, and even in the numerous studies on success factors for new ventures, the empirical results are often controversial and fragmented (Song et al. 2008). For example, studies by Allen and Hall (2008), Brown (2005) and Robb (2005) examine the effect of entrepreneurial characteristics' implication that access to capital, degree of novelty, location and stability with key stakeholders are important factors in ventures' success. In contrast, other research shows that new ventures created by teams are on average more successful than those founded by individuals (Cooper and Bruno 1977; Bird 1989; Kamm et al. 1990; Vyakarnam et al. 1997). Other authors argue that entrepreneurs' knowledge is a crucial asset (Vesper 1990; Robert 1990), while some studies focus on entrepreneurs' motivations (Van Praag and Cramer 2001; Collins-Dodd et al. 2004).

A major common point in previous studies on entrepreneurial success is that they implicitly assume that entrepreneurs are fully rational individuals and that they act in a rational manner according to what is commonly known as "homo economicus" (Lingelbach et al. 2005). Behavioral economics and finance theory show that entrepreneurs and individuals are generally normal (Statman 2005; Baccar et al. 2016) and are far from the homo-economicus model.

Research highlights that entrepreneurial psychology is an important factor in entrepreneurship (Baum and Locke 2004; Baron 2004; Brockner et al. 2004; De Carolis and Saporito 2006; Schneider 2005; Liang and Dunn 2008). A key feature in this new entrepreneurship theory is that it rejects the restrictive assumption of the homo-economicus entrepreneur (Ben Fatma and Ben Mohamed 2019). From this area of entrepreneurship theory "behavioral entrepreneurship theory"—we can discuss the behavioral determinants of new venture success.

In this paper, we will discuss the determinants of new ventures' success in Tunisia using the cognitive map technique to show whether success can be caused by entrepreneurial psychological bias, traditional determinants or rational and behavioral factors. In particular, we aim to determine whether entrepreneurs' psychological bias can affect new venture success.

In Section 1, we present a review regarding the determinants of new venture success from standard and behavioral entrepreneurship theory. In Section 2, we introduce our methodology, which is based on cognitive mapping, and present our structural model. In Section 3, we describe our database and the survey used for the data collection. Section 4 presents and discusses our results. Finally, Section 5 concludes.

Literature review

Studies of the predictors of new venture performance and success constitute one of the most important streams of entrepreneurship research (Cooper et al. 1994). However, identifying the determinants of new venture success is difficult and challenging (Hormiga et al. 2014) due to the divergence of methodology and results in the field of entrepreneurship theory.

The determinants of new ventures' success are discussed in a wave of research papers (Robb 2002, Brown 2005; Alstete 2008; Allen and Hall 2008; Black et al. 1996; Phonthanukitithaworn et al. 2019). These studies focus on both venture and entrepreneurial characteristics, and they report that traditional factors, such as access to capital, location, degree of innovation and stability, are key to venture success (Black et al. 1996). Teal and Hofer (2003) refer to three forms of factors that can be considered the pillars of new venture success. Namely, they find that the venture strategy, industry structure and founding entrepreneurial team are key. In a general way, a meta-analysis by Song et al. (2008) shows that the theoretical framework of new venture success consists of five elements: entrepreneurial opportunities, entrepreneurial team, entrepreneurial resources, strategic and organizational fit and performance.

There are numerous papers discussing factors that lead to venture success or failure; these studies take many different approaches and focus on multiple measures of success but are useful in identifying key factors among dimensions and are narrow in their focus (Black et al. 2009). For example, the majority of research around venture success largely ignores the effect of entrepreneurial psychological biases, such as optimism, overconfidence and other well-known cognitive biases.

The emergence of behavioral economics and finance theory can contribute to the study of the determinants of venture success. This theory assumes that entrepreneurs, as well as other economic agents, are governed by psychological, cognitive and emotional biases (Shefrin 2010; Fairchild 2005, 2007; Cassar 2010). Some studies highlight that entrepreneurs' psychology can influence entrepreneurial decision making, venture performance and venture development (Schneider 2005; Liang and Dunn 2008; Landier and Thesmar 2009; Cassar 2010; Wang et al. 2019). On this subject, it is worthwhile to revisit the determinants of venture success by addressing the potential effect of entrepreneurs' psychological biases.

In this paper, we aim to identify the key factors associated with new venture success in Tunisia. We analyze the effects of both traditional factors and well-documented behavioral factors using the cognitive mapping technique. In this section, we review the appropriate literature around (i) the classical determinants and (ii) the behavioral factors affecting venture success.

Determinants of new venture success via standard theory

The entrepreneurship literature documents several factors that can influence entrepreneurial success (Sefiani 2013). The most cited factors in entrepreneurship theory that may explain entrepreneurial success are human, financial and social capital. In fact, the majority of problems that entrepreneurs face derive from lack of skill, information, and financing sources and inadequate social networks (Bhoganadam et al. 2017).

Financial support and, more specifically, the availability of financial resources is one of the most important factors that can explain new venture success or failure. A study by Davila et al. (2003) shows that the presence of venture capital funding indicates a high probability of success. The importance of financial capital is justified by the fact that in the first step of launching a business, entrepreneurs need initial capital (Lipper and Sommer 2002). According to Aldrich and Zimmer (1986), the majority of new firms have difficulty obtaining financial capital. Financial resource scarcity can negatively affect small firms because they have limited ability to sustain economic downtrends (Gruber 2004).

Financial capital affects new venture success (Bastié et al. 2013). In fact, a new venture can fail because it does not have stable links to customers, clients and supporters when it begins its operations (Stinchcombe 1965), and it can seek these resources to avoid possible failure (Gruber 2004). The necessity of financial support (capital) is the essence of small firms' success, especially in emerging economies. This is due to poorly developed financial markets, weak institutions to distribute capital, low availability and high costs in these emerging market countries (Hitt et al. 2000).

Entrepreneurship theory also refers to the resource-based perspective (Barney 1991; Wernerfelt 1984), which argues that resource availability is a key factor in new venture success because these resources create a competitive advantage. With financial capital, standard theory teaches us that social capital is paramount in business ventures. Social capital is defined as the number of links and their intensities with economic agents, such as customers, suppliers, and banks. More specifically, Coleman (1988) defines social capital as the sum of actual or virtual resources that accrue to an individual or team via the possession of durable networks of more or less institutionalized relationships of acquaintance and recognition. Using the case of six small firms newly created in the Chinese context, Zhao and Aram (1995) find that the range and intensity of social networks influence venture success. In fact, the social network is a significant factor that can contribute to new venture success because it can facilitate access to critical resources from different stakeholders (Li and Atuahene-Gima 2002; Adler and Kwon 2002).

The effect of social networks in entrepreneurship success can be observed in their effect on identifying entrepreneurial opportunities (Lechner et al. 2016). On this subject, Chen et al. (2013) show that social network plays an important role in identifying opportunities and securing external resources. The social network is a key feature in entrepreneurial success due to its effect on small firms' performance (Lee et al. 2001) and on organizational development of new ventures (Hansen 1998).

The social network is one important factor in venture success because it has a positive impact on innovation and organizational development. A study by Hansen (1998) indicates that entrepreneurs' social networks positively affect small firms' organizational development and thus venture success and performance (Lee et al. 2001).

More recently, Leyden and Link (2013) empirically demonstrate that entrepreneurs' social networks are crucial in promoting innovation and reducing uncertainty. They argue that the social aspects of entrepreneurship increase the probability of new venture success. Neira et al. (2017) argue that the more a person has access to social networks, the greater his entrepreneurial intention will be and this will positively affect new venture success.

The contextual and cultural factors (Dana 1995; Dana et al. 2020) can also have a great impact on new venture launching and success in Tunisia (Touzani et al. 2015). In fact, the context is characterized by a bureaucratic system, autocracy, and the existence of entrepreneurial milieus such as social class, region, and geographical regions. This makes the entrepreneur's social network a critical factor of success.

Entrepreneurship theory suggests that entrepreneurs' demographic factors can play a role as determinants of venture success (Lee and Lee 2015; Reynolds et al. 2000; Sinha 1996; Kolvereid 1996). Previous works by Cragg and King (1998) and Rutherford and Oswald assert that the individual characteristics of the owner/manager influence small business success. The individual characteristics include entrepreneurs' age, gender, experience and education (Forsman 2005; Islam et al. 2011).

There are mitigating results regarding the effect of age on new venture success. While Sinha (1996) finds that successful entrepreneurs are relatively young, a study by Kristiansen et al. (2003a, b) among a sample of Indonesian entrepreneurs finds a significant relationship between entrepreneurs' age and business success and shows that older entrepreneurs are more successful than younger ones.

Entrepreneur age is a basic factor for its effect on the quality of decision making at the firm level (Ben Fatma et al. 2015). A seminal paper by Taylor (1975) argues that older decision makers are supposed to make more optimal and rational decisions than younger entrepreneurs. This is due to their ability to accurately assess the value of information. A wave of studies from the experimental psychology literature reports that younger decision makers make more risky choices than adults (Levin and Hart 2003; Harbaugh et al. 2002; Reyna and Ellis 1994). Age can also have an effect on small firms' resource allocation and use. From a psychology point of view, Ben Fatma et al. (2013) indicate that entrepreneurs' age reduces the negative effect of entrepreneurial cognitive biases and their effects on entrepreneurial decision making. Finally, entrepreneur age can reduce small firms' technical efficiency and so increase the probability of new venture survival (Ben Fatma et al. 2015).

The second demographic factor that we will study is entrepreneur gender. In fact, gender differences in the prevalence of entrepreneurship have been studied for decades (Zhang et al. 2009). The higher prevalence of entrepreneurship among men than among women is supported by numerous studies and especially in cases in which males and females have similar backgrounds (Brush 1992; Haber et al. 1987).

The relation between new venture success and entrepreneur gender suggests that women-owned business ventures have a lower propensity than men-owned ventures to realize growth and be successful (Welter et al. 2003). Generally, females are less likely to be founders of new businesses than males (Mazzarol et al. 1999) and have significantly lower entrepreneurial intention than males (Kolvereid 1996).

In this regard, comparisons are conducted between the performances of new ventures founded by males and other ventures by females (Fischer et al. 1993; Fasci and Valdez 1998; Hundley 2001; Coleman 2002; Fairlie and Robb 2009; Oppedal Berge and Garcia Pires 2019). The consensus in empirical findings is that small firms created by males are better than those created by females in terms of sales, employment, profit, income and growth.

According to Fischer et al. (1993), the observed differences are explained referring to liberal feminist theory or social feminist theory. While the first theory suggests that men are advantaged relative to women, in fact, it assumes that women have limited

access to education, professional experience and financial resources. This lack of access to resources impedes their ability to succeed. According to this theory, gender differences in performance will disappear if equal access is ensured (Gottschalk and Niefert 2011). However, the second theory suggests that differences between male and female performance exist because females differ inherently due to socialization differences. Therefore, women and men have their own attitudes toward risk and growth and pursue their appropriate goals (Gottschalk and Niefert 2011).

Other explanations are advanced by Goffee and Scase (1985) and Fairlie and Robb (2009). In fact, women are more burdened by home responsibilities and consequently work fewer hours in business than men. Similarly, Loscocco et al. (1991) report that differences in performance between males and females are derived from a lack of time and energy among women.

Human capital theory emphasizes the role of education in small firms' performance and growth (Mincer 1958; Becker 1964). More specifically, numerous studies suggest that education is one of the strongest drivers of entrepreneurial performance (Millán et al. 2013; Unger et al. 2011; Van Der Sluis et al. 2008).

The positive effect of entrepreneur education in venture success is reported by numerous studies (see Krueger 1993; Lussiers and Pfeifer 2001; Thapa 2007; Kamitewoko 2013). This positive effect derives mainly from the effect of education on new ventures' performance and future incomes (Burke et al. 2000; Van Praag et al. 2013).

According to Weick (1996), education plays a critical role in intellectual performance and helps individuals integrate and accumulate new knowledge, which improves their ability to adapt to new situations. Entrepreneurs' education can be used as a signal for suppliers of capital and thus facilitates access to financial resources (Parker and Van Praag 2006). The same signaling mechanism can be applied to attract customers and qualified employees (Backes-Gellner and Werner 2007). Kolstad and Wiig (2015) find a significant and substantial effect of an added year of primary education on entrepreneurial profitability using survey data from Malawi.

Education can also be of use in orienting entrepreneurs' behavior, as noted by Kolvereid and Moen (1997). It can also affect entrepreneurial tendency (Lüthje and Franke 2002). Education can be a governance system that controls entrepreneurs' behavior and tendencies and leads to business success. It provides a knowledge base as well as analytical and problem-solving skills; consequently, it positively influences entrepreneurial strategies (Aidis et al. 2008).

In summary, entrepreneurs' education is predicted to have an effect on new venture success and performance. In fact, recent studies show that this variable is a central factor that can increase entrepreneurs' knowledge and contribute to a venture's success (Rose et al. 2006; Djankov et al. 2007; Lussiers and Pfeifer 2001).

Another factor that can explain venture success is entrepreneurs' experience (Mazzarol et al. 1999; Metzger 2007). In fact, earlier studies indicate that entrepreneurial experience in industry and more generally all entrepreneur experiences have a positive effect on firm success (see Bates 1985, 1990; Dahl and Reichstein 2005).

The positive effect of experience on new ventures is studied referring to human capital theory (Metzger 2007). Indeed, human capital accumulates as a result of individual schooling, vocational education or professional experience (Becker 1985). According to Arrow (1962), experience is an important source of learning and can help individuals solve problems.

Entrepreneurs' experience seems to have a positive effect on new venture success (Kaplan and Schoar 2005; Sorensen 2007; Gompers et al. 2008). There are several explanations for this positive effect on venture success; above all are the positive effects of experience on business performance, opportunity detection and its negative effect on what is commonly called the "over-optimism" effect.

The positive effect of entrepreneur experience on business performance can be observed in the works of Cooper et al. 1994; Cressy 1996; Lee and Tsang 2001; Santarelli et al. 2006. These studies find that entrepreneurs with previous experience as top managers in the same sector perform better than inexperienced ones. This is because they have better access to information (Santarelli and Vivarelli 2006).

Experienced entrepreneurs can perform better than inexperienced ones because they can learn from their previous mistakes in the sector (Gibb 1997). More generally, experience increases entrepreneurs' ability to manage their business in the right way (Metzger 2007).

The effect of founder experience on new ventures is also a result of experienced entrepreneurs' ability to develop a strong social network, and they are well positioned in their networks (Gompers et al. 2005). This means that entrepreneurial experience can help entrepreneurs obtain critical resources and facilitates the integration of new ventures with their stakeholders, such as suppliers, banks and customers.

A further reason why entrepreneurial experience is likely able to increase new ventures' success is that it helps entrepreneurs detect and better exploit opportunities (Colombo et al. 2004; Eckhardt and Shane 2003). This will positively influence new venture success and development.

Fresh empirical evidence relating to the effect of entrepreneur experience on new ventures' technical efficiency (Ben Fatma et al. 2015) shows that small firms with experienced entrepreneurs are likely to be more technically efficient than others. This line of reasoning can be related to Alvarez and Crespi (2003), who also report a positive association between entrepreneurial experience and small firms' technical efficiency. The positive effect of experience on new venture success can also be justified by its benefits in reducing the negative effect of entrepreneurial psychology (Ben Mohamed et al. 2015). On the whole, traditional theory proposes the above-cited factors as strong factors that affect new ventures' success.

Behavioral determinants of entrepreneurial success

The behavioral economics and finance literature criticizes the classical assumption of the "homo economicus" entrepreneur. In fact, the effect of entrepreneurs' cognitive biases on their decision making has emerged as one of the central fields in entrepreneurship, and entrepreneurs' psychological biases help new ventures' creation and can explain small firms' failure or success (Gudmundsson and Lechner 2013).

In a general way, cognitive biases can be defined as mental simplifications that help entrepreneurs connect information, identify opportunities and start and develop new ventures (Mitchell et al. 2002). The essence of research in behavioral entrepreneurship is a consequence of the emergence of what is commonly called behavioral finance and specifically a new area in this field—"behavioral corporate finance"—which assumes that CEOs' psychology and psychological biases are of interest and affect firms' financial decisions (Fairchild 2005, 2007, Heaton 2002; Malmendier and Tate 2005a,

b; Ben Mohamed et al. 2014a, b; Ben Mohamed et al. 2015). Recently, a study by Zhang and Cueto (2017) reveals that there is a systematic deviation from rationality or norms in entrepreneurial decisions. In fact, entrepreneurs may engage in irrational actions due to overconfidence, over optimism, similarity biases and escalation of commitment.

Furthermore, behavioral corporate finance empirically shows that CEOs' psychological biases affect the rationality of managerial decisions and their firms' value (Ben Mohamed et al. 2015). Additionally, the psychology of entrepreneurs can contribute to new venture success or failure (Mitchell et al. 2002).

To my knowledge, there is a lack of studies of the effect of entrepreneurs' psychology on new ventures' success, and no previous study has focused on this field in the Tunisian context. In this section, we survey the relevant literature around the potential effect of entrepreneurs' psychological biases on venture success. In particular, we will focus on the effects of the most relevant biases, namely, entrepreneurial overconfidence, optimism, hope, fear and risk aversion.

Overconfidence bias and entrepreneurial success

The overconfidence bias is one of the most documented psychological biases in economics, finance, psychology, strategy and entrepreneurship theory (Malmendier and Tate 2005a; Busenitz and Barney 1997; Cooper et al. 1988). The effect of the overconfidence bias is excessively studied in financial markets and can cause an under or overreaction in stock markets. However, the effect of overconfidence at the firm level is first noted by Heaton (2002) in a theoretical paper in which he asserts that overconfident managers can act irrationally. In fact, they can accept a negative net present value under the effect of this bias.

The negative effect of overconfident CEOs in the financial literature is also supported by Hackbarth (2008), Lin et al. (2005) and Ben Mohamed et al. (2014a, b). Managerial overconfidence causes investment cash flow sensitivity, which means that CEOs will invest in a sub-optimal manner under the overconfidence bias. The overconfidence bias can also affect firms' capital structure and strategy. The development of this approach leads to the emergence of behavioral entrepreneurship theory.

Entrepreneurial overconfidence is first documented by Cooper et al. (1988). Among a sample of 2994 entrepreneurs, they find that 81% believe that their chances of success are at least 70%. Approximately 988 entrepreneurs suggest that they have an absolute 100% chance of succeeding in a new business. Generally, psychologists find that people are overconfident, particularly in their abilities and knowledge precision (Fischhoff et al. 1977; Alpert and Raiffa 1982). This bias is associated with self-esteem, ambition and success (Johnson and Fowler 2011). However, entrepreneurial overconfidence can also cause business failure (Camerer and Lovo 1999).

In sum, the effect of entrepreneurs' overconfidence on new venture success is mitigated. In fact, overconfidence can be observed to be a driving force that can encourage entrepreneurs to take on ventures that other individuals might not undertake (DeBondt and Thaler 1995). Entrepreneurs exhibit greater overconfidence than managers, and this overconfidence is the essence of new venture creation (Busenitz and Barney 1997). Another positive effect of overconfidence on new ventures is that overconfident entrepreneurs are more innovative than other, non-overconfident

entrepreneurs (Hirshleifer et al. 2012). Using a large sample of American firms between 1993 and 2003, they show that overconfident individuals increase their investment in risky projects and have a tendency to engage their firms in innovation. This can increase the probability of small firms' development and success. From another point of view, we can also predict that the overconfidence bias will negatively affect new venture success because it can lead to an over or underinvestment strategy (Malmendier and Tate 2005a, b; Ben Mohamed et al. 2014a, b, 2015). It can also cause difficulty in the production process and other similar processes because overconfident entrepreneurs will frequently underestimate the likelihood of unfavorable events (Bracha and Brown 2010). Additionally, an overconfident entrepreneur has a tendency to underestimate the variance of a future income or event, which can negatively affect corporate decisions. More recently, Bernoster et al. (2018) document that overconfidence is related to intended market entry but not to the market position of the business and it can affect entrepreneurial success. Invernizzi et al. (2017) argue that "while overconfidence can be advantageous during the start-up phase, it is also linked to overoptimistic forecasts, non-optimal outcomes and firm failure." In sum, the literature survey highlights that the overconfidence bias can be one of the determinants of new venture success.

Optimism and new venture success

The optimism bias is a well-documented psychological bias in the financial and the economics literature. Generally, the optimism bias is the tendency to overestimate the probability of favorable future outcomes and underestimate the probability of unfavorable outcomes (Irwin 1953). In the same vein, Weinstein (1980) argues that individuals have an optimism bias concerning personal risk because they tend to think themselves invulnerable. They are overly optimistic about the future (Chambers et al. 2003).

In a seminal paper, Heaton (2002) concludes that managers are optimistic and systematically overestimate the probability of good firm performance and underestimate the probability of bad firm performance. In the entrepreneurship field, Puri and Robinson (2004) report that entrepreneurs are more optimistic and more risk tolerant than non-entrepreneurs.

However, the effect of the optimism bias on new venture success is mixed (Liang and Dunn 2010). In fact, this bias can lead to a misallocation of resources and reduce welfare (Manove 2000). An optimistic entrepreneur can create problems in the production process because he/she will make mistakes in forecasting and therefore in corporate decisions. This bias leads to overestimation, for example, of demand, underestimation of competitive reaction and misjudgment of the need for complementary assets (Simon and Houghton 2002). A new paper by Ben Fatma et al. (2015) shows that the entrepreneurial optimism bias will negatively affect small firms' technical efficiency because it causes sub-optimal decisions. In sum, optimistic managers can make irrational decisions, as predicted by Heaton (2002), and optimistic CEOs are associated with distortions in the corporate investment level, which can cause business failure. In contrast, the optimism bias can be the essence of new venture creation because it increases entrepreneurs' risk tolerance (Puri and Robinson 2004). It can also stimulate savings and investment and provide added incentive for hard work (Manove 2000). More recently, Zhang et al. (2019) in their exploratory study of antecedents of entrepreneurial decision-

making logics and using data from USA and China conclude that entrepreneurial optimism is negatively related to the prediction decision-making logic in the USA while there is no significant correlation between optimism and the prediction decision-making logic in China. Even with the negative effect of this bias, optimism is a key factor in new venture success (Kuratko and Hodgetts 2004) because it stimulates persistence and commitment to new venture creation (Litt et al. 1992; McColl-Kennedy and Anderson 2005).

Entrepreneurial hope and fear emotions and new venture success

Entrepreneurs' emotions can have explanatory power and affect new venture success or failure (Forgas 1995; Baron 2008; Li et al. 2014; Hawkins and Mookherjee 2010). Treffers et al. (2017) examine the role of emotions and cognitions in entrepreneurial decision-making and how they interact in this process. They conclude that entrepreneurial emotions can influence the entrepreneurial process. The study of emotions in decision making originates in the seminal paper of Lopes (1987). She develops the security, potential and aspiration level (SPA) theory). In her theory, Lopes assumes that an individual is governed by two emotions: hope and fear. Hope can lead an individual to engage in risky decisions, events or projects, while fear leads to situations in which individuals will probably reject risky projects and events. This theory has been adopted in many management sciences problems, such as portfolio choice (Shefrin and Statman 2000).

In fact, emotions can influence portfolio choice because hope will push investors to choose risky assets, while fear leads to choosing non-risky assets, such as bonds, to guarantee a part of their wealth (Shefrin and Statman 2000). In the entrepreneurship field, individuals are assumed to also be governed by these two emotions. Hope and fear can affect new venture success. However, surveys of previous studies show that hope can positively affect business success, while fear can lead to business failure.

The hope emotion is the feeling that events will turn out for the best (Averill 1996; Carroll and Russell 1996). It can have explanatory power in new venture creation because it influences entrepreneurs to achieve a given goal (Snyder 2000). This effect can increase the probability of business success because entrepreneurs will act according to a sequence of goals that facilitates realizing their objective during the venture process. In fact, entrepreneurs' hope emotion increases the attractiveness and perceived success of the new venture because entrepreneurs, who have a low level of failure and even less unexpected success, will generally view the new venture as an opportunity (Li 2009).

Another emotion that can be of interest in business success is fear. In fact, an examination of the entrepreneurship literature indicates that fear of failure is assumed to inhibit new venture success. According to Bosma et al. (2008), the best-documented fear among entrepreneurs is the fear of failure. The idea that fear can have a great impact within the entrepreneurial process is derived from the assumption that entrepreneurship is an emotional journey (Baron 2008). Fear has an influence on the decision-making process and affects entrepreneurs' cognitive and behavioral responses (Damasio 1994).

Fear of failure appears to be a force that drives Chinese entrepreneurs in Singapore to succeed (Ray 1994). According to this study, fear is a factor that helps entrepreneurs

succeed. In contrast, according to Helms (2003), fear of failure will hinder the rapidity of new business start-ups in Japan in the future. The same result was supported by Wagner and Stenberg (2004). They conclude that fear of failure in a region is negatively associated with start-up behavior.

More recently, the Federation of German Psychologists asserts that fear of failure inhibits new venture start-ups at different levels (Burandt and Kanzeck 2010). In fact, this emotion helps mitigate risk and the ambiguity of economic decisions (Kirchler et al. 2001). According to Baron (2008) and Forgas (1995), the impact of entrepreneurs' emotions is of interest, and it is significant in circumstances that are characterized by a high degree of uncertainty and engagement. Cacciotti and Hayton (2015) argue that the impact of the experience of fear on individual cognition and behavior can be beneficial as well as detrimental. In fact, the fear emotion can be considered as a barrier to entrepreneurial behavior and it can be seen as a moderator of entrepreneurial behaviors.

To conclude, entrepreneurs who can master those two emotions will succeed. Hawkins and Mookherjee (2010) argues that "hope creates amazing things in the world. It's a passion that won't give up no matter the obstacle. Fear is the lazy guy who's not doing anything with his life, stares at a goal but does nothing about it."

Entrepreneurial risk profile and new venture success

The degree of entrepreneur risk aversion is a central concept in entrepreneurship theory. In fact, the influence of entrepreneurs' risk aversion on the decision to start new ventures is a much-discussed topic in entrepreneurship literature (Caliendo et al. 2006). Previous research in this field shows that entrepreneurs are willing to take greater risks than employees (Ekelund et al. 2005).

The traditional theory of economic decisions assumes that entrepreneurs and other economic agents have a concave utility function, which reflects that they are risk-averse (Ben Fatma and Ben Mohamed 2019). This form has been modified by prospect theory (Kahneman and Tversky 1979). According to prospect theory, entrepreneurs and other economic agents have an S-shaped utility function; entrepreneurs are risk-averse in the domain of gain and risk seeking in the domain of losses.

An entrepreneur's risk profile can affect his/her decision-making (Kahneman and Tversky 1979). Previous research demonstrates that entrepreneurs should have a profile that can help them bear risk and then make risky decisions that they need to start new ventures (Rees and Shah 1986; Wagner 2003; Ekelund et al. 2005).

The new form of entrepreneurs' utility function can affect their decision making. In fact, previous studies in experimental psychology show that entrepreneurs can make sub-optimal decisions under this S-shaped utility function, which can significantly affect the probability of new venture success. However, the traditional risk aversion encourages individuals to invest in balanced skill profiles, making them more likely to become entrepreneurs and this can increase the probability of new venture success (Hsieh et al. 2017).

Methodology

In this paper, we use a methodology based on the analysis of entrepreneurs' perception using the cognitive mapping technique. The aim of this section is to (i) introduce this

technique, (ii) present and discuss the method that we use to analyze the results and (iii) describe the survey.

The cognitive map: A tool to study entrepreneurs' perceptions

Cognitive mapping is a relatively old technique. In fact, a seminal work by Axelrod (1976) introduces cognitive maps to model decision-making in social-economic and political systems. It is a representation that reflects how individuals think about a particular issue by analyzing and arranging problems and graphically mapping interconnected concepts (Eden 2004).

It is a strong technique that helps study human perceptions about a special subject or phenomenon in their world (Bueno and Salmeron 2009; Nassreddine 2016; Nassreddine et al. 2017). It does this by identifying causes and effects and explaining causal links (Ben Mohamed and Abdelfatteh 2012). In fact, a cognitive map is a mental representation of a person's perception of his/her environment (Sharlin et al. 2009).

From a psychological point of view, cognitive maps include details of spatial information that people collect, integrate and use while interacting with their environment. Maps are an overall mental image or representation of the space and layout of a setting (Arthur and Passini 1992).

In this study, we use cognitive maps as a tool to explore the mental schema of Tunisian entrepreneurs. In fact, cognitive mapping helps us identify which factors can explain new venture success in the Tunisian context. In other terms, we will focus on the importance of previous variables, both traditional and behavioral factors, on new venture success.

The use of this methodology based on cognitive mapping is highly motivated by the difficulty of quantifying entrepreneurs' psychological biases; therefore, we will merely determine whether these variables can affect new venture success.

Construction of a cognitive map of Tunisian entrepreneurs

Literature around the cognitive mapping technique reveals two categories of cognitive maps: individual maps and aggregated cognitive maps. Individual maps are a simple description of a mental representation of individual perception around a specific concept, phenomenon or problem. However, the aggregated cognitive map is an average map that synthesizes different points of view of a group of individuals. This map is an average map that helps us obtain a global idea of how individuals in the considered sample see the links or relationships between the different variables of the problem. In this study, we use both maps, first constructing the individual maps and then drawing the average map.

According to Ozesmi and Ozesmi (2004), there are four ways to construct cognitive maps. The first is to construct maps using questionnaires. The second consists of extracting variables from written text. The third is to draw maps using data that show causal relationships. Finally, we can obtain maps through interviews, and then individuals can draw them directly.

In this paper, we extract variables from the relevant literature, then use a semi-directive interview around the proposed variables; then, entrepreneurs are invited to complete the adjacency matrix. Our choice is justified by the fact that the literature

around small business success is too large. This means that we have a large number of factors that can affect new venture success; of these, we propose to study the most relevant. The second reason is that entrepreneurs may not generate the behavioral factors by themselves because they may not distinguish among the overconfidence, optimism and other biases.

Our technique involves creating cognitive maps through an in-depth interviewing process in which entrepreneurs are invited to give their ideas about each proposed factor and its effect on small business success by completing the adjacency matrix.

Adjacency matrix

Cognitive maps are a graphical representation of how concepts around a special phenomenon are linked. According to graph theory, the adjacency matrix is a squared matrix that shows the links and relationships between different concepts or factors that may have influences on the considered phenomenon. It also shows the relationships between the explicative variables. According to Harary et al. (1965), the adjacency matrix has the following form:

$$A(D) = [a_{i,j}]$$

The variables i are listed on the vertical axis, while the variables j are listed on the horizontal axis to form the squared matrix. If there is a connection between the two variables i and j , then the variable is coded in the matrix, and it takes a value of 1 if the relationship is weak, 2 if it is moderate and 3 if it is strong. The absence of a relationship between these variables should be coded as the zero value. In this paper, we have a (11×11) adjacency matrix (see Table 1). In this study eleven variables are proposed in order to explain the entrepreneurial success. In fact, the literature review of the determinants of success via the standard theory shows that essentially six variables must be retained as factors that influence the entrepreneurial success: Age, Gender, Experience, Education, Social Capital, Capital. The review of the behavioral theory emphasizes the importance of five factors in explaining entrepreneurial success, which are: Overconfidence, Optimism, Hope, Fear and Risk aversion.

Average cognitive map analysis

We aim in this paper to study the determinants of new venture success among a sample of Tunisian entrepreneurs using the cognitive mapping technique. For this, we will construct individual adjacency matrices and then aggregate these matrices to obtain an average cognitive map. We use the arithmetic mean to obtain an average point of view around the effect of each variable on new venture success and the relationships between them (Ben Mohamed and Abdelfatteh 2012; Omri and Frikha 2014).

The analysis of our average cognitive map will be drawn by the structural analysis to identify the most important factors in determining new venture success in Tunisia. The structural analysis is based on the adjacency matrix, which includes various factors that are supposed to influence entrepreneurial success. To do so, we use “MICMAC” software to construct and analyze our average map.

Table 1 Adjacency matrix

concept j concept i	Age	Gender	Experience	Education	Social capital	Capital	Overconfidence	Optimism	Hope	Fear	Risk aversion
Age	0	$a_{1;2}$	$a_{1;3}$	$a_{1;4}$	$a_{1;5}$	$a_{1;6}$	$a_{1;7}$	$a_{1;8}$	$a_{1;9}$	$a_{1;10}$	$a_{1;11}$
Gender	$a_{2;1}$	0	$a_{2;3}$	$a_{2;4}$	$a_{2;5}$	$a_{2;6}$	$a_{2;7}$	$a_{2;8}$	$a_{2;9}$	$a_{2;10}$	$a_{2;11}$
Experience	$a_{3;1}$	$a_{3;2}$	0	$a_{3;4}$	$a_{3;5}$	$a_{3;6}$	$a_{3;7}$	$a_{3;8}$	$a_{3;9}$	$a_{3;10}$	$a_{3;11}$
Education	$a_{4;1}$	$a_{4;2}$	$a_{4;3}$	0	$a_{4;5}$	$a_{4;6}$	$a_{4;7}$	$a_{4;8}$	$a_{4;9}$	$a_{4;10}$	$a_{4;11}$
Social capital	$a_{5;1}$	$a_{5;2}$	$a_{5;3}$	$a_{5;4}$	0	$a_{5;6}$	$a_{5;7}$	$a_{5;8}$	$a_{5;9}$	$a_{5;10}$	$a_{5;11}$
Capital	$a_{6;1}$	$a_{6;2}$	$a_{6;3}$	$a_{6;4}$	$a_{6;5}$	0	$a_{6;7}$	$a_{6;8}$	$a_{6;9}$	$a_{6;10}$	$a_{6;11}$
Overconfidence	$a_{7;1}$	$a_{7;2}$	$a_{7;3}$	$a_{7;4}$	$a_{7;5}$	$a_{7;6}$	0	$a_{7;8}$	$a_{7;9}$	$a_{7;10}$	$a_{7;11}$
Optimism	$a_{8;1}$	$a_{8;2}$	$a_{8;3}$	$a_{8;4}$	$a_{8;5}$	$a_{8;6}$	$a_{8;7}$	0	$a_{8;9}$	$a_{8;10}$	$a_{8;11}$
Hope	$a_{9;1}$	$a_{9;2}$	$a_{9;3}$	$a_{9;4}$	$a_{9;5}$	$a_{9;6}$	$a_{9;7}$	$a_{9;8}$	0	$a_{9;10}$	$a_{9;11}$
Fear	$a_{10;1}$	$a_{10;2}$	$a_{10;3}$	$a_{10;4}$	$a_{10;5}$	$a_{10;6}$	$a_{10;7}$	$a_{10;8}$	$a_{10;9}$	0	$a_{10;11}$
Risk aversion	$a_{11;1}$	$a_{11;2}$	$a_{11;3}$	$a_{11;4}$	$a_{11;5}$	$a_{11;6}$	$a_{11;7}$	$a_{11;8}$	$a_{11;9}$	$a_{11;10}$	0

The MICMAC method is the cross-impact matrices, Multiplication Applied to a Classification. This software is a practical tool to analyze cognitive maps. In this analysis, we will use the centrality analysis and the influences-dependences graph and chart.

The first analysis is based on the number of links between variables. This is commonly called the “centrality analysis” (Ozesmi and Ozesmi 2004; Strickert et al. 2009). The centrality analysis comes from Freeman (1977) and Bavelas (1948). They measure the importance of a specific concept in the entire system by counting the number of shortest paths going through the node of this concept. Sabidussi (1966) uses the same method to identify the most important variable in a given system.

Our aim here is to extract the most relevant factors that are central concepts that can strongly influence new venture success. In fact, central concepts reflect those with the largest overall networks, or greatest perceived influence, and these are important to improve (Village et al. 2013). In the same line of research, Piraveenan et al. (2013) argue that the degree of centrality measure of a node gives a strong indication of the contribution of a concept in the system and shows how this concept is connected to other nodes and concepts.

We apply the MICMAC method, which gives us the classification of considered variables and proposes a ranking of factors that are essential to the evolution of the system. This is accomplished first through direct classification and then through indirect classification with the MICMAC software. The indirect classification is obtained after increasing the power of the matrix, which will be very instructive because we will have various types of relationships (direct, indirect and potential).

We also use the dependences/influences chart generated by the MICMAC software. In fact, according to Arcade et al. (1999), the variables characterizing the studied phenomenon and its environment can be projected onto the influence-dependence chart. They argue that the cloud of point repetition in this plane and more precisely with respect to the various frames set around their center of gravity can help us distinguish among four categories of variables, with a specific role for each one. These variables contribute to the evolution and explaining the dynamics of new venture success.

- *Determinant variables*: this category includes the influential variables that are the most relevant determinants of new venture success. In fact, these variables are very influential and slightly dependent (Arcade et al. 1999). This is because the entire system depends on these factors, which are located in the north-west frame of the perception chart. Influential variables are the explicative variables that are most appropriate to explain new venture success, and these are considered entry variables. In sum, determinant variables strongly affect entrepreneurial success; however, in general, we cannot control this category of variables. Rather, they act as an inertia factor (Arcade et al. 1999).
- *Relay variables*: this category includes variables that are at the same time very influential and dependent (Arcade et al. 1999). They are situated in the north-east frame of the chart. Relay variables are by nature factors of instability because any action on them will have consequences for other variables. According to Arcade et al. (1999), we can distinguish between two types of variables in this category: stake variables and target variables.

The stake variables are located around the diagonal and have a strong likelihood of arousing major actors because they have an unstable character and may be considered potential breakpoints for the system. However, the target variables, which are located under the diagonal rather than along the north-south frontier, are more dependent than the influential variables. Arcade et al. (1999) argue that these variables can be considered as resulting from the system's evolution. Appropriate actions on them can help their evolution occur in the desired way.

- *Dependent variables*: these are result variables and are situated in the south-east frame of the chart. These variables are at the same time very dependent and slightly influential. In the expression of Arcade et al. (1999), they are sensitive to the evolution of influential variables and/or relay variables. Consequently, they are considered exit variables from the system.
- *Excluded variables*: these are autonomous variables that are characterized by little influence and dependence. These variables are located in the south-west frame and are supposed to have no major effect on the evolution of the considered phenomenon.

The different categories of variables discussed above are presented in the influences-dependences chart.

Data source and description

To explore the effects of the proposed traditional and behavioral factors in new venture success among Tunisian entrepreneurs, we apply the technique of cognitive mapping with a sample of 32 entrepreneurs who have created small firms. The entrepreneurs in our sample have different levels of education and different education natures (i.e., management or technical). The new ventures considered here are small projects with a limited number of employees. (For more details about the sample, refer to Table 2).

We conduct an interview of between 20 and 30 min with each entrepreneur. First, at the beginning of the interview, we explain the aim of the study and inform the entrepreneur that information delivered in the interview will remain anonymous. We use a semi-directive interview. The entrepreneurs are invited to develop the potential effect of each proposed variable on his/her new venture success. We also describe and define the meaning of each psychological bias, using the Arabic language if necessary. We discuss with each entrepreneur the effect of each factor on new venture success.

In a second step, the entrepreneurs are invited to complete the adjacency matrix, which contains all of the considered variables. For this activity, a sheet of paper containing this matrix was distributed, and each entrepreneur was asked to complete it using four possible values to describe the relationships among the concepts. If there is no relationship between the two concepts i and j , then the entrepreneur will attribute the zero value. However, if he/she indicates that there is a relationship between them, then he/she is invited to specify the intensity of this relationship. If the relationship is weak, then he/she will attribute 1; if it is moderate, then he will give it the value 2. Finally, if it is strong, he/she will associate the value 3 with this relationship.

Table 2 Sample description and interview duration

Entrepreneur	Duration (min)	Gender	Age	Education level	Education nature	New venture age	number of employees	Entrepreneur ownership	indebt firms	Entrepreneur
1	20	M	34	B+5	T	5	2	Yes	yes	17
2	25	F	33	B+3	T	4	1	Yes	no	18
3	30	M	44	B	O	5	1	Yes	no	19
4	22	M	27	>B	T	5	3	Yes	no	20
5	20	M	33	B+6	M	3	2	yes	no	21
6	23	M	30	B+3	T	4	2	yes	yes	22
7	30	M	42	B+2	O	5	1	yes	no	23
8	21	F	30	B+4	M	2	1	yes	yes	24
9	30	M	56	B	T	5	3	yes	no	25
10	20	F	29	B+3	T	4	2	yes	no	26
11	22	M	33	B+2	T	4	3	yes	no	27
12	25	M	37	B+3	T	5	1	yes	yes	28
13	30	M	40	>B	M	5	1	yes	no	29
14	24	M	37	B	O	5	1	yes	yes	30
15	20	F	29	B+3	M	3	2	yes	no	31
16	25	M	35	B+2	T	5	2	yes	no	32

Entrepreneur	Duration (min)	Gender	Age	Education level	Education nature	Date of creation	number of employees	Entrepreneur ownership	indebt firms
1	20	M	28	B+4	T	5	7	Yes	no
2	30	F	41	>B	M	5	2	Yes	no
3	30	M	44	B+2	T	5	1	Yes	no
4	28	F	43	B+3	T	1	7	Yes	no
5	30	F	54	B	O	3	1	Yes	yes
6	20	F	25	B	T	4	3	Yes	no

Table 2 (continued)

Entrepreneur	Duration (min)	Gender	Age	Education level	Education nature	Date of creation	number of employees	Entrepreneur ownership	indebt firms
7	22	M	28	B + 5	T	3	2	Yes	no
8	30	M	45	>B	M	5	1	Yes	no
9	23	F	30	B + 4	M	3	2	Yes	no
10	25	M	34	>B	M	3	2	Yes	yes
11	30	M	74	B	T	5	35	Yes	no
12	27	M	61	B	T	2	1	Yes	no
13	30	M	52	>B	M	5	4	Yes	no
14	20	M	30	B + 3	M	3	1	Yes	no
15	25	M	24	B + 2	T	2	3	Yes	no
16	30	M	50	B	O	5	2	Yes	no

M male, *F* female, *B* baccalaureate degree, *T* technical education, *M* management education, *O* other type of education

We aggregate the individual matrices to obtain an average cognitive map. We also construct two other average cognitive maps using entrepreneur gender to check the robustness of our results.

Results

Aggregated cognitive map

We draw an average cognitive map for the full sample and we use the centrality analysis to classify the study variables according to their degree of importance. In fact, in a map or networks a variable may be more important than other variables. This is essentially due to the number of contacts this variable has with the other variables in the map. This central variable, which has the largest number of contacts in a map or network, is called the central variable. Attempts to identify the most important variable and influence the movement of a system are often called centrality analysis (Wasserman and Faust 1994; Caldarelli 2007).

The centrality analysis is a technique largely used in the graph theory. A concept *C* is a central concept if it has an important links with other concepts. The centrality analysis is a crucial tool to measure the weight of the influence of a concept *c* on a given subject (Ben Mohamed and Abdelfatteh 2012). One variable may have a direct influence on other variables and may also have indirect influences. MICMAC software has the advantage of classifying variables in a map according to their direct and indirect influences. The variable with the highest number of direct and indirect links is considered to be the central variable in a map and therefore it can explain the movement of a system. In a cognitive map a variable can have links of influences and links of independence. The links of influences represent the outbound links and the links of independence represent the outgoing links. The MICMAC can also classify the variables according to their power to influence the other variables of a network or according to their degrees of being influenced by other variables. The variable with the highest score is considered the most important variable in a map and therefore it is called the central variable. In what follows, the notation *B* indicates that the variable belongs to the behavioral theory while the notation *R* indicates that the variable belongs to the rational (standard) theory.

Our results indicate that the traditional variables are of interest to new venture success. In fact, the centrality analysis shows that the main important factors in entrepreneurial success are the overconfidence bias, the entrepreneurial optimism bias, experience, social capital, hope, risk profile, education and financial capital. The socio-demographic factors are ranked last (Table 3). In particular, the entrepreneurial overconfidence and optimism biases are central factors that can influence new venture success. In fact, the literature on behavioral economics and finance argues that these two psychological biases are the most important and dynamic biases that can influence corporate decisions and entrepreneurial behaviors (Heaton 2002; Malmendier and Tate 2005a, b). However, some traditional variables, such as entrepreneurial experience and social capital, still have explanatory power and influence venture success.

The MICMAC also offers other types of classification. The most used method to classify variables is to account for direct links. In fact, Arcade et al. (1999) argue that

Table 3 Centrality analysis on the basis of direct and indirect links

Rank	Variable	Score	Nature
1	Overconfidence	29	B
2	Optimism	26	B
3	Experience	24	R
4	Social capital	23	R
4	Hope	23	B
5	Risk profile	20	B
6	Education	19	R
6	Capital	19	R
7	Age	16	R
7	Fear	16	B
8	Gender	11	R

central concepts are those with the maximum number of direct links. In this case, entrepreneur experience, age, overconfidence bias, education level and nature and optimism level are the most central concepts. Another important classification of proposed factors can be obtained using the influence degree of each factor. In fact, we can classify variables regarding their ability to influence other variables related to new venture success. At this level, the most relevant factors that can govern new venture success are experience, age, social capital, overconfidence, education and entrepreneurial optimism. Socio-demographic factors and entrepreneur emotion rank last on the classification list (Tables 4 and 5).

The MICMAC software also generates another classification based on the dependence degree of each factor. Applying this classification, we obtain a new classification, and the behavioral factors are at the top of this new list. In fact, an entrepreneur's risk profile, overconfidence level, degree of optimism, and hope and fear emotions are the most dependent variables. These variables, then, can have an indirect influence on new

Table 4 Centrality analysis on the basis of variables' influences

Rank	Variable	Nature
1	Experience	R
2	Age	R
3	Social capital	R
4	Overconfidence	B
4	Education	R
5	Optimism	B
6	Gender	R
6	Capital	R
7	Hope	B
7	Fear	B
8	Risk profile	B

Table 5 Centrality analysis on the basis of variables’ dependences

Rank	Variable	Nature
1	Risk profile	B
2	Overconfidence	R
3	Hope	B
4	Optimism	B
4	Fear	B
5	Capital	R
6	Social capital	R
6	Experience	R
7	Education	R
7	Gender	R
8	Age	R

venture success because, in most cases, these variables can explain new venture success but are also affected by other variables, such as entrepreneur age and experience.

In sum, our results show that entrepreneurial psychology is of interest and can affect new venture success. In particular, entrepreneurial overconfidence and optimism are the most relevant psychological biases that can influence venture success. Our results corroborate previous studies that document that these psychological biases are important factors that influence corporate decisions (Heaton 2002; Malmendier and Tate 2005a, b; Ben Mohamed et al. 2014a, b). They can affect the rationality of entrepreneurial decisions and consequently affect the probability of venture success. A new study by Ben Fatma et al. (2015) demonstrates that the optimism bias can affect small firms’ technical efficiency in the Tunisian context.

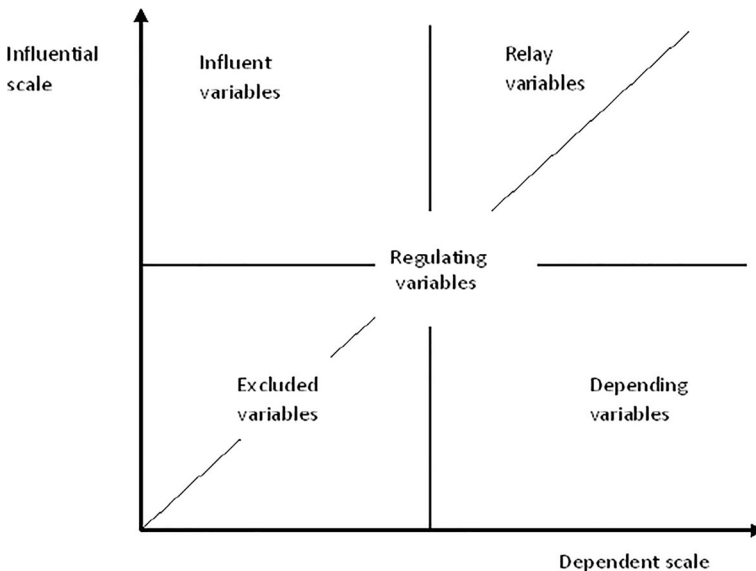


Fig. 1 Influences-dependences chart according to Arcade et al. (1999)

Our results partially corroborate the findings of Omri and Frikha (2014), who document that entrepreneur experience and social capital, among other factors, are the essence of new venture success. However, this study shows that behavioral factors are also predominant in and have explanatory power in this context.

In the second level of our analysis, we use the dependences/influences graph and chart. Doing so offers the possibility of classifying the proposed variables into four categories: determinant variables, relay variables, result variables or excluded variables.

The MICMAC can generate the influences/dependences chart using different types of matrices. In fact, this chart can be obtained using the matrix of direct influences. We obtain a graph composed of four zones as described in the previous section (Fig. 1).

The influences-dependences chart indicates that entrepreneur experience and age are the most influential variables that can govern new venture success among the entrepreneurs in our sample. These two factors are in fact interrelated because the average matrix and the cognitive maps show that age can affect entrepreneurs' experience (Fig. 2). Our results are similar to those of Omri and Frikha (2014) in the Tunisian context. In their work, they argue that entrepreneurs' experience and age are the most relevant factors in Tunisia that can influence small business failure or success.

Experience is the essence of new venture success. This is because entrepreneurs with previous experience in their domain of activity will have a good idea of the market in which they operate, demand, inputs and outputs, prices and other keys to success in the domain. This knowledge will increase the probability of new venture success.

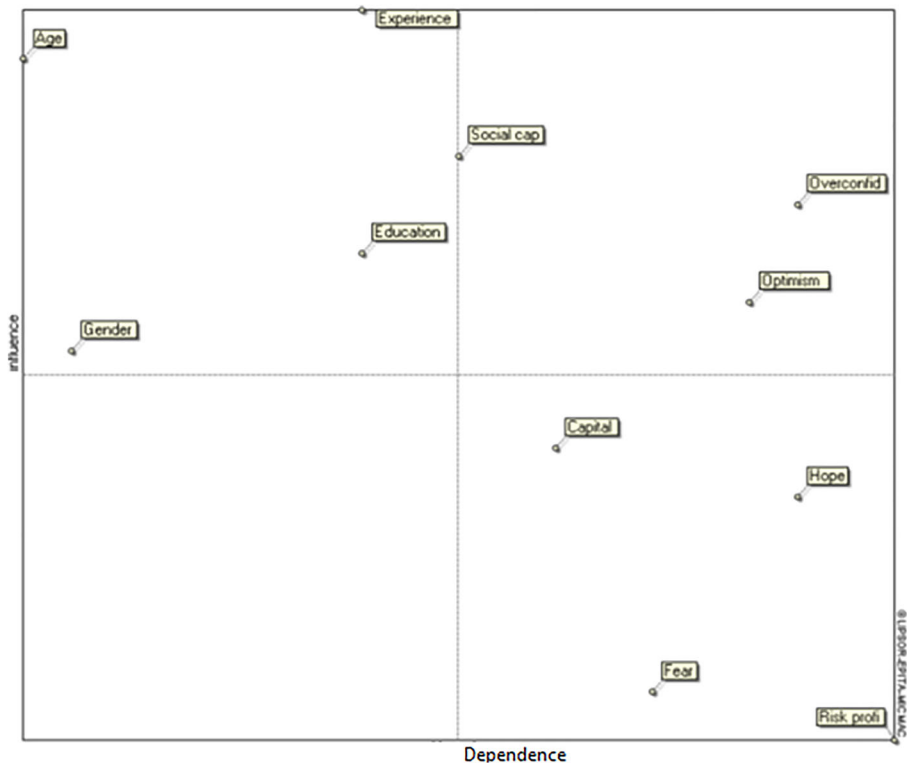


Fig. 2 Influences/dependences chart using the matrix of direct influences

Table 6 Adjacency matrix

	Age	Gender	Experience	Education	Social capital	Capital	Overconfidence	Optimism	Hope	Fear	Risk profile
Age	0	1	2	2	2	1	2	2	1	1	2
Gender	0	0	1	1	1	1	1	1	1	1	2
Experience	0	0	0	2	3	2	2	2	2	2	2
Education	0	0	1	0	2	1	2	2	2	1	1
Social capital	0	0	1	0	0	3	3	2	2	1	2
Capital	0	0	0	0	0	0	2	2	2	1	1
Overconfidence	0	0	1	0	1	1	0	3	3	2	2
Optimism	0	0	1	1	0	1	1	0	3	2	2
Hope	0	0	0	1	0	1	1	1	0	1	2
Fear	0	0	0	0	0	0	1	0	0	0	2
Risk profile	0	0	0	0	0	0	1	0	0	1	0

Another factor that can contribute to entrepreneurial success is entrepreneur education. In-depth discussions with entrepreneurs in our sample show that the majority highly value the effects of the nature and level of education on new venture success. They agree that education represents one of the pillars of venture success because it can help entrepreneurs resolve problems related to their projects and also help maintain communication with different stakeholders.

Entrepreneur gender can also be retained as an explicative variable of venture success but has less explanatory power than the three cited factors. In fact, it is very close to the zone of excluded variables, which have limited explanatory power.

The entrepreneurial overconfidence and optimism biases act as relay variables. They are at the same time very influential and very dependent. According to Arcade et al. (1999) these variables are key factors in the system. We can focus on these variables to increase the probability of new venture success (Arcade et al. 1999). Entrepreneurs, then, should optimize their optimism and overconfidence levels to have a successful venture. Our empirical finding confirms our theoretical prediction around the effects of these two psychological biases on venture success.

Another relay variable is entrepreneurial social capital. In fact, this variable can be considered one of the most important factors in new venture success in Tunisia. The same result is reported by Omri and Frikha (2014). This variable is of interest especially in emergent markets because it facilitates obtaining critical resources and also helps entrepreneurs identify new opportunities and develop their ventures.

The result variables in our case are mainly hope, fear and the risk profile of an entrepreneur. These variables do not have an intense direct influence on new venture success but influence other variables and also depend on other factors. The cognitive

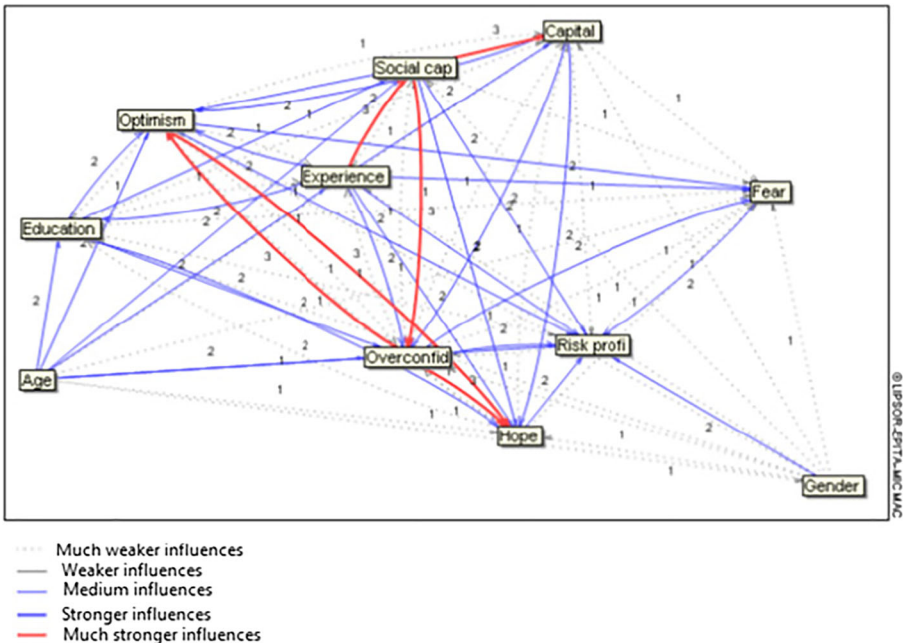


Fig. 3 Average cognitive maps of Tunisian entrepreneurs

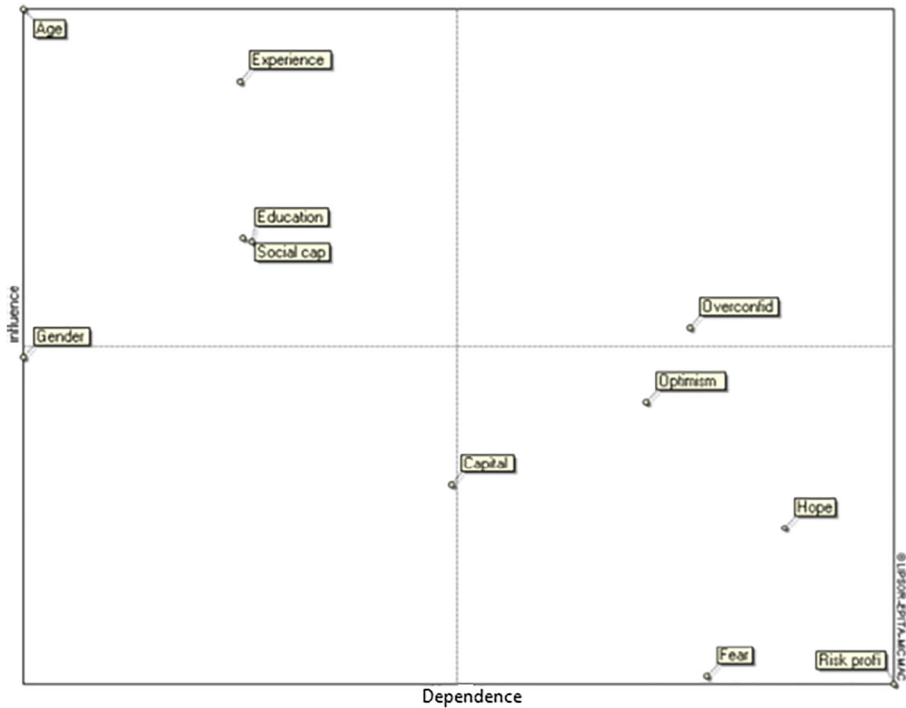


Fig. 4 Influences/dependences chart using the matrix of indirect influences

map shows that these variables are the most sensitive to other factors in venture success.

The hope emotion, for example, is sensitive to entrepreneurs' age, gender, experience, education, social capital, overconfidence and optimism (Table 6). The result variables mainly exert an influence on venture success by influencing the relay variables (overconfidence, optimism and capital).

Finally, the influences/dependences chart shows no excluded variables. The proposed factors, then, are appropriate and can explain new venture success (Fig. 3).

We also generate the influences/dependences chart using the matrix of indirect influences (Fig. 4). Our results are similar to those obtained using the matrix of direct influences. However, social capital moves to the zone of explicative variables, while capital and gender move to the zone of excluded variables.

In this new chart, overconfidence is still a relay variable, and it is the most influential and dependent variable in the system (Fig. 5). It is consequently the key feature in venture success.

In sum, we demonstrate that the new venture success depends on traditional factors, such as entrepreneurs' age, experience, and education, among other variables; however, it is also a result of certain psychological factors. In particular, overconfidence and optimism levels can be of interest and govern venture success in the Tunisian context.

Finally, we control for gender differences and their effects on our results. For this purpose, we divide our full sample to constitute two sub-samples using the

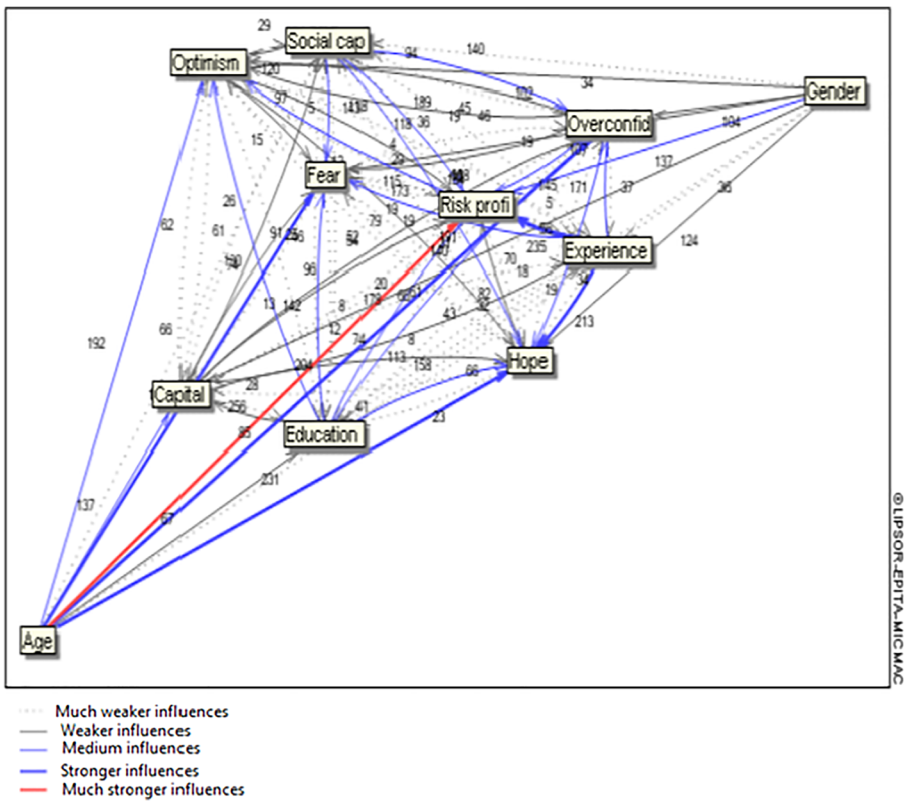


Fig. 5 Average cognitive map of Tunisian entrepreneurs using the indirect influences matrix

entrepreneur’s gender. We then draw the average cognitive maps of female and male entrepreneurs separately.

Table 7 Centrality analysis on the basis of direct and indirect effects

Rank	Variable	Score	Relative Weight	Nature
1	Overconfidence	27	0.1194	B
2	Optimism	25	0.1106	B
3	Experience	23	0.1017	R
4	Capital	22	0.0973	R
5	Hope	22	0.0973	B
6	Social capital	20	0.0840	R
7	Age	19	0.0840	R
8	Education	19	0.0840	R
9	Fear	19	0.0840	B
10	Risk profile	19	0.0840	B
11	Gender	11	0.0486	R

Table 8 Centrality analysis on the basis of variables' influences

Rank	Variable	Score	Nature
1	Age	19	R
2	Experience	17	B
3	Education	13	R
4	Overconfidence	12	B
5	Social capital	11	R
6	Optimism	11	B
7	Gender	10	R
8	Capital	10	R
9	Hope	5	B
10	Fear	3	B
11	Risk profile	2	B

Aggregated cognitive map of female entrepreneurs

The centrality analysis results are presented in Tables 7, 8 and 9. We use three methods of classification; we begin with the direct and indirect effects of each variable, then use the influence classification. Finally, we classify the variables using their degree of dependence.

The classification on the basis of direct and indirect effects shows that female entrepreneurs are governed by the overconfidence and optimism biases. They also consider their experience to be relevant to business success. This result conforms to that found using the full sample.

Using the second type of classification based on the degree of influence of each variable, our results are also robust because the most influential factors are entrepreneur age and experience. The relative weight of each concept highlights the dominance of

Table 9 Centrality analysis on the basis of variables' degree of dependence

Rank	Variable	Score	Nature
1	Hope	17	R
2	Risk profile	17	R
3	Fear	16	B
4	Overconfidence	15	B
5	Optimism	14	B
6	Capital	12	R
7	Social capital	9	R
8	Experience	6	R
9	Education	6	R
10	Gender	1	R
11	Age	0	R

two variables: age (17%) and entrepreneur experience (15%). According to Arcade et al. (1999), these two variables are the most central factors that have a great influence on new venture success because they exert a great direct influence on the system.

However, entrepreneurs' emotions and risk profile can only weakly influence new venture success and do not have a high degree of influence on the other system variables.

Variables' ranking according to their degree of dependence highlights that the behavioral factors in new venture success are the most dependent variables. In fact, an in-depth discussion with female entrepreneurs in our sample documents that their degree of optimism, overconfidence level, emotions and risk profile vary with the functions of the other variables.

The socio-demographic variables of entrepreneurs have the lowest dependence weights. Therefore, these variables, especially age, are important in explaining why new ventures succeed or fail. The variable of age affects all of the other factors in venture success, and it does not receive any influence from them.

The projection of new venture success factors in the influences/dependences chart shows that entrepreneurs' age, experience and education are the three pillars of success according to female entrepreneurs in our sample. These variables have a direct influence on business success, while entrepreneurs' overconfidence and optimism levels act as relay variables. Social capital is also an influence and depends on other variables. Entrepreneurial emotions are also of interest; however, these are result variables. Gender seems to be an excluded variable (Fig. 6).

Our results are in most cases similar to those obtained using the full sample. The average cognitive map documents a strong relationship among overconfidence, optimism and hope (See Fig. 7). There is also a strong relationship among three traditional factors of new venture success, namely, age, social capital and financial capital. However, entrepreneur gender has a weak relationship to other variables in the system (Figs. 8 and 9).

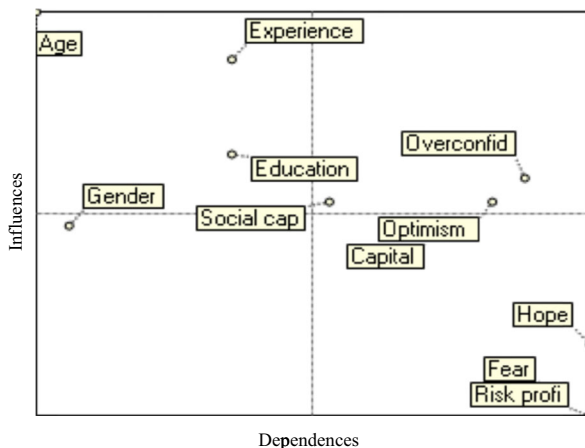


Fig. 6 Influences-dependences chart using the matrix of direct influences

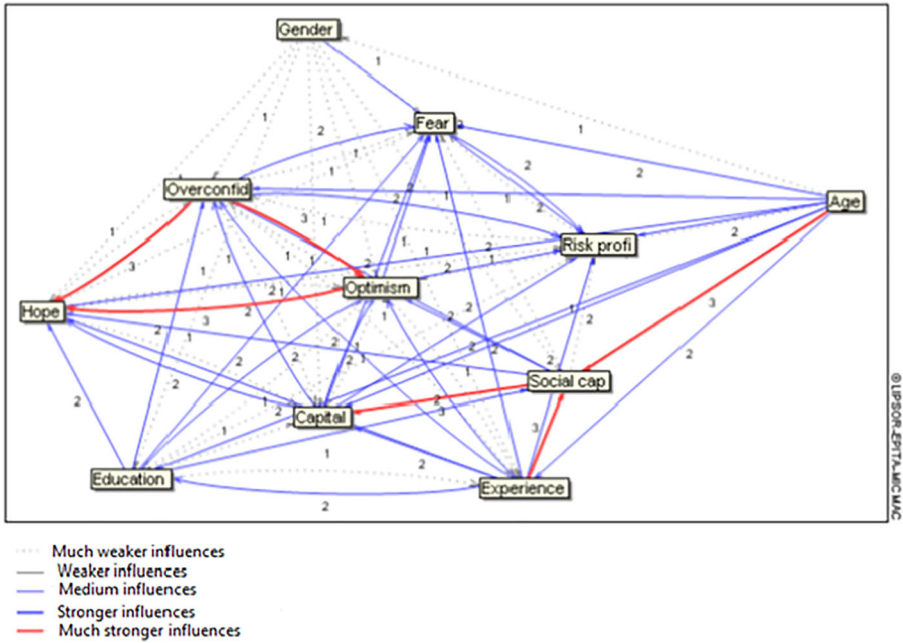


Fig. 7 Average cognitive map of female entrepreneurs

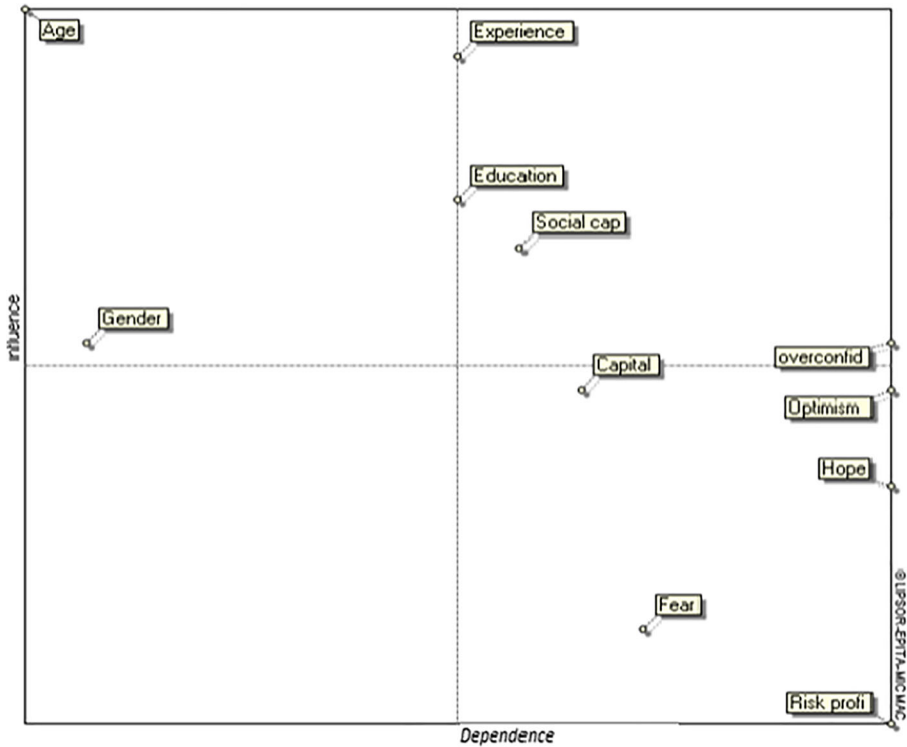


Fig. 8 Influences-dependences chart

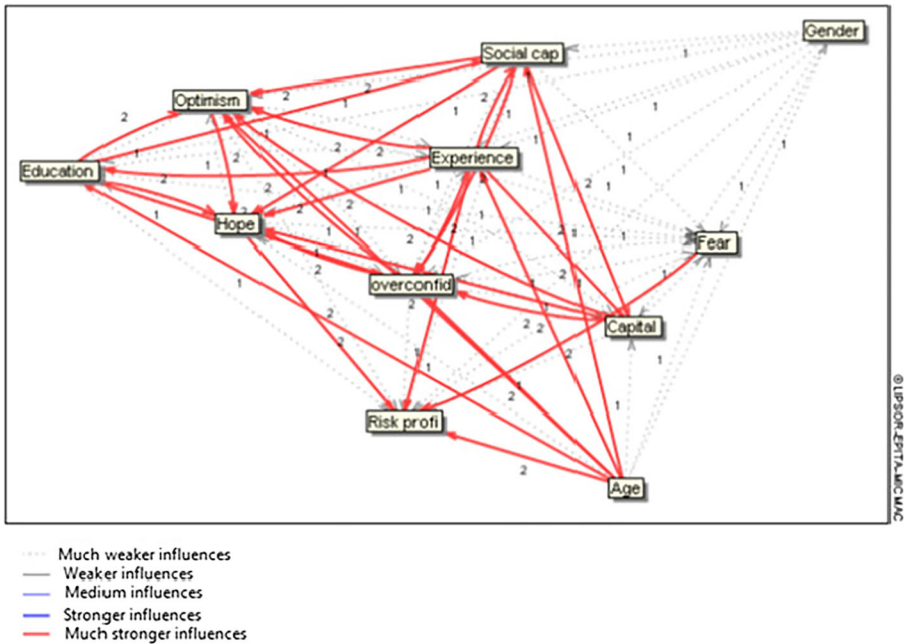


Fig. 9 Average cognitive map of male entrepreneurship

Aggregated cognitive maps of male cognitive maps

The results of the centrality analysis show that an entrepreneur’s overconfidence bias and optimism level are the most central concepts in the cognitive scheme. Therefore, entrepreneurial psychology can largely influence new venture success. Entrepreneurial experience is also one of the central concepts and can influence venture success. Our results using this sub-sample of male entrepreneurs are similar to those of female entrepreneurs (Tables 10, 11 and 12).

Table 10 Centrality analysis on the basis of direct and indirect effects

Rank	Variable	Score	Relative Weight	Nature
1	Overconfidence	23	0.1173	B
2	Optimism	22	0.1122	B
3	Experience	22	0.1122	R
4	Hope	20	0.1020	R
5	Education	19	0.0969	B
6	Social capital	19	0.0969	R
7	Capital	17	0.0867	R
8	Age	16	0.0816	R
9	Risk profile	15	0.0765	B
10	Fear	13	0.0663	B
11	Gender	10	0.0510	R

Table 11 Centrality analysis on the basis of degree of direct influence

Rank	Variable	Score	Relative Weight	Nature
1	Age	16	0.1633	B
2	Experience	15	0.1531	B
3	Education	12	0.1224	R
4	Social capital	11	0.1122	R
5	Gender	9	0.0918	B
6	Overconfidence	9	0.0918	R
7	Optimism	8	0.0816	R
8	Capital	8	0.0816	R
9	Hope	6	0.0612	B
10	Fear	3	0.0306	B
11	Risk profile	1	0.0102	R

The concepts' relative weights highlight that hope, the nature and level of entrepreneur education and social capital are also important factors in new venture success.

Using the influence degree of each variable, our results show the superiority of the traditional factors in venture success. In particular, entrepreneur age, experience, education and social capital are the most influential factors that can govern entrepreneurial success.

The overconfidence and optimism biases have a limited effect according to male entrepreneurs. In fact, male entrepreneurs consider socio-demographic factors and social capital more relevant to their success in their ventures.

Finally, the centrality analysis on the basis of their degree of dependence indicates that the behavioral factors in business success are the most central concepts. This result is similar to those with females and the full sample results.

Table 12 Centrality analysis regarding degree of dependence

Rank	Variable	Score	Relative Weight	Nature
1	Overconfidence	14	0.1429	B
2	Optimism	14	0.1429	B
3	Hope	14	0.1429	R
4	Risk profile	14	0.1429	R
5	Fear	10	0.1020	B
6	Capital	9	0.0918	R
7	Social capital	8	0.0816	R
8	Experience	7	0.0714	R
9	Education	7	0.0714	B
10	Gender	1	0.0102	B
11	Age	0	0.000	R

The socio-demographic factors are ranked last. Therefore, they are less influenced by other variables in the system.

The influences-dependences chart shows that entrepreneur age, experience and education are the most dominant factors and can explain venture success. The gender factor has limited explanatory power. However, only the social capital and overconfidence factors can be considered relay variables in this new framework.

In sum, the chart shows that there are some differences from female entrepreneurs. In fact, the effect of behavioral factors is limited, and only the overconfidence bias can influence the system and affect new venture success. The other behavioral factors are result variables, which have a limited impact on entrepreneurial success.

The average cognitive map demonstrates that these behavioral factors are receiver variables, which means that they are a function of other factors that have a direct influence on venture success.

Policy implications

Our results show that entrepreneurial psychology is a vital factor that influences new venture success. In particular, entrepreneurs' overconfidence bias and optimism level seem to have explanatory power and consequently can explain why new ventures sometimes fail even when they have sufficient financial support and a large social network. The psychology of entrepreneurs is one of the most relevant factors that govern their success. Consequently, policy makers and institutional organisms should revise their strategies and the supports provided to entrepreneurs, which must take the importance of the psychological dimension into account.

In fact, financial support seems to have less influence than the overconfidence and optimism biases. It is time to create new strategies and supports to integrate the psychology of entrepreneurs into plans to reduce venture failure.

Entrepreneurs' education is also important, and decision makers should advance entrepreneurs to accelerated courses that are relevant to their projects. Doing so will increase the probability of success because education seems to be a central concept related to venture success. We suggest that entrepreneurship education should be embedded in education from early formative years through secondary education and be part of the curriculum in all stages of education. Similarly, it is recommended that in order to improve entrepreneurial experience, entrepreneurs are invited to pass with an industrial and technical trainings before initiating their own business this in order to gain valuable managerial and practical experience (Sidrat et al. 2016).

Another important question is how to govern entrepreneurs' psychology to increase new venture success? This can be an interesting line of research; we should analyze in depth how, for example, debt, capital structure and ownership affect entrepreneurial psychology. In fact, optimism and overconfidence can help increase entrepreneurial success; however, a high level of these biases can negatively affect small firms (Ben Fatma et al. 2015).

Conclusion

Standard, rational entrepreneurship theory assumes that new venture success can be explained by some traditional factors such as entrepreneurial social capital and the

available financial support. It supposes also that socio-demographic variables such as entrepreneur's age can be considered as important factors that can affect the business failure or success. Beyond this rational theory, a wave of research papers reveals that entrepreneurial psychology is a fundamental dimension that can affect the entrepreneurial process and so it can explain new venture success. In this paper, we argued that especially entrepreneurial psychological biases are for interest and can influence the new venture success.

We use the cognitive mapping technique to test the effects of both traditional and behavioral factors on new venture success using a mixed sample of Tunisian entrepreneurs. Specifically, we test the effects of entrepreneurs' overconfidence, optimism, hope and fear emotions and risk profile on venture success. We also consider the traditional factors, such as entrepreneurs' financial and social capital, experience, education, gender and age. We then construct an average cognitive map.

As it predicted, entrepreneurs' psychology and especially optimism and overconfidence biases are important factors that can influence venture success. These variables act as relay variables; this means that they are at the same time more influential and more dependent on other variables in the system. However, traditional factors such as entrepreneurial age, experience and education level and nature seem to be the pillars of new venture success in the Tunisian context.

We also control for gender differences; to do so, we construct a sub-sample and an average cognitive map of female entrepreneurs and another map for male entrepreneurs. In sum, our findings are similar to those obtained using the full sample. However, the behavioral factors seem to have a greater impact among female entrepreneurs than among male entrepreneurs.

Our analysis provides a basis for future research. Future research should look more closely into the effect of managerial psychology on small firms at different levels: financing, investment decisions and small firm strategy. For example, we can develop a model to show the effect of entrepreneurs' psychology on absorbing all of the opportunity growth for new ventures. We should advance research in this field to explore how entrepreneurial psychology and emotion can influence venture success. Another development would be to consider ways of controlling entrepreneurial psychology during the venture process. In fact, it is time to find new forms of government supports. Policy makers should be aware that entrepreneur psychology is an important factor that can lead to the success or failure of new ventures.

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