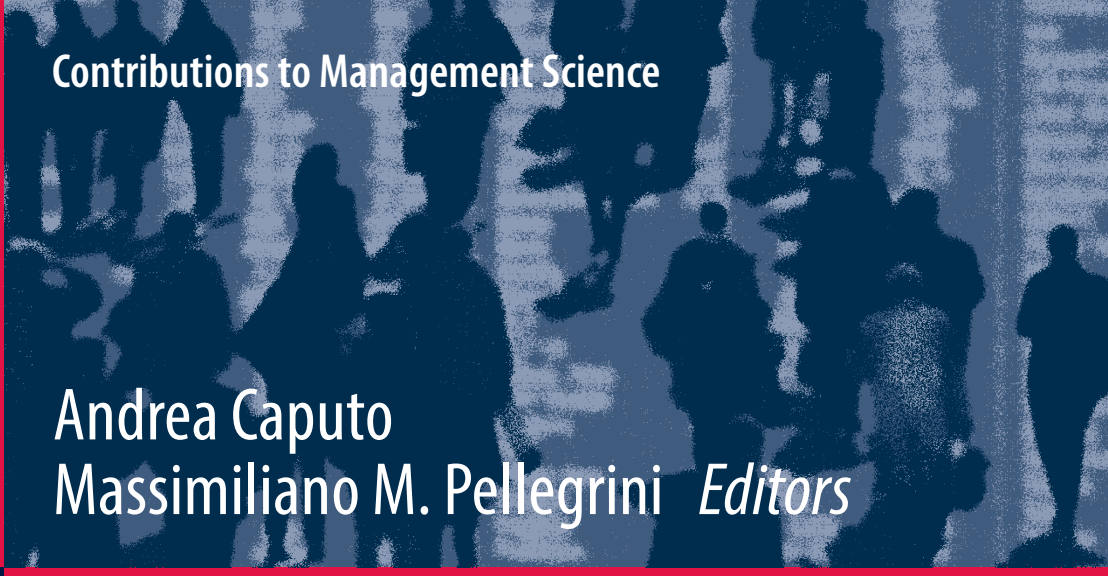
Contributions to Management Science



Andrea Caputo
Massimiliano M. Pellegrini *Editors*

The Anatomy of Entrepreneurial Decisions

Past, Present and Future Research Directions

Springer

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Editors

The Anatomy of Entrepreneurial Decisions

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To our families, the "entrepreneurial ventures" that always supported us until now.
Andrea Caputo and Massimiliano M. Pellegrini

Foreword

Entrepreneurship research has become the fashionable flavour of the month, and books about this phenomenon are growing exponentially in number. Yet, a neglected aspect till now has been decision-making by entrepreneurs. To fill the gap, enter the wise initiative of Andrea Caputo and Massimiliano M. Pellegrini!

Decision-making, important in management, political science, psychology, and sociology, is also central to entrepreneurship, and *The Anatomy of Entrepreneurial Decisions* is a long-awaited compilation of works about this important topic. This edited volume is wisely divided into five parts, respectively containing chapters by diverse scholars who have focused on issues relating to: (1) cognition, (2) joint decisions, (3) passion, (4) development, and (5) context.

Having researched context since the 1990s,[1] I am especially enchanted by the book's fifth part. Decisions are so very much a function of culture, circumstance, and environment.

Hats off to editors Andrea Caputo and Massimiliano M. Pellegrini!

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Leo-Paul Dana

[1] See: "Entrepreneurship in a Remote Sub-Arctic Community: Nome, Alaska," *Entrepreneurship: Theory and Practice*, 20 (1), Fall 1995, pp. 55–72 and "Self-Employment in the Canadian Sub-Arctic: An Exploratory Study," *Canadian Journal of Administrative Sciences* 13 (1), March 1996, pp. 65–77.

Acknowledgements

We would like to deeply thank all the friends and colleagues who were involved in the production of this edited book. In particular, special thanks go to all contributing authors for being interested in participating in this ambitious project and for delivering such high-quality manuscripts in a timely fashion. We would also like to explicitly thank all the reviewers who assisted us and took part in reviewing the manuscripts published in this book. Moreover, we would like to express our gratitude to the European Academy of Management community and the SIG of Entrepreneurship's scholars, who supported this project during its development.

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About the Editors

Andrea Caputo is Reader in Strategy and Entrepreneurship at the Lincoln International Business School (UK). He received his PhD in Management from the University of Rome "Tor Vergata" in 2013. Previously, he was Assistant Professor at Princess Sumaya University. He has also held visiting positions at several universities, like University of Queensland, George Washington University, and Universities of Seville, Alicante, Pisa, Macerata, and Naples Parthenope. His main research expertise is related to entrepreneurship, strategic management, innovation, negotiation, and decision-making. He has authored more than 40 international publications, including in *Journal of Business Research*, *International Journal of Entrepreneurial Behavior & Research*, *International Journal of Entrepreneurship and Small Business*, and *Business Process Management Journal*. He is editor of the book series "Entrepreneurial Behaviour" for Emerald and co-chair of the track Entrepreneurial Behaviour and Decision-Making at EURAM.

Massimiliano M. Pellegrini is qualified Associate Professor of Organizational Studies and Entrepreneurship at University of Rome "Tor Vergata". From the same university he also received his PhD in 2011. Previously, he was a Senior Lecturer at Roehampton University, and he covered several roles as permanent staff at University of West London and Princess Sumaya University, and visiting staff at the Wharton School, University of Linz, and University of Enlarger-Nuremberg. He was the Chair for the Strategic Interest Group of Entrepreneurship (E-ship SIG) at the European Academy of Management (EURAM) until 2018. He published more than 40 contributions focused on entrepreneurial, ethical, and organizational behaviours, e.g., in *Journal of Business Ethics*, *Journal of Managerial Psychology*, *International Journal of Entrepreneurial Behavior and Research*, *International Journal of Entrepreneurship & Small Business*, and *Business Process Management Journal*. He is also editor of the book series "Entrepreneurial Behaviour" for Emerald.

An Overview of *The Anatomy of Entrepreneurial Decisions*

Andrea Caputo and Massimiliano M. Pellegrini

Abstract This chapter introduces the content of the book, presenting the key insights from the contributed chapters.

It is evident from both entrepreneurship theory and practice that the success, longevity and survival of entrepreneurial activities are deeply linked to the effectiveness of decision-making processes and negotiation capabilities of the actors involved. An entrepreneur creating a new venture or reconfiguring an existing firm and those dealing with crises or normal business conditions have in common the need to take effective decisions, involving the entrepreneur and a plethora of external subjects.

Therefore, the impact of these decisions' characteristics and their relation to those of other actors is a fundamental topic to be investigated by entrepreneurship and organizational scholars. Following the seminal review on entrepreneurial decision-making by Shepherd et al. (2014), this edited collection aims to provide researchers, entrepreneurs, managers and students with an overview of the investigation and understanding of how decisions permeate the life of entrepreneurial ventures during their life cycle.

Indeed, decision-making processes affect all aspects of business at every stage of their development. Even if decision-making is a well-established field of study that spans in many areas, including management, psychology, sociology and political science, to name a few, what we know of decision-making in entrepreneurial contexts is still in need for investigation.

In fact, entrepreneurs and their counterparts in organizational setting such as intrapreneurs or change agents compared to non-entrepreneurial role face conditions of high uncertainty, ambiguity, time pressure, emotional intensity and high risk

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when making decisions. Similar conditions apply when entrepreneurial individuals negotiate with their internal and external stakeholders.

This book was initially born from an idea based on our joint research interests in entrepreneurship (e.g. Caputo 2013, 2014; Caputo et al. 2016; Mehtap et al. 2017; Rialti et al. 2017) that culminated in the proposal of a successful track, now standing, at the 18th European Academy of Management Annual Conference, within the SIG of Entrepreneurship, titled "Entrepreneurial Decision Making and Behaviour".

However, having opened the call for chapters to several audiences beyond the EURAM Conference, we were able to gather a large number of high-quality contributions from all over the world.

In the call for chapters of this edited book, we called for scholars to submit empirical, theoretical and review chapters, which try to bridge the literature on entrepreneurship, entrepreneurial and innovative behaviours with decision-making and negotiation. To the best of our knowledge, this edited book is among the first to combine those streams of research, thereby offering a new and insightful addition to the entrepreneurship field.

In particular, we originally proposed three particular broad areas that deserve research attention:

1. Entrepreneurial emotions, passion and trust
2. Entrepreneurial cognition and decision-making processes
3. Entrepreneurship, negotiation and conflict management

Every chapter that the reader will read in this book has undergone a thorough double-blind peer-reviewed process. It started with authors submitting a chapter proposal in April 2018, which was reviewed, and then authors were invited to submit a full chapter by July 2018. Chapters were sent to reviewers and finalized by the end of 2018, offering the reader with contemporary and high-quality research investigating the anatomy of entrepreneurial decisions.

1 Structure of the Book

The book is composed of five parts that aggregate the contributed chapters by areas of interest that together coherently represent the several dimensions constituting the anatomy of entrepreneurial decisions.

The first part, *Cognition of Entrepreneurial Decisions*, is devoted to the investigation of the mental schemata and other cognitive processes affecting entrepreneurs making decisions. The part comprises four chapters that cover topics from creativity (chapter "Using Creativity to Defeat Fear and Manage Ambiguity for Enhancing Entrepreneurial Decisions"), intuition (chapter "Intuition in Entrepreneurial Cognition"), affect (chapter "Entrepreneurial Success: A Theoretical Contribution Linking Affect and Cognition") and metacognitive abilities (chapter "Metacognition, Entrepreneurial Orientation, and Firm Performance: An Upper Echelons View").

In the second chapter, Yagnik and Chandra present a contribution titled *Using Creativity to Defeat Fear and Manage Ambiguity for Enhancing Entrepreneurial*

Decisions. Their study focuses on creativity and its potential role in overcoming fear and tolerating ambiguity, where both fear and ambiguity are known to be deterrents of entrepreneurial decisions. The chapter discusses Creative Aerobics (CA) as a strategy to enhance creativity and, in turn, overcoming fear of failure, and tolerating ambiguity/uncertainty to enhance entrepreneurial decision-making process is discussed. The chapter also presents a conceptual model that maps the possible relationships among those elements.

In the third chapter, Baldacchino presents a contribution titled *Intuition in Entrepreneurial Cognition*. The author unpacks the concept of intuition, which it is widely claimed to play a central role in entrepreneurial cognition. It comprises three main sections: understanding, appreciating and developing intuition, which, respectively, aim at (1) clarifying what intuition is (and is not), (2) fostering the role of intuition as enabling element for opportunity identification and exploitation and (3) reviewing principles, guidelines and methods that can increase intuition.

In the fourth chapter, Sassetti, Cavaliere and Lombardi present a contribution titled *Entrepreneurial Success: A Theoretical Contribution Linking Affect and Cognition*. Through a comprehensive theoretical framework, the authors contribute to further the understanding of how affect influences cognition and the outcomes of decision-making in the context of entrepreneurship. The chapter explores the process that links affect and cognition with entrepreneurial decision-making effectiveness delivering five propositions. The propositions suggest that entrepreneurs can be considered as "quasi-rational" decision-makers that adopt a complex, nonlinear, multicriteria and recursive process.

In the fifth chapter, Najmaei and Sadeghinejad present a contribution titled *Metacognition, Entrepreneurial Orientation, and Firm Performance: An Upper Echelons View*. This chapter is grounded in the upper echelons theory, which suggests that cognitive diversity in top management teams (TMTs) affects firms' operation and performance. Their study adopts a multidimensional view of entrepreneurial orientation and proposes that diversity in the metacognitive ability of top teams has different impacts on each dimension of the team's entrepreneurial behaviour and through this firm performance.

The second part *Joint Entrepreneurial Decisions* is instead dedicated to the joint and reciprocal influences that entrepreneurs receive from their social network and how those affect their decisions. Specifically, the part inquires the advice network used by the entrepreneurs (chapter "Givers, Takers, and New Venture Makers: Why Help-Seeking Processes Are Critical (and Different) for Entrepreneurs") and the family network in the case of family firms (chapter "Conflicts and Negotiations in the Intergenerational Succession of Family Firms: A Literature Review").

In the sixth chapter, Williams, Munyon and Fuller, with their contribution *Givers, Takers, and New Venture Makers: Why Help-Seeking Processes Are Critical (and Different) for Entrepreneurs*, address mechanisms used by entrepreneurs for seeking and receiving help when operating new ventures. In particular, the chapter inquires antecedents and outcomes of help-seeking behaviours, such as economic and social elements, individual differences of entrepreneurs and a set of individual- and firm-level impactful outcomes.

In the seventh chapter, Caputo, Pellegrini, Valenza and Zarone present a research agenda on *Conflicts and Negotiations in the Intergenerational Succession of Family Firms: A Literature Review*. This highlights the need of a serious debate about conflicts in family businesses with the specific support of the negotiation theory to solve them. Despite the literature on conflict management is highly developed as well as the literature in family business, scholars and researchers have not yet deepened several areas of conflict management in family businesses, and the chapter aims at identifying the issues and research gaps that should be explored for a comprehensive understanding of conflict resolutions in family businesses.

The third part *Passion and Entrepreneurial Decisions* pays mainly attention to the specific role of motivation and passion in entrepreneurship and in its effect on deliberate practice (chapter "Working Passionately Does Not Always Pay Off: The Negative Moderating Role of Passion on the Relationship Between Deliberate Practice and Venture Performance") and on the possibilities to be backed by Angel investors (chapter "Angel Investor-Entrepreneur Fit: The Role of Personality and Passion").

In the eighth chapter, Park, Martina and Smolka, with their study titled *Working Passionately Does Not Always Pay Off: The Negative Moderating Role of Passion on the Relationship Between Deliberate Practice and Venture Performance*, express a quite counterintuitive thesis about the relation between deliberate practices and firm performance. Indeed, deliberate practice, an iterative process that leads to expertise, is found to be positively associated with superior performance. Yet, passion is considered to be a vital motivator of engagement in and maintenance of deliberate practice. However, contrary to a general sense, entrepreneurial passion seems to negatively moderate the deliberate practice-venture performance relationship, and the explanation of this negative moderation is explained through Kolb's experiential learning cycle.

In the ninth chapter, Taylor and his contribution *Angel Investor-Entrepreneur Fit: The Role of Personality and Passion* inquire the non-economic motivations to invest in risky start-ups of business angels. The chapter shows how entrepreneurs' personality and passion may stimulate business angels' motivation to invest, with a discussion of practical implications for both angel investors and entrepreneurs.

The fourth part named *Development of Entrepreneurial Decisions* focuses on how to develop and shape decisions and decision-making processes of students in relation to their entrepreneurial intention (chapter "Entrepreneurial Intentions Among Students: The Italian Experience") and of professionals and their long-life learning (chapter "Lifelong Learning in Europe: An Analysis of Raw Materials Professionals' Learning Needs").

In the tenth chapter, Scafarto, Poggesi and Mari present a study titled *Entrepreneurial Intentions Among Students: The Italian Experience*. The chapter tests the theory of planned behaviour (TPB) and expands it by adding two "new" variables, i.e. risk-taking propensity and perceived environmental support through a structure equation modelling on a sample of 383 Italian undergraduate students. Results support this integrated entrepreneurial intention model also underlining the pivotal role of the environment to develop and foster the attitude towards entrepreneurship among students.

In the 11th chapter, Ceruti, Gavinelli, Chierici and Mazzucchelli, with their *Formative Needs as Antecedents of the Decision Making Process: Some Insights from European Raw Materials Professionals*, analyse formative/training needs of professional and how these influence their behaviours and choices. The chapter provides hints to the debate on lifelong learning, underlining some priorities in the raw materials industry. The methodological approach creates a new future research path since the work can be extended to other fields in order to plan and manage an overarching professional educational system in Europe.

Finally, the fifth part *External Context of Entrepreneurial Decisions* analyses the ecosystems and environmental contingencies that may affect entrepreneurship and its related decisions and behaviours. Specifically, chapters discuss about: the role of the University (chapter "The Relationship Between Entrepreneurship, Innovation and Growth in Italy"), the public funding scheme (chapter "What Start-Up Firms Are More Likely to Obtain Public Funding Support? A Systematic Analysis of the Funding Program Promoted by the Abruzzo Region in Italy") and the general ecosystems (chapter "Nurturing Innovation Through Entrepreneurial Ecosystems: What Does the Literature Say?").

In the 12th chapter, Arnone titled his research *The Relationship Between Entrepreneurship, Innovation and Growth in Italy* that inquires the innovations driven by academic entrepreneurship. This multidimensional approach sheds some lights on the University role inside two particular innovation ecosystems, science and technology parks and research spin-offs. The empirical analysis verifies whether research spin-offs can reduce development gaps compared to the targets set by Europe 2020 objectives.

In the 13th chapter, Corsi, De Luca and Prencipe titled their study *What Start-Up Firms Are More Likely to Obtain Public Funding Support? A Systematic Analysis of the Funding Program Promoted by the Abruzzo Region in Italy*. The chapter relates the profile of start-up firms, in terms of both entrepreneur and entrepreneurial project features, and their likelihoods of obtaining support through public funding. It seems that older entrepreneurs and entrepreneurial teams have a lower probability to be awarded by the public program compared to younger ones. However, project- and firm-related features seem not significant in determining whether a start-up will be awarded with public funds.

In the 14th chapter, Marshall, Caputo and Mehtap titled their work *Nurturing Innovation Through Entrepreneurial Ecosystems: What Does the Literature Say?* This chapter presents a literature review about entrepreneurial ecosystems and its relationships with entrepreneurship and innovation. Reviewed studies were aggregated into clusters and interpreted through the Neck et al. (2004) framework, providing a systematized summary of the surveyed literature.

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Part I
Cognition of Entrepreneurial Decisions

Using Creativity to Defeat Fear and Manage Ambiguity for Enhancing Entrepreneurial Decisions

Arpan Yagnik and Yamini Chandra

Abstract The present chapter focuses on creativity and its potential role in overcoming fear and tolerating ambiguity. Both fear and ambiguity are known to be deterrents of entrepreneurial decisions. In this chapter, entrepreneurial decision-making is discussed as a part of strategic and cognitive process, Creative Aerobics (CA) is introduced as a strategy for enhancing creativity, and finally the key role CA can play in overcoming fear and negotiating and tolerating ambiguity/uncertainty to enhance entrepreneurial decision-making process is discussed. This chapter presents a conceptual model mapping the relation between creativity, fear, ambiguity and entrepreneurial decisions. Review of conceptual and empirical literature in the field was adopted as a methodology to bring forth the possibility of the relationship model. The chapter also emphasizes the need for creativity enhancement and presents CA as a strategy to enhance creativity. CA, a four-step ideation system, can help entrepreneurs generate multiple ideas/solutions in quick succession.

1 Introduction

The framework of entrepreneurship has three major components: (a) the 'enterprise'—an entity a person ventures into, a ready-to-go market model which is preferably proposed to establish and address the need gap prevailing in the said (niche) market; (b) the 'entrepreneur'—a person himself/herself who with his/her knowledge, skills and abilities and personal struggles chooses entrepreneurship as a career option; and (c) the 'entrepreneurship', an unusual path which the person lives by choice, a journey which represents pain, challenges, obstacles, sacrifices and toughest experiences. Entrepreneurial journey is one of making decisions, mostly difficult ones, to ensure the execution of a thought-out plan (or a business model) with a background awareness of contingencies that might arise as a result

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of making decisions in an environment of high uncertainty. Decisions are often made in the absence of adequate market intelligence, with scarce resources and under the pressure of moving ahead of the competition. Every decision has a consequence, and when the stakes are high, the consequences are equally high. Entrepreneurs have to overcome a plethora of fears that infest them to make sound decisions. They also have to manage, and to a great extent even tolerate, the inherent ambiguity and uncertainty that abounds in entrepreneurship.

Is there something that can help entrepreneurs in overcoming fear and better managing ambiguity or uncertainty, which may in turn have the potential to improve entrepreneurial decisions? This question became the guiding force for this chapter. This chapter reviews and elaborates the fear and ambiguity and their role in entrepreneurial decisions. Following that this chapter introduces the seldom-discussed concept of creativity and explicates the very important role it can play in defeating fear and negotiating with and tolerating ambiguity and uncertainty to enhance entrepreneurial decisions. The aim of the chapter was to introduce a conceptual model proposing a relationship between fear, ambiguity, entrepreneurial decisions and creativity. This model presented is only a conceptual advancement and further empirical studies are required to validate and establish the strength of the model. The methodology that was adopted was a comprehensive review of conceptual and empirical literature in the field along with the in-depth discussion of the major concepts. This chapter is important and will add value for potential and aspiring entrepreneurs, research scholars, academicians and ecosystem enablers. This chapter is important specifically for entrepreneurs having a hard time making decisions related to their enterprise because of the prevailing fears and ambiguity associated with entrepreneurial decisions. Entrepreneurs work in environments that have high uncertainty and risk. This characteristic of the environment makes decision-making challenging and difficult. This chapter is important for entrepreneurs because it introduces them to creativity as a tool to overcome and manage fear and ambiguity and because it enables them to overcome their fears by using creativity techniques to generate multiple options in quick succession and also better manage the ambiguity and uncertainty by increasing their tolerance for it by being accustomed and privy to the notion of what it isn't. This chapter has two goals: first, to present a discussion of decision-making, fear and ambiguity, in regard to their role in entrepreneurship, based on a comprehensive review of literature, and second, to present creativity as a tool to overcome fear and manage ambiguity along while introducing Creative Aerobics (CA) as a creativity enhancement strategy suitable for adoption by entrepreneurs. This chapter is divided into four major sections explicating decision-making, fear, ambiguity, and creativity and creativity enhancement. The main takeaway from this chapter is that creativity helps in generating multiple ideas, and having multiple options can drastically alter the decision-making process. Enhanced creativity also improves one's ability to tolerate ambiguity and navigate it. This enhanced skill is greatly relevant to entrepreneurs who constantly live in ambiguity and make decisions with little or no information. Creative Aerobics (CA) (George and Yagnik 2017) is one of the creativity enhancement strategies that is a good fit as it can not only help entrepreneurs enhance their creativity but also help them access solutions that existed

before but were not accessible. This would greatly aid entrepreneurs in defeating their fear, managing ambiguity and optimizing entrepreneurial decisions.

2 Decision-Making

Decision-making is a complex phenomenon, which requires a person to think in a strategic way, to come up with solution(s) for a prevailing problem. Decision-making under complex situations demands thoughtful and executable strategic thoughts. Often the entrepreneur lives in a situation that poses questions against their own decision and subsequent strategies, which they may have adopted to make those decisions.

2.1 Entrepreneurial Decision-Making

The practice of decision-making in organizations revolves around two important concepts: (a) strategy and (b) cognition. Decision-making in itself is a strategic activity, which counts for determining specific course of action to reach the desired strategic goals. Strategic decision-making process leads to the choice of stepwise activity and the way in which these steps are executed to derive a probable desired solution (Vermeulen and Curseu 2008, p. 16). The second relevant facet is cognition; it refers to the way in which decision-related information is presented and transformed into a meaningful data.

The success of small firms hinges greatly on well-thought-out strategic decisions (Robinson and Pearce 1983). Schoemaker defined strategic decisions as 'intentional choices of programmed responses about issues that materially affect the survival prospects, well-being and nature of the organization' (1993, p. 107). Entrepreneurial decisions are complex. In some instances, it has been observed that entrepreneurs have to make judgements under uncertain circumstances when discovering and defining a new opportunity. Shane (2000) argued that the same situations are interpreted differently by different entrepreneurs, thereby making different judgement about the outcome of the decision taken under those situations (e.g. defining business opportunities). Thus different expectations' 'triggering entrepreneurial judgement' varies based on individual discretion.

Entrepreneurs have a strong desire to be independent; they believe it is better to invest in their own self (or in their own ideas). Oftentimes the decision to start one's own business comes from a disruption (Frederick et al. 2007). The knowledge of identifying a market and subsequently creating possibilities for profit is referred to as alertness in entrepreneurship. Entrepreneurs are differentiated from non-entrepreneurs by not just their ability of alertness (Kirzner 1973); they also differ on attitudes, characteristics, experiences and other aspects that end up in action taken by them (Brandstatter 2010).

Entrepreneurs typically function under circumstances where elements are shifting from one to another, ill-defined situations and problems present themselves periodically that require solving problems strategically, competing goals (within and outside the organization) and multiple players competing at all levels are very likely to be present. Decision-making belongs to the domain of problem structuring and problem-solving—a form of cognitive activity, which can be treated as a specific skill. Some researchers have argued that the level of affect about the perception of the way the world operates (e.g. locus of control), the varied nature of people, and understanding of oneself has had effect on the entire process of decision-making. Sometimes connections with the business and social communities can also be a predictor in the decision-making process (Izard 2009; Schwartz 1994; Granovetter 1985). Entrepreneurs approach decision-making strategy and the implementation of it differently from most people.

2.2 *Strategic Decision-Making*

Strategic decisions vary along two dimensions—control and performance. When an individual is said to be taking decisions under the influence of 'control', he/she first considers to what extent they can influence a decision and the resulting output. The second way strategic decision-making affects is where dimension of success is measured, considering relative capacity from others.[1]

Rosenzweig (2013) explained three dimensions that affect the decision-making; these are:

1. *Making routine choices and judgements*. This behaviour is observed when the person is encountered with random available options/alternatives in front of him/her—where control over the best choice is very low as more or less all the available options seemed to be appropriate or sometimes it suits best at that moment. This can be replicated with the personal investment decisions in the business environment; here, the entrepreneur is stuck between where to pour more investment either in branding/marketing or purchasing raw material or giving extra perks to the employees.
2. *Influencing outcomes*. Decisions at times involve selections from available options/alternatives where influences on the outcomes of the decisions are minimal. For example, determining how long the project at hand will take time to finish, this is more of a judgemental in nature where the individual has some control over the completion of the task and output in terms of performance. Sometimes, such an activity calls for making the mind back and forth, choosing between first and second substitute. Here, shifting between mindsets is a crucial

[1]Retrieved as on May 2018 from: https://hbr.org/2013/11/what-makes-strategic-decisions-different

element of high performance for the tasks requiring repeated actions to be taken within shorter durations.

3. *Placing competitive gamble*. This introduces individuals to a competitive dimension, where calculating success is no longer a matter of the outcome of the absolute performance, but it does depend on how well the person performs in relation to others. It should further be noted that the best decisions under these circumstances are to notice and keep a tap on the moves of rivals, anticipating on their likely moves so to predict the chances of winning.

While these are processes which entrepreneurs follow, which may sometimes not go step by step or flow in the form of overlapping each other, others have discussed the five most widespread drivers for an organization which can add to defining a strategy (McMullen and Shepherd 2006; Plummer et al. 2007; Vermeulen and Curşeu 2008); these are:

(a) Providing a better focus on the core activity and understanding the better ways to improve the current practices
(b) Strengthening the market position (which also counts for analysing the rivals)
(c) Distribution of the products geographically and simultaneously calculating the risk distribution which will be incurred
(d) Growth of the entire organization (e.g. increasing knowledge or size)
(e) The involvement of heuristics (a mental schema allowing people to solve problems and making judgements quickly and efficiently) in the strategy formation process

When a discovered opportunity does not fit the organizations' entrepreneurial strategy, entrepreneurs search for other viable commercial opportunities that do fit the entrepreneurial strategy. After an opportunity fits the entrepreneurial strategy of an organization, entrepreneurs exploit these opportunities.

Figure 1 illustrates the strategic decision models adopted for the public decision-making process, especially for issues which do not have easy available solutions. These models suggest that the centre of the decision-making framework revolves around the collaboration and learning between the decision-makers, scientists and associated stakeholders who closely interact with each other at times to understand various ways in which these situations (issues) can be addressed. This process starts by defining the criticality of the issues which leads to accessing the information (to find out ways to address these issues), analysing the risks and scrutinizing the available supportive resources which could be converted into a tool to address these issues. This sort of analysis is referred to as the 'resource-based view' which emphasizes analysing the internal factors of the firm (Papadakis and Barwise 2002). The next step arises with understanding the integrated steps which can be an alternative to consider or trade off these measures. All these processes require monitoring. Parallel to these, other steps move on to further augment the enhancement of understanding to establish decision criteria that are followed by the implementation of these analysed strategies. Papadakis (2006) suggested that '...the decision-making process is far from being an iterative, well-defined and sequentially

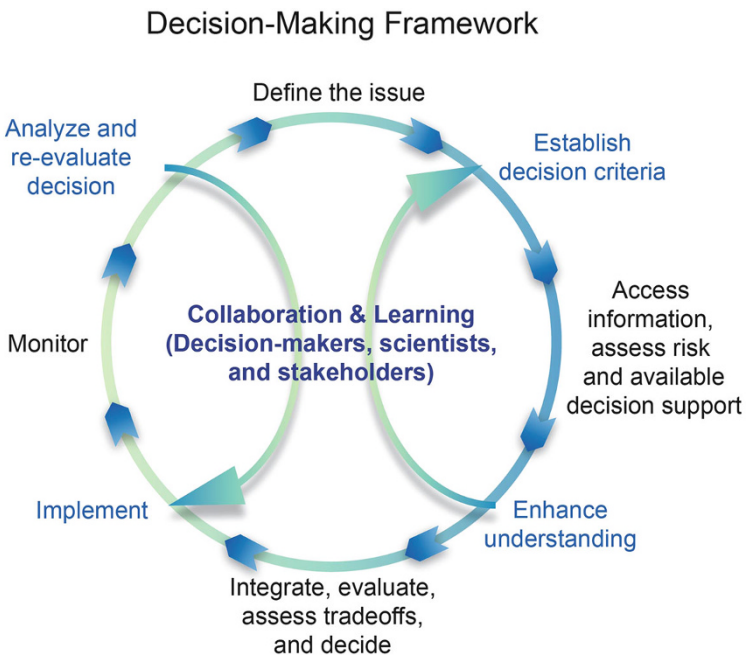

Fig. 1 Strategic decision models for public decision-making (Source: Allen and Coates 2009)

evolving set of activities. Thus, instead of using step-by-step models of strategic decision making processes researchers create a number of dimensions describing generic attributes of the process. . .' (p. 370).

2.3 Theories of Strategic Decision-Making

The theories of entrepreneurial strategic decision-making process are closely associated with exploring and exploiting the entrepreneurial opportunities. For potential entrepreneurs, decision-making process plays a key role in determining the probability of the success. High probability of succeeding in one's entrepreneurial venture increases the likelihood of choosing those strategies to receive the desired results (MacMillan et al. 1985). Sometimes it has also been observed that firms have been created by entrepreneurs even though the willingness of the market to accept their product/services is negligible, and this makes situation more complex that they elevate in the scenario without bringing out more necessary information to bring new markets into existence.

Entrepreneurs are observed operating in the situations relating from uncertainty to ambiguity. The effectuation reasoning models say that during the decision-making process entrepreneurs operate either through the logic of control or through the logic

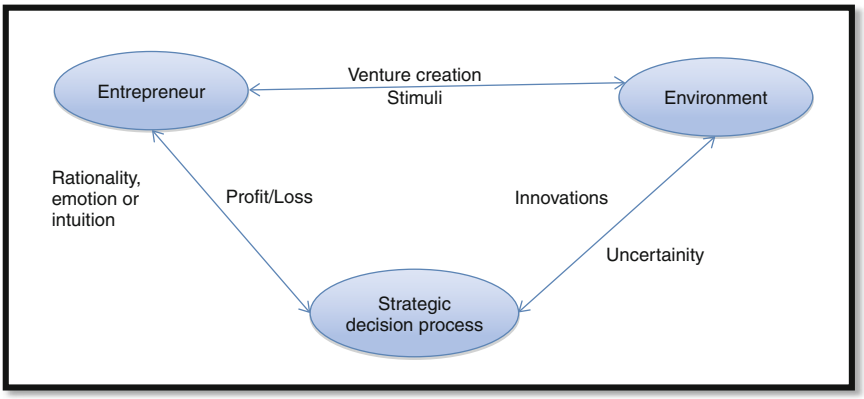

Fig. 2 A framework for entrepreneurial decision-making (Source: Adapted from Vermeulen and Curseu 2008; based on: Ivanova and Gibcus 2003)

of prediction. In the logic of control, if a person can control the future, then he/she has no need for predicting it, whereas in the logic of prediction, if a person can predict future, he/she will be able to control it.

Another model of strategic decision-making described by Vermeulen and Curseu (2008) is depicted in Fig. 2. A framework for entrepreneurial decision-making showed here consists of three aspects: the environment, the entrepreneur and the strategic decision process. These three components are in constant interaction with each other while following the path of decision process. These three major elements constructing entrepreneurial decision-making are interlinked, and change in any one of them reflects a change in the others.

3 Fear: What It Is and How It Affects Entrepreneurs

Fear is real, powerful and debilitating. Fear is closely related to, but should be distinguished from, emotional anxiety, which occurs as the result of threats that are perceived to be uncontrollable or unavoidable. Some of the researchers like Rauch and Frese (2007) in their work assert that entrepreneurs prefer certainty more than uncertainty to avoid fear of failure as it may lead to 'potential loss of self-image and self-respect' (Ray 1994, p. 157). Wagner and Stenberg (2004) looked at fear of failure as an indication of greater risk aversion tendencies, whereas Vaillant and Lafuente (2007) explicated that the 'social stigma which surrounds fear of failure is the source of origin' in many individuals to sometimes avoid or many a times it acts as a hindrance in trying out novel opportunities in life. An emotion of fear, in any individual, brings out two kinds of behaviour, where the person chooses either to approach the situation with a strategy to deal with the outcome or, in some individuals, to flee from the situation when uncertainty is observed. These behaviors are of

similar kind as described by Hans Selye (1907) in the theory of general adaptation syndrome (GAS, 1956) which tells '. . .the alarm reaction phase, where the response of the individual is "fight or flight". . .' (3479: 32).[2]

The fear of failure in the literature has been grouped into two ways, viz. personological and motivational orientation of an individual. Personological approach closely looks at individual's tendency to experience fear, and motivational approach looks at the environment and its relation with psychological and behavioural outcomes (Cacciotti and Hayton 2014). We also highlight here that both internal and external circumstances intrigue reactions as a response to the situations, which elicits fear in the person. This is affected by many factors including the upbringing of the person. For example, some parents force their children to get exposed to different situations which make them understand the process of exploring and recognizing the potential threats, novel experiences, etc. Another of its kind are past experiences of the person, which he has experienced because of the outcome of similar situations (this could be from self and sometimes shared by others), and lastly a way of exploring things by trial-and-error method. In the case of entrepreneurs, many of them have observed their fathers or uncles taking decisions in many situations (who are/were associated with their family businesses), with a pre-mindset to accept the outcomes of those decisions. Sometimes, the older generation shares these experiences with the younger generation to enhance their knowledge, skills and values of the businesses and thus enhance their competencies.

Entrepreneurs experience many fears, such as fear of making an idea acceptable to the ecosystem, fear of entrepreneurial entry, fear of failure, fear of taking risks, fear of falling prey to the fears, fear of being mediocre, fear of losing creativity, fear of new entrants, fear of financial losses, fear of loss of autonomy, fear of losing the established sense of self and, the most unusual, the 'fear of success or sometimes handling the success'.[3] However, a common denominator for entrepreneurs is the 'fear of failure'. This emotion when experienced can inhibit and/or motivate entrepreneurial behaviour. Thus investigating fear of failure can create basis for better understanding entrepreneurial motivation. Fear of failure sometimes stands out to be one of the deterrent factors for setting up new business. McMullen and Shepherd (2006) argued that individuals' reaction to opportunities comes first and then comes considerations about desirability and feasibility for new business start-up. For entrepreneurs, fear of failure comes as an assessment of threats in situations where he/she could potentially not succeed. An entrepreneurial situation is closely associated with risk-taking and uncertainty and acts as an inhibitor in one's entrepreneurial entry (Caliendo et al. 2009).

Through this section, we want to highlight various modes of fear as experienced by entrepreneurs. These sources of fear arise from various internal and external stimuli and have different responses based on the different situations from which it is arising. Different types of fear are described below, of which some are adapted from

[2]Retrieved as on September 2018 from: www.worldcat.org/title/stress-of-life/oclc/597890662

[3]Retrieved as on May 2018 from: www.entrepreneur.com

the literature and some of them have been quoted by authors based on their interactions with the student/entrepreneurs during the classroom activities.

3.1 Fear as Experienced by Entrepreneurs

When fear is behind entrepreneurial decisions, the probability of producing ideas for ventures that may lead to breakthrough innovations and disruptions is meagre. Fear is experienced by entrepreneurs in many different ways and at many different stages. Different fears come in different intensities and with a different impact on the entrepreneur depending upon the situations. Hence for an entrepreneur, it is important to understand different types of fears. Largely speaking, fear can be experienced and it can turn out to be a motivator or an inhibitor. The latter is more frequent. The fear of stepping out of one's comfort zone and risking things associated with it can be a deterrent for the entrepreneurial spirit. Entrepreneurship also forces an individual to wear hats that he/she has never worn before. Fear of being unable to wear multiple new hats at the same time and coping with the challenges associated with it can be debilitating. It has also been observed in many instances that rather than simply inhibiting people from being entrepreneurial, fear of failure motivates greater striving for success. Ideally, no entrepreneur wants to fail, even though the current trend of the start-up movement has seen and accepted the notion of 'fail fast and fail often'. For example, students are encouraged to go for a pilot run of their business ideas while their studies are continuing to test the viability and acceptability of the product/service: if it fails, they move onto test another one; if they succeed, they further study it in a bigger geographic arena. The educational campuses sometimes act as a better ecosystem to go for trial-and-error attempts.

Fear of failure is a big fear among entrepreneurs. The loss of face and fortune and not being able to recover from the losses are all real possibilities. Entrepreneurs, sometimes, decide to choose objectives that are relatively easier to achieve rather than goals that have higher risk (Hayton and Cacciotti 2018). Fear can also elevate a difficult goal into an impossible goal. While taking on a perceivably impossible goal, the individual becomes prey to rationalization that failure may occur due to the perceived impossibility of achieving the goal and not from other reasons such as lack of enough effort or understanding of the market or the timing of the product launch.

Another fear experienced by entrepreneurs is the fear of doing badly. 'What if I do badly?' Entrepreneurs fall prey to such thoughts by having second thoughts about their ability to deliver. Such thoughts impact entrepreneurs' decisions by making them undermine their decision and even question it and even putting off things till a later time.

Another fear experienced by entrepreneurs is the fear of going back to the traditional job environment. Individuals who choose to become entrepreneurs after pursuing a career in traditional jobs often live under the fear of not being able to perform better in their venture and are fearful of 'what if this fails I have to go back to that world which I have already left behind?' This can serve as both a motivator and

Fig. 3 Individual's perceptions: opportunities, capabilities and fear of failure (Source: Global Entrepreneurship Monitor 2013, pp. 26–28)

an inhibitor. Lastly, the entrepreneurial life is typically seen as full of uncertainty, and therefore an important fear experienced by entrepreneurs is the fear of uncertainty. Fear of success is another fear experienced by entrepreneurs. The vacuum created by not having anything to do after succeeding in ones venture is yet another fear that entrepreneurs dread. There are many more fears that are experienced by entrepreneurs but are not as generic as the ones listed here.

Fear is an integral part of entrepreneurship. And the above points throw a light upon some common fears as experienced by the entrepreneurs. Risk and uncertainty stand out as the common anticipation of discomfort, arising due to the drastic changes that occur as a result of unprecedented success. Fear of failure has been a major concern not only for the entrepreneurs but also for the ecosystem supporters. It is closely related to the understanding of entrepreneurial opportunities and the strategic steps taken for exploring and exploiting opportunities. The Global Entrepreneurship Monitor (GEM) report of 2017 states that there is a moderate increase in the fear of failure among the population (aged 18–64 years) in comparison to the year 2016.

Figure 3 describes the individual's perceptions—in terms of opportunities, capabilities and fear of failure—as observed in the Global Entrepreneurship Monitor (GEM) report (2013). The report observed that the perceived opportunities and perceived capabilities measures were doubly higher in factor-driven economies in comparison with innovation-driven economies. The report highlighted the

percentage of population (between the age 18 and 64) from Italy, Japan, France, Germany, the United Kingdom and the United States and their subsequent fear of failure preventing from initiating a new venture.

4 Ambiguity, Entrepreneurs and Decision-Making

Entrepreneurialism is highly appreciated in today's time. Every organization aspires to become highly innovative, nimble and agile (qualities that are mostly observed in entrepreneurs). Yet entrepreneurs often create firms in the absence or with a lesser amount of detailing about the market trends (Shane and Venkataraman 2000). The other factors that differentiate entrepreneurs from others are the ability to 'thrive in uncertainty, a passionate desire to author and own project, and unique skill at persuasion' (Butler 2017, para. 3). Bhidé (2000) conducted an exploratory study on a sample of 100 successful start-up founders from the fast-growing innovative companies. This study concluded that entrepreneurs differ from normal folks as they remain confident even when dealing with ambiguous situations:

> [T]he low ambiguity aversion of the individuals who start promising businesses derives from (or is a manifestation of) exceptionally high levels of self-confidence [...]. The self confidence of entrepreneurs however, appears so strong that they are prepared to start a business where they do not have any objective advantage over their rivals. (Bhidé 2000, 98)

In the survival of individuals, both at the professional and personal front, decision-making ability is key (Liebherr et al. 2017). Setbacks and surprises are inevitable part of life and they also prevail under business environment setting. Decisions are based on the previous experiences with a prior thought on the consequences, which follows it. Liebherr et al. (2017) further suggested that in both research and applied perspective, the in-depth comprehension of risk-taking preferences and decision-making competence is gaining momentum.

'When an ambiguous situation arises individuals have available options but have no information on which options are better or worse' (Brand et al. 2006). Hence, it is only through the test of time that one learns the merits and demerits of the decisions made. Entrepreneurs face similar challenges while implementing a decision under ambiguous situations. Sometimes they are under pressure of the investors, who were seen as more interfering in the decision process related to their business. For example, instead of price war, the entrepreneur selects to offer better and faster services to minimize inventory level of their network members and encourages them to go for horizontal growth in respect of variety than less number of items in large quantity stocked by them. Here, flexibility for providing better service to their vendors and simultaneously managing the stock at higher price creates ambiguous situation.

The most important decision to make is the decision to make a decision. Here it is important to remember that not deciding is a decision in itself, for example, deciding the price of the product—from how much revenue it will bring, to the kinds of

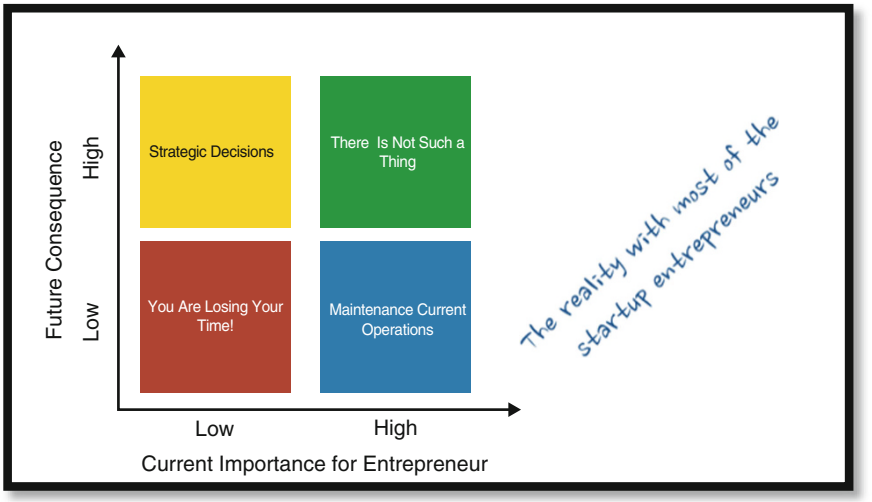

Fig. 4 Start-up entrepreneur focus (Source: https://www.entrepreneurshipinabox.com)

customers which they are able to attract, to building of the branding image, etc. For a person deciding to venture into the world of entrepreneurship in itself is a process of forming a huge decision in himself/herself, they have already decided to leave the predictability of standard corporate jobs. These steps itself help them to face unpredictable results with confidence, tackling it with guts. Being able to confine and commit to the big decisions in itself is the most important fundamental skill an entrepreneur can develop.

Figure 4 describes a decision-making focus for start-up entrepreneurs. As described in this figure, most of the entrepreneurs lay focus on the decisions that have low consequences on the future of the start-up business, but at the time when they were making decisions, that decision seemed to be something most important which they need to decide and implement quickly as possible. The nuances of success are defined differently for different entrepreneurs in different situations. Some of them think that the success of their business lies in surviving, while others think that success is more about creating sustainable or a scalable/sellable company. Some of them think that success is giving a gratitude for self-employment, while others think that success is creating the high-potential growth company which is worthy not only for them but also for the economy. Sometimes entrepreneurs get stuck in a situation where they need to reject all decisions that have low future consequences for their company for it brings low importance for them.

To better understand the complexity that ambiguity presents in decision-making, it is worth taking a look at the case in an article published in *Harvard Business*

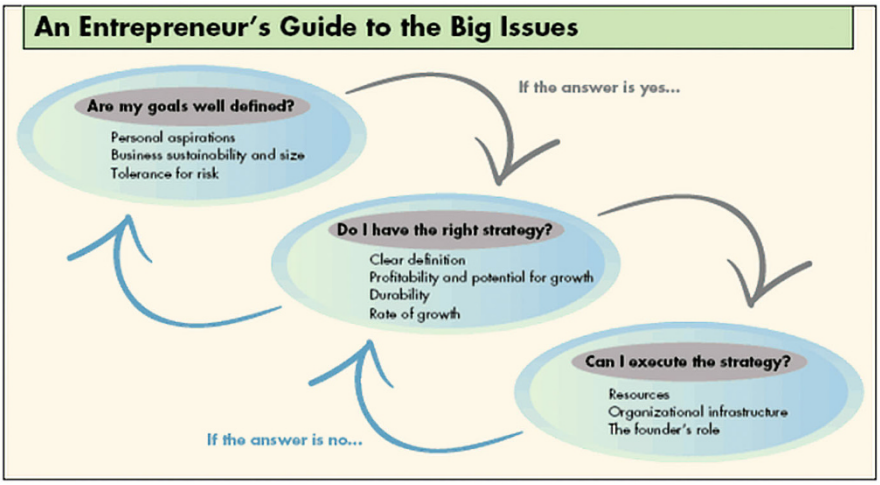

Fig. 5 An entrepreneur's guide to the big issues (Source: Bhide 1996, https://hbr.org/1996/11/the-questions-every-entrepreneur-must-answer)

Review by Amar Bhide[4] (November–December, 1996, issue). Bhide also presents a series of questions that any entrepreneur must ask from him/herself as success necessitates asking questions to oneself about the end goal and the appropriateness of the path that they are taking to resolve the complications arising from ambiguity.

It is to be further understood that the appropriateness of options varies from venture to venture (depending on varying situations, products, customers, market penetration, etc.). Entrepreneurs are always in a fix, and they need to make bewildering number of decisions. All their decisions not only have to be right for them but also for their venture and everyone associated with it. The challenging part over here is that all the decision making by an entrepreneur has to occur with inadequate information and intelligence about the market, competitors and other unaccounted changes. Hence the framework Bhide (1996) proposed is of a three-step sequence of questions. These steps help entrepreneurs to clarify current goals, evaluate their strategies for attaining those goals and assess their capacity to execute their strategies. The hierarchical way an entrepreneur needs to address these questions is described in Fig. 5.

For any entrepreneur, he/she cannot (or are mostly not in a position to) differentiate between personal and business goals; often it goes hand in hand or overlaps each other. Hence, setting personal goals should precede the setting of business goals. A very crucial step is to ask their own selves periodically, whether these goals have changed or are still the same. Ambiguity and uncertainty are prevalent and

[4]Retrieved as on May 2018 from: https://hbr.org/1996/11/the-questions-every-entrepreneur-must-answer

rampant in an entrepreneur's world. And an entrepreneur must develop the ability to successfully navigate or tolerate ambiguity and uncertainty.

5 Creativity and Creativity Enhancement in Entrepreneurial Decision-Making

> A creative man is motivated by the desire to achieve, not by the desire to beat others—Ayn Rand

It has been observed that many successful ideas ignite and germinate in a free-form environment. The passion and zeal to produce novel or unique solution or product or service helps to showcase his/her ability to come up with probable solutions while addressing the problem itself brings a sense of self-gratitude to that individual.

Butler (2017) describes some of the myths about entrepreneurs; these are:

- The Stereotype: *Entrepreneurs are unusually creative*.
- The Subtler Truth: *Entrepreneurs are curious seekers of adventure, learning and opportunity*. (para. 7)

Butler (2017) further asserts that there is a tendency of entrepreneurs to be high on curiosity and restlessness and not necessarily outstandingly creative. 'They aren't seekers—but they find uncertainty and novelty motivating' (Butler 2017, para. 4). While entrepreneurs excel at original thinking, so do non-entrepreneurs (Butler 2017).

Often the creative process is collaborative; a typical flow of creativity process is shown in Fig. 6. It starts with describing the problem. Next comes the incubation period, where the entrepreneur observes, understands and studies the problem. This

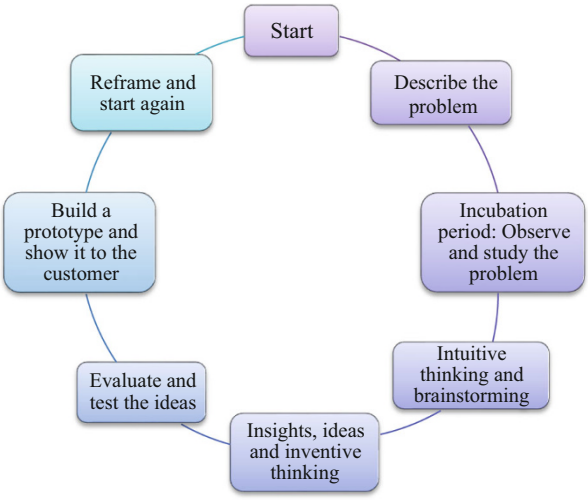

Fig. 6 Creativity process (Source: Dorf and Byers 2013)

is followed by brainstorming where an individual produces numerous probable solutions to the given problem in a small group setting. The next step comes when the person starts to gain newer ideas through insights and innovative thinking followed by evaluating and testing these ideas. This helps to build a prototype which can be discussed with probable customer (i.e. a stage of pilot testing the product), and if it fails at any of these she starts the process/she starts the process again.

Kern (2010) (as cited in Yagnik 2018) emphasizes on the importance of creativity and an individual's creative abilities in the contemporary American culture. Additionally, Yagnik (2018) also refers to the work of several scholars such as Coholic et al. (2012), Greene et al. (2012), Lynch et al. (2013) and Metzl (2009) that indicated better coping abilities of individuals with higher creative capacity amidst tragic and traumatic events. Entrepreneurs also work in conditions that are high risk, high stress and high stake. A major loss could easily lead to depression, trauma and tragedy. Therefore, it does not come as a surprise that a common key element that successful entrepreneurs have is creative thinking (Amabile 1997; Ward 2004).

Growth and survival of any business entity depend on its ability to constantly adapt and bring in processes that are unique in the current system (VanGundy 1992; Kao 1997). The same is also likely true for an individual entrepreneur. If an entrepreneur is unable to adapt and introduce new ideas, then over a period of time his/her growth is questionable. Thus, enhancing creativity systematically among entrepreneurs can go a long way because it can not only help with ambiguity but also manage and defeat fear.

5.1 Creative Aerobics for Entrepreneurs

> Creativity is like a booster rocket, it can propel human mind beyond the confines of gravity into the outer space.

Creative Aerobics (CA) (George and Yagnik 2017) is an ideation process that can help entrepreneurs generate ideas in quick succession. CA has a set of four mental interconnected exercises. CA minimizes the stress involved in generating ideas. This is so because CA is a process-driven enhancement strategy that takes the focus away from the outcome and instead transfers it to the process. The process of CA is a good fit for entrepreneurs because CA is better suited for an individual in comparison to many other ideation techniques that are mainly suited for small groups. A brief explanation of the four CA exercises is given here as follows:

- The first exercise, Creative Aerobic 1 (CA-1), is a left-brained solicitor of facts about the process, product, problem or situation under scrutiny. 'Facts' are delivered by way of lists using secondary research, primary observation, experiential data, associative information and even others' observations.
- The second exercise, Creative Aerobic 2 (CA-2), puts the right brain to work creating what-it-isn't 'names' (nouns) for the selected process, product, problem

or situation by manipulating facts from CA-1 and making lists of tangible, unrelated objects that share the same functional or physical characteristics. This process can be repeated as many times as needed to build more lists.

- Analytic, left-brained Creative Aerobic 3 (CA-3) connects the seemingly unconnected dots by finding similarities between the list of facts generated in CA-1 and the new names created in CA-2. Thus, the third exercise is intended to find the similarity between dissimilar things.
- Finally, right-brained Creative Aerobic 4 (CA-4) increases and extends creative ambiguity by developing new, what-it-isn't definitions for relevant, already existing CA-1 facts. The close, detailed interconnection of these four exercises develops related links of creative discovery. In the process of generating mega-data specific to the assignment, there is no delay in results: entrepreneurs can arrive at solutions immediately following or even during implementation.

To give an understanding of why CA is a good fit for entrepreneurs, let us take a closer look at CA-3. CA-3 (finding similarities between dissimilars) is especially great for entrepreneurs because it trains entrepreneurs to not only navigate ambiguity but also tolerate ambiguity and find connections between the disconnected. The finding connection between the seemingly unconnected is a tremendous asset for entrepreneurs in terms of identifying opportunities and unmet needs. CA-3 also enhances one's ability to think outside the box to identify solutions that exist but were previously not accessible.

CA-4 is the exercise of creating new meanings for existing phrases. It is apt for entrepreneurs because through this exercise one can develop an ability to see the same things differently, for example, 'Tickle the Ivories' ad by a University of Florida student for an ad promoting the Zambia National Tourist Board that won the Gold Award at the American Advertising Federation Student ADDY Awards (George and Yagnik 2017, p. 97). There was a deliberate use of ambiguity here with the phrase Tickle the Ivories, which traditionally means playing the piano, whereas here it meant playing with the elephants. Such exercises with deliberate use of ambiguity not only increase tolerance for ambiguity but also allow an entrepreneur to give an adverse or risky situation or problem a new meaning and transform adversity into opportunity. The ability to see opportunity in adversity is precious and serves as a competitive edge for an entrepreneur. This ability also sets you apart as an entrepreneur or an intrapreneur and even as a leader.

CA is a suitable creativity enhancement strategy because it is easy to learn and easy to follow. There is no need for any specialized education or training to learn and master CA. The core strength of CA is to generate numerous options in quick succession for problems or situations. It also helps navigate ambiguity by incorporating the ability to provide meaning to ambiguity and therefore tolerating and accepting. Also, having options adds to one's confidence and also reduces the stress and fear. Hence, CA is apt for entrepreneurs.

To succeed in entrepreneurship, many readily place their bet on technology. We differ here and with all due regard and respect for technology choose ideas. Ideas reign sovereign. The power of ideas transcends time, whereas technology may not.

By engaging in the simple and fun Creative Aerobics exercises, your reward will be the ideas, lots of them that will be generated with little to no effort. CA is vital for entrepreneurs because it is authentic and 'it allows you to reach down into the depths of your creativity and arrive at solutions that will be yours' (George and Yagnik 2017, p. 26). This is a great advantage because the ideas that you produce are unique and novel.

A constant stress-inducer for innovators and entrepreneurs is to come up with a game-changing, disrupting Big Idea. Big Ideas are rare and few and don't come around as often as one would like. However, most individuals spend a considerable amount of time coming up with a Big Idea to innovate or to solve an existing problem. But spending time in doing so is not greatly sustainable because there is no process or method to get to it. A kind of eureka moment is not systematic occurrence. Regardless of the number of times it happens, there is no guarantee that it will happen again. George and Yagnik (2017) assert that 'Big Ideas start out as those fresh, small, out-of-the-box thoughts Creative Aerobics generates for you'. And then they grow up! It is so much more productive—and less time-consuming, by the way—to keep adding on elements and dimensions until your thoughts scream 'I'm a Big Idea now!' (p. 15). Moreover, George and Yagnik (2017) also insist that individuals should focus on process and not the end result and all that is needed is to divert the already existing skills to the process.

6 Conclusion

This chapter proposes a conceptual model for enhancing entrepreneurial decisions by enhancing creativity. The rationale for enhancing creativity is that fear and ambiguity are major deterrents of effective entrepreneurial decisions. And enhancing creativity will enable entrepreneurs to better manage their fears and ambiguous situations. Given in Fig. 7 is the conceptual model of the proposed relationship.

To better illustrate the link between the three concepts of creativity, fear and ambiguity and their role in entrepreneurial decision-making, the chapter also introduces Creative Aerobics (a creativity enhancement technique developed by George and Yagnik 2017), a four-step ideation process that enables an entrepreneurs in many ways to make sound entrepreneurial decisions. CA is not only a tool to enhance creativity but also a systematic technique to generate multiple options rapidly. It also trains individuals to play with and manipulate ambiguity. This increases ones' tolerance towards ambiguity and ambiguous situations making them better managers of ambiguity. Additionally, it also trains individuals to see similarities between seemingly dissimilar or unconnected situations and find new meanings for existing situations. Both these qualities are advantageous not only when it comes to managing fear and ambiguity but also while facing difficult or adverse situations. Moreover, it is less stressful to choose from multiple options in comparison to having to forcefully choose just the one option that is set upon you. By using an unconventionally systematic enhancement strategy such as CA, you can

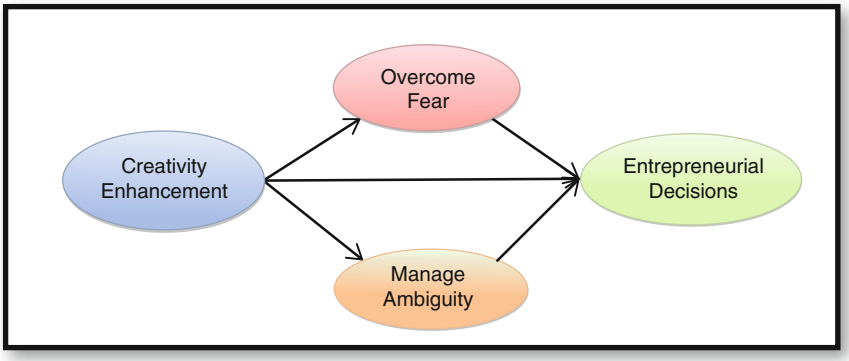

Fig. 7 Creativity enabled conceptual model to improve entrepreneurial decisions (Source: Author)

come up with multiple solution options rather than a few using conventional knowledge and research. Thus, CA training of entrepreneurs will allow them to defeat fear, manage ambiguity and optimize their decision-making ability. Given that this chapter is proposing a conceptual advancement, the future research will focus on an empirical studying and testing the proposed model for its efficacy. Future research should first explore the strength and type of relationship between creativity and overcoming fear, creativity and managing ambiguity, and then move towards confirmatory and predictory tests. Once again, the proposed conceptual model is important as it advances theory and presents opportunities for newer ways to improve entrepreneurial decisions to be examined. The knowledge regarding the strategic use of creativity will add value for potential and aspirant entrepreneurs, research scholars, academicians and ecosystem enablers.

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Intuition in Entrepreneurial Cognition

Leonie Baldacchino

Abstract Intuition is widely claimed to play a central role in entrepreneurial cognition. Various well-known entrepreneurs have attributed many of their decisions and much of their success to their gut feelings, and these claims are supported to some extent by the academic literature. Although the past few years have witnessed a marked growth in the body of literature on entrepreneurial intuition, there are still numerous avenues to be explored in this research area because robust empirical evidence is scant, leaving some questions unanswered and others unasked. This chapter provides an overview of what is currently known about intuition in entrepreneurial cognition. It comprises three main sections, namely: 'Understanding Intuition', which aims at clarifying what intuition is (and is not), discussing its relationship with experience and expertise and elucidating the link between intuition as a cognitive style and as a cognitive strategy; 'Appreciating Intuition', which aims at fostering an appreciation for intuition by reporting some recent research findings which highlight how it may be beneficial in entrepreneurship, particularly in enabling opportunity identification and exploitation; and 'Developing Intuition', which consolidates a selection of principles, guidelines and methods that have been proposed by leading authors to foster intuition. The chapter ends with some suggestions for future research on intuition in entrepreneurship.

1 Introduction

> Your most valuable asset isn't held in a bank vault, or in bricks and mortar or on a company balance sheet, it's held in a much more secure but quite fragile place—your head—and is the twin portfolio of assets comprised of your analytical mind and your intuitive mind. (Sadler-Smith 2010, 2)

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It has long been recognised that human cognition occurs in two different modes or at two different levels (Dane and Pratt 2009), namely, the nonconscious, automatic, *intuitive* mode (broadly referred to as 'System 1') and the conscious, deliberate, *analytical* mode (known as 'System 2') (Allinson et al. 2000; Dutta and Thornhill 2008; Evans 2008). The intuitive mode—or intuition—was regarded in ancient societies as 'the most valuable kind of knowledge', believed to constitute 'messages from the gods or evidence of . . . exceptional powers' (Noddings and Shore 1998, 4). Over time, however, these connotations of spirituality and mysticism led scholars to view intuition as scientifically weak and inferior to rational, analytical processing (Hodgkinson et al. 2008). *Homo economicus*—the 'rational economic man'—dominated cognitive theory until the 1970s, with the consensus at the time being that people are driven by pure rationality and should thus be able to pursue the optimal outcome in every situation (Gibcus et al. 2008). Intuition was regarded as a negative influence on human cognition as it was believed to lead to 'irrational choice behaviour' (Peters et al. 2006, 79).

It gradually became evident, however, that purely rational models are inadequate to account for the complexity of human cognition. The classic theory of pure rationality evolved into one of bounded rationality, which accepted that individuals can never be fully rational or fully analytical, as human cognition is constrained by inherent limitations, availability of information and time restrictions (Simon 2000). Moreover, scholars began to acknowledge that cognition is often influenced by nonconscious, emotionally charged processes—sometimes referred to as gut feelings—and that research was needed to better understand these influences on human cognition and behaviour. This led JDM (judgement and decision-making) scholars—and later entrepreneurship and entrepreneurial cognition scholars—to shift their interest from 'cold' cognition to 'hot' cognition and to acknowledge that nonconscious, automatic intuitive processing plays an important role in cognition (Peters et al. 2006).

Intuition has now 'emerged as a legitimate subject of scientific inquiry' (Hodgkinson et al. 2008, 19) rather than 'a magical sixth sense or a paranormal process' (Matzler et al. 2007, 13) as was previously believed. Moreover, intuition is widely claimed to play a central role in entrepreneurial cognition, which refers to the ways in which entrepreneurs process and use information to 'make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth' (Mitchell et al. 2002, 97). Various well-known entrepreneurs, including Richard Branson and Bill Gates, have attributed many of their decisions and much of their success to their gut feelings, which they regard as a beacon that guides them along their entrepreneurial journey and alerts them to the opportunities and perils that they may encounter. These claims are supported to some extent by the academic literature, which also contains instances of entrepreneurs alluding to intuition as a driving force behind their decisions and actions. For example, entrepreneurs refer to their intuition to explain their buy/sell decisions, choice of key stakeholders (e.g. partners and investors) and selection of products for promotion and markets for entry (Mitchell et al. 2005). Furthermore, intuition has been found to play a key role in opportunity identification (Baldacchino 2013) as well as in decision-making related to opportunity exploitation (Boffa 2017).

1.1 Chapter Overview

This chapter provides a comprehensive yet concise overview of what is currently known about intuition in entrepreneurial cognition. Following this introduction, the chapter comprises three main sections, namely: 'Understanding Intuition', which aims at clarifying what intuition is (and is not), discussing its relationship with experience and expertise and elucidating the link between intuition as a cognitive style and as a cognitive strategy; 'Appreciating Intuition', which aims at fostering an appreciation for intuition by reporting some recent research findings which highlight how it may be beneficial in entrepreneurship, particularly in enabling opportunity identification and exploitation; and 'Developing Intuition', which consolidates a selection of principles, guidelines and methods that have been proposed by leading authors on how to foster intuition. The chapter ends with a brief summary and some suggestions for future research on intuition in entrepreneurship.

2 Understanding Intuition

2.1 What Is Intuition?

> We experience feelings about what is or is not the right decision, but the reasons that underlie these feelings escape us. We know but we cannot explain why. It seems as though we have an intuition or sixth sense that is beyond our own comprehension. (Hogarth 2001, 4)

As noted in the introduction, intuition has received growing scholarly attention in recent years. This has led to the publication of various definitions and descriptions of this phenomenon. Blume and Covin (2011) observe three elements that are common to the majority of definitions.

The first is that intuition originates beyond conscious thought and emerges as a sense of '"knowing" without knowing why' (Hodgkinson et al. 2009, 279). It leads to 'a judgment . . . that comes to mind with an aura or conviction of rightness or plausibility, but without clearly articulated reasons or justifications' (Hodgkinson et al. 2009, 279). Intuition is thus a 'special kind of "off-line processing" . . . that is often not open to inspection by the persons who engage in it' (Baron 2007, 178). This implies that while individuals are aware of the outcomes of their intuition (e.g. intuitive decisions), which frequently arise rapidly and are associated with feelings of certainty, the process of how they arrived at such decisions is not accessible to conscious scrutiny (Dane and Pratt 2007) and cannot be articulated (Blackman and Sadler-Smith 2009).

The second element which Blume and Covin (2011) found to be common to all definitions of intuition is that it involves holistic associations. Sinclair and Ashkanasy (2005, 357) compare intuitive processing to a 'non-conscious scanning of internal . . . and external . . . resources in a non-logical, non-temporal manner in order to identify relevant pieces of information that are fitted into the "solution picture" in a seemingly haphazard way, similar to assembling a jigsaw puzzle'. This is similar to the

recognition-primed decision (RPD) model (Klein 2004) which portrays intuition as an automatic process of pattern matching. Klein (2004) defines patterns as cues that are usually found together, so that when one of the cues is encountered, the others are also expected to be found. He notes that when a pattern is recognised, a sense of familiarity is aroused such that even new situations can be perceived as familiar if they bear sufficient similarity to a pattern that was encountered in the past. This enables individuals to 'automatically know what to do, without having to deliberately think out the options' due to having 'a sense of what will work and what won't' (Klein 2004, 24).

The third element identified by Blume and Covin (2011) upon which there is consensus in the literature is that intuition results in affectively charged judgements. Dane and Pratt (2007) claim that a judgement can be identified as intuitive if it is accompanied by affect, such as the 'feeling(s) of certitude and relief' that accompany the sudden intuitive emergence of the 'big picture' (Sinclair and Ashkanasy 2005, 357). Sadler-Smith (2008, 30) states that 'intuition is at the crossroads of thinking and feeling—the nexus of cognition and affect', while Sadler-Smith and Shefy's (2004, 81) notion of 'intuition-as-feeling . . . connects the mind and body' by means of subconscious affective reactions to external stimuli.

A definition of intuition that effectively consolidates all three above-mentioned consensual elements of intuition was proposed by Dane and Pratt (2007, 40), who view intuition as 'affectively-charged judgments that arise through rapid, nonconscious, and holistic associations'. Similarly, Blackman and Sadler-Smith (2009, 579) describe intuition as 'affectively charged, holistic and involuntary' and which 'cannot be literally spoken'.

In addition to the above, Baldacchino et al. (2015) highlight a fourth element of intuition, namely, that it is frequently associated with domain-specific experience and expertise. This is discussed in further detail in Sect. 2.3.

2.2 What Intuition Is Not

> Intuitive processes are essentially automatic and consequently consume little or no attention. On the other hand, the fact that a process is automatic does not necessarily mean that it represents intuition. (Hogarth 2001, 18)

Although scholars nowadays largely agree about the nature and definition of intuition, it is worth noting that not all automatic cognitive processes are intuitions. There are a number of other constructs, namely, instinct, incubation, insight and guessing, that are in some ways similar to intuition and which are hence often mistaken for intuition.

Instinct refers to 'hardwired, autonomous reflex actions' such as the knee-jerk or to the 'behaviour patterns of certain animals (such as the homing instinct in birds)' (Hodgkinson et al. 2009, 279). Some authors use the terms intuition and instinct interchangeably, but although they are both nonconscious and automatic, instincts are innate, whereas intuition is derived from experience (Dane and Pratt 2007).

Incubation refers to a period of nonconscious processing which normally occurs when conscious deliberation (e.g. idea generation, problem-solving or decision-making) fails to lead to the desired outcome. During incubation, attention is focused elsewhere, while the issue is put aside, out of conscious awareness. For example, one might tackle a different problem, carry out another task, undertake a leisure activity or 'sleep on it' by postponing the issue to another day. In some cases, this period of incubation may result in a moment of sudden discovery known as insight, which 'literally means seeing the solution to the problem' (Sadler-Smith and Shefy 2004, 81), often when least expected. This takes place because during incubation, the issue continues to be processed at a nonconscious level, and when a satisfactory outcome (e.g. solution or decision) is reached, this rises into conscious awareness. Some authors refer to this as illumination or as the 'eureka' or 'aha' moment (due to the expression of surprise and satisfaction that often accompanies such realisations).

Insight is similar to intuition as they both involve nonconscious processing and they both result in a form of knowing (a solution, a judgement, an idea, etc.). They differ, however, as insight arises from a lengthy process of incubation, whereas intuition occurs instantly. Moreover, while insight brings to conscious awareness the solution of a problem together with the logical processing underlying it, the reasoning beneath intuition cannot be explained (Dane and Pratt 2007).

Finally, some cynics criticise intuitive judgements as being nothing but 'best guess' decisions. However, 'intuition is not … a random process of guessing' (Isenberg 1984, 86). Although intuition and guessing both arise rapidly, there are important differences between them, as explained by Dane and Pratt (2007, 40):

> Intuition is similar to guessing only in terms of its speed. Guessing neither involves affectively charged judgments nor requires making associations through nonconscious information processing. It also lacks … certitude.

It is therefore clear that although intuition bears some similarity to a number of other constructs, it has its own distinctive features and warrants exploration in its own right.

2.3 Intuition, Experience and Expertise

> I define intuition as the way we translate our experience into action … The key to using intuition effectively is experience—more specifically, meaningful experience—that allows us to recognize patterns and build mental models. (Klein 2004, 4, 36)

As mentioned above, Baldacchino et al. (2015) added a fourth element to Blume and Covin's (2011) synthesis of intuition definitions, namely, that intuition is associated with domain-specific experience and expertise. This is due to the fact that many scholars consider experience and expertise to be the defining features of intuition (e.g. Hodgkinson et al. 2009; Klein 2004; Miller and Ireland 2005; Sadler-Smith and Shefy 2004; Simon 1987), which suggests that entrepreneurial experience and expertise are necessary for—or determinants of—entrepreneurial intuition.

Miller and Ireland (2005, 21) noted that 'intuition can be conceptualized in two distinct ways: as holistic hunch and as automated expertise'. The 'holistic hunch', popularly known as gut feeling, arises from a subconscious process in which information stored in memory is rearranged to form new connections. The 'automated expertise' refers to the 'recognition of a familiar situation and the straightforward but partially subconscious application of previous learning related to that situation'. This is domain-specific (i.e. having intuition in one area does not denote having intuition in other areas) and develops gradually as a result of gaining salient experience in one's own area of expertise. This automated process replaces the explicit analysis conducted by individuals prior to gaining sufficient experience in their domain. This is in line with Sadler-Smith and Shefy's (2004, 82) view of intuition, who contend that over time, experience and analysis become 'frozen ... into familiar routines and habitual responses' which then form the basis of 'intuition-as-expertise'. In other words, tasks (including entrepreneurial tasks) which initially require deliberate effort and conscious attention gradually become second nature as individuals acquire skills, at which point they can be performed automatically and outside of conscious awareness.

This expertise-based view of intuition may be traced back to the work of Simon (1987, 63) who argued that intuition is 'simply analyses frozen into habit and into the capacity for rapid response through recognition'. Simon (1987) studied the thinking processes of chess grandmasters and concluded that their ability to identify a good move within seconds, even when playing against multiple opponents at the same time, is due to their intuition. This intuition, Simon argued, arises from the extensive knowledge of patterns and of their significance, both of which are held in the chess grandmaster's memory. Many authors agree that this instant, knowledge-based pattern recognition process is the secret not only of chess grandmasters' intuition but also of intuition of experts in other domains including management and entrepreneurship. Klein (2004) maintains that intuition involves a process of pattern matching. He defines intuition as 'the way we translate our experiences into judgments and decisions' (2004, 23) and explains that as we build experience in a particular domain, we build up a collection of patterns and action scripts (courses of action). The more patterns we accumulate, the easier it becomes for a match to be made between a new situation and one of the patterns in our collection: 'The more patterns and action scripts we have available, the more expertise we have, and the easier it is to make decisions. The patterns tell us what to do and the action scripts tell us how' (Klein 2004, 23). Similarly, Hodgkinson et al. (2008, 7) maintain that the intuitive ability of experts is 'derived in large part from the large numbers of patterns held in long-term memory' and in part from 'their capacity to recognize salient environmental cues and rapidly match those cues to commonly occurring patterns, responding in ways that lead to effective problem solving and decision making'.

In spite of the above, it has been suggested that intuition is possible even in the absence of domain-specific experience. According to Crossan et al. (1999) and Dutta and Crossan (2005), intuition can be of two types: The first is *expert intuition*, which is 'based on pattern recognition' and which 'emphasizes the complex knowledge base of the individual as being the primary means by which patterns are recognized'

(Dutta and Crossan 2005, 436). The second type is *entrepreneurial intuition* which, in contrast, 'relies less on the knowledge base of the individual, but rather, on their creative capacity to recognize gaps and to identify possibilities' (Dutta and Crossan 2005, 436). In this view, experience is an antecedent of expert intuition but not of entrepreneurial intuition, which leads to 'novel, intuitive insights' (Crossan et al. 1999, 526) and to the identification of new opportunities (Dutta and Crossan 2005).

The notion of entrepreneurial intuition was later elaborated upon by Dane and Pratt (2009) in the context of their suggested types or functions of intuition. They view one type of intuition as 'a vehicle for problem-solving' (Dane and Pratt 2009, 4), based on the matching of patterns made possible through practice and experience. They view another type—which they labelled *creative intuition*—as 'a creative act of synthesis in which disparate elements are fused together in novel combinations', such as in the generation of entrepreneurial ideas, and as therefore 'a key input in the creative process' (Dane and Pratt 2009, 9). They explain that creative intuition is of particular value in situations where there are few or no precedents upon which to model one's decisions—which are the sort of situations faced in entrepreneurship, where change and uncertainty are the order of the day. They view creative intuition as similar to entrepreneurial intuition (Crossan et al. 1999; Dutta and Crossan 2005), which is regarded to be unrelated to domain-specific experience and knowledge. At the same time, however, Dane and Pratt (2009, 5) acknowledge that 'each of the types of intuition we discuss, particularly creative intuition, may be related to expertise', and they describe creative intuition as 'based on integration of knowledge across different domains'. The implications of this argument may be that experience, particularly that which is domain-specific, is an antecedent of the problem-solving type of intuition, but not necessarily of creative intuition.

2.3.1 Empirical Research on Entrepreneurial Intuition, Experience and Expertise

One way of attempting to resolve the debate on whether entrepreneurial intuition is related to experience and expertise is to refer to the extant empirical literature on the subject which, unfortunately, is rather scarce and has led to conflicting results. One study which addressed this issue was conducted by Gustafsson (2006), who explored whether novice and expert entrepreneurs differed in their use of intuition and analysis when performing opportunity identification tasks of varying levels of uncertainty. Consistent with the expertise view of intuition, Gustafsson found the following difference between expert and novice entrepreneurs: Experts shifted from being predominantly analytical in the low-uncertainty task to predominantly intuitive in the high-uncertainty task, indicating that they are able to engage in intuitive processing when the need arises. Conversely, the dominant mode of processing of novices tended to be analytical, regardless of the level of uncertainty in the task, indicating an inability to engage in intuitive processing. These findings negate the notion of 'inexperienced' forms of intuition, such as the entrepreneurial intuition suggested by Crossan et al. (1999) and Dutta and Crossan (2005).

In another study, Baron and Ensley (2006) asked experienced and novice entrepreneurs to describe the idea on which their new venture was based and to state why they felt it was an idea worth pursuing. One of the top five factors that emerged from the entrepreneurs' responses was intuition or gut feeling. However, Baron and Ensley (2006, 1339) found that this was part of the discriminant profile of novices, who 'tended to emphasize the "newness" or "uniqueness" of their product or service and their "gut-level" belief in its potential', but not of the experienced entrepreneurs. This finding is in contrast with the results of Gustafsson's (2006) study and appears to imply that novices—but not experienced entrepreneurs—use intuition in the identification and pursuit of new opportunities. This offers support for the notion of 'inexperienced' entrepreneurial intuition (Crossan et al. 1999; Dutta and Crossan 2005) while negating the widely held view that intuition is associated with experience and expertise (e.g. Hodgkinson et al. 2008; Miller and Ireland 2005).

Another study which explored the cognitive processes of expert and novice entrepreneurs was conducted by Dew et al. (2009), who asked their research participants to think aloud as they made a series of decisions concerning a hypothetical business scenario and then counted the number of times that intuition or gut feel was mentioned. As opposed to Gustafsson (2006) and Baron and Ensley (2006), no significant differences were found with respect to intuition or gut feel. More specifically, neither the experts nor the novices referred to intuition to any great extent during their decision-making. These findings may be due to the nature of the task portrayed in the decision scenario, which was highly structured with ample information. The literature suggests that intuition is more appropriate and more prevalent in unstructured tasks with limited information (Agor 1986; Brigham et al. 2007; Burke and Miller 1999; Elbanna et al. 2010); thus the structured task presented by Dew et al. (2009) may have elicited analytical rather than intuitive processing.

More recently, Baldacchino (2013) explored the relationship between entrepreneurial experience, intuition and opportunity identification among a sample of 74 technology entrepreneurs (owners of businesses in the ICT—information and communications technology—industry). This study adopted a multi-method approach including a think-aloud scenario-based opportunity identification exercise involving three different hypothetical but realistic technologies of varying levels of innovativeness (high, moderate and low), together with a survey to measure experience and other variables. The think-aloud data was analysed using the protocol analysis method (Ericsson and Simon 1993), whereby the transcribed verbalisations were segmented, coded into intuition and analysis according to a coding guide, quantified by counting the number of intuitive and analytical segments and then subjected to statistical analysis [see Baldacchino (2013) and Baldacchino et al. (2014) for more details]. Experience and expertise were operationalised in several ways, including education, work experience, business ownership history (number of years of business ownership experience, number of businesses owned and in which industries) and deliberate practice [focused, frequent and sustained efforts to improve performance: Ericsson et al. (2007); Unger et al. (2009)], in order to obtain a nuanced view of which aspects of experience (if any) were related to intuition and opportunity identification.

Past research posits that a minimum of 10 years' experience—or between 10,000 and 15,000 hours of practice—is required for the acquisition of expertise in a given domain (e.g. Sadler-Smith 2008, 2010; Weisberg 1999). However, Baldacchino (2013) did not find the number of years of business ownership experience to be related to intuition (or to opportunity identification). Moreover, entrepreneurs with more than 10 years of business ownership experience were no more intuitive (or any better at opportunity identification) than those who had owned businesses for a shorter length of time. The so-called 10-year rule was therefore not upheld in Baldacchino's (2013) study.

On the other hand, habitual entrepreneurs [business owners who have, or have had, ownership of two or more businesses: Ucbasaran et al. (2015)] produced a significantly greater number of intuitive segments than novices [entrepreneurs with no prior business ownership experience: Ucbasaran et al. (2015)]. Interestingly, however, Baldacchino's (2013) results indicate that the positive effects of habitual entrepreneurship may in some cases begin to appear not from the second business [as suggested by the novice/habitual distinction that is often made in the literature, e.g. Ucbasaran et al. (2003)] but from the third or fourth business owned. This delay may be mitigated if business ownership occurs within the same industry. Specifically, Baldacchino (2013) found that the number of businesses owned in the industry in which the opportunity identification task was situated (in this case, the ICT industry) was significantly positively associated with intuition (and with the number and innovativeness of opportunities identified). This provides support for the notion that experienced entrepreneurs are more intuitive than their inexperienced counterparts. However, it suggests that it may be the nature of entrepreneurial experience (the number of businesses owned, particularly in a relevant industry), rather than the duration of such experience (the number of years of business ownership), that is associated with the use of intuition.

Furthermore, Baldacchino (2013) found that education, work experience and deliberate practice were significant positive predictors of intuition, indicating that they may play a role in determining the extent of intuitive processing—although their effect was smaller and less significant than that of the number of ICT businesses owned. These results support the notion that entrepreneurial intuition is based on knowledge, experience and expertise, derived mainly from the number of industry-related businesses owned, as well as from education, employment and deliberate practice.

To conclude this discussion on the relationship between entrepreneurial intuition, experience and expertise, it may be argued that although older literature led to inconsistent suggestions and results, more recent research has provided robust empirical evidence, derived from a multi-method approach that overcame some of the shortcomings of past research (such as an overreliance on self-report measures of dispositional cognitive style), that entrepreneurial intuition is indeed enhanced by relevant experience and expertise (Baldacchino 2013).

2.4 Intuition as Cognitive Style and as Cognitive Strategy

> Individual differences theorists distinguish between cognitive style and cognitive strategies . . . The former refers to an enduring overarching preference in approach to the processing of information, whereas the latter are approaches adopted in response to circumstantial demands. (Hodgkinson and Clarke 2007, 245)

As indicated in the above quotation, a distinction is made in the literature between intuition as a cognitive style and intuition as a cognitive strategy. Cognitive style refers to a dispositional preference for an intuitive or analytical mode of processing. Cognitive strategy, on the other hand, refers to the information processing approach employed by individuals in a given situation, i.e. whether they actually use intuition or analysis (or a combination of both) for a particular task. Cognitive strategy may be influenced by cognitive style as well as by situational factors including time constraints, amount of information available and level of uncertainty present.

The distinction between cognitive style and cognitive strategy has not always been so clear-cut in the entrepreneurship literature, and researchers have often relied on measures of cognitive style to infer entrepreneurial intuition. Moreover, the relationship between a preference for intuition (cognitive style) and use of intuition (cognitive strategy) has not yet been extensively studied in the context of entrepreneurship. It is nevertheless pertinent to outline the limited entrepreneurship literature on intuition as a cognitive style, intuition as a cognitive strategy and the relationship between them, as it contributes to a fuller understanding of entrepreneurial intuition.

In general terms, there are various conceptualisations of cognitive style, most of which are aligned with the two modes of processing outlined earlier in this chapter (System 1—intuitive, System 2—analytical). Broadly speaking, individuals with an intuitive cognitive style—sometimes referred to as 'big picture conscious'—prefer to solve problems and make decisions using a holistic approach based on gut feelings, while those with an analytical cognitive style—also known as 'detail conscious'—prefer a rational, logical, deliberate approach with due attention to relevant information (Hodgkinson and Clarke 2007). Although it is possible to be 'mentally ambidextrous' (Sadler-Smith 2010) or 'cognitively versatile' (Hodgkinson and Clarke 2007)—which refers to an ability to engage in high levels of both intuition and analysis and to 'switch cognitive gears' between the two modes of processing, as required by the demands of particular situations (Louis and Sutton 1991)—most people (including entrepreneurs) have a preference for either an intuitive or an analytical cognitive style. This claim was supported in an entrepreneurship context by Baldacchino (2013), who found a significant negative correlation between entrepreneurs' intuitive cognitive style and analytical cognitive style. In other words, a higher preference for intuition was associated with a lower preference for analysis and vice versa.

A systematic literature review conducted by Baldacchino et al. (2015) identified eight studies that explored the role of cognitive style in entrepreneurship. This body of literature indicates that an intuitive cognitive style is associated with various positive outcomes, including financial performance (Sadler-Smith 2004), job satisfaction (Brigham et al. 2007), self-efficacy (Kickul et al. 2009) and firm capability (Chaston and Sadler-Smith 2012). However, research on cognitive style has been

criticised for providing an incomplete picture of entrepreneurial intuition. Blume and Covin (2011) and Hodgkinson and Sadler-Smith (2011) argue that cognitive style is not necessarily analogous to the actual use of intuition. While an intuitive cognitive style may predispose individuals towards an intuitive mode of processing, it does not imply that they will necessarily employ an intuitive cognitive strategy in all situations.

This was supported in an entrepreneurship context by Baldacchino (2013). The entrepreneurs in this study scored significantly higher on analytical cognitive style than intuitive cognitive style, which implies that they preferred to process information analytically rather than intuitively. Nevertheless, actual intuitive processing significantly outweighed analytical processing (as measured through the number of segments) in the think-aloud tasks. Furthermore, no significant correlations were found between intuitive preference and intuitive processing or between analytical preference and analytical processing. Thus cognitive style did not appear to significantly impact cognitive strategy in Baldacchino's (2013) study. This suggests that although individuals may have a preference for an intuitive or analytical mode of processing, entrepreneurs are able to override their preference and employ the cognitive strategy that is more appropriate for the task at hand. In other words, and in contrast with what was indicated in earlier literature (Evans 2010; Sinclair and Ashkanasy 2005), cognitive style does not necessarily determine cognitive strategy.

Following the above discussion on the nature of intuition, its relationship with experience and expertise and the link between cognitive style and cognitive strategy, the next section aims at fostering an appreciation for intuition in entrepreneurial cognition by reviewing recent research that highlights its positive effects on entrepreneurial outcomes, particularly with respect to opportunity identification and exploitation.

3 Appreciating Intuition: Insights from Recent Research

3.1 Intuition in Opportunity Identification

> The seed of any entrepreneurial action lies in an initial preconscious reflection by an individual (an existing or would-be entrepreneur) about a potential business idea that the individual feels holds some potential in meeting a current or emerging requirement of customers/potential customers. (Dutta and Crossan 2005, 436)

A small but growing number of researchers maintain that intuition plays an important role in opportunity identification, which is considered to be the lifeblood of entrepreneurship (e.g. Shane and Venkataraman 2000). The literature suggests that intuition is more appropriate and more prevalent in unstructured tasks with limited information (Agor 1986; Brigham et al. 2007; Elbanna et al. 2010), such as when there are no predetermined guidelines or rules to follow, if objective data seem incorrect or inaccurate, when decisions need to be made quickly or unexpectedly because delays would generate additional costs, in novel situations which are high in

uncertainty, and when explicit cues or guidelines are lacking (Burke and Miller 1999). These situations are highly characteristic of those frequently faced by entrepreneurs, including when identifying opportunities.

Kickul et al. (2009) found that entrepreneurs with an intuitive cognitive style are more likely to have high self-efficacy in the early stages of a venture (opportunity identification), while those with an analytical cognitive style are more likely to have a higher self-efficacy in the later planning, resource acquisition and launching stages of a venture (opportunity evaluation and exploitation). Although it was noted in the previous section that cognitive style is not necessarily analogous to cognitive strategy, self-efficacy has been found to be positively related with performance (Hmieleski and Baron 2008). This implies that an intuitive cognitive style may be more conducive for opportunity identification, while an analytical cognitive style is preferable for the later stages where it leads to higher self-efficacy.

Crossan et al. (1999) proposed a framework for organisational learning (referred to as the 4I organisational learning framework) which suggests that learning occurs through four stages, the first of which is termed *intuiting*. This involves 'the preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience' (Crossan et al. 1999, 525). Dutta and Crossan apply this framework to entrepreneurship and argue that intuition is 'a critical part of learning about opportunities' (2005, 436), as every business opportunity originates from an intuition about an unmet need, coupled with a vague idea of how it could be met. Similarly, Vaghley and Julien (2010) highlight the critical role that intuition plays in the early stages of the entrepreneurial process. They argue that intuition is involved both in pattern recognition on the basis of past experience, thus enabling opportunity recognition (which represents a positivist view), and in sense-making and social interaction and interpretation, which enables the enactment or creation of opportunities (which draws from a social constructionist perspective).

There are other authors who have suggested that intuition plays a key role in opportunity identification. Ravasi and Turati (2005) maintain that business opportunities often appear as rough intuitions, and it is only with considerable development that they can be turned into profitable products or services. They therefore argue that intuition is a crucial initial step in the entrepreneurial process. Dimov's (2007a, b) views are entirely consistent with the above. He extends Dutta and Crossan's (2005) application of the 4I framework to entrepreneurial opportunities and argues that intuition is the trigger of initial business ideas, which are developed through a learning process driven by intentionality, shaped by prior knowledge (Dimov 2007a) and contextual influences (Dimov 2007b).

The above claims that entrepreneurial intuition plays a vital role in the early stages of the entrepreneurial process and that it is more prevalent in high-uncertainty tasks were supported by Baldacchino's (2013) study. The entrepreneurs in her sample engaged in a significantly greater amount of intuitive than analytical processing, as measured by the total number of intuitive and analytical segments generated by each participant in the three opportunity identification tasks. This suggests that intuition is more prevalent than analysis in opportunity identification, with an interesting caveat: When each task was analysed independently, significantly

more intuitive than analytical processing was found in the high and moderate innovation tasks, but not in the low innovation task where no such difference was found. Furthermore, intuitive processing was consistent across all the three tasks, but more analytical processing than intuitive processing was used in the low innovation task. Together, these results suggest that intuition outweighs analysis in opportunity identification, particularly in contexts that are high or moderate in innovativeness (which can be taken as a proxy for uncertainty), such as high-growth and rapidly changing industries. However, contexts where innovativeness and uncertainty are low seem to trigger the use of analysis. These findings are in line with past research by Covin et al. (2001) and Khatri and Ng (2000).

Furthermore, Baldacchino (2013) found that intuition is a predictor of the number and innovativeness of opportunities identified. Specifically, a greater use of intuition was significantly positively associated with the identification of a larger number of opportunities, as well as with the identification of opportunities that are more innovative. These findings were consistent across all three tasks and were therefore unaffected by the level of uncertainty within the opportunity identification scenarios. This suggests that even in contexts that might trigger a greater use of analysis, an ability to engage in intuitive processing is likely to lead to an enhanced opportunity identification capacity. Moreover, intuition was found to mediate the relationship between entrepreneurial experience (number of industry-relevant businesses owned) and opportunity identification with respect to the number and innovativeness of opportunities identified. Baldacchino (2013) concludes that intuition is one of the cognitive processes that links experience and opportunity identification and that experienced entrepreneurs appear to be more proficient at opportunity identification due—at least in part—to their ability to engage their intuition to a greater extent than their less experienced counterparts.

3.2 Intuition in Opportunity Exploitation

> We know little about how entrepreneurs' cognitive processes may vary along the entrepreneurial journey and the venture's life cycle and with what effect. We might expect that, as the business develops and systems and processes become more elaborated, the balance between entrepreneurs' use of intuitive and analytical processing may vary over time. (Baldacchino et al. 2015, 227)

It is a generally accepted notion that selecting the appropriate opportunities for new entrepreneurial ventures is one of the most important abilities of a successful entrepreneur (Ardichvili et al. 2003; Baldacchino 2013) and that 'opportunity exploitation is a necessary step in creating a successful business in the entrepreneurial process' (Choi and Shepherd 2004, 377). Entrepreneurs need to evaluate the attractiveness of opportunities because the 'exploitation of an idea that is neither valuable nor rare can only lead to the generation of average profits' (Fiet 2002, 1). However, the evaluation and exploitation stages of the entrepreneurial process have largely been neglected by entrepreneurship scholars in general and by intuition

researchers in particular. One of the recommendations put forward by Baldacchino (2013) and Baldacchino et al. (2015) was therefore to investigate the role of intuition in the later stages of the entrepreneurial process.

In response to the above, Boffa (2017) studied the effects of intuition on opportunity exploration and exploitation. She analysed data that was collected, but not yet analysed, by Baldacchino (2013) from 74 technology entrepreneurs. In addition to the opportunity identification tasks, Baldacchino's (2013) scenarios prompted participants to consider whether they would exploit or reject the opportunities they identified or whether they would seek more information to explore the opportunities further before making a decision. However, Baldacchino (2013) only analysed the data generated with respect to opportunity identification. Boffa (2017) analysed the rest of the data to help complete the picture of the role of intuition throughout the entrepreneurial process, so as to gain a better understanding of 'why, when and how' (Shane and Venkataraman 2000, 218) opportunities are exploited.

As outlined in the previous section, Baldacchino (2013) found that intuition outweighs analysis in the opportunity identification stage. Conversely, Boffa (2017) found that there was a significantly greater amount of analysis than intuition at the opportunity exploitation stage. Furthermore, there were significantly fewer intuition segments in the opportunity exploitation stage than there were at the opportunity identification stage. These findings suggest that entrepreneurs use intuition to a lesser degree when making decisions regarding opportunity exploitation than they do when identifying opportunities. However, it is interesting to note that these entrepreneurs were largely consistent in their cognitive strategy throughout the process. Those who used more intuition during opportunity identification were also likely to use more intuition during opportunity exploitation, while the ones who were more analytical during opportunity identification were similarly more likely to be analytical during opportunity exploitation.

Notwithstanding the above, Boffa's (2017) results indicate that a greater use of intuition at the opportunity exploitation stage was associated with the decision to exploit the opportunities identified in each of the three tasks, while analysis was associated with the decision to reject opportunities. Furthermore, intuition was found to be a predictor of the number of opportunities that the entrepreneurs claimed that they would exploit, such that the more intuitive entrepreneurs claimed they would exploit a greater number of opportunities than their less intuitive counterparts (as measured by the number of intuitive segments generated during the exploitation tasks). This suggests that decisions to exploit opportunities are guided by intuition, while decisions to reject opportunities are based on a greater amount of analytical thinking.

The research reviewed in this section indicates that intuition plays an important role in entrepreneurship, particularly in the crucial processes of opportunity identification and exploitation. This implies that entrepreneurs should make an effort to develop their intuition as this will help them become more proficient at various key tasks such as identifying opportunities and making exploitation decisions. This is the focus of the next section.

4 Developing Intuition

> Rather than being an extraordinary 'gift' innate to a special few, intuition is an inherent natural ability that can likely be developed and improved through the use of systematic methods. (Hogarth 2008, 257)

One of the advantages of studying entrepreneurial cognition is that cognitive skills can be learned and developed for the benefit of the entrepreneur (Forbes 2005). This is applicable to intuition, which is viewed by various authors as a skill that can be acquired and strengthened (e.g. Hogarth 2001; Klein 2004; Sadler-Smith 2010). Although education may have some positive effect on intuition, as indicated by Baldacchino's (2013) findings that entrepreneurs with a higher level of education engaged in more intuitive processing than their less-educated counterparts, this is likely due to knowledge accumulation that provides the raw ingredients for intuition, as opposed to direct contributions made by education to the formation of intuitive abilities. Therefore, entrepreneurs should not rely exclusively on education but should seek other ways of developing their intuition.

As discussed in Sect. 2, intuition is associated with domain-specific experience (Baldacchino 2013; Gustafsson 2006; Hodgkinson et al. 2008). Klein (2004) maintains that the most salient type of experience is real-life experience, while Baldacchino (2013) found that the strongest antecedent of intuition is ownership of multiple businesses in one's own industry. Does this imply that entrepreneurs must wait until they gain experience in starting up and running multiple businesses in order to develop their intuition? This would be problematic and potentially rather costly. Fortunately, the literature indicates that there are various ways of developing intuition. Entrepreneurs who do not have the relevant business ownership experience can therefore actively enhance their intuitive processing skills.

Hogarth (2001) presents seven guidelines for educating intuition and argues that this requires awareness, acquisition of specific skills and practice. Klein (2004) argues that improving intuitive skills requires strengthening one's experience base. As it is not always feasible (or desirable) to rely on real-life experience to develop intuition, he introduces an 'intuition workout program', based on the notion that 'the more we exercise—the more repetitions—the stronger we get. Intuitive decision making improves as we acquire more patterns and larger repertoires of strategies' (Klein 2004, 8). This training programme comprises three basic elements of mental conditioning, each of which is accompanied by a useful tool for practice. Sadler-Smith, who is one of the leading proponents of the notion that intuition is a valuable cognitive skill that can and should be developed, has published several works providing guidelines and suggestions as to how intuition can be fostered in different contexts. In an article that he co-authored with Shefy in 2004, he presents seven guidelines on how to make better use of intuition, which acknowledge intuition as a 'composite phenomenon involving interplay between knowing (intuition-as-expertise) and sensing (intuition-as-feeling)' (Sadler-Smith and Shefy 2004, 76). In another co-authored article, Sadler-Smith and Shefy (2007) report on an intuition training programme that they designed, implemented and evaluated. Sadler-Smith's

contribution to intuition development culminates in a book (2010) in which he proposes a series of 'intuitive intelligence principles' and 'intuition workouts' to develop 'intuitive intelligence'. He defines intuitive intelligence as 'the capacity to understand, apply and develop one's intuitive judgement' (2010, 304) and argues that:

> The answer to the fundamental question of 'can intuition be developed?' is . . . an unequivocal and resounding 'yes'. Professional experience, knowledge of the science of intuition and an informed self-awareness are the building blocks of one of your deepest and most durable assets—your 'intuitive intelligence'. (Sadler-Smith 2010, 7)

This section consolidates the above-mentioned authors' principles, guidelines and methods into a six-step framework for developing intuition. The steps are as follows: (1) recognise intuition, (2) explore intuition, (3) enable intuition, (4) strengthen intuition, (5) challenge intuition and (6) blend intuition (with analysis). It should be noted that although these principles, guidelines and methods were not designed specifically for entrepreneurial intuition but for 'general' intuition, they are applicable (perhaps with minor adaptations) for entrepreneurial contexts. Readers are referred to the original sources for further details.

4.1 Recognise Intuition

The first step in developing intuition is to recognise it and distinguish it from similar but distinct processes. Sadler-Smith (2010) and Sadler-Smith and Shefy (2004) caution readers not to mix up their 'I's, with reference to intuition, incubation, insight and instinct. In order to differentiate intuition from insight, Sadler-Smith (2010) proposes a number of puzzles for which flashes of insight are required, while Sadler-Smith and Shefy (2007) maintain that 'sleeping on it' facilitates incubation and flashes of insight.

As intuition is associated with feelings (emotionally charged judgements or gut feelings), it is also important to foster 'somatic awareness' by focusing on the bodily aspect of intuition, as this enables individuals to sense and identify gut feelings (Sadler-Smith and Shefy 2007). It is also important to acknowledge emotions, which are part of the intuitive system—although they should not be the only driving force behind decisions, they supply relevant information that should be taken into account (Hogarth 2001). Moreover, emotional feelings should be distinguished from intuitive feelings. This can be done by asking the following questions: (1) Is the feeling short and intense? (2) Is it one of the basic emotions? (3) Is the cause of the feeling readily apparent? Answering 'Yes' to all three questions suggests an emotional feeling rather than an intuitive feeling (Sadler-Smith 2010).

Recognising intuition is facilitated when it is articulated and recorded (Sadler-Smith 2010; Sadler-Smith and Shefy 2004, 2007). It is essential to express and record intuition even though it is often impossible to know whether or not it is correct, as this enables intuition to be recognised, acknowledged, questioned, justified, explained

and understood. In this regard, Sadler-Smith (2010) provides an intuition lexicon (list of adjectives) to express positive and negative gut feelings, while Sadler-Smith and Shefy (2004, 2007) recommend keeping a diary or journal that logs details such as the time of day when an intuition occurred, its content, location, form (words, images, feelings) and any biases, fears or wishful thinking that may have contaminated the intuition.

4.2 Explore Intuition

In addition to recognising intuition, a deeper understanding of one's intuitive processing should be sought. According to Hogarth (2001), acquiring access to aspects of knowledge that may not be amenable to analytical thought requires an effort to reframe problems imaginatively and to use narrative to explore novel connections.

Sadler-Smith (2010) suggests that 'what happens when you intuit?' and 'what happened when you followed your intuition?' should be explored in detail. This can be done by reflecting on instances where the 'how' or 'why' of a decision could not be explained and on broader aspects of one's work and personal life where intuition was found to be effective or ineffective. This is in line with Sadler-Smith and Shefy (2004) who argue that it is important to 'open up the closet' by reflecting on the extent to which one experiences intuition, trusts and counts on intuition, suppresses intuition or secretly relies on gut feelings. Sadler-Smith and Shefy (2004) also advise readers to 'get a feel for your batting average' by paying attention to how accurate and reliable intuition is over time, engaging in critical reflection while recalling instances where intuition led to positive and negative outcomes, and identifying misleading assumptions and predispositions to over-rely on intuition when this is not appropriate.

4.3 Enable Intuition

In addition to recognising and understanding intuition, the development of intuition is contingent upon a number of enabling factors. These are outlined below.

4.3.1 Appropriate Feedback

According to Hogarth (2001, 2008), the acquisition of intuition generally takes place automatically through experience, without any conscious awareness of the process. However, not all intuitions that are acquired are equally effective, as some are more accurate than others. He argues, however, that by understanding the process and the environmental conditions that lead to the development of valid and invalid

intuitions, individuals can 'improve the proportion of good intuitions learned—and at little cost' (Hogarth 2008, 91). Hogarth (2001, 2008) distinguishes between 'kind' and 'wicked' learning structures (environments) and argues that 'kind learning structures lead to good intuitions; wicked ones do not' (2001, 89). Kind learning structures provide feedback that allows individuals to learn appropriate lessons from experience, while wicked ones provide feedback that teach the wrong lessons. Hogarth (2001, 195) hence claims that 'what is important ... is knowing that intuitions that have been acquired in kind environments are likely to be functional and those acquired in wicked environments are likely to be dysfunctional'.

In view of the above, Hogarth's (2001) guidelines for educating intuition include selecting and/or creating appropriate environments and seeking relevant feedback. With respect to the former, he advises that one should not passively react to environmental influences but should actively seek 'kind' environments and avoid 'wicked' environments to develop valid intuitions. With respect to the latter, he suggests that one should develop a habit of seeking feedback to test impressions and intuitions, bearing in mind that 'kind' environments provide functional feedback that develops valid intuitions, while wicked environments provide faulty, misleading feedback that can lead to invalid intuitions. This is echoed by Sadler-Smith and Shefy (2004) whose guidelines for developing intuitive awareness include eliciting constructively critical feedback on intuitive decisions and judgements and creating or selecting environments that will enable intuitive learning.

4.3.2 Visual Imagery

According to Sadler-Smith and Shefy (2007), intuition is preverbal; therefore, the ability to visualise scenarios is important for developing intuition. They propose a training technique called 'inner journey', which entails a guided visual imagery exercise. This follows one of the earlier guidelines that they proposed (Sadler-Smith and Shefy 2004), whereby they advised readers to visualise future scenarios in order to instigate intuitive processing and to practice with simple decision visualisation exercises, such as walking along a path that includes alternative routes (choices) and noting how one feels when considering each option, imagining where each path leads to and its possible present and future outcomes.

In his later work, Sadler-Smith (2010) proposed three 'intuition workouts' related to visual imagery. The first, called 'just imagine', entails visualising the steps that will be involved in a decision or course of action, imagining oneself in the vision, communicating the vision to others and encouraging them to buy into it and believe in it. The second, titled 'as if intuitive moments', involves imagining decision scenarios and the alternatives available and simulating 'as if' intuitive moments through the following steps: (1) retreat to a quiet place away from interruptions, articulate the decision in the form of a question, and list the choices available; (2) reflect on a similar past decision and mentally replay it in detail, including where it occurred, who was involved and what happened. Pay attention to any bodily sensations (feelings) that arise as the scenario unfolds; (3) rehearse each

choice for the future decision by imagining it has already taken place. Include details and pay attention to bodily sensations as in (2) above. The third workout, which he refers to as 'intuiting futures', uses a variant of a mental simulation technique proposed by Klein (2004: 'crystal ball') to select between two seemingly plausible choices for an important future scenario. This workout involves the following steps: (a) specify in detail the elements of the scenario in the crystal ball; (b) assemble the elements into a logical sequence for both choices, and consider what the sequence would be like for choice 1 and choice 2; (c) watch (i.e. imagine) each sequence unfold in the crystal ball, treating it like a movie-playing device that can be controlled by playing, pausing, fast-forwarding, rewinding and replaying the sequence; (d) sense the feelings that arise as each sequence is viewed in the crystal ball, compare the feelings triggered by each choice, and use this as soft 'data' to guide judgement of each choice.

4.3.3 Meditation and Mindfulness

Meditation and mindfulness have also been argued to be enablers of intuition. These practices originated in Eastern traditions but are becoming increasingly popular and accepted in the West, where various studies have shown that they have a range of physical and psychological benefits (see, e.g. Penman 2015, 5–6, for a brief overview). Meditation refers to a range of practices that foster a calm, focused cognitive state in which the rational mind is serene and quiet. Mindfulness is a mental state—which may be cultivated through meditation—in which attention is focused on internal and external stimuli (including physical sensations, thoughts and emotions) that may arise in the present moment. Such mental states, in which the verbal and often dominant analytical voice is 'quietened', allow intuition to emerge by providing access to subtle, holistic forms of knowledge and enabling the intuitive voice to be heard (Sadler-Smith 2010). Furthermore, just because an intuition emerges into consciousness does not necessarily imply that it is given sufficient attention, and intuitions can therefore 'recede or dissipate before receiving due consideration' (Dane 2011b, 217). Mindfulness may offset this dissipation by increasing the level of attention that is paid to internal phenomena including intuition.

In line with the above, Sadler-Smith and Shefy's (2007) intuition training programme includes several principles and techniques based on meditation and mindfulness. These include a sitting meditation exercise, a visual meditation exercise, a walking meditation exercise, a drawing exercise to enhance mindful awareness and a 'loving kindness' meditation exercise that promotes 'befriending' or acceptance of oneself. Sadler-Smith (2010) also includes an intuition workout based on mindfulness, which he calls 'drop in on the moment'. This workout involves practising mindfulness to refine one's capacity for paying attention and foster a calmness of mind, which in turn allows intuitive thoughts to come to awareness.

4.3.4 Relaxation

Sadler-Smith and Shefy (2007) argue that developing intuition requires clarity, calmness and relaxation, which are enhanced by adopting an open, non-judgemental, acceptance of oneself and the present moment. They therefore propose a lying or sitting relaxation exercise as part of their intuition training programme. Relaxation is also featured in one of Sadler-Smith's (2010) intuition workouts called 'Time out and team up', which encourages readers to make time for mental relaxation as this is required for ideas to incubate.

4.3.5 Spontaneity

According to Sadler-Smith and Shefy (2007), the ability to be spontaneous, including making quick decisions and allowing thoughts to flow freely, is an important aspect of intuition, as this form of processing often takes place rapidly, under time pressure and other constraints. They propose two techniques as part of their intuition training programme to encourage individuals to be more spontaneous, namely: 'go with your gut', which is an exercise that encourages spontaneity in trivial tasks, and 'morning pages', which is an exercise in spontaneous writing.

4.4 Strengthen Intuition

According to Klein (2004), 'the real challenge is not whether to trust your intuition, but how to strengthen it to make it more trustworthy' (2004, 10). Thus once the necessary conditions are in place to enable intuition to occur, effort must be made to strengthen intuition. Intuition can be strengthened in various ways, as outlined below.

Hogarth (2001, 215) argues that educating intuition requires 'practice, and practice, and practice', while Klein (2004, 9) maintains that:

> People don't automatically develop good judgment skills, any more than joggers suddenly have an outstanding day ... As with physical exercise, you will get some results if you simply take the time to physically exert yourself, to do the 'repetitions', but you will get better results faster if you use proper technique.

Hogarth (2001) recommends an incremental approach to practising intuition skills, by initially isolating a few skills and gradually incorporating them into one's thinking processes through repeated practice. This will lead to these skills becoming less effortful and more automatic, at which point more skills can be added to one's repertoire. One of his guidelines for educating intuition is to 'make scientific method intuitive' by practising different aspects of scientific thinking, so that conscious knowledge and rules become internalised and transferred to the automatic intuitive system.

Practice is important as it builds a repertoire of relevant knowledge and experiences that can be drawn on in real-life situations that require intuition. According to

Klein (2004), whose research on decision-making in emergency situations (e.g. firefighting and intensive care nursing) led to the development of the naturalistic decision-making (NDM) tradition and the recognition-primed decision (RPD) model, expert decision-making is based on instant intuitive awareness of a situation by means of pattern recognition, which is in turn based on experience and expertise. This pattern recognition is followed by a process of mental simulation, which involves 'consciously imagining what would happen . . . simulating and envisioning a scenario—playing it out in their heads what they expect would happen if they implemented the decision in a particular case' (Klein 2004, 26). Klein proposes an 'Intuition Skills Training Programme' for practising relevant decision-making situations that could form the basis of intuitive pattern recognition and mental simulation in real-life contexts. This programme is made up of the following three elements:

1. Identifying and understanding the decision requirements of one's job. This involves making a list of the decisions that need to be made repeatedly, together with the intuitions, judgements and skills that must be mastered before a job can be reliably completed. It also involves improving how these decisions are handled by learning from others who excel at making similar decisions. This first element can be accomplished by addressing the following questions in a 'decision requirements table': (i) What makes this decision difficult? (ii) What kinds of errors are often made? (iii) How would an expert make this decision differently from a novice? (iv) How can this decision be practiced and feedback obtained to improve future decision-making?
2. Practising the difficult decisions in context. This involves finding opportunities to deliberately practice the decisions that are faced on a regular basis. If this is not possible within the daily routine, 'decision making exercises' (DMXs) can be created to suit one's own specific decision training requirements. DMXs are simple thought exercises or scenarios that capture the essence of a typical, difficult decision or dilemma. This is typically characterised by uncertainty and should require the generation of a plan of action.
3. Reviewing the decision-making experiences. This involves seeking feedback from other decision-makers who have experience in one's field, reflecting on how and why decisions were made and understanding their link to outcomes. The decision-making review can be carried out using a 'decision-making critique' to understand what worked well and what could have been done differently. This entails listing the key decisions that were made and asking the following questions about each one: (i) Why was this difficult? (ii) How was the situation interpreted? What cues and patterns were there? (iii) Why was a particular course of action selected? (iv) In hindsight, should a different course of action have been selected?

4.5 Challenge Intuition

No matter how much practice is undertaken to strengthen intuition, intuitive processing is not infallible and should therefore be challenged so that it does not

lead one astray. Sadler-Smith (2010, 164) cautions readers to 'beware of feeble intuitions', which are based on logical errors, cognitive biases, stereotypes and wishful thinking. These arise from the limitations that are inherent in human cognition, which lead individuals to be 'cognitive misers' and allow the intuitive mind to perform certain tasks that it is not well suited to do. He proposes two workouts to challenge intuition, namely:

1. 'Intuitive hits and misses', which entails recalling and analysing decisions that led to intuitive 'hits' (when gut feeling worked well) and others that resulted in intuitive 'misses' (when gut feeling didn't work well). Issues to consider include what was the decision, what was the situation, who was involved, what happened, what feelings were experienced and why was it a hit/miss? This workout also involves reflecting on any differences between the intuitive hits and misses and on what could have resulted in gut feelings being accurate or inaccurate (Sadler-Smith 2010).
2. 'Play devil's advocate', which involves engaging in an objective critique of particular intuitive decisions by pointing out weaknesses in the assumptions underlying them, internal inconsistencies, long-term problems that could be encountered and threats from feeble intuitions. Sadler-Smith and Shefy (2004) also included this as one of their guidelines for developing intuitive awareness, whereby they argued that the robustness of intuitive judgements should be probed by raising objections; challenging underlying assumptions; generating counter-arguments; identifying inconsistencies, inaccuracies and other weaknesses; and proposing alternative courses of action.

Sadler-Smith (2010) notes that although intuitive first impressions are not always accurate and lasting, intuition enables initial judgements or first impressions to be made rapidly on the basis of limited information. He therefore recommends counting on first impressions and making first impressions count. In other words, one should be aware of one's first impressions of others and on others (Sadler-Smith 2010). Nevertheless, Hogarth (2001) argues that one should train oneself to not rely on automatic first impressions and to apply 'circuit breakers' (interventions that interrupt automatic processes) in order to analyse and reflect critically before making decisions and taking action.

4.6 Blend Intuition (with Analysis)

Although the focus of this chapter is on entrepreneurial intuition, it is important to note that one should not be exclusively intuitive in one's cognitive processing but should be able to blend intuition with rational analysis as required. In addition to his intuition training programme, Klein (2004) suggests seven strategies for harmonising intuition and analysis. These include starting with intuition, not with analysis, using mental simulation to evaluate the options, bringing in the intuition of

an outsider to check on one's analyses and not attempting to replace intuitions with procedures.

According to Sadler-Smith (2010), one should 'acknowledge the intuitive mind' in order to understand when intuition should be used and when analysis would be more appropriate. Moreover, one should assess one's cognitive style to understand one's preference for intuition or analysis. Sadler-Smith (2010) further argues that being able to discern and apply the appropriate mode of processing in a given situation are key cognitive skills. He encourages readers to develop these skills together with the ability to switch between different modes according to situational demands. In this respect, Sadler-Smith (2010) maintains that it is desirable and possible to become 'cognitively ambidextrous' or 'cognitively versatile', but doing so requires self-awareness, practice and feedback (particularly if unfamiliar territory is being explored). Furthermore, he notes that since individuals generally have a preference for an intuitive or analytical mode of processing (see Sect. 2.4), it is important to learn to step out of one's comfort zone and into the less familiar territory of one's weaker cognitive style. This entails challenging one's weaker mode of processing by considering a decision-making scenario, reflecting on how this decision would be made using one's preferred mode and then trying to make the same decision using one's weaker mode while exploring how this process and outcome would differ. Ultimately, one should strive for a balance of expertise (head) to provide the raw material for intuition to work with, passion (heart) to persevere and business instinct (gut) to detect opportunities and assess their viability (Sadler-Smith 2010).

5 Conclusion

> We can't get through life in the business world by being exclusively analytically-minded or intuitively-minded. (Sadler-Smith 2010, 49)

It is widely accepted that entrepreneurship is the engine of economic growth (Wymenga et al. 2012) and 'one of the roads to future prosperity' (Iversen et al. 2008, 1); therefore learning what contributes to prosperous entrepreneurship may be argued to have an impact on the cultivation of a thriving economy. It is therefore reasonable to argue that understanding intuition in entrepreneurial cognition not only has academic value but also economic significance, as the knowledge gleaned from such research may then be used in entrepreneurship education and training programmes to better enable budding and established entrepreneurs to pursue entrepreneurship successfully.

This chapter has presented an overview of what is known about entrepreneurial intuition, highlighted its role in the crucial entrepreneurial processes of opportunity identification and exploitation and outlined ways in which intuition can be developed. There is, of course, still a great deal to be learned about entrepreneurial intuition and, moreover, about its interplay with analysis in entrepreneurial cognition. Despite its growing acceptance among academic circles, a recent systematic

review of the literature (Baldacchino et al. 2015) revealed that research on intuition in entrepreneurship is still limited and that various questions have remained unasked or unanswered. Various gaps and future research directions were identified in the above-mentioned literature review, and it is beyond the scope of this chapter to repeat them. However, the following additional areas are suggested to advance the state of knowledge on intuition in entrepreneurship.

First, future research could explore gender differences in intuition, particularly in the context of entrepreneurship where women are underrepresented. Hogarth (2001, 2008) notes that women are stereotyped as being more intuitive in interpersonal judgements than men but less so in male-dominated domains such as engineering. If the former stereotype were found to be true, then women may be at an advantage in aspects of entrepreneurship that require interpersonal interactions, and they could use this to overcome some of their weaknesses and level the playing field with men. If, however, the latter stereotype is also true, then women would be at a disadvantage in the business world which is still male-dominated.

Second, it would be interesting to explore whether it is possible to foster intuition among children and youths. Although intuition is associated with domain-specific experience and expertise, it may be possible to lay the foundations upon which more advanced intuitive processing may occur in the future. Noddings and Shore (1998) argue that teachers can and should enhance their students' 'intuitive modes' by familiarising them with the notion of intuition (e.g. by sharing examples of intuitive thinking that produced positive results) and by incorporating intuitive tasks (e.g. open-ended reading/writing that allows flexible processes and acknowledges feelings, rather than rigid 'right/wrong' answers) alongside the traditional analytical ones in schoolwork:

> We might consider doing things in stages. Give intuition free play at the outset. If something is to be written, let it be written; if something is to be read, let it be read. Let whatever-is-there come through, be revealed. After something is in existence, we can undertake elaboration, revision, analysis, perfection of the first product. Finally, we return to the finished product so that the intuition may contribute a final insight on the problem and complete the quest for understanding. (Noddings and Shore 1998, 113)

The above process could form the basis which intuition and analysis act upon during the different stages of opportunity identification and exploitation in later years. If children can be taught to intuit, at least within the context of their studies, then it could have important implications on the way they are educated for life in general and for entrepreneurship in particular. There is a growing emphasis on a European level on entrepreneurial mindsets and creativity. Could enabling intuitive thinking among young people be a way forward in this regard?

Linked to the above, a third research direction could explore the effectiveness of the intuition training programmes, guidelines and suggestions that have been proposed by various authors as outlined in Sect. 4, as empirical studies that have implemented and evaluated their application in naturalistic settings are lacking (with the exception of Sadler-Smith and Shefy 2007). Some of the claims in these training programmes would benefit from empirical investigation, which would provide them with further legitimacy. For example, meditation and mindfulness

are presented as enablers of intuition, but further research is required to support this claim (Dane 2011a). Furthermore, these programmes were developed for developing intuition in general or strategic management contexts, and there are several areas of overlap between them. There is therefore scope for their adaptation into a single comprehensive programme for the specific domain of entrepreneurial intuition.

Although the focus of this chapter was on intuition, it was highlighted several times that analysis also plays an important role in entrepreneurial cognition and decision-making (as well as in human cognition more broadly). As noted by Sadler-Smith (2008, 247):

> Different kinds of cognitive processes may contribute to creative and innovative outcomes. For example, many creative individuals appear to begin with a private, intuitive sense of what the final product will be like, but they rely on other more explicit cognitive processes (such as analysis) to articulate a tacit idea which eventually becomes explicit, is made public and materialized as an invention. ... Creating something novel and useful requires both intuition and analysis through the integration and coordination of processes served by systems located in both hemispheres of the brain.

Research that investigates the use of intuition alongside analysis in entrepreneurship is even more scarce than that which focuses exclusively on intuition [an exception is Baldacchino (2013), who explored cognitive versatility as well as intuition, in opportunity identification]. Future research—as well as any entrepreneurial action—should therefore incorporate analysis with intuition in order to provide a more comprehensive picture of entrepreneurial cognition and decision-making.

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Entrepreneurial Success: A Theoretical Contribution Linking Affect and Cognition

Sara Sassetti, Vincenzo Cavaliere, and Sara Lombardi

Abstract A comprehensive understanding of how affect influences cognition and the outcomes of decision-making is still lacking in the literature. Accordingly, this study explores the process that links affect and cognition with entrepreneurial decision-making effectiveness.

Designed as a conceptual paper, the model developed attempts to link three main pillars of entrepreneurial decision-making: the affect side (input), the cognitive processes underlying decisions (processes), and the entrepreneurial decision-making effectiveness (outcome).

Five propositions are developed which suggest that affect can be considered information and input in the decision-making process and that the effectiveness of entrepreneurs' decisions depends on a combination of intuition and rationality, thus pointing to entrepreneurs as truly "quasirational" decision-makers. Moreover, the paper explains that the relation between affect and cognitive mechanisms is positively moderated by emotional intelligence, defined as the ability to understand the effects that emotions may have on decisions.

The conceptual model attempts to contribute to the entrepreneurial cognition literature by offering a model that brings out a set of elements composing the "affect side" of the entrepreneurial decision-making process. Furthermore, consistent with the idea that feelings and thoughts are interdependent, the study sheds light on the complexity of the entrepreneurial decision-making process, as well as its nonlinearity, multi-criteria features, and recursiveness.

1 Introduction

Understanding the relationship between emotions and moods on decision-making is a "hot topic" across different disciplines, from philosophy, through economics and management, to psychology and neuroscience (Cardon et al. 2012; Lerner et al.

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2015). As noted by Forgas (1995), "Affect is a pervasive part of the way we see the world" (p. 40). Equally, as Simon (1990) pointed out in his theory of decision-making, "[. . .] in order to have anything like a complete theory of human rationality, we have to understand what role emotion plays in it" (p. 29). Consistent with this, scholars have acknowledged that successful decision-making depends on the affect of decision-makers (Fenton-O'Creevy et al. 2011; Forgas and George 2001; Seo and Barrett 2007) as this is a critical prerequisite for organizational success (Forgas and George 2001).

Mostly in the field of entrepreneurial decision-making, understanding the role of emotions and mood became an interesting stream of study (Baron 2008; Vermeulen and Curşeu 2010). Recent research (Delgado García et al. 2015) has demonstrated that affect influences all stages of the entrepreneurial process, namely the opportunity recognition (e.g., Baron 2008; Cardon et al. 2009; Foo et al. 2015), the evaluation of opportunity (Grichnik et al. 2010; Hayton and Cholakova 2012; Wood and Williams 2014), exploitation of opportunities (Klaukien et al. 2013; Welpe et al. 2012), the management of entrepreneurial ventures (Baron and Tang 2011; Brundin and Gustafsson 2013; Morris et al. 2010), and business failure (Cope 2011; Shepherd 2003), as well as success and survival (Baum and Locke 2004; Cardon et al. 2009).

Entrepreneurial success is strongly associated with decision effectiveness (Nutt 2008), that is, success is measured through an effectiveness estimator that evaluates the value and benefits of decisions (Nutt 2008; Beyer and Trice 1982). To understand entrepreneurial success fully, it is important to uncover the relationship between affect and cognition on entrepreneurial decision-making process (Frese and Gielnik 2014).

Indeed, the topic of affect in decision-making has attracted great attention in studies of entrepreneurial cognition (Baron 2008; Mitchell et al. 2007), which is defined as the "knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation and growth" (Mitchell et al. 2002, p. 97). As Baron (2008) pointed out:

> . . .affect and cognition interact in an intimate and continuous manner [. . .], and this interaction is visible even at basic levels of brain functioning [. . .]. As a result, it seems essential to include affect and its interface with cognition in ongoing efforts to investigate entrepreneurial cognition. (p. 336)

Many studies have investigated the relation between affect and success (Baron 2008; Baron and Tang 2011; Cardon et al. 2009; Ho and Pollack 2014). For example, researchers have demonstrated that positive affect, such as passion, is linked to proactive actions and efforts (Elliot 2006), and passion is related to entrepreneurs' need for success (Cardon et al. 2009); this is because passionate entrepreneurs are not satisfied with low or medium goals, but seek challenging objectives (Locke and Latham 2002). In the same vein, Foo et al. (2009) established that negative affect, such as anger, may have a positive effect on entrepreneurship because it may reduce common judgmental biases and error, e.g., the fundamental attribution error (Forgas 1998). Nevertheless, few studies have addressed which cognitive mechanisms mediate

the relation between affect and entrepreneurial success (Delgado Garcia et al. 2015). Moreover, the literature has rarely sought to explain the entrepreneurial decision-making process in terms of both affective and cognitive processes (Hayton and Cholakova 2012).

We therefore develop a conceptual model to address the following research question: "What is the relation between entrepreneurs' affect, cognitive mechanisms, and decision-making effectiveness?". Our model draws on three main pillars: first, the *inputs* in the decision-making process, namely, the positive and negative affect, considered as information to process (Forgas 1995); second, the *processes*, i.e., the ways in which decisions are made, considered by investigating two cognitive mechanisms—intuition and rationality (Stanovich and West 2000); and third, the *outcome* of decision-making, captured by the effectiveness of entrepreneurial decision-making.

In developing our argument, we also propose that emotional intelligence may have a significant role in influencing the relation between affect and cognition. Indeed, emotional intelligence, defined as the ability of individuals to understand their own emotions, perceive the emotions of others, use emotions to achieve their goals, and regulate their emotions (Salovey and Mayer 1990), is critical for entrepreneurship (Cardon et al. 2012). Hence, this ability could be useful for entrepreneurs' activities because it helps in negotiating the resources necessary for their business, thus supporting entrepreneurial success (Shepherd 2009). Given this, however, there is the need to gain a better understanding of the role emotional intelligence plays in entrepreneurship, and this concept can also help understand how entrepreneurs may "control the heart" (Cardon et al. 2012, p. 3).

This study contributes to the entrepreneurial cognition literature by offering a conceptual model that identifies a set of elements composing the affect side of the entrepreneurial decision-making process contributing to entrepreneurial success in terms of the effectiveness of decision-making. Furthermore, we capture the complexity of the entrepreneurial decision-making process by taking into account the link between affect and cognition (Grichnik et al. 2010) and explain how cognition mediates the relation between affect and decision-making effectiveness (Delgado Garcia et al. 2015).

Moreover, our interest in understanding the relation between affect and entrepreneurs' decision-making is in line with the need to consider in greater depth the complex, multilevel, and dynamic process of entrepreneurship (Grégoire et al. 2011).

The remainder of the paper is organized as follows. In the first section, we focus on the theoretical background, reviewing the research field of entrepreneurial cognition and the affect infusion model (AIM), and explaining entrepreneurial success in terms of decision-making effectiveness. Next, we discuss the argument underlying our conceptual model, and finally provide theoretical and managerial implications and directions for future research.

2 Theoretical Background

2.1 Entrepreneurial Cognition

Entrepreneurial cognition is related to understanding how entrepreneurs make use of simplified mental models to connect previously unconnected information helpful in generating new ideas, starting a new business, or fostering an existing one. Entrepreneurial cognition has recently emerged as an interesting field of study in entrepreneurship (Randolph-Seng et al. 2015).

Specifically, "entrepreneurial cognitions are the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth" (p. 97) (Mitchell et al. 2002).

As Mitchell et al. (2002) pointed out, it is possible to distinguish different periods in the emerging literature on this topic. Between the early and mid-1990s, the terms "entrepreneurs' cognitions" (Bird 1992) and "entrepreneurial cognition" (Busenitz and Lau 1996) began to gain currency, and entrepreneurial cognition-based constructs were first used to distinguish entrepreneurs from non-entrepreneurs (Mitchell 1994). Starting from this point, scholars have stressed that cognitive decision-making style is one of the most important variables distinguishing entrepreneurs from managers (Smith et al. 1988). For example, Smith et al. (1988) showed that entrepreneurs are less comprehensive in their decision-making behavior than professional managers, with comprehensiveness defined as the degree to which an individual follows a formal rational decision-making process. Similarly, Busenitz (1992) demonstrated that entrepreneurs are more confident in their decision-making than managers in large organizations. Furthermore, in making decisions, they engage in more extensive use of representative heuristics, defined as "rules of thumb" individuals rely on to simplify complex problems (Schwenk 1988).

Starting from the mid-1990s, the cognitive theory was applied to investigate entrepreneurial risk-taking (Palich and Bagby 1995; Mitchell and Chesteen 1995), and increasing attention was paid to self-efficacy as an important component in understanding entrepreneurial cognition (see, for instance, Boyd and Vozikis 1994; Chen et al. 1998; Krueger and Dickson 1994).

At the end of the 1990s, entrepreneurial cognition research was mainly driven by Baron (1998), who argued that consideration of several cognitive mechanisms, such as counterfactual thinking, attributional style, planning fallacy, and self-justification, might be significant in explaining why entrepreneurs behave in a certain way. Busenitz and colleagues (e.g., Alvarez and Busenitz 2001; Wright et al. 2000), for example, used these cognitive models to explain how heuristic-based logic helps explain how entrepreneurs think and make strategic decisions. Moreover, Mitchell et al. (2000) applied entrepreneurial cognition constructs to explain the venture creation decision in the cross-cultural setting.

More recently, emphasis has increasingly been placed on a new topic within entrepreneurial studies: entrepreneurial affect (Baron 2008). Lerner et al. (2015) define affect as a set of unspecified feelings, comprising the "superordinate umbrella of constructs involving emotion, mood, and emotion-related traits" (p. 3). Many

studies in this field have focused on entrepreneurial passion (e.g., Cardon et al. 2009), while others have broadened the focus to include both positive and negative affect, and the consequences for entrepreneurial exploitation (Baron 2008; Foo et al. 2009).

Although some scholars debate whether affect may be distinguished from the cognitive processes individuals rely on (see, for instance, Fiedler and Forgas 1988; Salovey and Mayer 1990), we ground our study on prior research (see Zajonc 1980) suggesting that affect usually precedes and should be separated from people's cognition.

2.2 *Affect, Cognition, and Decision-Making: The Affect Infusion Model*

The affective infusion model (AIM), developed by Forgas (1995), is particularly helpful in understanding the relations between affect, cognition, and decision-making. According to this model, people make decisions considering affect as information, trying to understand how they feel about a situation (Schwarz and Clore 1988). Accordingly, AIM defines affective infusion as "the process whereby affectively loaded information exerts an influence on, and becomes incorporated into, a person's cognitive and behavioral processes, entering into their constructive deliberations and eventually coloring the outcome in a mood-congruent direction" (Forgas 1995, p. 39). In particular, affect infusion is based on two different yet complementary mechanisms: affect-as-information and affect-priming. Based on the affect-as-information mechanism, when faced with a decision to be made, an individual will not rely on recalling the features of a situation, but rather will ask himself/herself how he/she feels about the target. In doing so, affect can directly inform judgments and is used as a shortcut in the decision-making process, especially when decisions have to be made rapidly. In contrast, the affect-priming mechanism suggests that affect can indirectly inform judgments by selectively influencing the attention, encoding, retrieval, and use of information in the decision-making process. Based on this, affect and decision-making can be considered predominantly cognitive, and affect can be said to be a component of or an input in an information-processing and retrieval system (Forgas 1995).

In line with this, Curşeu et al. (2010) argue that emotions become a channel through which entrepreneurs process information, selecting information that aligns with their knowledge structure.

2.3 *Entrepreneurial Success as Decision-Making Effectiveness*

Venture success is frequently measured by looking at effectiveness (Nutt 2008), in particular decision-making effectiveness. Grounded on the work of Eisenhardt and

Zbaracki (1992), Dean and Sharfman (1996) defined decision-making effectiveness as the extent to which decisions result in desired outcomes or similarly the extent to which decisions achieve the objectives established by the decision-makers at the time they are made. This suggests that decision-making effectiveness is a measure of a decision's success. This is highly applicable in the entrepreneurship context because entrepreneurs often identify themselves with their ventures. The success of their business therefore strongly depends on the effectiveness of the decisions they make.

Researchers agree that the perception of effectiveness may differ depending upon whether it is evaluated by external actors instead of the decision-makers themselves (see, for instance, Friedlander and Pickle 1968). Given that our study investigates entrepreneurs' decision-making success, our focus is on effectiveness based on the decision-makers' goals, not on those of external actors (Dean and Sharfman 1996).

Given the widespread acknowledgment of the need to distinguish between the speed of decision-making and its effectiveness (see Gigerenzer and Gaissmaier 2011), this study investigates the effectiveness of the decision-making process regardless of how rapid it is. In so doing, we do not mean to underestimate the importance of making fast decisions (see Eisenhardt 1989); rather, our aim is to place emphasis on the success of the decisions made in terms of the extent to which they achieve the purpose intended.

So far, decision-making effectiveness has been studied by looking at the steps managers take when making decisions (Dean and Sharfman 1996). However, the literature on decision-making has seldom focused on decision effectiveness per se (Eisenhardt 1989), rather pointing to overall firm performance, which is generally a function of a wide variety of factors (Dean and Sharfman 1996). Moreover, in studying decision-making effectiveness, researchers stress the importance of considering decision processes and environmental factors, as both of these may play a critical role in affecting organizations' evolution (Elbanna and Child 2007; Romanelli and Tushman 1986). To narrow down the focus of this study, we limit our attention to decision-making processes, and more specifically to the cognitive factors likely to influence entrepreneurial decision-making success. We therefore ground our study on extant research stressing that decision-making is one of the main themes of business and management that embraces a cognitive perspective (Armstrong et al. 2012).

3 Conceptual Model

The conceptual model we propose postulates that the relation between affect and decision-making effectiveness is mediated by two different cognitive mechanisms: intuition (System 1) and rationality (System 2) (Stanovich and West 2000). Furthermore, we propose that the connection between affect and cognition is moderated by emotional intelligence.

3.1 Affect and Cognition

Based on the bounded rationality concept (Simon 1986), we know that people use both rationality and intuitive mechanisms in order to make decisions. Consequently, rationality and intuition are complementary mechanisms instead competitive ways of thinking. Traditionally, this mechanism for processing information has been called a "dual process." It points to the existence, within the human mind, of two systems of information processing (Chaiken and Trope 1999). On the one hand is the rational, deliberate (Hogarth 2010), and slow system of thought based on the effortful, rule-based, exhaustive processing of information (Sherry and Schacter 1987), termed System 2 by Stanovich and West (2000) and Kahneman (2003). On the other hand is the nonrational, tacit, and fast system of thought involving the automatic, associative, and selective processing of information (Lieberman 2000), labeled System 1 (Kahneman 2003; Stanovich and West 2000). Accordingly, entrepreneurs use simplified mental models to connect previously unconnected information helpful in generating new ideas, starting a new business, or foster an existing one (Mitchell et al. 2002).

In our model, we consider affect as the information (Forgas 1995) to be processed through cognitive mechanisms. Being information, affect can thus be processed by the dual process. Affect includes both moods (e.g., cheerfulness, depression), which are often relatively long-lasting but less focused on specific events or objects, and emotions (e.g., anger, sorrow, joy), which are often shorter in duration, but are more specifically directed toward a particular object (e.g., a person, event, object) (Baron et al. 2012). Although moods may have a more enduring and insidious influence on individuals' cognitive processes than emotions, the principles of AIM apply to all kinds of valence of affective states (Forgas 1995).

Scholars propose three main paradigms to study the relationship between affect and cognition (Forgas and Eich 2012): (1) mood-congruent cognition, based on the argument that a given affect often produces powerful assimilative or congruent effects on the ways in which people acquire, remember, and interpret information; (2) mood-dependence memory, which builds on the idea that what has been learned in a certain state of affect or mood is best remembered in that state; (3) a more recent paradigm that considers that positive and negative affect influence not only *what* people think, but also *how* people think, that is how different affect conditions the choice of different information processing (Bless and Fiedler 2006; Clark and Isen 1982).

The last paradigm may help explain the relation between affect and cognitive mechanisms during the decision-making process. For example, positive affect is usually associated with a less biased processing of information than negative mood (see Mittal and Ross 1998) in such a way that—under certain task conditions—it leads to more effective information processing (Staw and Barsade 1993). Other studies demonstrate that happy persons reach decisions more quickly, use less information, employ more casual information-processing strategies, and are more confident about their decisions (Forgas and Eich 2012). This stance is consistent

with research acknowledging that positive material is more extensively connected in memory at the psychological level (Kuvaas and Kaufmann 2004).

As Schwarz (2000, p. 434) stresses "individuals who are in a happy mood are more likely to adopt a heuristic processing strategy that is characterized by top-down processing, with high reliance on pre-existing knowledge structures and relatively little attention to the details at hand." Thus, when people feel positive emotion, they are inclined to perceive the overall situation as favorable, recall previous experiences of success, and have greater confidence in making a decision; similarly, they avoid an effortful thinking process in order to remain in the current positive affective state (Clark and Isen 1982). As such, people who feel positive emotions tend to use an intuitive process (Sinclair et al. 2002).

Unlike decision-makers in positive mood, those in negative mood have been found to be more strongly affected by framing manipulations (Mittal and Ross 1998). Despite this, researchers contend that such results are methodologically biased in that they observe positive mood and negative mood in decision-makers presented with different scenarios. Interpreting prior studies with a new lens has led scholars to suggest that negative mood rather facilitates systematic and analytic information processing (e.g., Forgas 1995, 2000; Forgas and George 2001; Schwarz 2000) by enabling the adoption of "more detail-oriented, bottom-up, and vigilant processing styles" (Kuvaas and Kaufmann 2004, p. 61). Accordingly, negative mood may lead to information processing that reduces or even eliminates common judgmental biases (e.g., the fundamental attribution error; see Forgas 1998), as well as other cognitive mistakes in social thinking (e.g., Forgas 2000). In a similar vein, scholars have found that negative moods significantly help decision-makers to follow a structured decision protocol when facing complex decisions (Elsbach and Barr 1999); in so doing, they tend to reduce strategy bias in solving problems (Kaufmann and Vosburg 1997). In this regard, Schwarz (2000) contends that "individuals who are in a sad mood are more likely to adopt a systematic processing strategy that is characterized by bottom-up processing, with little reliance on preexisting knowledge structures and considerable attention to the details at hand" (p. 434). Thus, when negative emotions are felt, people tend to perceive the overall situation as unfavorable and engage in a detailed and careful analysis to avoid mistakes in an attempt to improve the current affective state (Elsbach and Barr 1999; Erber and Erber 2000). In this case, an analytic process is seen to be the most fitting.

This suggests that positive and negative affect have a signaling function; that is, they automatically inform the person whether a relaxed decision involving minimum effort is required (positive effect) or whether a more causal and effortful processing style (negative effect) is appropriate in a given situation. Researchers argue that positive and negative affect not only increase or reduce the effort, vigilance, and elaborateness of the information process during decision-making (Bless 2000; Bless and Fiedler 2006), but they also exert a more comprehensive influence "to trigger equally effortful, but fundamentally different information processing styles" (Forgas and Eich 2012, p. 73). Thus, positive and negative affect play the role of a "decision-facilitator" instead of a "bias-inducer" (Seo and Barrett 2007); that is, they ease and

improve the decision-making process and its effectiveness, thanks to the different cognitive processes involved in the decision-making itself (Damasio 1994; Kitayama 1997).

Based on this, we propose that different emotions and moods can have similar effects on the decision-making process, and positive and negative affect are processed respectively by System 1 and System 2.

Proposition 1 *Positive affect is processed by System 1.*

Proposition 2 *Negative affect is processed by System 2.*

3.2 Affect and Cognition: The Moderating Role of Emotional Intelligence

According to Salovey and Mayer (1990, p. 189), emotional intelligence is defined as "the ability to monitor one's own and others' feelings, to discriminate among them, and to use this information to guide one's thinking and action." In this definition, emotions are considered "useful sources of information that help one to make sense of and navigate the social environment" (Salovey and Grewal 2005, p. 281). In the decision-making process, if a person is able to understand his/her own emotions, this allows him/her to realize not only the motivations at the basis of decisions, but also the consequences that these decisions could have for others (Hess and Bacigalupo 2011). Indeed, emotional intelligence is considered a set of different but related abilities that permit decision-makers to process emotionally relevant information both efficiently and accurately (Salovey and Grewal 2005).

Emotional intelligence is composed of four abilities: perceiving, using, understanding, and managing emotions (Mayer and Salovey 1997). Perceiving emotion is the ability to identify one's own and others' emotions, and it is considered to be the fundamental to emotional intelligence because it allows others to apply emotional abilities. Using emotions refers to the capacity to exploit emotions to encourage different cognitive activities, such as thinking and decision-making. Understanding emotions defines the ability to be able to recognize and describe emotions, while managing emotions describes the ability to regulate one's own and others' emotions.

The role of emotional intelligence in decision-making is to understand when an emotional reaction is incidental and consequently misleading, instead of a useful source of information to be processed (Fiori 2009). Accordingly, when decision-makers, in particular entrepreneurs, are able to understand their emotions and the factors that give rise to them, it might be easier to understand whether emotions are linked to opportunities or problems and use these emotions as information in the decision-making process (George 2000). Indeed, the emotional intelligence construct may contribute to grasping the differences in entrepreneurs' success in discovering, creating, and exploiting opportunities (Rhee and White 2007). Moreover, entrepreneurs with high emotional intelligence are usually aware that their positive

mood may cause them to be overly optimistic. Therefore, to ensure they take realistic and critical decisions, they may rethink judgment in a more neutral or negative mood to ensure the careful consideration of all issues involved (George 2000). Likewise, negative emotions could be used as a motivator to lead specific effort or shape a sense of resignation and apathy, depending on the degree of decision-makers' emotional intelligence (Fallon et al. 2014). Indeed, high levels of emotional intelligence may attenuate negative emotional responses or limit their adverse impact on decision-making (Fallon et al. 2014).

Following prior research (Ybarra et al. 2013), decision-makers might use their emotional intelligence through two different types of information processes: intuitive and deliberative. The deliberative process of emotional intelligence implies that people consciously use their emotional intelligence to judge and make decisions. On the other hand, the intuitive process refers to an automatic, unaware use of emotional intelligence (Ybarra et al. 2013). Adopting the deliberative process of emotional intelligence means that decision-makers are able to anticipate the effects of emotions through a conscious process. Once these emotions are experienced and recognized frequently through the deliberative process, they become automatized and habitual responses to a particular situation (Fiori 2009). This is due to the traces that conscious processes leave in the memory: Some emotions felt in particular situations tend to be stored in the memory and recalled automatically when a similar situation is experienced (Fiori 2009). The flexible use of these two processes might have effects on the judgmental strategies that decision-makers use in different situations.

Based on this, we expect that emotional intelligence may produce effects on decision-making through both the inputs of decision-making (i.e., affect) and the process itself (i.e., judgmental strategies). This is consistent with the research suggesting that there is a relation between these three elements: affect, judgmental strategies, and emotional intelligence (Forgas and George 2001; Gardner and Stough 2002).

Decision-makers with high emotional intelligence may improve their decision-making, thanks to the awareness and management of emotions; given this, they become more able to determine whether the emotion is linked to opportunities or problems and thus use those emotions in the process of decision-making (Gardner and Stough 2002).

Drawing on these considerations, we propose that emotional intelligence may play a moderating effect on the relation between affect and judgmental strategies. In particular, entrepreneurs with high emotional intelligence are expected to be better able to understand their emotions and consequently choose the best judgmental strategy to make more effective decisions.

Proposition 3 *Emotional intelligence plays a positive moderating effect on the relation between positive affect and judgmental strategies.*

Proposition 4 *Emotional intelligence plays a positive moderating effect on the relation between negative affect and judgmental strategies.*

3.3 Cognition and Decision-Making Effectiveness

The inclusion of System 1 (heuristic) and System 2 (rational) in our model is consistent with the idea that these cognitive mechanisms are at the base of entrepreneurial decision-making (Vermeulen and Curşeu 2010) and serve in evaluating available knowledge and information (Dane and Pratt 2007; Stanovich and West 2000). While the use of information in System 2 is analytically treated, when decision-makers use System 1, information "is quickly processed on the basis of holistic activation of these long term memory heuristic structures, very often associated with emotional content" (Curşeu et al. 2010, p. 62).

Given the lack of time and resources that entrepreneurs usually experience, they frequently use the heuristic process (Blume and Covin 2005). Hence, one of the main variables differentiating entrepreneurs from managers is that the former tend to adopt an intuitive cognitive mechanism, while the latter prefer a more rational system to process information (Blume and Covin 2005). Although the heuristic process is likely to ease the entrepreneurs' decision-making process, rational thinking may also be useful to entrepreneurs because it can reduce the negative consequences and cognitive biases arising during decision-making (Groves et al. 2011; Simon et al. 2000). Hence, as Fiet's (2002) research demonstrates, rational thinking is a crucial element for entrepreneurial success during the opportunity discovery process. Moreover, entrepreneurs are considered perspicacious and original decision-makers, but, as Townsend and Harkins (2005) argue, they ground their decisions upon rational considerations, data assessment, and careful examination of market stimuli. In line with this, Groves et al. (2011) argue:

> [...] in contrast to a popular nonlinear, stereotype of entrepreneurs as being primarily creative, visionary, and intuitive, [...] entrepreneurs utilize both nonlinear and linear dimensions in their overall cognitive processes, and employ either a linear or a nonlinear thinking style depending on situational circumstances and the different entrepreneurial and functional needs within an enterprise. (p. 444)

Therefore, the successful entrepreneur employs a balance of intuitive and rational cognitive mechanisms, facilitating the decision-making process. Entrepreneurs can thus be defined as truly "quasirational" (Dhami and Thomson 2012) decision-makers, who use the combination of two cognitive mechanisms: intuitive and rational. Indeed:

> [...] to some extent analytic models and intuitive management are substitutable as they take into account much of the same relevant information, but in other ways they are complementary: the former combine data in a consistent and unbiased manner, while the latter are flexible and have insights about the task environment that models fail to incorporate. The quasirationality approach thus benefits from the strengths of both intuition and analysis. (Dhami and Thomson 2012, p. 323)

Previous research confirms this standpoint. For example, Schwenk (1988) and Barr et al. (1992) argued that during the intuitive process, a decision may be influenced by cognitive biases, which results in an oversimplification of the situation and overlooking opportunities. As a result, the outcome of the decision might be less effective. Thanks to the substantive process, the risk embedded in the heuristic

process can be limited (Schwenk 1988). Moreover, intuitive and rational processes, in terms of substantive and heuristic judgmental strategies, are complementary rather than conflicting information-processing options (Forgas 1995). One may be useful to overcome the limitations of the other. Consequently, the use of both decision-making processes will have not only general effects on the effectiveness of decision-making (Curşeu et al. 2010) but also rather positive ones. Based on this, we propose the following:

Proposition 5 *The use of intuitive (System 1) and rational (System 2) cognitive mechanisms has a positive effect on entrepreneurial decision-making effectiveness.*

The conceptual model is illustrated in Fig. 1.

4 Conclusion

Based on the idea that emotions and moods exert an influence on cognition (Baron 2008), scholars have increasingly devoted attention to the relation between affect and entrepreneurial cognition. Starting from this, we develop a conceptual model to explain the relation between affect, cognition, and decision-making effectiveness. In particular, grounded on the affect infusion model (AIM), developed by Forgas (1995), we propose that affect can be considered information and input in the decision-making process and that entrepreneurial success can be captured by the effectiveness of decision-making.

Given that the study of decision-making effectiveness requires consideration of the decision-making process (Elbanna and Child 2007), our model focuses on

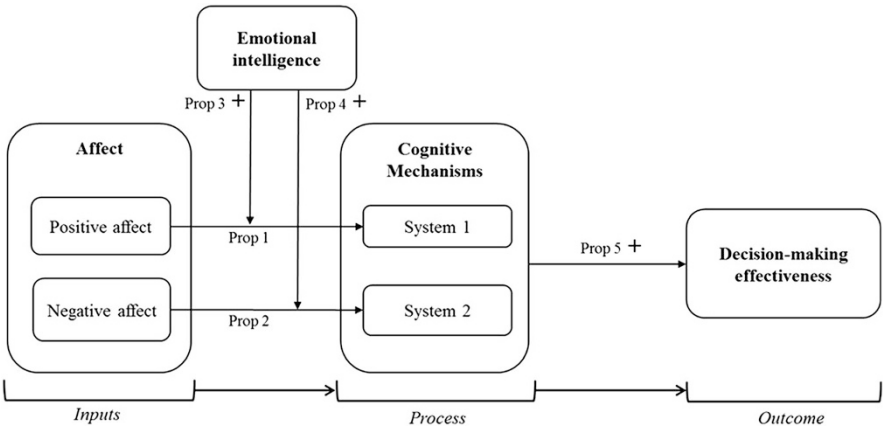

Fig. 1 The relationship between affect, cognition, and decision-making effectiveness. Source: Authors' own figure

System 1 (intuition) and System 2 (rationality) decision-making. Consistent with the idea that these cognitive mechanisms can help explain the way in which decisions are made, we argue that the effectiveness of entrepreneurs' decisions depends on a combination of both of these, thus pointing to entrepreneurs as truly "quasirational" (Dhami and Thomson 2012) decision-makers.

Moreover, bearing in mind the influence of affect on information-processing style (Forgas and Eich 2012), we propose that both positive and negative affect exert a positive influence on the two cognitive mechanisms, System 1 and System 2. Moreover, we expect that the relation between the affect and cognitive mechanisms is positively moderated by emotional intelligence, defined as the ability to understand the effects that emotions may have on decisions (Fiori 2009). Finally, we argue that both System 1 and System 2 positively influence decision-making effectiveness.

Our conceptual model attempts to contribute to the entrepreneurial cognition literature giving a model that brings out a set of elements composing the "affect side" of the entrepreneurial decision-making process. Furthermore, consistent with the idea that "feelings shape thought and thought shapes feelings" (Grichnik et al. 2010, p. 3), the study sheds light on the complexity of the entrepreneurial decision-making process, as well as its nonlinearity, multi-criteria features, and recursiveness (Hall and Hofer 1993).

4.1 Managerial Implications

This study alerts entrepreneurs to be aware of their decision-making processes. As entrepreneurial decision-making is a complex and multifaceted process in which emotions and cognition are linked to each other, entrepreneurs should be able to evaluate and monitor their decision-making process over time. Entrepreneurial awareness is defined as the propensity to notice and be sensitive to information about behavior in the environment and to discover new needs and opportunities (Ardichvili et al. 2003). Therefore, entrepreneurs who succeed in this will have the chance to make more effective decisions and ultimately generate better performance.

Entrepreneurial awareness of the complexity of decision-making processes should also be associated with the awareness of emotions and moods. Being aware of where emotions originate entails analyzing the process of the allocation of attention (Fiori 2009); similarly, this implicitly suggests that entrepreneurs should focus on certain information available in their environment over other information and understand which information could be useful for information processing. In so doing, they may anticipate the effects that emotions could have on their decisions (Fiori 2009). From this point of view, awareness can be considered deeply related to emotional intelligence. Indeed, "emotional intelligence abilities could become efficient and automatized through practice, much like others skills" (Ybarra et al. 2013, p. 13), and entrepreneurs may voluntarily practice, develop, and apply these abilities in specific situations. This means that entrepreneurs with a higher level of emotional intelligence may be more adaptable to different situations (Fiori 2009).

Entrepreneurs may therefore be interested in implementing human resource strategies aimed at developing their own emotional intelligence, such as appropriate training courses. Entrepreneurs who are able to improve their understanding of their moods and emotions will make better decisions, avoiding biases and increasing their effectiveness.

Moreover, entrepreneurial awareness may also be considered from the perspective of entrepreneurship educational programs (Groves et al. 2011). Often, such programs tend to emphasize the intuitive side of decision-making, while the rational aspects remain underestimated. For these reasons, it might be useful for academic and training institutions to start looking at entrepreneurs as "quasirational" decision-makers who need to develop and be more aware of their intuitive and rational cognitive mechanisms. Hence, entrepreneurship education should offer training programs in which a more adaptable, versatile, and balanced way of thinking is promoted for entrepreneurial success.

4.2 Limitations and Future Research

This study provides a starting point for an empirical test of the conceptual model we propose. Developing an experimental design, for instance, may help manipulate positive versus negative mood, as well as proving a better understanding of how affect influences decision-making effectiveness as the ultimate goal. Indeed, as Hayton and Cholakova (2012) have pointed out:

> [. . .] considering the possibility that some entrepreneurs may be more aware of their own affective states than others leads to the inevitable problem of operationalization. This is a situation where experimental manipulation of affect may be the best solution. Experimental inducement of affect has been used consistently and effectively in laboratory settings for a number of years. (p. 59)

An extension of the conceptual model we offer may explore the boundary conditions under which the model holds. It might be that strong prior entrepreneurial experience affects the way decision-makers face the influence of emotions, such that more experienced entrepreneurs are less influenced by emotions as their decisions are more driven by market data and analysis. Similarly, second- or third-generation entrepreneurs may show a different orientation in making decisions given their tradition "of being entrepreneurs." The feelings and emotions attached to a long-lasting history of entrepreneurs may lead to them adopting a less analytical decision-making process.

In addition, understanding the impact of social factors on the relationship between affect and entrepreneurs' decision-making may be a fruitful avenue for future research. Scholars may be interested in investigating whether the social networks with which the entrepreneur interacts affect the ways in which emotions drive his/her decision-making process. Similarly, internationalization experiences may play a role in shaping how emotions affect the process and outcome of decision-making.

A further direction resulting from this study may be to examine the strategies entrepreneurs adopt to handle the impact emotions have on decision-making, especially when the effects are detrimental. Lerner et al. (2015) suggest these strategies mainly take one of two forms. On the one hand, they might tend to minimize the magnitude of the emotional response through, for instance, reappraisal (i.e., reframing the meaning of stimuli that leads to an emotional response) or the induction of another emotion that triggers opposing tendencies in decision-making. On the other hand, entrepreneurs may prefer to insulate the decision-making process from the emotion, for instance, by increasing decision-makers' awareness of the decision-making process.

Furthermore, our study has focused on the role of entrepreneurial cognition in the decision-making process, and no environmental or contextual factors were considered. However, scholars (Mador 2000; Mintzberg et al. 1976; Papadakis et al. 1998) have underlined that decision-making models are composed of three fundamental elements: the environment, the specific characteristics of the decision to be taken, and the entrepreneur him/herself (Gibcus et al. 2010). Future research may thus explore the dynamics linking the environment, decision characteristics, and the entrepreneur's characteristics (Hough and White 2003; Papadakis et al. 1998). A valuable way of doing this might be the use of the socially situated approach (Smith and Semin 2007), according to which cognition is strictly related to the social environment, and it is considered not only in terms of the content of thought but also as an element that influences the process underpinning thoughts and behavior (Randolph-Seng et al. 2015). Moreover, it would be interesting to understand how and if the relation between affect and cognition changes across the different phases of entrepreneurship process (Baron 2008), and the effect that this relation may have on entrepreneurial success. In this regard, the theory on entrepreneurs' passion (Cardon et al. 2009) is a good example that explains how a specific positive affect follows different dynamics depending on different phases, and this then has an effect on entrepreneurs' decisions (Frese and Gielnik 2014). In conclusion, given that our conceptual model sheds light on the importance of considering entrepreneurs as "quasirational" decision-makers, future research could investigate in greater depth how the concept of quasirationality, and cognitive continuum theory in general (Dhami and Thomson 2012), may support entrepreneurial cognition.

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Metacognition, Entrepreneurial Orientation, and Firm Performance: An Upper Echelons View

Arash Najmaei and Zahra Sadeghinejad

Abstract Upper echelons theory suggests that cognitive diversity in top management teams (TMTs) affects firms' operation and performance. Prior research in this stream has focused primarily on lower-order cognitive factors, such as beliefs, perceptions, and preferences, rather than higher-order ones, known as metacognitive abilities. This study is an early, perhaps the first, attempt to begin this line of enquiry. Adopting a multidimensional view of entrepreneurial orientation, we propose that diversity in the metacognitive ability of top teams has different impacts on each dimension of the team's entrepreneurial behavior and through this firm performance. Our empirical analysis, based on data from 105 TMTs of Australian small- and medium-sized enterprises (SMEs), partially supports our theorization. We found that while metacognitive diversity is positively associated with the innovative endeavors of TMTs, it has no significant effects on their risk-taking and proactive behaviors. We found additional evidence that each aspect of the TMT's entrepreneurial orientation has a different implication for firm performance. Overall, our research offers novel and more nuanced insights into how and when diversity in the metacognitive ability of TMTs matters for the performance of the firm.

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1 Introduction

Entrepreneurial orientation (EO) is one of the most important constructs in business and the cornerstone of research on entrepreneurial behaviors exhibited by a firm (van Doorn et al. 2017). It reflects the tendency of a firm's top management to take calculated risks, to be innovative, and to exhibit strategic proactiveness (Covin and Slevin 1989). Empirical research has long focused on the performance implications of entrepreneurial orientation (Baron et al. 2013; Miller 2011; Miller and Le Breton-Miller 2011; Rosenbusch et al. 2013) and highlighted the importance of EO to large and established (Ahuja and Lampert 2001), small and private (Simsek et al. 2010), and even public sector organization (Morris and Jones 1999), but how this orientation develops and is manifested within an organization has received less attention (Wood and Michalisin 2010).

A stream of research seems to have turned to the inhibitors and antecedents of entrepreneurial orientation (e.g., Engelen et al. 2015b). For instance, Ahuja and Lampert (2001) argue that the familiarity trap, favoring the familiar; the maturity trap, favoring the mature; and the propinquity trap, favoring the search for solutions near to existing solutions, inhibit EO.[1] On the other hand, characteristics of executives such as younger age, transformational leadership, social capital (Escribá-Esteve et al. 2009; Cao et al. 2015), and core self-evaluation (Simsek et al. 2010) could facilitate the development of entrepreneurial orientation. More recently characteristics of entrepreneurial teams—teams of top managers that run entrepreneurial firms—have been placed under the research spotlight (Dai et al. 2016; van Doorn et al. 2017). Extending this line of enquiry, this research builds upon upper echelons theory to discuss the importance of the top management team (hereinafter TMT) and its members' various level of cognitive awareness, monitoring, and control known as metacognitive ability for a firm's entrepreneurial orientation and performance.

Upper echelons theory represents a view on and an approach to studying the behavior of a firm through the behavior of its most important people, the TMT (Hambrick and Mason 1984). From this perspective, it has been argued that the cognition, perception, and values of the top managers, as a team, influence their interpretations of the situations they encounter and thus their strategic choices (Hambrick 2007).

Given the ambiguous and complex nature of entrepreneurial activities (Tumasjan and Braun 2012), managers may need to have access to multiple cognitive resources (Olson et al. 2007; Talke et al. 2011). It is their combined cognition that directs the firm's entrepreneurial decision-making processes and actions (West 2007). It seems that upper echelons theory could offer complementary insights into a team's entrepreneurial behavior and endeavors. It is therefore somewhat surprising that the entrepreneurship literature has not yet probed far into the potential implications of the upper echelons view.

With the intention of providing insights into the origins of entrepreneurial orientation from the upper echelons perspective, this study focuses at the team

[1] We thank an anonymous reviewer for this point.

level on a relatively new aspect of managerial cognition known as "metacognition" and examines how this contributes to entrepreneurial orientation and the performance of the firm. Metacognition refers to individuals' knowledge of and control over their own cognitive processes (Baron et al. 2013; Flavell 1979; Nambisan and Baron 2013).

Metacognition differs from cognition in that it describes the higher-order cognitive process through which individuals recognize the multiple ways of framing a problem or decision task and consciously consider the alternatives for addressing a decision task (Haynie and Shepherd 2009; Haynie et al. 2012).

The concept of metacognition appears to be promising as it is an important factor in understanding and performing entrepreneurial tasks (Haynie and Shepherd 2009; Haynie et al. 2012). We thus contend that metacognition is likely to be an antecedent of entrepreneurial orientation.

Entrepreneurial orientation has also been shown to have important performance implications (e.g., Alegre and Chiva 2013; Brouthers et al. 2015; Miller and Le Breton-Miller 2011), so it has the potential to act as a conduit through which the metacognitive diversity of the TMT contributes to firm performance.

To test the proposed model, we focus on the TMTs of small- and medium-sized enterprises (SMEs) in Australia. Using SMEs affords a greater possibility of variance in the exercise of entrepreneurial as well as administrative management styles (Bradley et al. 2011). The small and simpler structure of SMEs also makes the role of the TMT more important than in large firms (Cao et al. 2010; Ling et al. 2008). Therefore, focusing on SMEs allows a more direct setting for testing the study model (Escribá-Esteve et al. 2009) and accordingly provides findings that contribute to both the theory and the practice of small firms.

Small firms form the largest proportion of employing businesses in Australia, and they play an important role in its economy (ABS 2010–2011). Therefore, studying factors involved in the management and performance of SMEs has managerial implications for policymakers in Australia and other developed economies (Rosenbusch et al. 2011). By developing a novel model, this study contributes to both the upper echelons and entrepreneurship literature. It advances knowledge concerning the role of TMTs' metacognitive diversity in firm performance by integrating entrepreneurial orientation as a potential reflection of top managers' metacognitive ability (Baron et al. 2013; Haynie et al. 2012; Nambisan and Baron 2013) and a significant determinant of firm performance (Simsek et al. 2010). Prior entrepreneurship research is skewed markedly toward individual entrepreneurs (e.g., Baron et al. 2013; Mukherji et al. 2011). This study is an attempt to rectify this bias by examining metacognition at the team level and explaining entrepreneurial initiatives from the upper echelons perspective. In this way, this study also contributes to the emerging research on the role of top management teams and particularly their cognition in entrepreneurial behavior of the firm (Birley and Stockley 2017; Dierdorff and Ellington 2012; Miller 2011; van Doorn et al. 2017).

2 Literature Review

2.1 Upper Echelons Theory

Strategic management scholars have long sought to explain why the behavior of firms varies. Over the past few decades, since the influential works of Herbert Simon (1947, 1957), scholars have increasingly paid attention to the cognitive drivers of executives' behavior as a crucial precursor to a firm's strategic behavior (Buyl et al. 2011b; Narayanan et al. 2011). The notion of the managerial cognitive process refers to upper echelons theory—the idea that TMTs' cognitive processes are important in their interpretation of the situation and choice making (Buyl et al. 2011b; Hambrick 2007; Hambrick and Mason 1984). The upper echelons perspective attempts to draw attention to the cognitive attributes of the top managers as a team and their impact on firm operation and performance.

Understanding how executives' cognition influences their administrative behavior could afford worthwhile insights into the human side of strategy and contrast with the deterministic view of strategic management by placing executives' cognitive attributes between the firm and its business ecosystem. Such understanding at the TMT level will enrich the existing upper echelons literature, which asserts that a focus on an entire team of top managers could provide strong explanations of organizational behavior (Hambrick 2007).

2.2 Top Management Teams and Entrepreneurial Teams

Entrepreneurial teams are central to the study of entrepreneurship. As Birley and Stockley (2017) state, an assumption behind this team is that "if the new business is to grow at the desired rate, the entrepreneur is unlikely to be able to manage the process alone—the team must be in place at the start." Despite this assumption, prior research on the impact of team characteristics on entrepreneurial behavior of firms has been scant and fragmented. For instance, studying entrepreneurial teams in family firms, Ensley and Pearson (2005) found that the social system of the family creates a synergy in the top management team (TMT) that is not present in TMTs with less "familiness." Furthermore, Dai et al. (2016) found that transactive memory system of ventures' top management team enhances their tendencies toward entrepreneurial behavior. In addition, Lyngsie and Foss (2017) studied the association between gender diversity in top management teams and entrepreneurial behaviors in established firms. They concluded that the presence of female top managers is positively related to entrepreneurial outcomes in established firms. Yet, this relation is conditional on the proportion between male and female top managers.

In a different study, Cardon et al. (2017) argued that team entrepreneurial passion, defined as "a team-level construct representing the level of shared intense positive feelings for a collective and central team identity for new venture teams" (p. 283) plays a pivotal role in the success of entrepreneurial firms. van Doorn et al. (2017)

addressed entrepreneurial teams' ability to acquire and utilize knowledge. They found that TMT external advice-seeking and TMT absorptive capacity interactively impact the ability of top managers to enhance entrepreneurial orientation when environments are dynamic. Finally, a meta-analysis performed by Jin et al. (2017) suggests that all entrepreneurial team composition characteristics are positively related to new venture performance but differ in strength of effect. This paper adds to and extends this line of inquiry by looking into the mechanisms that link a novel aspect of entrepreneurial teams' cognition known as metacognitive ability to the pursuit of entrepreneurial behaviors.

2.3 From Cognition to Metacognition

Our behavior is the result of the way our brains undertake information processing (Simon 1957). It has been well documented in the fields of psychology (Schroder et al. 1967) and management (McGaffey and Christy 1975; Taylor 1975) that human information processing is far less than perfect due to the brain's limited processing capacity (Simon 1957). Therefore, we tend to employ heuristics or shortcuts in our information processing, which may result in biases (cognitive tilts). These biases prevent us taking optimal action (e.g., making the optimal choice) and achieving desired goals (Baron and Ward 2004). Debate on these biases is lengthy and rich in the psychology, business, and management literature (Barnes 1984; Gilovich et al. 2002; Schwenk 1986; Simon et al. 2000; Tversky and Kahneman 1974). Nonetheless, the question that remains unanswered is how individuals regulate their cognitive limitations to maximize the likelihood of achieving goals. As will be shown below, this question has stimulated research into metacognition.

Armstrong and Hird (2009, p. 421) define cognition as the "activities of thinking, knowing, and processing information." Cognitive psychology conceives cognition in terms of "representational structures in the mind and computational algorithms that operate on those structures" (Thagard 1996, p. 10, cited in Gavetti and Rivkin 2007, p. 437). In management and organization science, a central tenet is that executives are information workers (Carmeli et al. 2012). That is, they spend their time absorbing, processing, and disseminating information about issues, opportunities, and problems (Walsh 1995, p. 280). This tenet has given rise to the cognitive view of executives, also interchangeably referred to as the behavioral view of strategy (Lovallo and Sibony 2010). The cognition of executives, or their information-processing abilities, puts boundaries around a firm's behavior, including the ability to pursue and therefore compete for opportunities (Gavetti 2011).

Cognition goes beyond simple "know-what" and "know-how": It covers rationality, perception, mind-set, mental models, interpretation, emotion, intuition, value judgment, feeling, and morality (Noteboom 2009). The cognition of individuals evolves over time. It is partly inborn, for example, in cognitive styles (Armstrong et al. 2012), and partly constructed by experience along life trajectories (Noteboom 2009). Therefore, different individuals have different cognitive structures in as far as

their life trajectories differ (Noteboom 2009, p. 4). These differences determine different patterns of information processing (Armstrong et al. 2012).

Importantly, the knowledge and experience that an individual has gained over his or her life trajectory influence, to a greater or lesser extent, his or her information processing. This issue has been well documented and studied in the upper echelons literature. For instance, demographic factors as proxies of executives' cognition have been widely studied by scholars (Hambrick 2007). These proxies include age, tenure, level of education, scope of education, such as business-related degree or general degree, job-related and non-related experience, and a variety of industrial experience, among many other factors (Bell et al. 2011).

Despite the extensive research, the issue of how executives monitor and control their use of knowledge and experience in the processing of information is still unclear. This issue is significant, in particular, for the upper echelons perspective. Executives have discretion and make choices based on their free will (Child 1997); they apply their knowledge and experience based on their personal discretion. The ability of executives to apply knowledge and experience is limited (Walsh 1995), and thus there are situations in which executives must make choices for which they do not have the requisite knowledge or experience, or at best have only partial knowledge and experience. (Perfect and Schwartz 2004). Metacognitive abilities come to help under such circumstances.

Metacognition is defined as one's knowledge and experience of one's own cognitive processes (Flavell 1979), i.e., knowledge and experience concerning anything cognitive. However, it can reasonably be broadened to include anything psychological, such as knowledge and experience of emotions and motives (Flavell 1987, p. 22). It must be distinguished from cognition as it is a more abstract level of cognitive activity (Flavell 1979).

More precisely, metacognition is a higher-level heuristic applied by individuals to process information about their environment (Kozhevnikov 2007). Contemporary research in metacognition has two parallel roots: cognitive psychology of the 1960s (e.g., Hart 1965) and post-Piagetian developmental psychology of the 1970s (e.g., Flavell 1979; Perfect and Schwartz 2004, p. 2). The essence of this stream of research is that individuals can develop cognitive mechanisms over their cognitive functioning (i.e., information processing) in the form of self-controlling and self-monitoring abilities (Kholodnaya 2002).

The significance of this higher-level mechanism is that it gives individuals cognitive flexibility (Kozhevnikov 2007). This flexibility refers to the conscious allocation of cognitive resources (i.e., knowledge and experience). Put simply, metacognitive ability enables individuals to control, monitor, and regulate their use of knowledge consciously (Kholodnaya 2002).

Metacognition is believed to influence numerous daily behaviors of individuals (Baron 2007; Nambisan and Baron 2013) because it mediates the relationship between an individual and his or her environment (Kozhevnikov 2007, p. 477). More recently, metacognitive ability has been shown to be important in both entrepreneurs' and managers' decisions and actions (Baron et al. 2013; Cho and Jung 2014; Haynie et al. 2012; Mitchell et al. 2011; Mueller et al. 2015). It is an important cognitive resource and is useful in understanding a wide range of tasks and situations, particularly uncertain and dynamic ones (Baron and Henry 2010).

Metacognitive ability is specifically important in understanding and interpreting entrepreneurial tasks (Haynie et al. 2010; Shepherd et al. 2015). More importantly, the dynamic and uncertain nature of entrepreneurial tasks requires managers to have access to different ideas and perspectives (Talke et al. 2011), and this could arise from their diverse metacognitive abilities. Entrepreneurial orientation could thus reflect top managers' metacognitive abilities, which in turn has performance implications.

2.4 Entrepreneurial Orientation: Multidimensional vs. Unidimensional Perspective

Entrepreneurial orientation has been widely acknowledged to be an important capability composed of three main components—innovativeness, risk-taking, and proactiveness—shaped by the executive team of the firm (e.g., Green et al. 2008; Li et al. 2009; Lomberg et al. 2016). While some scholars have considered entrepreneurial orientation to be a unidimensional construct and have assumed that its three main components can be integrated to assess the firm's entrepreneurial orientation (e.g., Alegre and Chiva 2013; Brettel and Rottenberger 2013), a few authors have advocated the multidimensional view and have suggested that, although related, these dimensions should be treated separately (e.g., Baron et al. 2013; Kollmann and Stöckmann 2014; Kreiser et al. 2013).

However, recently a trend that has been gaining momentum is the suggestion that these three aspects are not highly correlated and thus cannot always act jointly to determine whether a firm acts entrepreneurially or not (Miller 2011). Therefore, their respective impact on the firm's performance should be assessed separately rather than jointly. The contention of this strand is that a multidimensional and disaggregated assessment of entrepreneurial orientation leads to a more complete and parsimonious view of how a firm acts entrepreneurially and how each dimension of this behavior influences the performance of the firm. George (2011) and George and Marino (2011) have further enriched this debate by arguing that research on entrepreneurial orientation can advance by considering it as a reflective three-dimensional construct, represented by three different sub-constructs that can vary or covary independently.

Although both approaches are indisputably legitimate (Lomberg et al. 2016), the multidimensional view has been argued to be more informative because it investigates the drivers and consequences of each dimension of entrepreneurial orientation independently (Baron et al. 2013; Kollmann and Stöckmann 2014; Miller 2011). In keeping with this logic, this study draws on the multidimensional view and examines how the metacognitive diversity of TMTs affects each component of the teams' entrepreneurial orientation.

Given the above overview of key constructs, the conceptual model presented in Fig. 1 illustrates the relationships between diversity in TMTs' metacognitive ability, certain entrepreneurial orientation components (innovativeness, risk-taking, and proactiveness), and firm performance.

This conceptual framework illustrates the study's attempt to bring together the upper echelons perspective and the entrepreneurship literature in arguing the

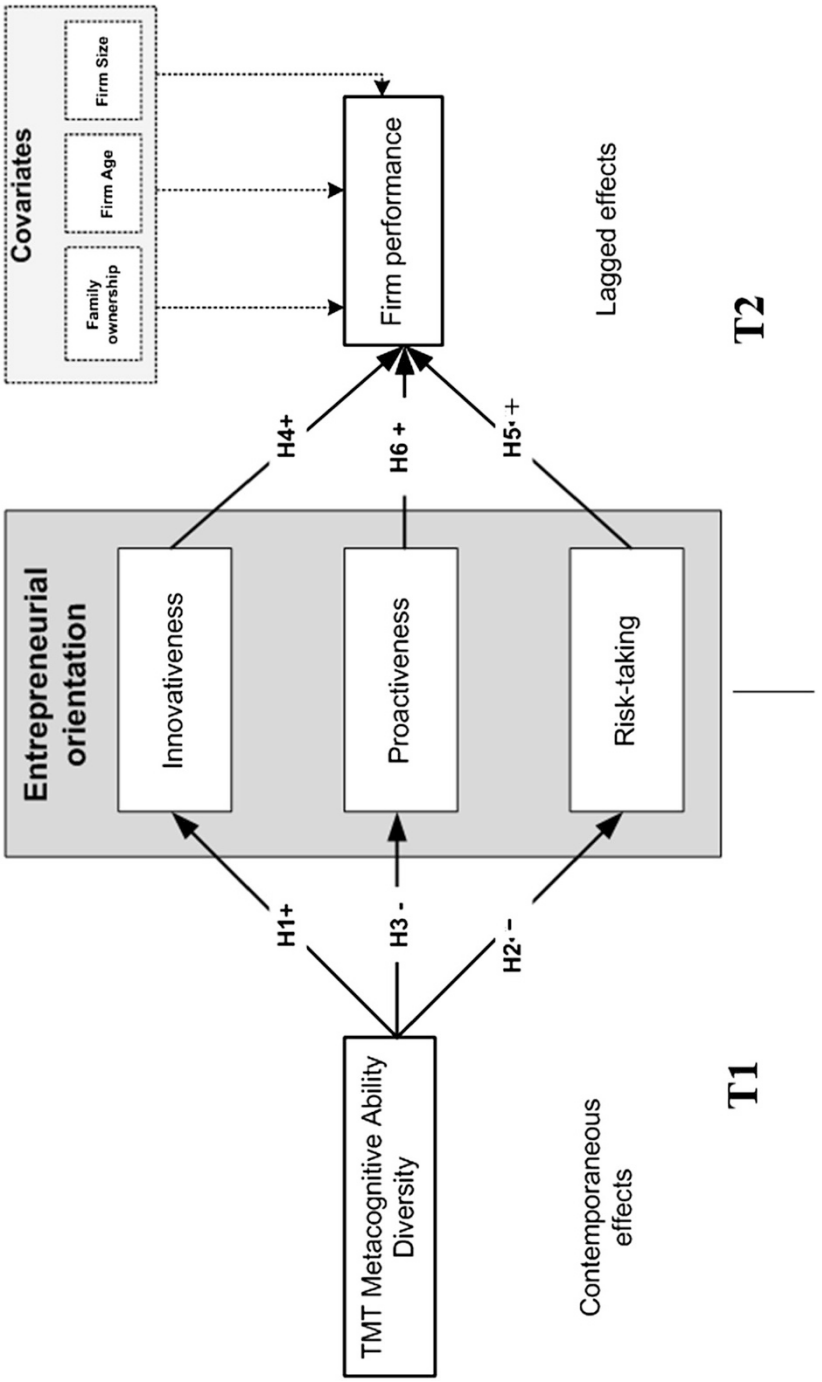

Fig. 1 Conceptual framework of the study (Authors' own figure)

importance of teams and their behavior for a firm's entrepreneurial performance. Given the importance of entrepreneurial behavior and activities for a firm's survival and success, this study provides new insights by focusing on the metacognition and behavior of the people who are the main directors of a firm's entrepreneurial activities and performance (Eisenhardt 2013).

3 Development of Hypotheses

Six hypotheses are presented below to describe the relationships between diversity in TMTs' metacognitive ability, entrepreneurial orientation, and firm performance.

3.1 Metacognitive Diversity and Entrepreneurial Orientation

Diversity is generally assumed to improve performance because it ensures that a TMT has a broader range of experiences and capabilities (Eesley et al. 2014). Such beneficial effects, however, may depend on the type of diversity, for instance, whether it is task-oriented or not (e.g., Talke et al. 2010). Metacognitive ability relates to a person's understanding of his/her own cognitive strengths and weaknesses (Nambisan and Baron 2013). It has been argued to be beneficial in a wide range of activities of an individual (Baron 2007) and in a wide range of contexts (Nambisan and Baron 2013). Metacognitive ability can help individuals understand and assess their own actions, based on their knowledge of themselves and their environment (Haynie and Shepherd 2009), and can be useful for informing, selecting, and generating decision frameworks for tasks (Cho and Jung 2014; Haynie and Shepherd 2009; Mitchell et al. 2011). We suggest that differences in metacognitive ability could have important implications for a TMT's entrepreneurial orientation because it depends on the team having the cognitive wherewithal to recognize and understand potential entrepreneurial opportunities (Heavey and Simsek 2013).

3.2 TMTs' Metacognitive Diversity and Innovativeness

Innovativeness is a firm's tendency to embrace new ideas and introduce new product offerings (Baker and Sinkula 2009; Kreiser 2011; Wales et al. 2013). Diversity, in general, has been considered to be an important driver of organizational innovation (Qian et al. 2013). Research on the impact of TMTs' diversity on innovativeness has mostly reported a positive association (Wei and Lau 2012). This is because diversity brings different and new perspectives and therefore stimulates novel and exploratory ideas (Alexiev et al. 2010), making the adoption of different techniques more likely and resulting in product and administrative innovations (Wei and Lau 2012).

Diversity in a TMT's metacognitive ability could provide the team with multiple decision frameworks for performing different innovative tasks (Kuratko 2016). Such differences stem, to some extent, from individual top managers focusing on meeting the goals and expectations required by their firms (Nambisan and Baron 2013). Given that being inclined toward ideals and aspirations rather than tasks and responsibilities could be advantageous in finding innovative solutions to business problems (Tumasjan and Braun 2012), different levels of focus on the task may provide the team with opportunities to find innovative and creative ideas and solutions. Specifically, it has been suggested that metacognitive ability is important for the recognition and interpretation of innovative opportunities (Baron et al. 2013; Grégoire et al. 2011; Nambisan and Baron 2013).

Baron et al. (2013) found that metacognitive knowledge could make individual entrepreneurs more confident in pursuing innovative activities. Likewise, Nambisan and Baron (2013) suggested that entrepreneurs' metacognitive ability is important in identifying opportunities for innovation and growth. Moving from individuals to a team of top managers, there would be different interpretations and evaluations of innovative opportunities. Such diversity could enhance the range of information that can be accessed by the team, and in turn facilitate innovation through criticism and agreement (Chiu and Pawlikowski 2013). The consideration of multiple alternatives offers the team increased confidence in going forward (Heavey and Simsek 2013) and acting upon their different interpretations and evaluations of innovative opportunities. Therefore, we posit that:

Hypothesis 1 Diversity in a top management team's metacognitive ability has a positive impact on the team's innovative behavior.

3.3 TMTs' Metacognitive Diversity and Risk-Taking

Risk-taking is a firm's wish to embrace uncertainty and risky activities (Grande et al. 2011) to take on high-risk projects (Baron et al. 2013; Wales et al. 2013). It requires managers to have a tolerance of risk and the potential for mistakes (Garrett et al. 2009; Wang 2008). As risk-taking may produce uncertain outcomes, managers should be willing to deal with ambiguity in strategic situations (Kreiser et al. 2010). They need to simplify their information processing to lessen the ambiguity and stress associated with risky decisions (Simon et al. 2000). Given that risk-taking activities are particularly critical for SMEs, which do not hold the resources to absorb potential losses (Rosenbusch et al. 2013), these firms' managers are especially required to manage risk very carefully to protect their limited resources (Zhao et al. 2010). For these managers, risk may reflect the possibility of failure (Kreiser et al. 2013; Lechner and Gudmundsson 2014), and thus they are more likely to evaluate triggering issues negatively (Plambeck 2012).

Metacognitive ability enhances managers' interpretation of entrepreneurial tasks (Haynie et al. 2010). Diverse metacognitive abilities provide the team with different

understandings of the environment and have an impact on their ability to adapt to uncertainty. Therefore, managers will probably have diverse views on the potential impact of risk and whether the firm should accept or reject it. However, as they are more concerned with the outcome (Plambeck 2012), there could be a high chance that their different views and understandings will trigger negative evaluation in the team. Therefore, we posit that:

Hypothesis 2 Diversity in a top management team's metacognitive ability has a negative impact on the risk-taking behavior of the team.

3.4 TMTs' Metacognitive Diversity and Proactiveness

Proactiveness is a firm's capacity to discover and seize opportunities (Lumpkin et al. 2010) in order to initiate new offerings ahead of its competitors (Wales et al. 2013). Proactiveness implies a forward-looking perspective to predict opportunities (Grande et al. 2011) and to act in anticipation of emerging demand (Kreiser 2011; Lumpkin et al. 2010) to pursue market opportunities before the firm's competitors (Baker and Sinkula 2009). It has been suggested that metacognitive ability is important in adapting to novel and new situations (Haynie and Shepherd 2009; Nambisan and Baron 2013). Initiating competitive actions in novel situations is an area in which metacognitive ability could have important implications (Baron et al. 2013; Nambisan and Baron 2013). Different metacognitive abilities will give rise to different assessments of the investment required to seize market opportunities and initiate competitive actions. Different assessments could provide a TMT with a broader view of the issues; however, at the same time, this may engender slowness in its decision-making process (Hambrick et al. 1996). In terms of time, this may impede the team from acting on opportunities faster than the firm's competitors. Accordingly, we posit that:

Hypothesis 3 Diversity in a top management team's metacognitive ability has a negative impact on the team's proactive behavior.

3.5 Dimensions of Entrepreneurial Orientation and Firm Performance

Entrepreneurial orientation has been shown to have important performance implications (Lomberg et al. 2016). It has been argued that entrepreneurially oriented firms, or in other words firms that are innovative, risk-taking, and proactive, generally outperform firms that are not (Anderson and Eshima 2013; Anderson et al. 2009). The level of a firm's entrepreneurial orientation is related to its ability to compete and perform effectively (Simsek et al. 2010). This is particularly true for SMEs,

whose survival depends on their ability to pursue entrepreneurial activities (Real et al. 2014). The next section describes the potential effects of each individual component of entrepreneurial orientation on the performance of an SME.

3.6 Innovativeness and Performance

It has been argued that innovativeness enables a firm to capture market share, to increase its return on investment (Çakar and Ertürk 2010), and to promote its rate of growth (Casillas and Moreno 2010). A proclivity toward innovation could enhance employee satisfaction (Rosenbusch et al. 2011). It could make employees more committed and devoted to the firm (De Clercq and Belausteguigoitia Rius 2007). It has been argued that such commitment and effort are beneficial for SMEs (Ling et al. 2008). Furthermore, to perform better, SMEs need to obtain information about customers and competitors to develop competitive marketing strategies (Keh et al. 2007). As innovativeness places an emphasis on responding to customer needs through research and product development (Li et al. 2008), it enables SMEs to develop specialized and innovative offerings and subsequently refrain from price competition, create new demand, and consequently promote growth (Moreno and Casillas 2008; Rosenbusch et al. 2011).

Adopting entrepreneurial activities and attitudes in general and an innovative proclivity in particular may be a useful way of allocating resources and more importantly may be an effective response to the liabilities associated with the small size of an SME (Grande et al. 2011; Rosenbusch et al. 2011). This could help SMEs to allocate their resources where they can create more value (Rosenbusch et al. 2011). Given that the success of SMEs depends mainly on their ability to develop new products and services (Zahra et al. 2007), this study posits that SMEs will benefit from willingness and efforts to develop innovative offerings. Therefore:

Hypothesis 4 The top management team's innovativeness has a positive impact on the performance of an SME.

3.7 Risk-Taking and Performance

Risk-taking indicates a firm's ability to commit resources to projects, the outcomes of which are uncertain (Kreiser 2011; Wiklund and Shepherd 2005). It therefore means a greater likelihood of gains as well as losses (Grande et al. 2011). Risk-taking is, hence, a double-edged sword (Lechner and Gudmundsson 2014). Specifically, risk-taking behavior does not appear to be worthwhile for small firms (Kreiser et al. 2013). Owing to their size and accordingly limited resources, such firms are less likely to assume risk than their large counterparts (Real et al. 2014). Their scarce resources might hinder their entrepreneurial process and probability of success

(Grande et al. 2011). Thus, in line with earlier works (e.g., Kollmann and Stöckmann 2014; Kreiser et al. 2013; Lechner and Gudmundsson 2014), we assume that SMEs may not reap benefits from pursuing risky initiatives and it is likely that these initiatives diminish their performance; thus:

Hypothesis 5 The top management team's risk-taking behavior has a negative impact on the performance of an SME.

3.8 Proactiveness and Performance

Today's business environment is driven by increasingly rapid change (Lyon et al. 2000) and short product and market life cycles (Hamel 2000). Future profits based on current production may not be certain, and thus firms continuously need to explore new opportunities (Grande et al. 2011). Under such circumstances, proactive firms are expected to identify more resources and opportunities (Tang et al. 2010), to capitalize on them, and subsequently to respond to environmental changes earlier than their competitors (Wiklund and Shepherd 2003).

As noted earlier, proactiveness implies a perspective that looks for opportunities, to anticipate prospective demand before competitors (Kollmann and Stöckmann 2014; Kreiser 2011). Proactive firms have more capacity than other firms to collect information regarding resources and opportunities (Tang et al. 2010) and make use of information (Keh et al. 2007; Tang et al. 2010) to act faster (Lumpkin et al. 2010) in competitive environments. Such quickness allows firms to be first movers, and they are rewarded by superior competitive positions in the marketplace (Li et al. 2009). Taken together, it has been argued that proactiveness benefits firms (Lumpkin et al. 2010), for example, by promoting their rate of growth (Casillas and Moreno 2010). We posit that such beneficial effects also apply to SMEs. A proactive top management team enables a SME not only to identify opportunities and resources within an industry (Tang et al. 2010) but also to respond effectively to environmental conditions (Escribá-Esteve et al. 2009). In summary:

Hypothesis 6 The top management team's proactive behavior has a positive impact on the performance of an SME.

4 Research Design and Methods

4.1 Sample and Data Collection

We collected a list of 1500 Australian SMEs and their individual contacts from Dun and Bradstreet. Then a package containing a questionnaire, an informed consent letter, and a postage-paid return envelope was addressed directly to the managing director or director of each firm (data provided by Dun and Bradstreet). As there is a

lack of information on the TMTs of small firms, we adopted the approach used in previous research (e.g., Buyl et al. 2011b; Carmeli et al. 2012; Simsek and Heavey 2011) which uses the chief executive officers (CEOs) as the most knowledgeable persons in the firm about their fellow top managers. Accordingly, CEOs were provided with the definition of the TMT as "those organizational members who make or are involved with decisions affecting the company's strategy" (Cao et al. 2010, p. 1280). They were then asked to distribute the questionnaires to their team members. To ensure confidentiality and anonymity, postage-paid return envelopes were provided for team members (Ling and Kellermanns 2010), and thus the responses were sent back directly without CEO oversight (Simsek and Heavey 2011). We also coded firms, envelopes, and questionnaires to avoid any possible mismatch (Simsek et al. 2005).

We only included firms whose entire team completed the questionnaire. In total, data from 140 out of 1500 SMEs were used in analysis. The respondents comprised the CEOs of 140 firms and 371 TMT members. These 140 firms were contacted again 1 year after the initial survey to collect lagged performance data. After two reminders, 105 firms (321 TMT members) provided complete workable questionnaires. Thus, the overall firm-level response rate was almost 7%, which is comparable to other TMT research in which a mail survey was used (e.g., Alexiev et al. 2010; Olson et al. 2007). Upper echelons research has mainly been based on small samples (Nielsen 2010; van Knippenberg et al. 2011). Moreover, for studies such as this, investigating complex interactional relationships, case selection bias is not likely to be a threat (Buyl et al. 2011a, b; Simons et al. 1999). Furthermore, the results of the Heckman procedure (Heckman 1979; Puhani 2000) and two ad hoc t-tests between early and late responders ruled out both selection and response bias.

Finally, we investigated the potential effects of the sampling method on the data by comparing the late responders and nonresponding firms with the early responders (Armstrong and Overton 1977). To do this, early responders were coded 1 ("wave one"), late responders 2 ("wave two"), and nonresponding firms 0. Then, following Simsek and Heavey (2011), a two-sample Kolmogorov-Smirnov (K-S) test was performed to examine the differences between early and late responders in terms of firm age, firm size, and firm performance. Similarly, the size and age of early responders were compared with those of nonresponding firms. The results revealed no statistically significant difference between these subsamples (asymptotic significance >0.05), suggesting that the sampling method generated no bias in our data.

4.2 Measures

To measure the variables, we used previously validated measures. All the measures are provided in Appendix.

4.2.1 Independent Variables: Diversity in TMTs' Metacognitive Ability

To measure the diversity in TMTs' metacognitive ability, we first measured the metacognitive ability of each TMT and then computed the level of diversity in this factor. A TMT's metacognitive ability is composed of two dimensions: metacognitive knowledge and metacognitive experience (Haynie and Shepherd 2009). To measure metacognitive knowledge, we asked the top managers (including the CEOs) to respond to the 11 items developed and validated by Haynie and Shepherd (2009). This measure uses a seven-point Likert scale ranging from "strongly disagree" to "strongly agree." A sample item is "I think of several ways to solve a problem and choose the best one." The reliability of this measure was high (0.726), consistent with recent studies (e.g., 0.834 in Haynie et al. 2012).

To measure the second dimension of the diversity of TMTs' metacognitive ability—their metacognitive experience—we also used the scale developed by Haynie and Shepherd (2009). This scale is composed of eight items, each assessed on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree." A sample item is "I use different strategies depending on the situation." Our analysis revealed the reliability of this measure (0.718), consistent with prior studies (e.g., 0.74 in Mitchell et al. 2011 and 0.77 in Haynie et al. 2012). To measure the TMTs' overall metacognitive diversity, we adopted the method used by Biemann and Kearney (2010), pooling all the items for metacognitive knowledge and metacognitive experience (19 items in total), and computing the bias-corrected coefficient of variation (Biemann and Kearney 2010) for each item. We then calculated a composite scale using the average of these variations as the indicator of a TMT's overall metacognitive diversity.

4.2.2 Intervening Variable: TMTs' Entrepreneurial Orientation

To measure innovativeness, risk-taking, and proactiveness, this study used the nine-item, semantic differential scale developed by Covin and Slevin (1989). The nine items consist of three items developed to evaluate the innovation dimension (a sample item being "How many new lines of products or services has your firm marketed during the past 3 years? No new lines of product or services vs. very many new lines of products or services"), three items measuring proactiveness (a sample item being "In dealing with its competitors, my firm typically responds to actions which competitors initiate or typically initiates actions to which competitors then respond"), and three items measuring risk-taking (a sample item being "In general, the top managers of my firm have a strong proclivity for low-risk projects [with normal and certain rates of return] vs. a strong proclivity for high-risk projects [with chances of very high returns]").

Each item is measured on a seven-point semantic differential scale with a neutral midpoint (Stam and Elfring 2008). The reliability of the measure composed of all nine items was 0.87. Tang et al. (2010) used deconstructed measures for each dimension of entrepreneurial orientation and reported reliability values of $\alpha = 0.65$ for

proactiveness, $\alpha = 0.78$ for innovativeness, and $\alpha = 0.78$ for risk-taking. Consistent with our hypotheses, we also deconstructed the entrepreneurial orientation measure and achieved similar high reliabilities for proactiveness (0.75), innovativeness (0.71), and risk-taking (0.73). Then, data were aggregated for each firm. This technique minimizes common method bias and thus generates more reliable data (Escribá-Esteve et al. 2009). It is also useful for obtaining additional insights into the level of agreement between a firm's top managers on the firm's entrepreneurial orientation (Miller 2011).

4.2.3 Dependent Variable: Firm Performance

Performance was measured using nine financial, marketing, and operational indicators adopted from the study of Li and Atuahene-Gima (2001). It has been argued that a combination of financial and nonfinancial measures provides a more comprehensive assessment of firm performance (Li et al. 2009). Executives in top management teams were asked to rate their firm's performance on a five-point scale (much worse to much better) relative to their main competitors over the last 3 years. A sample item is "My firm's return on investment over the last 3 years has been. . .." This measure has a reliability of 0.88 (Li and Atuahene-Gima 2001). The study of De Clercq et al. (2010) reported a reliability of 0.92. As for entrepreneurial orientation, we aggregated individual responses to these items to obtain the team-level responses.

4.2.4 Control Variables

To address interpretational confounds, firm age and size were controlled as it has been argued that they influence firm performance (e.g., De Clercq et al. 2010; Su et al. 2011). It has also been contended that family ownership influences entrepreneurial orientation (e.g., Simsek et al. 2010). Accordingly, family ownership was controlled and assessed by asking the CEOs to indicate whether their firms were family-owned (Simsek et al. 2010).

4.3 Level of Analysis: Aggregation Method

As a multiple-informant method is more reliable and more likely to yield deeper understanding than a single-respondent technique (Carmeli et al. 2011; Carmeli et al. 2012; Wei and Lau 2012), the responses of individual managers on entrepreneurial orientation and firm performance were aggregated at the team level. The size of the TMTs varied between two and five members, and on average three managers from each TMT participated in the survey. Before aggregating these responses in the teams, we checked the individual responses to ensure that this aggregation was justified (Clark and Maggitti 2012).

First, a one-way analysis of variance (ANOVA) was conducted to check the consistency of the team members' responses. This test determines the variability in

Table 1 Aggregation statistics (Generated by the authors using SPSS 20)

Variable	ICC (1)	ICC (2)	Average Rwg	Size of TMTs (range)	Mode of raters
Entrepreneurial orientation					
Innovativeness	0.45	0.89	0.73	2–5	3
Risk-taking	0.44	0.93	0.77	2–5	3
Proactiveness	0.47	0.92	0.82	2–5	3
Firm performance	0.55	0.91	0.83	2–5	3

the ratings between teams and within teams. A significant F-test (P-value <0.05) showed greater variability in the ratings between teams than within teams (Carmeli et al. 2011; Ling et al. 2008). Three aggregation indices, the within-group inter-rater agreement (Rwg) (James et al. 1984) and two types of intra-class correlation coefficients (ICC (1) and ICC (2)), were then calculated (Clark and Maggitti 2012; Wei and Wu 2013) to examine whether aggregation could be performed. Rwg ranges from 0 to 1 and indicates the proportional reduction in error variance caused by the nonrandom responding of participants (James et al. 1984).

Research suggests a value of 0.7 as the cutoff for this index, while values between 0.71 and 0.9 indicate strong agreement between respondents (LeBreton and Senter 2007). Our analysis shows that all constructs are consistently measured, with strong agreement between the TMT members (Table 1).

In addition, ICC (1) informs a "researcher as to whether judges' [participants'] ratings are affected by group membership, whereas the ICC (2) tells him or her how reliably the mean rating (taken over judges) distinguishes between groups" (LeBreton and Senter 2007, p. 834). For ICC (1), values of 0.25 and higher indicate a large effect size (van Mierlo et al. 2009). It should be noted that our analysis revealed an unusually high effect size (ICC (1) $>$ 0.4), which even though not a threat to our analysis, prompts investigations. We realized that this could have been caused by the presence of both very high inter-rater reliability and very high inter-rater agreement (LeBreton and Senter 2007, p. 838) among the members of the relatively small TMTs in our sample. Finally, for ICC (2), a traditional reliability cutoff value of 0.7 is suggested (LeBreton and Senter 2007). Our analysis also exhibited a high ICC (2) for our constructs. All in all, the results of these tests, shown in Table 1, legitimized the aggregation process.

We used the aggregation function of SPSS™ 21.0 to generate a new data file containing team-level data for hypothesis testing.

5 Results

5.1 Validity and Reliability

Descriptive statistics including inter-construct correlations are shown in Table 2. As can be seen, no correlation is above 0.7, suggesting a lack of collinearity and

Table 2 Inter-construct correlations (Generated by the authors using SmartPLS 3.0)

Construct	Mean	SD	1	2	3	4	5	6	7
Firm age	15	5.7	–						
Firm size	56.1	21.8	0.57**	–					
Family ownership	–	–	0.68**	0.53**	–				
Firm performance	3.7	2.9	0.067	0.13	0.07	–			
TMT's innovativeness	–	–	0.33*	0.15	0.38*	0.30*	–		
TMT's proactiveness	–	–	0.60**	0.64**	0.69**	0.11	0.23*	–	
TMT's risk-taking	–	–	−0.16	−0.01	−0.07	0.33*	0.04	0.09	–
TMT metacognitive ability diversity	–	–	0.09	0.09	0.14	0.55**	0.36*	0.13	0.10

$N = 105$, **denotes significance at 0.01 and *denotes significance at 0.05

providing initial evidence of convergent and discriminant validity (Hair et al. 2014b). Building on this evidence, reliability and convergent and discriminant validity were assessed more closely by calculating the composite reliability (CR), average variance extracted (AVE), maximum shared squared variance (MSV), and average shared squared variance (ASV). According to Hair et al. (2010), a value for CR above 0.8 indicates a reliable measure. Furthermore, if CR > AVE and AVE > 0.5, convergent validity is established, and if MSV < AVE and ASV < AVE, discriminant validity is achieved. The results reveal that these criteria are satisfied in this research.

Furthermore, the average age of executives in the dataset was 44 years with a minimum of 41 and maximum of 52 years. The average tenure of executives was 10 years with a minimum of 8 and maximum of 13. The average experience of executives was 15 years with a minimum of 13 and maximum of 18. Also, all executives were male. These statistics indicate sufficient variation and heterogeneity in our sample and point to the absence of sample section bias in our data.[2]

5.2 Choice of Analytic Method

To test the hypotheses, we used Partial Least Squares Structural Equation Modeling (PLS-SEM) (Hair et al. 2014a, b). PLS-SEM is a variance-based (VB-SEM) approach which is preferred over the traditional covariance-based SEM (CB-SEM) when the sample size is relatively small and the model contains both latent and second-order constructs (see Sarstedt et al. 2016; Rigdon 2016 for a detailed discussion on the choice between VB-SEM and CB-SEM). Since our model is

[2]We thank an anonymous reviewer for asking us to present these statistics.

Table 3 Results of PLS path analysis (Generated by the authors using SmartPLS 3.0)

Path	*B*	Standard error	*T* statistics	*P*
Research hypotheses				
H 1: TMT metacognitive ability diversity → TMT innovativeness	0.36	0.10	3.81	0.00
H 2: TMT metacognitive ability diversity → TMT risk-taking	0.10	0.10	1.00	0.32
H 3: TMT metacognitive ability diversity → TMT proactiveness	0.13	0.11	1.20	0.23
H 4: TMT's innovativeness → firm performance	0.30	0.10	3.11	0.00
H 5: TMT's risk-taking → firm performance	0.33	0.08	4.07	0.00
H 6: TMT's proactiveness → firm performance	−0.05	0.16	0.34	0.73
Covariates				
Firm age → firm performance	−0.00	0.14	0.01	0.99
Firm size → firm performance	0.21	0.13	1.61	0.11
Family ownership → firm performance	−0.10	0.17	0.58	0.56

composed of latent constructs (i.e., EO and FP) and measured (non-latent) (i.e., metacognitive diversities in TMT), and our sample is small for a CB-SEM, PLS-SEM is deemed more suitable than VB-SEM for our analysis.

5.3 Hypothesis Testing

The results are illustrated in Table 3 and suggest that our proposed model receives partial empirical support. More specifically, the first hypothesis predicted a positive association between the extent of diversity in the metacognitive ability of the members of a TMT and the team's overall innovativeness. Our analysis supported this prediction ($\beta = 0.361$, $P = 0.000 < 0.01$). The second hypothesis proposed that diversity in the metacognitive ability of a TMT has a negative impact on the team's overall risk-taking behavior. Our analysis does not support this hypothesis ($\beta = 0.103$, $P = 0.316 > 0.05$).

Hypothesis 3 predicted that diversity in a TMT's metacognitive ability influences the team's overall proactiveness. In this hypothesis, we predicted a significantly negative relationship between these factors. The results did not support this prediction. In fact, our analysis revealed a positive but insignificant ($\beta = 0.129$, $P = 0.231$) association between these factors, suggesting that diversity in a TMT's metacognitive ability does not have any bearing on the team's overall proactiveness.

Having examined the implications of the diversity of a TMT's metacognitive ability in relation to the three dimensions of entrepreneurial orientation, the next three hypotheses proposed how these three distinct aspects of entrepreneurial orientation influence performance. In hypothesis 4, we predicted a positive and significant relationship between the innovativeness of a TMT and the performance of the firm.

Our empirical test shows a positive and significant ($\beta = 0.304$, $P = 0.002 < 0.01$) association between these two constructs, supporting this hypothesis. In the fifth hypothesis, we predicted that a TMT's risk-taking tendency could have detrimental effects on firm performance. The results did not support this prediction ($\beta = 0.333$, $P = 0.000 < 0.01$), suggesting that a firm with a more risk-taking TMT is in fact more likely to experience superior performance. In the last hypothesis, we stated that a TMT's proclivity to be proactive would enhance firm performance. However, our empirical test did not support this statement. On the contrary, we found that the proactiveness of a TMT does not have any significant impact on the performance of the firm.

Regarding the covariates, we found that none of the variables firm age, firm size, or type of ownership significantly influence the performance of the firms in our sample. This observation suggests that the dimensions of the entrepreneurial orientation of a firm's TMT are more important than ecological factors in predicting the success of the firm. In addition, our findings point to a novel factor (the diversity of the TMT's metacognitive ability) that could explain why different TMTs exhibit different entrepreneurial proclivities and hence have different effects on firm performance (Fig. 2).

5.4 Robustness Checks

5.4.1 Bias-Corrected Confidence Intervals

In PLS path modeling, the significance of effects is assessed by confidence interval percentiles derived from a bootstrapping procedure (Hair et al. 2014a, b). This approach is superior to the traditional analysis of confidence intervals, particularly when the sample is small ($N < 400$), and the distributions of the variables are likely to be skewed and leptokurtic (Efron and Tibshirani 1986). Therefore, in addition to the commonly used bootstrapping approach in PLS path analysis (Hair et al. 2014a, b), we adopted the bias-corrected confidence interval technique proposed by Hair et al. (2014a, b). The results of this test, depicted in Table 4, suggest that the bias inherent in bootstrapping for small samples is negligible (less than 0.1%) and does not affect the validity of our results (DiCiccio and Efron 1996).

5.4.2 Detecting and Dealing with Common Method Bias

We took several steps to minimize common method bias. First, in a manner consistent with other studies (e.g., Carmeli et al. 2012; Wei and Lau 2012), we collected data from multiple respondents. Second, following Clark and Maggitti (2012) and Brettel and Rottenberger (2013), we not only used scales that had been pre-validated by recent studies, but we also pretested the questionnaire to ensure that the questions were not complicated or ambiguous. Third, to reduce the possibility

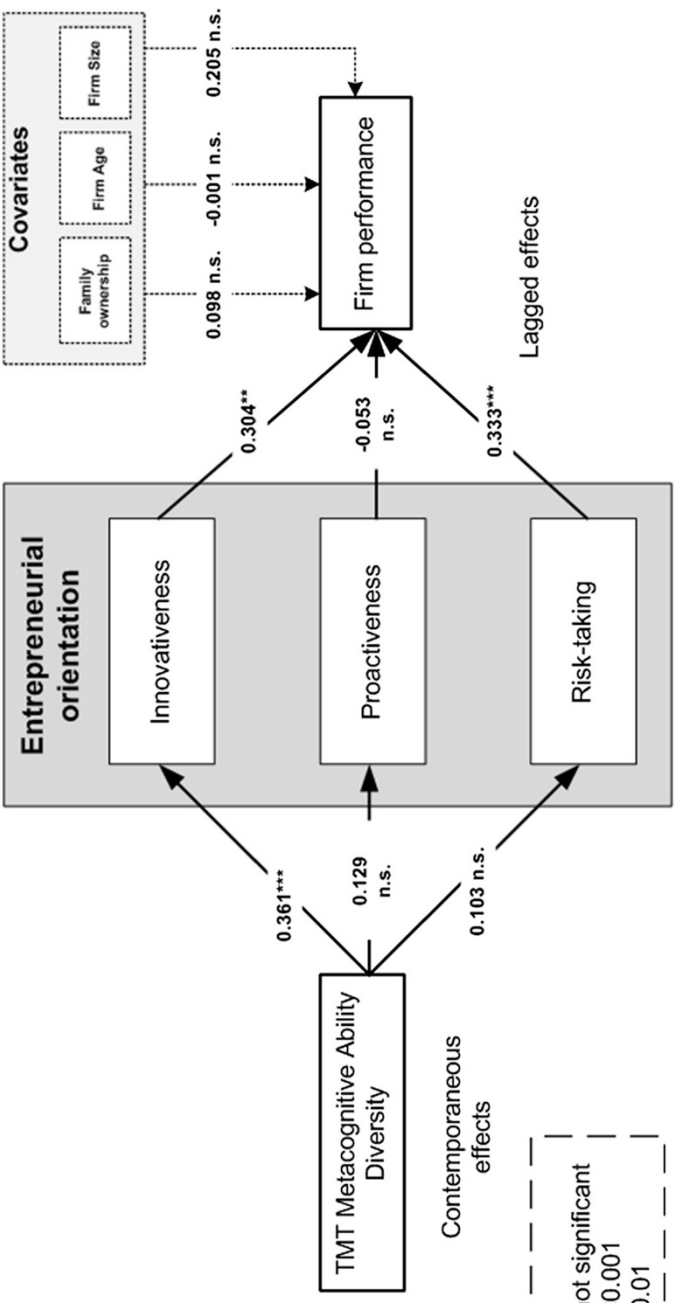

Fig. 2 Results of hypotheses testing (Authors' own figure)

Table 4 Results of bias-corrected confidence interval test (Generated by the authors using SmartPLS 3.0)

Bias-corrected confidence intervals	Original sample	Sample mean	Bias	2.5%	97.5%
TMT's innovativeness → firm performance	0.30	0.30	−0.00	0.10	0.48
TMT's risk-taking → firm performance	0.33	0.33	−0.00	0.14	0.48
TMT's proactiveness → firm performance	−0.05	−0.05	0.01	−0.36	0.24
TMT metacognitive ability diversity → TMT innovativeness	0.36	0.36	−0.00	0.16	0.53
TMT metacognitive ability diversity → TMT risk-taking	0.10	0.11	0.01	−0.09	0.32
TMT metacognitive ability diversity → TMT proactiveness	0.13	0.13	0.00	−0.08	0.35
Firm age → firm performance	−0.00	−0.01	−0.01	−0.30	0.23
Firm size → firm performance	0.21	0.20	−0.00	−0.03	0.46
Family ownership → firm performance	−0.10	−0.09	0.01	−0.40	0.26

that the respondents would fall into a pattern related to the use of repetitive Likert scales, such items were interspersed with different types of question (Clark and Maggitti 2012, p. 1179).

Finally, following the recommendations of Podsakoff et al. (2003), the survey was anonymous to minimize apprehension and to make respondents less likely to answer in a way they thought was socially desirable (Clark and Maggitti 2012). In addition, to detect the possible effects of common method bias on the results, we performed Harman's single-factor test (Alexiev et al. 2010; Clark and Maggitti 2012; Sciascia et al. 2013) and found that a single factor explained 27% of the variance in the model. As this value is less than 50%, we conclude that common method bias is not a threat to the validity of our results (Podsakoff et al. 2003).

6 Discussion and Implications

This study connects the entrepreneurship literature with the notion of upper echelons theory. In creating this link, it develops a theory of how differences in metacognitive ability in a team of top managers affect entrepreneurial orientation, which is an important determinant of firm performance. While the importance of TMT diversity has been realized (Ling and Kellermanns 2010), few scholars have investigated this phenomenon through the cognitive lens (e.g., Olson et al. 2007). Because of the challenges of collecting psychological data from top managers, who do not have the time to undertake psychological tests or be observed (Wong et al. 2011), such research has been slow to accumulate (Nielsen 2010; Souitaris and Maestro 2010). Metacognitive ability is important in theory and practice, yet it is an under-researched construct in both the upper echelons and entrepreneurship

literature. This study drew on this concept and used measures that were recently developed by Haynie and Shepherd (2009).

The focus of previous entrepreneurial research is mostly on individual entrepreneurs (e.g., Baron et al. 2013; Mukherji et al. 2011). This study departed from that by highlighting the importance of team-level cognitive diversity. Given that entrepreneurship scholars have primarily focused on the performance implications of entrepreneurial orientation rather than its antecedents (Baron et al. 2013; Miller 2011; Miller and Le Breton-Miller 2011; Rosenbusch et al. 2013), our study contributes to this side of entrepreneurship research by explaining entrepreneurial orientation from a TMT perspective. It provides evidence indicating that the metacognitive ability of the TMT is related to the adoption of certain dimensions of entrepreneurship orientation.

It has been argued that metacognition is important in recognizing and interpreting innovative opportunities (Haynie et al. 2010; Nambisan and Baron 2013). This study further confirms the importance of the metacognitive ability of the TMT for its innovative behavior and actions. We showed that diversity in metacognitive ability helps TMTs create novel and exploratory ideas (Alexiev et al. 2010; Qian et al. 2013) and encourages team members to identify and seize opportunities for new offerings and markets (Alexiev et al. 2010; Talke et al. 2011). It is especially relevant for small firms, the managers of which have more direct and immediate impacts on the formation and implementation of innovation goals (Harmancioglu et al. 2010).

However, diversity in the metacognitive ability of managers does not seem to generate positivity in the team with regard to dealing with ambiguity and uncertainty, or to make it overly confident in its ability to reap the potential benefits of risky activities. Such results imply that the metacognitive ability of top managers does not completely explain the team's risk-taking behavior. This finding is interesting in that the metacognitive ability of individual managers has been linked to their risk-taking propensity (Haynie et al. 2012). This difference between individual managers and management teams further supports the pivotal role of team dynamics in the firm's strategic stance (Escribá-Esteve et al. 2009) and implies that the effects of TMT diversity depend on the nature of the TMT's task and the situation, as well as on the nature of diversity itself (Jackson et al. 2003; Wei and Wu 2013).

Diversity in TMT members' metacognitive ability shows no impact on proactiveness. It seems likely that there may be other unmeasured factors that influence the association between TMTs' metacognitive diversity and their proclivity to engage in proactive behavior. It can be assumed that this association is more complex than expected, requiring more detailed investigations.

With respect to the impacts of entrepreneurial orientation on firm performance, the empirical results reveal that a deconstructed view of entrepreneurial orientation offers more insights into the performance of a firm. Specifically, we found that the three components of entrepreneurial orientation do not have the same effect on firm performance. That is, while innovativeness and risk-taking are shown to be positively associated with firm performance, proactiveness seems not to enhance performance.

In conclusion, the theoretical discussion and the empirical results of this study point to the importance of examining metacognition at the team level. This study suggests that future research may benefit from applying the concept of

metacognition to develop a better understanding of TMTs and their firms' entrepreneurial behavior and performance. The importance of such research also extends to the entrepreneurship literature, in which the antecedents of firms' entrepreneurial behavior and actions have been studied to a lesser extent, particularly from the upper echelons perspective.

6.1 Managerial Implications

Diversity is a fact in today's organizations (Homan et al. 2008). Managing and turning this into an asset has become a priority for organizations so that they are able to reinforce their competitiveness (Kearney et al. 2009). Having multiple metacognitive abilities in the TMT that are diverse in nature requires that individual top managers are aware of their own metacognition (Nambisan and Baron 2013). This may help them to recognize and apply their own ability in a more optimal way when engaging in the firm's decision-making processes and actions. Firms also need to consider the importance of such abilities among their key decision-makers.

While some personality traits are beyond the control of both managers and entrepreneurs (Fini et al. 2012), metacognition could be developed through training (Nambisan and Baron 2013; Schmidt and Ford 2003). Accordingly, firms should be aware of this and try to include such training in their managerial practices. Firms could use several techniques, such as mental contrasting and implementation intentions, to strengthen managers' metacognition (Nambisan and Baron 2013). Supplementing such techniques with diversity practices aimed at lessening the negative consequences associated with team diversity (Bell et al. 2011) could help top managers appreciate each other's abilities and thereby help the firm build a competent and high-performing team.

It has been argued that the survival of SMEs depends on their ability to pursue entrepreneurial activities (Real et al. 2014). Managing such activities, however, is a challenging task (Wales et al. 2011). This study has found that while innovativeness and the risk-taking behavior of a TMT is beneficial, the proclivity of the TMT to be proactive may not have a significant impact on the performance of an SME. These conclusions have important managerial implications.

Designing and developing information-processing routines would help exploit the diverse points of view of the team members, which may stem from their different metacognitive abilities (Wei and Wu 2013). Performance improvement at the firm level may require that top managers are cognizant of the management of their entrepreneurial activities (Kreiser et al. 2013) to maintain the focus on their innovative and risk-taking behaviors. This means that they should manage the entrepreneurial orientation dimensions individually (Kollmann and Stöckmann 2014; Lomberg et al. 2016), for instance, by carrying out careful risk analysis and project scoring to prioritize innovative initiatives over others.

Top managers would benefit from consciously adjusting the firm's context in accordance with their interpretations of environmental changes in their

entrepreneurial decision-making (Lomberg et al. 2016; Plambeck 2012). They need to create and support an appropriate organizational atmosphere (Escribá-Esteve and Montoro-Sánchez 2012) in which innovative and risk-taking behaviors are perceived to be both desirable and achievable (Fini et al. 2012). High-quality communication between CEOs and other top managers allows the exchange of more viewpoints and thus the development of more creative strategies (Cao et al. 2010).

Finally, these findings also have some implications for policymakers. They should establish proper policies, programs in consultancy and training (Shinnar et al. 2012), and incentives to support and encourage these firms to innovate, thereby facilitating their success. New ventures are often started by entrepreneurial teams rather than single entrepreneurs (Schjoedt et al. 2013). Thus, putting proper training in place for top teams to harness the power of diversity in the metacognitive abilities of their members could enhance ventures' survival and growth.

6.2 Limitations and Directions for Future Research

Several limitations of this study might open up directions for future research. This study has examined entrepreneurial orientation as one of the most important concepts in the entrepreneurship literature (Slevin and Terjesen 2011; Wales et al. 2011); however, it accepts that there are other potential mediators deserving consideration in future research. In this respect, future work can consider other aspects of firms' entrepreneurial behavior and activities, such as opportunity evaluation. Although this was beyond the scope of our study, useful insights would be gained if a more detailed investigation was undertaken into the effects of entrepreneurial orientation on performance by incorporating mediators and moderators, such as firms' internal and external factors (e.g., resources and environmental conditions).

Furthermore, we only examined direct effects in this paper and did not hypothesize the potential mediating role of EO in the link between TMTs' metacognitive abilities and performance of the firm. Future studies can extend our paper by examining this intervening mechanism. We recommend researchers to consider points discussed by Aguinis et al. (2017), when testing potential mediators in these relationships.

Additionally, as Engelen et al. (2015a, p. 1089) put it, "in contrast to SMEs where leadership behaviors are likely to be enacted by a very small group of top managers, larger companies have bigger management teams and more levels, raising the possibility that leadership behavior varies substantially across managers." Future studies should examine the possibility that interactions between the metacognitions of top management teams and firm's environmental conditions could affect the relationship between entrepreneurial orientation and performance.

Another important limitation is the sample of the study. Although our sample was relatively small which is not uncommon in TMT research (van Knippenberg et al. 2011), we encourage researchers to validate our findings with larger samples. It would also be interesting to investigate whether the findings hold true for large firms,

or whether distinct results would be obtained. Finally, causal relationships proposed in the study's conceptual model should be further validated by longitudinal research design (Engelen et al. 2015a). Longitudinal research would also offer more insights into the endogeneity bias which cannot be truly addressed in cross-sectional research such as this research (Talke et al. 2011).

7 Conclusion

By focusing on the concepts of metacognition and entrepreneurial orientation, this study has suggested that connecting notions from different bodies of social science with the upper echelons perspective may shed new light on the role of TMT attributes and behavior in firm performance. Similarly, integrating insights from upper echelons theory with entrepreneurship research implies that other bodies of management research may benefit from the notion of upper echelons and from examining how a team of key decision-makers in a firm collectively understands and performs tasks.

Appendix: Survey Items (Compiled by the Authors)

Item	Metacognitive ability	Scale	Source
I think of several ways to solve a problem and choose the best one.	Metacognitive knowledge ability	Seven anchors from "strongly disagree" to "strongly agree"	Haynie and Shepherd's (2009)
I challenge my own assumptions about a task before I begin.			
I think about how others may react to my actions.			
I find myself automatically employing strategies that have worked in the past.			
I perform best when I already have knowledge of the task.			
I create my own examples to make information more meaningful.			
I try to use strategies that have worked in the past.			
I ask myself questions about the task before I begin.			
I try to translate new information into my own words.			
I try to break problems down into smaller components.			

(continued)

Item	Metacognitive ability	Scale	Source
I focus on the meaning and significance of new information.			
I think about what I really need to accomplish before I begin a task.	Metacognitive experience ability		
I use different strategies depending on the situation.			
I organize my time to best accomplish my goals.			
I am good at organizing information.			
I know what kind of information is most important to consider when faced with a problem.			
I consciously focus my attention on important information.			
My "gut" tells me when a given strategy I use will be most effective.			
I depend on my intuition to help me formulate strategies.			
My firm's return on investment over the last 3 years has been...	Firm performance	Five anchors: From "much worse" to "much better"	Li and Atuahene-Gima (2001)
My firm's return on sales over the last 3 years has been...			
My firm's profit growth over the last 3 years has been...			
My firm's return on assets over the last 3 years has been...			
My firm's overall efficiency of operations over the last 3 years has been...			
My firm's sales growth over the last 3 years has been...			
My firm's market share growth over the last 3 years has been...			
My firm's cash flow from operations over the last 3 years has been...			
My firm's overall reputation over the last 3 years has been...			
A strong emphasis on the marketing of tried and true products or services vs. a strong emphasis on R&D, technological leadership, and innovation.	Innovativeness	Semantic differential	Covin and Slevin (1989)
How many new lines of products or services has your firm marketed during the past 3 years? No new lines of product or services vs. very many new lines of products or services.			

(continued)

Item	Metacognitive ability	Scale	Source
Changes in product or service lines have been mostly of a minor nature vs. changes in product or service lines have usually been quite dramatic.			
In dealing with its competitors, my firm typically responds to actions which competitors initiate vs. typically initiates actions to which competitors then respond.	Proactiveness		
Is very seldom the first business to introduce new products/services, administrative techniques, operating technologies, etc. vs. is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.			
Typically seeks to avoid competitive clashes, preferring a "live-and-let-live" posture vs. typically adopts a very competitive, "undo-the-competitors" posture.			
In general, the top managers of my firm have a strong proclivity for low-risk projects (with normal and certain rates of return) vs. a strong proclivity for high-risk projects (with chances of very high returns).	Risk-taking		
In general, the top managers of my firm believe that owing to the nature of the environment, it is best to explore it gradually via cautious, incremental behavior vs. owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives.			
When confronted with decision-making situations involving uncertainty, my firm typically adopts a cautious, "wait-and-see" posture to minimize the probability of making costly decisions vs. typically adopts a bold, aggressive posture to maximize the probability of exploiting potential opportunities.			

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Part II
Joint Entrepreneurial Decisions

Givers, Takers, and New Venture Makers: Why Help-Seeking Processes Are Critical (and Different) for Entrepreneurs

Erika N. Williams, Timothy P. Munyon, and Robert M. Fuller

Abstract This essay addresses how entrepreneurs seek and receive help when operating new ventures. Specifically, we evaluate the nature of entrepreneurial help-seeking processes, exploring why the entrepreneurial context challenges assumptions of those processes. We then consider the antecedents of help-seeking behavior, how economic and social sources of help are sought by entrepreneurs, and how entrepreneur individual differences bound the relationships between problem characteristics and help-seeking. Finally, we consider the potential individual- and firm-level outcomes of help-seeking in the entrepreneurship context. In sum, this essay seeks to establish an agenda for further empirical and theoretical inquiry into entrepreneur help-seeking.

Help-seeking reflects the cognitive and behavioral processes through which requesters seek and gain assistance, how helpers are approached, and how they ultimately provide assistance (Bamberger 2009). Although a thorough literature exists in psychology and organizational behavior about help-seeking, little is known about this process in the entrepreneurship context, including the means through which entrepreneurs gain needed assistance in forming and growing their new ventures.

This knowledge deficiency is exacerbated by an entrepreneurial context offering unique managerial challenges not found in more established organizational forms. For example, many entrepreneurs work under high levels of risk and work (Shane and Venkataraman 2000), juggling multiple roles and exhibiting a genuine sense of urgency regarding their ventures (Krueger 2002). In addition, new ventures are often

Note: This essay is based on the dissertation of the first author completed under the supervision of the second and third authors.

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resource constrained, lacking the legitimacy and structure needed for social learning to take place (Nagy et al. 2012; Zimmerman and Zeitz 2002). Due to the liability of newness, entrepreneurs may lack awareness of the problems they will face (e.g., Sarasvathy 2001), and have difficulties articulating these issues to others when problems arise (e.g., Godley and Casson 2015). Finally and critically, the decisions entrepreneurs make have direct implications for their ventures' survival. Thus, the way entrepreneurs seek and gain needed help is of theoretical and applied importance.

Unfortunately, theory to date has largely implied the entrepreneur help-seeking process without explicating the underlying cognitive and behavioral mechanisms that comprise it. For example, co-creation theory suggests that value is created when entrepreneurs interact with other stakeholders (Galvagno and Dalli 2014). The theory provides fruitful insights into how engagement with stakeholder groups, such as customers and suppliers, can enhance entrepreneur outcomes; however, it is limited in its explanation of when and how entrepreneurs decide to engage these stakeholder groups. Furthermore, it does not consider the personal and situational constraints that limit or enable help-seeking nor the trade-offs associated with engagement with specific stakeholder groups relative to others. Similarly, social capital theory (e.g., Liao and Welsch 2003; Hansen 1998; Zhang 2010) highlights how structural positions impact entrepreneurial outcomes, assuming that entrepreneurs seek and gain needed resources embedded in their networks. However, the theory does not account for the consequences of not seeking help or seeking help from suboptimal sources. Thus, although the existing literature considers many of the channels available to entrepreneurs to gain needed help, it has not yet clarified the cognitive-behavioral process that may limit or enable access to, or the efficacy of, these resources.

The net effect of this theoretical deficiency is that our understanding of entrepreneur help-seeking remains opaque and subject to speculation. Furthermore, although help-seeking has been explored in the context of established organizations (e.g., Cleavenger and Munyon 2015; Hofmann et al. 2009; Mueller and Kamdar 2011; Nadler 1991), the extent to which these findings may be generalized to the entrepreneurship context is unclear.

To address these limitations, this essay proposes a cognitive-behavioral model of entrepreneur help-seeking, theorizing how entrepreneurs choose when to seek help, from whom, and how their ventures are affected by these processes. Consistent with the tenets of interactional psychology (Schneider 1983), we also evaluate how entrepreneur differences bound this process. In sum, this essay seeks to theorize how entrepreneurs engage in help-seeking, shedding new light on how helping processes and external inputs affect the viability of new ventures.

Several contributions derive from this essay. First, we bridge findings from social psychology and entrepreneurship literatures to consider help-seeking in a new context of entrepreneurship. In doing so, we consider the generalizability of each literature as it applies to a new context. Second, we theorize the individual differences that theoretically bound these relationships, drawing on interactional psychology (Schneider 1983) to predict how entrepreneur differences impact help-seeking,

learning, and adaptation following exposure to problems. Third, we also contribute theoretically by differentiating economic and social sources of help, and also the consequences of each form of assistance. Finally, we differentiate levels of analysis, and consider both the venture and entrepreneur as sources of problems that may impact the venture's performance and entrepreneur well-being. Our overarching contribution is to consider how entrepreneurs theoretically decide when and where to seek help, and how the source of help sought impacts the resolution of their problem and also venture-related outcomes.

1 Toward a Model of Entrepreneur Help-Seeking

Figure 1 illustrates the cognitive-behavioral process through which entrepreneurs seek help and how received help subsequently influences venture and entrepreneur outcomes. Following Stevenson and Jarillo (2007), we characterize entrepreneurship as the process of pursuing opportunity regardless of current resources. Table 1 provides a summary of key works in the help-seeking literature.

Although help-seeking is often used synonymously with such constructs as feedback- and advice-seeking, conceptual differences between help-seeking and these constructs are important to note. For example, according to Bamberger (2009), one critical aspect of help-seeking is that it is problem-based, meaning that people seek help specifically to solve or manage a problem. Thus, a distinction can be created between help-seeking and feedback- or advice-seeking, which can occur without any connection to a particular problem or personal interaction (Bamberger 2009).

We begin by considering the cognitive factors that affect an entrepreneur's choice to seek help. Drawing on organization theory and social psychology, we consider the problems likely to be encountered by entrepreneurs, and the influence of problem characteristics on the entrepreneur's decision to seek help from others. In doing so,

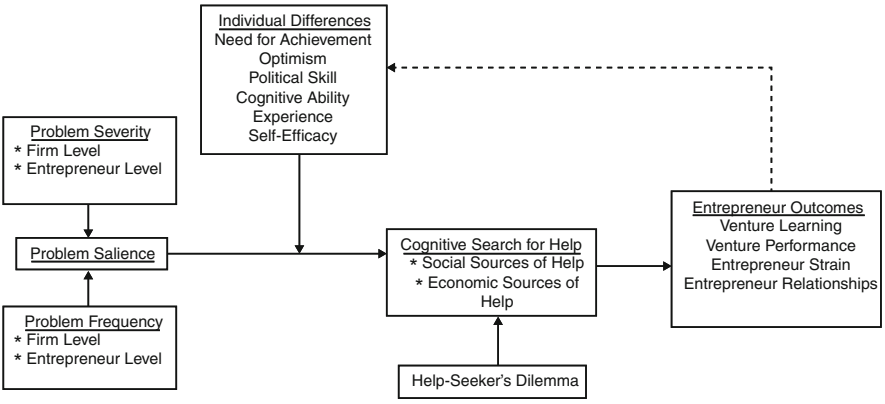

Fig. 1 Conceptual model of entrepreneur help-seeking

Table 1 Summary of selected research: help-seeking in organizations

Author(s)	Method	Sample	Description	Results
Bamberger (2009)	Conceptual	N/A	Unpacks the antecedents and consequences of help-seeking in the workplace	N/A
Geller and Bamberger, (2012)	Survey	110 New employees and archival performance data	Performance-related outcomes of employee help-seeking are dependent upon whether the individuals seeking help have a mastery or learning orientation	Support for help-seeking-performance relationship
Mueller and Kamdar (2011)	Survey	55 Teams of engineers	Help-seeking may incur reciprocation costs that inhibit creativity in a team setting	High levels of help reduced creativity of teams
Hofmann et al. (2009)	Survey	146 Nurses	Explores the (perceived) cost of seeking help based on perceptions of superiors/experts	Found support for seeking help from peers
Nadler et al. (2003)	Survey and archival data	35 Production or maintenance employees	Explores the level of employee help-seeking and job evaluations	Help-seeking and performance evaluation have curvilinear relationship
Shapiro (1978)	Experiment	60 Undergraduate students; female	Explores the likelihood of help-seeking when seeking help and task performance are private vs. public	Individuals are more likely to seek help when poor performance would become public and help-seeking behavior would remain private
Anderson and Williams (1996)	Survey	237 Dyads; supervisor-subordinates	This paper looks at relationship quality and help-seeking behaviors	Found support for quality of relationship and help-seeking
Bowler and Brass (2006)	Survey	141 Employees at small manufacturing firm	This paper looked at the role of social networks in ICB	Found support for ICB

(continued)

Table 1 (continued)

Author(s)	Method	Sample	Description	Results
Lanaj et al. (2016)	Experience sampling method	68 Executive MBA students	Looks at the cost and benefits of helping from the perspective of the helper	Support for curvilinear relationship between helping and depletion
Newark et al. (2017)	4 experiments	Study 1, 200 participants, 50 from 2 US universities; Study 2, 224 Amazon Mechanical Turk participants; Study 3, 169 Amazon Mechanical Turk participants; Study 4, 102 unspecified individuals	Looks at help-seekers prediction of helper's effort	Support for underestimating effort of help-givers
Cleavenger et al. (2007)	ANOVA	124 Students	Explored relationship between task interdependence and helping norms on help-seeking propensity	Support for interdependence and helping norms
Sirola and Pitesa (2017)	4 studies: Study 1, survey; Study 2, experiment; Study 3, - experiment; Study 4, field study	Study 1, archival data; Study 2, 231 employees of US firms; Study 3, 212 employees of US firms; Study 4, 101 freelance marketing professionals	Impact of economic downturn on helping behaviors in the workplace	Poor economic conditions decrease likelihood of helping at work
Burke and Weir (1978)	Survey	71 Employees	Relationship between organizational climate and informal helping behaviors	Support for variation in helping behaviors and work climate
Lee (1997)	2 studies: experiment and observation and surveys	Study 1, 153 students; Study 2, 184 doctors and 198 nurses	Role of power in help-seeking within organizations	Help-seeking is highest among male peers with collectivist norms
Erdogan et al. (2015)	Survey	297 Dyads	Explores relationship between helping and gossip within leader-worker dyadic relationships	Workers who are helpful and discreet benefit in leader–member relationship

(continued)

Table 1 (continued)

Author(s)	Method	Sample	Description	Results
Koopman et al. (2016)	Experience sampling	82 Employees	Looks at the costs and benefits of OCB	OCB positively related to positive affect
Uy et al. (2017)	Diary/experience sampling	102 Participants	Relationship between help and surface acting	Support for giving help and restoring one's sense of self
Grodal et al. (2015)	Observation; inductive qualitative study	Engineers	Looks at help-giving and help-seeking as part of organizational routine	Help-seeking and help-giving important organizational routines
Cleavenger and Munyon (2015)	Experiment	457 Undergraduate students	Tested the influence of computer-mediated communication on help-seeking	Participants sought help faster when goals are interdependent and under the condition of anonymity

Source: Table compiled by authors

we extend the "help-seeker's dilemma" (Nadler 1991) to the study of entrepreneurship. Second, drawing on interactional psychology and existing entrepreneurship literatures, we consider the individual differences that theoretically bound this relationship. Research in established organizations demonstrates that demographic factors such as gender, age, socioeconomic status, and level of education also influence help-seeking behaviors (Grable and Joo 1999). These individual-level factors can be attenuated or amplified by situational factors such as the type of problem to be addressed, stigma beliefs, and environmental characteristics (Bamberger 2009; Nadler et al. 2003). Accordingly, we anticipate that entrepreneur differences will also affect their help-seeking behavior, and consider previously untested differences.

Third, we consider how entrepreneurs may trend toward social or economic sources of help. Social and economic sources of help have unique considerations and trade-offs that potentially impact the entrepreneur in terms of the cost associated with the source of help (cf., Zhang 2010). For example, social sources of help tend to elicit reciprocity expectations (Gouldner 1960) while economic sources demand financial considerations. Whereas both options may offer needed assistance for the entrepreneur, each option carries expectations and costs that bear on the utility of any help gained. Finally, we consider the venture and entrepreneur implications of this process for learning, performance, entrepreneur strain, and entrepreneur work- and family-relationships. Our overarching thesis is that the process of entrepreneur help-seeking differentiates venture performance, and also affects the entrepreneur. We conclude with a discussion of implications, new research directions, and practical insights from this theoretical framework. Having briefly reviewed the model, we now specify its operation.

1.1 Problem Characteristics

New ventures are challenged by both internal and external firm-specific problems (Zacharakis et al. 1999), including the liabilities of newness and smallness (Aldrich and Auster 1986). According to Yang and Aldrich (2017), liabilities of newness are reflected in new venture routines, resources, and boundaries. Specifically, beyond attempting to commercialize their products or services, entrepreneurs must negotiate organizational routines and roles, acquire and exploit resources, and assimilate into the competitive landscape of their industry. The novelty of these experiences and competing temporal demands complicate each of these processes for entrepreneurs seeking to grow their ventures (cf., Edelman and Yli-Renko 2010).

Similarly, the liability of smallness reflects the idea that smaller firms tend to be less competitive than larger firms as a function of decreased access to capital, increased costs of capital, an inability to attract and retain skilled workers, higher administrative costs, and legitimacy constraints with external stakeholders (Mellahi and Wilkinson 2004; Singh and Lumsden 1990).

By contrast, more mature organizations have often formalized their routines, relationships with suppliers and customers, and the processes and policies that will govern the production of value (Katz and Kahn 1978; Perrow 1972). Development in these areas reduces ambiguity and uncertainty that is a defining characteristic of new ventures.

While the entrepreneur is facing firm-level concerns, they are often also dealing with personal and situational issues as well due to overlapping resource use between work and non-work domains (Jennings and MacDougald 2007). Time constraints, lack of social capital, and lack of relevant expertise can create additional challenges that impact the venture, entrepreneur, and the personal relationships of the entrepreneur.

This differs significantly from established ventures where personal and situational issues of the entrepreneur may have less influence over the outcomes of the organization. Furthermore, where work and stressors in more established organizations tend to be more formalized and often shared (Katz and Kahn 1978; Perrow 1972), entrepreneurs often face these constraints alone. By contrast, the boundaries between work and home domains can be stronger for individuals working in more established ventures, which theoretically changes the transfer of resources and stress between the two domains (see Jennings and MacDougald 2007 for related discussion). Thus, entrepreneurs face a plethora of work- and non-work challenges that impede their progress in starting and growing new ventures, and these problems are magnified when compared with work in more established organizations.

According to Bamberger (2009), the characteristics of the problem influence help-seeking behavior. For example, to the extent that an entrepreneur gauges that a problem they are experiencing is common among other entrepreneurs, this potentially reduces stigma and self-presentation threats (Bamberger 2009; Nadler 1991). Nevertheless, goal literature suggests that the severity and frequency of a problem are important cues to the entrepreneur, who then must choose how to respond when confronted with real, perceived, or foreseen obstacles (cf., Jiang et al. 2018; Shah

et al. 2002). Our theorizing also accommodates situations in which an entrepreneur has encountered a problem, but the problem is not salient enough to the entrepreneur to activate a cognitive and behavioral response.

1.2 Problem Severity

Problem severity refers to the perceived complexity and difficulty of a problem. We suggest that individuals react differently to the same problem scenarios (i.e., Cleavenger and Munyon 2015). Thus, the objective conditions of the problem are less important than its perceived difficulties by the entrepreneur. For measurement purposes, we must also assume that entrepreneurs will generally not assess problems in the same manner due to individual differences, such as experience, personality, and even cognitive ability.

Following Suchman's (1966) theoretical framework, the initial stage of the decision-making process for help-seeking involves the evaluation of the problem. An isolated, but sufficiently severe, problem may activate a help-seeking response by an entrepreneur, while the rate of problem incidence, or frequency, also influences their potential help-seeking response. Tallman et al. (1993) suggest that problem severity also initiates a search for further information. As the severity of a problem increases, they propose that individuals will increasingly reduce their expectations for a favorable resolution, precipitating a potential help-seeking response. A stress response (Monat and Lazarus 1991), with concomitant affect, may also follow from such evaluations, preparing the entrepreneur to cope with the problem via help-seeking.

1.3 Problem Frequency

Problem frequency refers to the rate at which an entrepreneur is exposed to a problem over a period of time or in a specific context. Problem frequency may be perceived as high when a problem is encountered many times over a defined interval of time, or also when a problem is encountered whenever an entrepreneur is in a specific context. For example, problem frequency would be high for an entrepreneur facing a repeated technical problem each day of a week. Similarly, problem frequency may also be perceived as high if an entrepreneur struggles each time he, or she, attempts to complete a specific task. The latter contextual cues signal that the entrepreneur is not adapting and learning at a high-enough level to surmount the problem, and a help-seeking response may be required. Although repeated exposure may lead to learning (Gordon and Holyoak 1983), when an entrepreneur repeatedly encounters problems that is beyond their capacity to resolve they are likely to seek out new information via help-seeking in order to protect their resources and avoid losses (Tallman et al. 1993).

Thus, both problem severity and problem frequency affect the salience of a problem to the entrepreneur, working individually or interactively.

In an established venture, the entrepreneur is likely to have developed systems and processes as well as hire employees who are responsible for managing specific problems as they come up. This is evidenced by research that cites planning, flexibility, adaptiveness, and employees who can perform a variety of duties as key factors in the success and viability of an entrepreneurial firm (Duchesneau and Gartner 1990).

1.4 Problem Salience

Fiske and Taylor (2013) describe salience as being noticeable, important, or attracting attention but also as relative to the current context. Thus, problem salience can be characterized as a problem that exists in such a way that it attracts attention. As described above, the frequency and severity of a problem with which the entrepreneur experiences affect the interpretation of that problem as salient, or not. In our examination of entrepreneur help-seeking behavior, as the entrepreneur encounters problems that are increasingly complex and consistent, they are motivated to seek information, assistance, or resources in order to find a resolution. This assumption is based on the idea that entrepreneurs are interested in the survival of their ventures and therefore motivated toward learning and action (Tallman et al. 1993). Thus, we offer our first proposition:

Proposition 1 *The frequency and severity of a problem affect its salience to the entrepreneur, precipitating a potential help-seeking response.*

Although problem frequency and problem severity theoretically impact the salience of an issue to an entrepreneur, help-seeking is not strictly a cognitive issue. Rather, the decision to seek help also reflects personal deficiencies on the part of the entrepreneur, which may threaten the entrepreneur's reputation and image in the eyes of others (cf., Cleavenger et al. 2007; Cleavenger and Munyon 2015). Accordingly, entrepreneurs also likely face a "help-seeker's dilemma" (Nadler 1991) where they must balance the needs of the venture against their personal standing in the eyes of others.

1.5 Help-Seeker's Dilemma

The help-seeker's dilemma refers to the trade-off between the benefits of asking for help and the costs, most notably the mental and social costs of engaging in this behavior (Bamberger 2009; Nadler 1991, 1997). This is based on the idea that an individual's request for help may be interpreted as an admission of a lack of competence or dependence on someone else (Bamberger 2009; Lee 2002). According to Shapiro

(1978), individuals are more likely to seek help when evidence of poor performance would become public, particularly when the fact that they engaged in help-seeking behavior would remain private (Cleavenger and Munyon 2015). Additional research on help-seeking indicates that individuals are likely to engage in this behavior if they are operating in an environment where helping is a part of the organization's normative processes (Cleavenger et al. 2007; Grodal et al. 2015).

The help-seekers dilemma potentially creates a situation where, even when faced with complex problems and the lack of skill to create a solid resolution, the entrepreneur may choose not to seek help, or delay doing so. For example, Cleavenger and Munyon (2015) found that individuals chose not to seek help when it was available, even when confronted with repeated failures and a high likelihood of continuing failure. They characterized the reluctance to seek help as a self-presentation concern.

In further support, Lee (1997) suggests that when competence and independence are central to one's self-confidence, individuals are less likely to seek help due to impression management concerns. Entrepreneurs tend to value independence (Douglas 2013), which may help explain why an entrepreneur might avoid seeking help when needed. Values such as independence are strongly related to public impression in the entrepreneurship context where the venture can be seen as an extension of the entrepreneurs' identity (Lee 2002).

However, Bandura (1986) contends that individuals high in self-efficacy are more likely to persist in their efforts, even when there is negative feedback. Research has demonstrated that entrepreneurs tend to be high in self-efficacy (McGee et al. 2009), leading to the conclusion that they would persist in seeking solutions to the problems that they experience with their venture.

In sum, a problem typically has to be difficult enough in scope, and/or occur frequently, to catalyze an entrepreneur's attention in a manner strong enough to elicit a help-seeking response. However, the desire to seek help and the expected benefit must outweigh any concerns over self-presentation and self-efficacy in order for the entrepreneur to engage in help-seeking. Thus, we offer the following:

Proposition 2 *Even when confronted with a severe or frequent problem, entrepreneurs will generally avoid help-seeking. This tendency of avoidance will be magnified for entrepreneurs concerned with self-presentation, and weakened for entrepreneurs less interested in self-presentation concerns.*

2 Sources of Help

Although problem characteristics are theoretically the most important drivers of help-seeking behavior, prior literature (e.g., Hofmann et al. 2009) also suggests that potential sources of help affect help-seeking responses. Unlike established organizations, entrepreneurs must choose whether to leverage social or economic sources of assistance when seeking to gain help. For example, entrepreneurs can

seek help through the process of developing and leveraging their social and supplier networks to gain access to knowledge or resources they lack, to solve problems more efficiently, and to improve their skillsets (Aldrich and Martinez 2001; Greve and Salaff 2003).

However, most research on employee help-seeking assumes that this behavior occurs in an established organization where there are clear role definitions, role expectations, clear responsibilities, and where people are reasonably accessible (e.g., Hofmann et al. 2009). As entrepreneurs are in the process of forming their ventures, these conditions do not necessarily apply. Specifically, although most organizations provide some base level of support to employees in order to achieve efficient outcomes, the entrepreneur must develop these support systems for themselves or leverage the support systems of others. Furthermore, role expectations and responsibilities are managed primarily by the entrepreneur, rather than a broader set of managerial influences (Biddle 1986).

When seeking help, an individual must be careful in selecting a source of help. Prior relationships are important when seeking help because individuals are more likely to reach out to someone with whom they have a relationship rather than to a stranger. For example, individuals are more likely to seek help from others who are viewed as peers, rather than from a supervisor or those who are considered to be of higher status (Hofmann et al. 2009). Moreover, help-seekers are more likely to solicit individuals who possess the task-relevant expertise and can be discreet about the help that they give (Erdogan et al. 2015; Hofmann et al. 2009; Lee 1997). In their research, Anderson and Williams (1996) found that higher quality relationships would lead to greater helping, and that a higher amount of help-seeking is positively correlated with receiving more help. Thus, help-seekers tend to utilize the same helpers repeatedly if a help-seeking request has been satisfied in the past. We expect a similar pattern for entrepreneurs.

Organizational research assumes an existing social structure through which helping (OCB, training, etc.) occurs, whereas entrepreneurs create their own helping resource structure by establishing a network to draw upon for information, support, and resources. In sum, organizational research assumes proximity to sources of help (i.e., those who can inform and guide individuals in their roles as employees), whereas potential helping sources are emergent for entrepreneurs (Bamberger 2009; Blau 1955). It is incumbent upon the entrepreneur to cultivate the relationships necessary to access the people who can provide them with information and resources (Davidsson and Honig 2003). Thus, the entrepreneurial context allows us to scrutinize the search for help in more detail as compared to employee help-seeking in established organizations.

This selection process is compounded by the resource constraints innate in entrepreneurship, and magnifies the importance of choosing an appropriate helping resource. Specifically, entrepreneurs are often required to make time-sensitive decisions requiring them to improvise, rely on heuristics and information from prior work experiences, or turn to their network for quick feedback (Aldrich and Martinez 2001). Thus, entrepreneurs may lack the time needed to consider help-seeking resources at length, increasing the probability of poor selections via satisficing.

This stands in contrast to more established organizations. Entrepreneurs often define their own job activities based on the dynamic and shifting demands of their work (Hmieleski and Corbett 2008; Hmieleski and Ensley 2004). In other words, unlike an organization's employees who often have specific boundaries regarding their job description and expectations, the entrepreneur is required to juggle multiple roles. Often at the beginning of the venture, no role or responsibility is outside of the entrepreneur's boundaries. In contrast, with traditional forms of helping found in organizations, organizational citizenship behavior and interpersonal helping behavior are defined as "extra-role" behavior beyond the scope of job descriptions and role requirements (see Bateman and Organ 1983 and Borman and Motowidlo 1997 for discussion). Thus, whereas help-seeking and helping processes are classified as "extra-role" behavior in traditional organizational contexts, these behaviors are differentiated in entrepreneurship because they reflect "in role" behavior for entrepreneurs (and potentially those who assist them).

Sources of help also are sometimes implicitly or explicitly institutionalized in established organizations (Cleavenger et al. 2007; Hofmann et al. 2009). As such, the sources of available assistance may be readily known to individuals seeking help, meaning information searches are much more efficient. The quality of assistance may also be inferred as a function of repeated interactions within social exchanges (Cleavenger and Munyon 2015). However, in entrepreneurship, available sources of help may be unknown and subject to significant changes. The complexity of challenges facing entrepreneurs also suggests that they will be unable to rely on the same sources of assistance to manage each of the contingencies they face.

Traditional forms of help-seeking occur within the broad context of shared goals. Specifically, employees working for the same organization share a degree of goal consensus as they work to help the organization achieve its objectives (Cleavenger and Munyon 2015; Hofmann et al. 2009; Munyon et al. 2010); meaning help-seekers and helpers often have similar goals within the organization's boundaries. However, entrepreneurs engage in help-seeking processes across organizational boundaries, meaning they seek help from others who may not share similar goals, complicating the process of help-seeking. This also affords entrepreneurs the opportunity to seek help across organizational boundaries via economic contracts (Williamson 1981), rather than seek help strictly within the confines of their professional or personal networks.

2.1 Economic Sources

Sources of economic help (i.e., seeking help from a professional) include options such as consultants, investors, banks, and other individuals and organizations that provide support to entrepreneurs based on contracts and financial exchanges (Rickwood et al. 2005). These sources tend to have a higher financial expense relative to social sources of help; however, there are also some benefits such as clear expectations for contract fulfillment, relieving concerns of ambiguous future

expectation, and a lack of role assumptions that often accompany personal relationships. Thus, economic sources of help tend to reflect instrumental exchanges based on financial resources, with limited expectation of future involvement.

2.2 Social Sources

By contrast, social sources of help include friends, family, mentors, and others with whom the entrepreneur has a personal relationship (Rickwood et al. 2005). Social sources of help are potentially less costly to the entrepreneur as social sources tend to be informal with little to no financial consideration, but these exchanges tend to come with unclear expectations of reciprocity that can create strain for the entrepreneur (Gouldner 1960). In addition, these relationships have high levels of interdependence that can be difficult to manage (Shumaker and Brownell 1984).

For example, Zhang (2010) discussed the benefits of using social ties in the short-term referring specifically to the lower initial cost of leveraging social ties. However, the entrepreneurs in that study noted that over the long term social ties can become costly to use and suggested "not relying on them too much" (p. 356). Further, the author states that if the cost of obtaining a resource from a social source is not much lower than that of an economic source, the entrepreneur would likely prefer to access the resource from the economic source (Zhang 2010), further indicating the desire to lower the social costs of seeking help.

Thus, there is a trade-off between social and economic sources of help for entrepreneurs. On one hand, economic sources of help are bound by clear contracts that guide completion and the delivery of needed assistance (Williamson 1981). However, they also consume highly scarce financial resources. On the other hand, social sources of help obligate the entrepreneur to future reciprocity (Gouldner 1960). Nevertheless, due to financial resource constraints, we anticipate that entrepreneurs will attempt to leverage social sources of help before economic sources of help. Furthermore, we anticipate that entrepreneurs will seek out social sources of help that historically have been productive for themselves or others, via social learning effects. Thus, we propose:

Proposition 3 *Entrepreneurs will prefer to seek help from social sources of help before economic sources of help, and will prefer to seek help from resources that worked historically.*

3 Individual Difference Moderators

Individual differences are powerful influences in decision-making, and likely also in the help-seeking process for entrepreneurs. However, a significant amount of help-seeking research has not considered the full interaction of person and situation

variables and how they unfold in the process of help-seeking. Theoretically, the interactional psychology perspective (e.g., Schneider 1983) predicts that both situational and individual differences impact subsequent behavior. Thus, in the following, we describe theoretically specified individual differences that may strengthen or mitigate how and when entrepreneurs seek help for themselves and/or their ventures.

Need for Achievement When compared with the general population, entrepreneurs tend to be high in achievement motivation (Johnson 1990; Stewart and Roth 2007). Nicholls (1984) describes achievement motivation as the desire to show behavior that indicates high levels of ability, or avoid indications of low levels of ability to others. This individual characteristic can be confounding when it comes to help-seeking. According to Bamberger (2009), while those who are high in achievement motivation have a strong desire to succeed, creating more willingness to seek help, they also tend to place a high value on individual achievement, increasing the desire to succeed on their own rather than seek out help from others. Thus, we anticipate that entrepreneurs higher in need for achievement will be less likely to seek help overall than entrepreneurs lower in need of achievement.

Furthermore, because of the self-presentation concerns exhibited by those high in need for achievement, we anticipate that entrepreneurs high in need for achievement will be more likely to seek help from economic, rather than social, sources of help as economic sources of help carry less stigma and threat.

Dispositional Optimism Optimism is another individual difference that theoretically impacts help-seeking behavior. Described as a general expectation for positive versus negative outcomes, optimism has been shown to have a significant impact on entrepreneur judgment and decision-making (Hmieleski and Baron 2009). The literature has demonstrated that entrepreneurs tend to be high in dispositional optimism when compared with the general population (Abdelsamad and Kindling 1978; Fraser and Greene 2006; Lowe and Ziedonis 2006). This is a reasonable conclusion, as individuals who are high in optimism tend to exude confidence and persist in challenges (Hmieleski and Baron 2009). Unfortunately, optimism can have detrimental effects on help-seeking behavior due to overconfidence in either the entrepreneur's ability, or the probability of solving problems using existing resources.

We anticipate that entrepreneurs high in dispositional optimism will be less likely to seek help than entrepreneurs low in dispositional optimism. However, unlike the need for achievement moderation, optimism may lead entrepreneurs to believe that social sources of help will be effective in resolving their problems. For example, optimism theoretically weakens reciprocity concerns (Munyon et al. 2010), suggesting that entrepreneurs high in optimism will be less concerned about reciprocating than entrepreneurs lower in optimism. Thus, available evidence suggests that optimism should reduce perceived reciprocity concerns for entrepreneurs, making social sources of help more attractive relative to economic sources of help. Finally, optimism, and its related positivity, may make entrepreneurs more attractive exchange partners to others, enhancing the level and quality of help available to them when compared with pessimistic entrepreneurs.

Political Skill Political skill is characterized in the literature as a social effectiveness construct that is described as interpersonal savvy enabling individuals to have influence with others such that they are able to understand their peers, secure resources, and leverage influence (Munyon et al. 2015). Political influence theory proposes that political skill affects how individuals understand and influence others, including the networking activities they pursue or avoid. Political skill has been shown to differentiate entrepreneur outcomes (Baron and Markman 2003), suggesting it also will play a role in the help-seeking process.

Specifically, politically skilled entrepreneurs should be less concerned with the help-seeker's dilemma than entrepreneurs with lower levels of political skill. This effect theoretically occurs because political skill enables entrepreneurs to frame issues and problems in ways that make them look competent to others (Ferris et al. 2005, 2007).

Entrepreneurs will also be more likely to leverage social sources of help as they gain more political skill because they can effectively build and leverage social networks (Bolander et al. 2015; Ferris et al. 2005; Treadway et al. 2007). Political skill should also theoretically reduce reciprocity concerns, as entrepreneurs are able to more effectively manage these relationships (see Ferris et al. 2007 for related discussion). Finally, political skill should theoretically enable individuals to understand where to go to maximize their chances of receiving needed assistance because it enables opportunity recognition and capitalization (McAllister et al. 2018). Consequently, we anticipate that entrepreneurs will be more likely to seek help from social sources as their political skill increases, compared with economic sources of help. We also anticipate that these efforts will be more fruitful as the entrepreneur's political skill increases as entrepreneurs gain assistance from those who are able and willing to assist them.

General Cognitive Ability General cognitive ability is understood to be the ability to learn (Hunter 1986; Schmidt 2002). General cognitive ability has been demonstrated to impact performance in many different job roles (Hunter 1986). Research has shown that individuals with higher cognitive ability tend to make better decisions (LePine et al. 2000). In terms of help-seeking, higher levels of cognitive ability would allow the entrepreneur to make solid decisions about the type of help that they need, who to get help from, and how to apply the information or resources that they receive in a way that allows for the best outcomes for the venture. However, increased levels of cognitive ability may lead to overconfidence in one's ability to address problems without help and result in a reduction of help-seeking. Finally, high levels of cognitive ability may exacerbate the "help-seeker's dilemma" for entrepreneurs. Specifically, more intelligent entrepreneurs may be less likely to seek help from others because it threatens their identity as a confident and intelligent individual.

Given this information, we predict that general cognitive ability will be negatively related to entrepreneur help-seeking. Furthermore, to reduce the potential stigma associated with help-seeking, we anticipate that entrepreneurs will seek help from economic, rather than social, sources of help as their general cognitive ability levels increase.

Industry Experience Industry experience is characterized as the individual's experience within a particular area of work (Cassar 2014). Individuals carry the knowledge gained from their previous line of work with them into their future endeavors, including entrepreneurship. Entrepreneurs come from a variety of different backgrounds, with different areas and levels of expertise. This diversity of experience should also theoretically influence help-seeking behavior.

For example, if an entrepreneur were to begin their venture in an area where they have previous experience, established connections, and have received tacit knowledge, they may need less help than if they engage in entrepreneurship within an entirely different industry. Furthermore, if the entrepreneur were to need assistance in a familiar industry, they would likely know the social sources of help to target for assistance. Conversely, an entrepreneur in a new industry may need more help and lack the knowledge of how to access that assistance most efficiently, and entrepreneurs operating in "unfamiliar" territory may be more apt to seek out economic sources of help than more experienced entrepreneurs.

Self-Efficacy Self-efficacy is described in the literature as an individual's belief in his or her own effectiveness (Bandura 1977). General self-efficacy reflects one's ability beliefs in general, while task-specific self-efficacy reflects the individual's ability beliefs for a specific task. Both forms of self-efficacy may influence how entrepreneurs seek help, but we anticipate that general self-efficacy will be the more important characteristic.

Specifically, one's conviction regarding the ability to perform influences the amount of effort put forth and perseverance demonstrated when obstacles are present (Bandura 1977, 1986). When an entrepreneur has a strong sense of self-efficacy, this has a direct influence on their ability to cope with problems, their decision to seek help, and ability to put forth the effort required to sustain their venture. Thus, similar to general cognitive ability, we anticipate that there will be a negative relationship between self-efficacy and help-seeking (cf., Cleavenger et al. 2007) as more confident entrepreneurs pursue resolution of the problem on their own than less confident entrepreneurs.

Similarly, we anticipate that general self-efficacy will differentiate from whom entrepreneurs will seek help. Specifically, as general self-efficacy increases, we anticipate that entrepreneurs will seek help more from social sources of help, rather than economic sources of help, because they believe they possess the ability to meet future reciprocity demands. Similarly, entrepreneurs low in general self-efficacy also may lack belief in their ability to identify and leverage help from others, leading them to pursue help from economic sources. Thus, we propose:

Proposition 4 *Entrepreneur differences affect the help-seeking process. Specifically, an entrepreneur's need for achievement, political skill, general cognitive ability, industry experience, and self-efficacy all influence when the entrepreneur engages in help-seeking, and the selection of source of the help-seeking request.*

Although we have discussed how entrepreneur differences theoretically impact their help-seeking responses, we also recognize that some of these differences may

interact with one another. For example, we anticipate that need for achievement and general self-efficacy will interact to influence entrepreneur help-seeking responses. Specifically, since general self-efficacy is an ability belief, entrepreneurs would be expected to pursue help from others as their need for achievement increases, but also when they believe they cannot resolve the dilemma themselves (i.e., low task- or general-specific self-efficacy). However, entrepreneurs lower in need for achievement may tolerate unresolved problems longer, particularly if they lack the efficacy to resolve the issue themselves. Thus, we highly anticipate that these individual differences will operate with one another.

Beyond their personal traits and characteristics, entrepreneurs are influenced by the context of the industry in which they are involved (Johns 2006). Consequently, we now consider how industry differences affect entrepreneur help-seeking.

Industry Differences

Variations among industries have a profound impact on the number of new ventures founded. Factors such as the level of competition, income potential, and growth all affect the number of new ventures created (Shane 2003). Research argues that differences such as knowledge conditions, market variations, life cycle, and industry structure impact opportunity exploitation and, therefore, venture creation (Shane 2003).

Help-seeking behavior particularly impacts knowledge conditions which are defined by Shane (2003) as "aspects of the industry that affect how people gather information about the production of goods and services" (p. 120). Demand conditions and an industry's life cycle are industry differences that are not easily manipulated or malleable. However, based on the resources and knowledge available, knowledge conditions can create an opportunity for venture success if help-seeking is leveraged effectively. Help-seeking can provide the entrepreneur insight into how new knowledge is created as well as the source of new knowledge (customers, suppliers, etc.).

Furthermore, industries vary in competitiveness such that some industries normalize helping behaviors while others stigmatize those behaviors because individuals in those industries see helping others as an appropriate or inappropriate based on the professional norms (Bruton et al. 2010; Scott 2007). Also, some industries have high entrance barriers that can inhibit entrepreneurs from starting new ventures without the assistance of someone who is knowledgeable about the type of business.

Institutional theory states that behavior is often influenced by normative values in professional and organizational interactions (Bruton et al. 2010). These systems of norms within an industry provide guidelines that can either promote or discourage help-seeking by shaping individuals such that they support or limit the behavior.

For example, in emergent industries with few key players, entrepreneurs are likely to have less access to economic sources of help and may even have to rely on competitors for needed assistance via the mechanisms of competition. However, entrepreneurs in more mature industries may have greater economic resources available to support their new ventures. Thus,

Proposition 5 *Entrepreneurs in emergent industries will be more likely to seek help from social, rather than economic, sources of help than entrepreneurs operating in mature or maturing industries.*

4 Potential Outcomes of Entrepreneur Help-Seeking Behavior

In spite of the significant literature addressing the process of help-seeking and helping, many outcomes of help-seeking are only implied in the current literature (e.g., Cleavenger and Munyon 2015). However, for entrepreneurs, the potential consequences of help-seeking include reciprocity demands, time demands, burnout, venture survival, and functions; as well as health and well-being outcomes for the entrepreneur. The potential outcomes of help-seeking behavior stretch beyond the boundaries of the new venture and also include the entrepreneur's well-being and relationships. We now briefly consider these outcomes.

4.1 Reciprocity Demands

Although help-seeking has been widely viewed as a positive construct in the literature, it is not wholly without consequence. Reciprocity has been characterized as a shared exchange of goods and services (Gouldner 1960). According to Gouldner (1960), reciprocity comes with its own set of consequences; i.e., when we engage in social exchange, such as help-seeking, we become obligated to someone based on that individual's past behaviors. Thus, the help recipient has conditional obligations based on the perceived value of the help received.

4.2 Time Demands

Help-seeking does not occur without some cost. Identifying the problem, selecting the appropriate person or venue to ask for help, and actively pursuing that option all require a time investment (Lee 1997). Entrepreneurs often seek help early in their ventures when time, along with other resources, is limited. The challenge of seeking needed help without creating more problems by taxing the entrepreneur's limited time and energy can lead to additional strain.

4.3 Stress and Strain

Work that includes high demands and low resources often increases stress (Cardon and Patel 2015). Entrepreneurs tend to face both of these issues because they are required to fulfill many different roles while seeking both to establish legitimacy and gain resources for their venture, often without social support (Baron 2010; Cardon and Patel 2015). Entrepreneurs may seek help in order to mitigate some of the role ambiguity and stress that they are experiencing.

In addition, the entrepreneur faces strain based on the social costs of seeking help. By seeking assistance, entrepreneurs admit a lack of both knowledge and competence, thus threatening their sense of power and self-image (Lee 1997).

Although much of the helping literature's focus has been on the help-seeker, there are some implications for helpers that should also be noted. Providing help to others involves both costs and benefits. According to Uy, Lin, and Ilies' study (2017), help-givers found that while some work-related behaviors were depleting and emotionally exhausting, helping others provided them with a renewed sense of self. Lanaj et al. (2016) found that while some individuals were motivated by such prosocial behaviors, others who desired to be helpful still found the effort depleting due to consumption of attention and energy. Furthermore, when researching help-seeking among teammates, Mueller and Kamdar (2011) found that high levels of help reduced creativity within the team; thus these researchers concluded that the reciprocal relationship of helping could diminish benefits over time.

4.4 Venture Survival and Functioning

It is challenging for entrepreneurs to acquire the knowledge necessary to successfully establish and grow their ventures (Kirchoff 1994). Engaging in help-seeking allows the entrepreneur to gain information and resources that support a positive result for their venture (Studdard and Munchus 2009). Lee (2002) found that help-seeking behavior has a significant, positive effect on organizational success because of knowledge gained in the process. This knowledge is a positive consequence of seeking help. The entrepreneur is better able to acquire and leverage resources, thus minimizing the risk of failure and lack of growth that often occur with new ventures (Aldrich 2000; Kirchoff 1994; Studdard and Munchus 2009).

4.5 Entrepreneur Health and Well-Being

Cardon and Patel (2015) found not only that entrepreneurs experience higher levels of stress than employees, but also that the effects of the stress are different for entrepreneurs due to increased complexity and uncertainty. This stress has a strong

negative impact on their health and well-being over the long term and is exacerbated by the lack of social support the entrepreneur often experiences (Baron 2010; Cardon and Patel 2015). Help-seeking assists in mitigating these effects by providing the entrepreneur much needed support as well as reducing the strain of role ambiguity, defined as "the perceived uncertainty of how to perform in the role of entrepreneur" (Wincent and Örtqvist 2009, p. 227; Buttner 1992; Cardon and Patel 2015). Thus, we propose:

Proposition 6 *Entrepreneur help-seeking affects their personal reciprocity demands, time demands, and stress and strain. The help-seeking process also has venture-level implications for functioning and survival. Finally, the help-seeking process affects the entrepreneur's personal well-being and relationships.*

5 Discussion

Help-seeking commonly occurs in everyday society and is an important part of how people overcome challenges such as lack of a particular skill or information. Social psychology has described the many individual-level antecedents and various processes influencing a person's choice to seek help or not, but very little is known about how these factors interact in the entrepreneurial context. Thus, this essay's primary intention is to theorize how entrepreneurs choose to seek help, and how this process impacts their well-being and the functioning of their ventures.

Demonstrating the intersection of help-seeking and entrepreneurship, this essay contributes in several ways. Most research examining help-seeking behavior looks through the lens of psychology and social psychology, and researchers have then connected it to the broader organization literature. While these studies are important and lay a strong foundation as to how help-seeking influences environmental processes, the behavior has not been related directly to entrepreneurs who provide a unique context through which to study help-seeking.

Similarly, this paper contributes to the help-seeking literature by identifying contextual conditions that suggest help-seeking may be different in the entrepreneurial context. Help-seeking has distinctive features that are contrary to what research shows about entrepreneurs, namely that their need for independence and their strong identification with their ventures can potentially provide additional challenges to engaging in help-seeking behavior. The decision to seek help can positively and negatively affect the entrepreneur, representing a potential trade-off. Soliciting assistance from others allows the entrepreneur to gain needed information and resources to solve problems more efficiently. Conversely, help-seeking is also costly in terms of both the time required to select the proper source of help and potentially stressful future reciprocity expectations. Our model extrapolates several of the conditions that affect this trade-off, enabling future researchers to theoretically test how entrepreneurs gain needed assistance.

Third, this work also contributes to the entrepreneurship literature by developing theory for a previously neglected "black box." Entrepreneurship literature to date has largely neglected the help-seeking process, and our model enables researchers to consider how cognitive decision-making processes innate in help-seeking impact entrepreneurs and their ventures.

Fourth, new ventures differ from more established organizations in several ways. These differences impact how entrepreneurs develop their own means of gaining needed information and resources in order for their ventures to survive, and this paper is one of the first to differentiate new ventures from more established organizational forms. In doing so, we provide scholars with new insights into the unique contextual challenges that entrepreneurs face, and, by extension, offer new insights into factors that potentially differentiate new venture success or failure.

Finally, this conceptual paper has both theoretical and practical implications. By examining help-seeking behavior within a new context with attributes that differ from established organizations, we can assist with informing entrepreneurs and entrepreneurship researchers as to how entrepreneurs can best implement help-seeking behavior in order to allow them to operate their ventures more efficiently and improve their outcomes.

Limitations

There are several limitations that impact this essay. First, our model is theoretical and conceptual in nature. As such, we are aware that it is overly simplified, and that future research will be needed to "fill in the gaps" with regard to the complex process of help-seeking. Second, our model is necessarily cognitive in nature, describing the decision-making process of help-making for entrepreneurs. In doing so, we are aware that we have neglected the affective, or emotional, components that may also play a powerful role in help-seeking. Emotions such as pride, hope, enthusiasm, and even despondency can powerfully impact how individuals make decisions, and future research is needed to unpack how emotions impact the help-seeking process for both entrepreneurs and non-entrepreneurs. Third, we recognize that our theory primarily applies for sole entrepreneurs, rather than new venture teams, and that new venture teams will likely pursue help in different ways than sole entrepreneurs. Specifically, new venture teams may face less of a need for help-seeking because they possess greater knowledge and other resources to tackle venture-related problems. However, access to these individuals also means exposure to a greater number of personal and situational constraints, suggesting that new venture team resources come with "strings attached." As a final limitation, our model implies that helping is received, and that such help subsequently impacts the venture. As the study of entrepreneur help-seeking is in its infancy, this is appropriate and commensurate with the limitations of a single essay. Nevertheless, prior theory (e.g., Bamberger 2009; Cleavenger and Munyon 2015) suggests that help-seeking may not be effective in gaining needed assistance. Thus, the timing and quality of received help is of critical importance for future researchers.

In addition, we acknowledge that teams rather than individual entrepreneurs create many new ventures. The model described here is limited in that we are

focused on the individual entrepreneur, thus team level dynamics that are often present in start-ups are not considered here. This change would create a shift in the approach to problem-solving and help-seeking behavior. The authors consider help-seeking among founding teams to be a strong area for future research.

Future Research

One implied aim of this essay was to highlight the critical importance of help-seeking processes for entrepreneurs, and there are a number of ways for future research to progress beyond our theoretical treatment. First, we encourage scholars to begin empirically testing the relationships that we have specified in this essay using primary data. Although secondary data is quite useful for establishing antecedent–consequence relationships in entrepreneurship, primary data is powerful as a tool to "get inside the head" of entrepreneurs, and survey-based and experimental approaches offer particular promise here (cf., Jiang et al. 2018).

Second, we encourage scholars to enrich the specification of our theoretical model. For example, there is great promise to explore where entrepreneurs gain assistance at different stages of their venture's development. We have assumed a largely static framework in our model, but it is likely that entrepreneurs learn and adapt their help-seeking behaviors as the venture grows and begins to mature, and we anticipate that the relationships in our theoretical model will operate recursively across time.

Third, entrepreneurs are often bound by the influences of angel and venture capital partners as they grow their ventures. We anticipate that the presence of angel or VC partnerships will change how entrepreneurs seek help, and may indeed provide them with a context more similar to established organizational forms, complete with role requirements and demands from concerned investors. Thus, external funding sources may influence how entrepreneurs gain needed assistance in an effort to "protect their investments" and ensure that the new venture remains viable.

Finally, it would be fruitful to explore how social learning and help-seeking occurs for entrepreneurs who grew up in entrepreneurial families, or who are in close relationships with successful entrepreneurs. On one hand, social learning may be easier for entrepreneurs who have easy access to entrepreneurs in their family and friend networks. However, on the other hand, entrepreneurs may be less likely to seek out help from these friends as they desire to demonstrate their unique capabilities in beginning and growing new ventures.

Finally, given the difficulty of capturing the help-seeking process in the field, we encourage scholars to pursue alternative sources of research, such as experiments and even content analyses of biographies and historical works. Our understanding of entrepreneur help-seeking processes will be greatly enhanced by the use of multiple methods.

6 Conclusion

Help-seeking is a critical process at work, and this essay considered how entrepreneurs seek help to guide the development of their new ventures. Specifically, in this essay, we considered the problem characteristics that catalyze a help-seeking response, how entrepreneur differences bound these relationships, the economic and social sources of help available to entrepreneurs, and the personal and venture-related consequences associated with help-seeking. Our essay establishes a foundation for the study of help-seeking in new ventures, and we hope that it will stimulate new research to improve the success of new ventures.

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Conflicts and Negotiations in the Intergenerational Succession of Family Firms: A Literature Review

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Abstract This chapter intends to stimulate a serious debate on the topic of conflict in family businesses and the theory of negotiation as a tool to resolve these conflicts. The methodology is based on the survey of the main literature on these topics. Although both literatures on conflict management and family business are highly developed, scholars and researchers have not yet deepened several areas of specific conflicts emerging in family businesses. Thus, the two filed are not yet fully integrated, showing a potential for future research avenues. We then propose a research agenda identifying the issues and research gaps that should be explored by researchers to reach a deeper understanding on conflict resolution in family businesses.

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1 Introduction

Nowadays, family businesses play a fundamental role in the economic development of all countries of the world, and they have always represented one of the key elements of capitalist models. According to data provided in the Business Yearbook 2014, family businesses anywhere in the world represent the majority of all businesses. They also represent the category of companies that most of all contribute to the production of the GDP: 70% of GDP was produced by family companies in Europe in 2014. These statistics have been studied by academic scholars (Sharma et al. 1996; Shepherd and Zacharakis 2000), according to which family companies control a huge percentage of GDP in most capitalist countries. Family businesses also use more than 80% of the workforce employed overall by all companies (Neuberg and Lank 1998).

Intergenerational succession is a critical aspect of family businesses. It is estimated that only 30% of family businesses survive after the first generation (Davis and Harveston 1998; Handler 1990, 1992; Ward 1997). Several scholars have identified different causes of generational change failures, such as inability of the incumbent generation to step down, lack of engagement of incoming generation, conflict of visions between heirs, and lack of planning and preparation for the succession (e.g., Dyer 1986; Gersick et al. 1997; Handler 1990, 1992, 1994; Kets de Vries 1996; Kets de Vries and Miller 1984, 1987; Lansberg 1999; Miller 1991, 1993; Morris et al. 1997).

Family businesses live within themselves intense conflicts, and this is mainly due to the fact that the members managing the company are bound together not only by co-ownership, but also by family ties and this creates a nexus of economic and family-centered goals to be simultaneously achieved (Kotlar and De Massis 2013). Due to this fact, the relational equilibria within family businesses are very delicate, and therefore subject to a greater amount and intensity of conflicts.

A specific field of research called conflict management dedicates one of its main streams to the theory of negotiation. After some early contributions (Fisher and Ury 1981; Raiffa 1982), the milestone of the field is the work of Lax and Sebenius (1986) who have tried to reconcile previous studies by encouraging the spread of negotiation theory in management area (Caputo 2011).

A relevant topic in the conflict management literature is related to the activity of mediation and the role of the mediator, as an effective mechanism for mitigating and resolving conflicts. This aspect plays a very important role "to make the negotiation more viable" (Carnevale and Pruitt 1992), through the improvement of the communication flows and the increase in the level of trust between the parties involved. The issue of mediation of conflict, despite being the subject of specific attention for some decades (i.e., Pruitt and Kressel 1985), is a field not completely explored, but potentially very profitable, even in the context of the contrasting dynamics that characterize the business environment.

However, although the literature on these two strands, i.e., conflicts in family businesses and conflict management, is very wide, scholars have not yet fully

deepened several areas of conflict management in family businesses. In other words, the two strands of the literature are still not fully integrated today. Thus, there are no comprehensive studies with a general application of conflict management theories to conflict resolution in family businesses.

This chapter intends to propose a critical literature review on the topic of conflict in family businesses and negotiation theory. The chapter also proposes a research agenda to identify issues and research gaps that should be explored by researchers to reach a more mature literature on conflict resolution in family businesses.

The chapter is organized as follows. After this introduction, the second section presents literature on family business in order to frame the main features of family companies and the importance of the family members' skills. The third section presents literature on conflict management and the theory of negotiation. The fourth section focuses on types and characteristics of conflicts in family businesses, with particular reference to the intergenerational succession. In the conclusion section, finally, the research gaps are found, and a useful research agenda is proposed in order to integrate these two research fields stated in the previous paragraphs. Following this framework, it would be possible to develop in the future a new body of literature related to the resolution of conflicts among family members.

2 Family Business

2.1 Definition and Characteristics of Family Businesses

Giving a definition of family business is quite difficult; even in the literature, there is no fully agreed definition (e.g., Astrachan et al. 2002; Borheim 2006; Litz 1995). However, there are certainly some elements that help to clarify the characteristics of family businesses (Lambrecht and Naudts 2008; Mandl 2008):

- The founder (or an heir of the founder) is the head of the company.
- Other family members are employed in the company and/or participate in the property and/or the internal decision-making process.
- Nonfamily managers (if any) are aware of being influenced decisively in their actions by the family group.

The European Commission has also provided a definition of family business, i.e., companies of any size where:

1. The majority of decision-making rights are in the possession of the natural person (s) who established the firm, or in the possession of the natural person(s) who has/have acquired the share capital of the firm, or in the possession of their spouses, parents, child, or children's direct heirs.
2. The majority of decision-making rights are indirect or direct.
3. At least one representative of the family or kin is formally involved in the governance of the firm.

4. Listed companies meet the definition of family enterprise if the person who established or acquired the firm (share capital) or their families or descendants possess 25% of the decision-making rights mandated by their share capital.

Corbetta (1995) defines family business a business in which one or a few families, linked by ties of kinship, affinity or strong alliances, holds a sufficient share of risk capital to ensure the control of the business itself, even if this effective and governance control is carried out by directors and/or managers outside the family (but trusted and close to the family people), till including the case in which no member of the owning family is engaged in the management of the company.

Other authors apply a family ownership index, where the intensity of family control is measured through the percentage of family-owned shares (Dyer 2006). Martínez et al. (2007) define a company "family-controlled" if one of the following conditions exists: (a) control by a family made through the election of the majority of the *board* members, with direct participation of family members in the board and/or the top management; (b) control through the election of a majority of members in the board by a group of families (two to four), with direct participation of family members in the board; (c) the company belonging to a group of companies associated with a family; (d) company belonging to a group of companies associated with an entrepreneur who, despite not having direct descendants, have designated their successors among his family.

Thus, a common element of all these definitions that characterize the company as a family business is the role of the founder, whose presence in top positions of the managerial structure gives greater strength to the familiar character. Anderson and Reeb (2003), for example, consider, among discriminating elements, the condition that the Chief Executive Officer is the founder or one of her/his descendants. This centrality undoubtedly has a greater importance in the case of smaller family businesses, where the entire organization, management and governance are shaped to fit the entrepreneur, from who they receive a unique imprinting. Another common aspect is the family involvement (Chrisman et al. 2010) that also defines the behavioral aspect of being a family business (Chua et al. 1999).

2.2 *The Skills of Family Members and Training in Family Businesses*

The issues of training and development of individual skills assume a particular emphasis in family businesses and even more if the generational passage is considered (Gersick et al. 1997; Handler 1992; Mazzola et al. 2008). In fact, the investment in training and development of individual skills of family members, especially young generations that will guide the company in the future, is essential in order to ensure continuity in time in the family business (Barbera et al. 2015).

In family businesses, training first of all is considered as the best tool for the gradual integration in the company of family members (Handler 1990). This training

for integration of a family member presents elements of substantial differentiation with respect to the training for the entrance of external managers in the company. For nonfamily managers, vocational training is generally carried out before joining the company, and it aims to fill up the expertise gap in the organization. In the case of family members, instead, training and skills development can take place not only before the integration, but it is on ongoing process even after joining the family business. Indeed, the goal is not simply to fill skill gaps, but more broadly, encourage the entry of a member who will reap the family-business values and the relation system with stakeholders, in order to ensure continuity in the future generational change.

The training strategy must therefore be appropriately defined to ensure business continuity in generational change. According to Meignant (2009), there might be some critical points in translating the orientations into effective training policies consisting of concrete objectives, achievable and compatible with the human and financial resources available, based on the proper definition of the requirements sources and the characteristics of the recipients of the interventions.

The success of a training strategy and development of the skills of a family can be attributed to three factors:

1. Individual factors (skills, competencies, knowledge, relationships).
2. Business environment factors (opportunities, constraints and limitations inherent to the business system that depend on the organizational structure, on the market, the company history, etc.).
3. Training strategy, which includes multiple possibilities of focusing:
   - General management training, meant as training for the development of managerial skills, which can be acquired through traditional channels of learning (universities, specialized studies) or personal experience (learning by doing, even in different operating environments)
   - Sector and function training, i.e., specialist studies necessary to operate in competitive sectors or specific business functions, which develop mainly with field experience
   - Training for succession, finalized to the transfer of corporate knowledge (history and values of the company and the family) in the generational succession perspective (Daspit et al. 2015)

The family member, before and after joining the company, needs to develop some skills. The family member competencies are based on knowledge, skills, and abilities in a professional environment, and these must be recognized by other members of the company through both formal (assessments) and informal (reputation) judgments (Le Boterf 1994).

Speaking of skills, in the literature, the issue of the translation of knowledge into skills has been addressed through empirical studies related to decision-making problems, through organizational learning and through empirical studies aimed at identifying the main areas of concern (e.g., March et al. 1993; Weick 1995). Other management studies (e.g., Argyris 1984; Normann 1979; Porter 2001) have

addressed the issue of skills at a business level, which highlight the importance of skills and core competencies and of detection mechanisms and their reinforcement, as a source of competitive advantages over competitors. Other contributions can be attributed to the resource-based approach, whose first developments date back to the eighties of the last century (e.g., Rumelt 1984; Wernerfelt 1984). The first elements of this vision had already been proposed in earlier studies (e.g., Penrose 1959) and then integrated with the dynamic skill theories that widely expanded the analysis perspective (Teece and Pisano 1994). Attention has been paid to the huge role of all resources, defined as all assets, capabilities, skills, organizational processes, corporate characteristics, information, knowledge for survival, growth, and overall effectiveness of the company (Barney 1991, 2006; Peteraf 1993).

The achievement of competitive advantage is based on scarce company resources, so even on internal expertise that each company possesses (Kraatz and Zajac 2001). The competence-based view is an interesting theoretical evolution, aimed at overcoming some of the limitations inherent to traditional formulations of the resource-based view. It is important to note that the jurisdiction that the authors refer to is not considered as a characteristic of individuals, but it is more properly conceived as a set of transversely spread knowledge and skills in the organization. This aspect assumes a specific importance for family businesses, considering the indissoluble bond that can be licitly postulated between culture and values of the business system and the family.

Training allows a progressive alignment of attitudes and personal skills to the organization's needs. According to Bonti (2012), among the lines of development for small and medium-sized enterprises it is necessary not only to a balanced mix of entrepreneurship and managerial skills, but also the processes of learning and development of organizational skills.

Nonaka (1991, 1994), about the methods of creation and dissemination of knowledge, distinguishes between an explicit knowledge, that is formalized and, therefore, easier to transmit, and the tacit knowledge embodied in individuals, which consists of technical knowledge and cognitive elements. The new business knowledge, tacit and explicit, originates from the interaction between individuals and more complex aggregations (groups, company organization, social systems), through different ways (socialization, externalization, combination), triggering what the author calls "the spiral of knowledge in organizations": this construct approaches the individual and social dimensions of knowledge, enhancing the necessary interactions.

The recognition of competences is functional to the overall improvement of the performance of family business, which depends on the coordinated contribution of each family member. In this view it is interesting to refer to the theoretical approaches that favor a stronger focus on the individual perspective (Boyatzis 1982). Spencer and Spencer (1993) develop a definition of competence as individual intrinsic characteristic, made up of differentiated and uneven elements, such as the following: motivations that push a person to act; the traits from which cometh the propensity to adopt certain behaviors or reactions; self-image, which sums up the perception of self in relation to own values and attitudes system; knowledge, referring to the ability to

choose the best option in a given situation (although not involving a conduct necessarily conforming to such awareness); and the skills, i.e., the ability to perform a job effectively. The skills building activities aim at achieving, as defined in the model of Boyatzis (1982), the so-called actions or superior behaviors which originate from the combination of the main factors that influence the effectiveness of a person's behavior, such as individual skills, organizational environment, and the peculiarities related to the specific role played in the organization. Boyatzis also distinguishes between the threshold skills necessary to perform duties at a level that can be considered acceptable, from the distinctive ones which possession is a prerogative of the best performers.

Some authors (Ellström 1997) differentiate among competence and qualification; in the first, skills are the human capital attributes that can be transformed into productivity, while the qualification is the prerequisite for the performance of certain tasks. Other authors (e.g., Tanguy 1998; Zimmerman 2000) showed that there is no automatic link between obtaining qualifying titles and the actual possession of necessary skills to cover certain roles.

In addition, in the knowledge transfer to a family member, the only experience that the person owns in the company is not sufficient to ensure automatic skills' transfer. According to Lévy-Leboyer (2009), the experience, in order to be able to really help skills development, must have certain characteristics: it must make changes in the roles and responsibilities that follow from the taking of decisions; there must be a reworking process of information which people would make the most of; the nature of the experience, finally, must present a certain degree of consonance with the individual's cognitive style.

The family member, to be competent, must "learn to learn" from different sources and through multiple learning, growing and qualification pathways. In this process of skills development lurk critical issues connected to other people's expectations, to pressures and personal motivations, which may be a propulsion element or a brake in skills development.

3 Conflicts and Conflict Management

3.1 Type of Conflicts

In the literature, three types of conflicts have been identified: task, process, and relationship conflict (Jehn 1995, 1997a). The task conflict regards issues that may arise in the discussion of the objectives and business strategies. This type of conflicts can improve decision quality by threads. However, only moderate task conflicts can bring benefit to teamwork. Companies with high levels of task conflict, in fact, may have problems in terms of "efficiency of relationships" (Zacharakis et al. 2010), or in completing their goals for excess of conflicts, while companies with low levels of task conflict often remain stagnant and have a lack of development of new strategies because of low intensity discussions on business objectives.

The process conflict arises from disagreement on how to do the work and internal processes, and what are the tasks to be performed by employees/members. Therefore, this conflict refers to responsibilities and tasks that are assigned to the various individuals within the company.

Finally, unlike the task and the process, the relationship conflict has an important affective component. In particular, the relationship conflict occurs when there is personal and human incompatibility between members of the company. There may be an affective conflict even in the case of "psychological contract violations", that is, when one party fails to meet "expectations about what each party is entitled to receive, and obligated to give, in exchange for another party's contributions" (Parhankangas and Landström 2004). This kind of violations can lead to "constructive or destructive responses" and to a strong increase in all levels of conflict, reverberating both on the task and process conflicts. The affective type of conflict may adversely affect the results of a company because it causes stress, hostile behavior and the perception that the other members have ulterior motives. The three types of conflicts described so far up to now, although distinct, are certainly connected to each other: as stated by George et al. (2016), task conflict may also have "negative implications by increasing the level of affective conflict" and increasing also "the level of process conflict."

Another classification distinguishes between cognitive and process conflict (Jehn 1992, 1997a, b; Jehn and Mannix 2001; Putman 1994). Cognitive and process conflicts are work-related conflicts lacking negative emotions (Jehn 1994, 1995) that are evaluated positively because they increase options, prevent premature consensus, and encourage the involvement of workers (Tjosvold 1991; Wall et al. 1987). The cognitive conflict is related to disagreements linked to operational work and strategies to be pursued (Jehn 1997b), while process conflict relates to discussions about who is responsible for each task (Jehn and Mannix 2001).

Family businesses are often criticized because they limit the participation in the company's decision-making process to family members (Eddleston and Kellermanns 2007; Stavrou 1999) and because they hire people only because of their family status and not of their qualifications (Kellermanns and Eddleston 2004). For these reasons, the two types of conflict may be particularly important for the success of family businesses, and they need a better management. Conflicts, therefore, must be well addressed and understood, instead of being avoided (Kaye and McCarthy 1996). In this discussion, it will be addressed with major emphasis on the stagnation perspective of family business (e.g., Schulze et al. 2001); however, this does not neglect the fact that even more virtuous and steward family business (Miller et al. 2008) may face similar problem at least potentially.

The cognitive conflict focuses on objectives and strategies that a company should pursue. Previous studies have consolidated the idea that the cognitive conflict increases the opportunities to be included in a possible of choice and their quality (Kellermanns and Eddlseton 2006). In general, the cognitive conflict improves decision-making by articulating more discussion on what specific tasks need to be addressed. The cognitive conflict facilitates the critical assessment of problems, ensuring that the major alternatives would not be neglected and also more innovative

or non-conform solutions would be evaluated (Jehn 1995). Actually, if problems are seen in a different way, and the differences are discussed openly and without the involvement of emotions, critical and negative thinking of the group can be avoided and a greater consensus on issues can be reached (Jehn 1994, 1997a; Kellermanns and Floyd 2005). The presence of cognitive conflict can be particularly useful in family businesses in order to allow these companies to constantly analyze their strategies and their goals. It can help people identifying and better understanding the problems that the company faces (Putman 1994) and developing new ideas and innovative approaches (Baron 1991). In addition, it was shown that such conflict increases creativity while at the same time reduces opportunistic behavior of individuals (Jehn and Bendersky 2003).

Family businesses often suffer from a stifled growth because they fail to adapt their strategies to changes in the environment and tend to limit the participation to family members in the decision-making process. Therefore, the cognitive conflict can have in many cases a positive effect on the performance of family businesses by facilitating the critical evaluation of strategies and company's work (Eddleston and Kellermanns 2007).

The process conflict focuses on how the capacities of individuals can be used to perform a specific job (Jehn and Bendersky 2003). In particular, this conflict stimulates discussion on how a job should be done and how workers should be managed in the company (Jehn and Mannix 2001). Its functionality is therefore helping to ensure that an appropriate role is assigned to the most skilled person (Jehn 1997b). The effects of this type of conflict on performance are not always consistent (Jehn and Mannix 2001). However, researches confirm that when assigning roles and responsibilities and changes must be imposed, process conflict increases productivity and group performance (Jehn 1997b). Since in family companies, family members are often hired because of their family status and not because of their qualifications, such conflict could be particularly important (Kellermanns and Eddleston 2004). An excessive presence of not completely qualified family members is likely to be less accurate in the strategic action and have less chance to survive in the market (Lansberg 1983). These companies, therefore, are mostly in need of process conflict to actually use the talents of various family members (Kellermanns and Eddleston 2004). To achieve this, it must be taken the best from each family member, taking advantage of all their potential, and this can establish an effective control group for the company (McCann et al. 2001). The process conflict promotes the discussion of technical qualifications (Jehn 1997b), mostly important for family business, because family members occupy the highest positions in the organization (Kellermanns and Eddleston 2004).

In summary, the cumulative effect of process conflict should lead to the increase in the adequacy of tasks, to the improvement of resource allocation, and to the reassessment of the standards over time, resulting in an improved business performance (Jehn and Bendersky 2003).

3.2 Conflict Management and Negotiation Theory

Generational conflicts especially during successions are likely to occur. Thus, traditional approaches and theories of conflict management could be useful. In order to preserve the familiar nature of company's balance over time, it is necessary to understand, anticipate, and manage the conflicts that arise at different stages of the succession process between generations.

Over the years negotiation theory has been proposed, which assumed, as a principal target of the investigations, the development of techniques and models to solve business problems and also political conflicts. In the field of study on strategic ways of cooperation between companies, management theorists deepen the aspect of decision-making processes commonly known as "negotiations" (Barile 2009; Caputo 2011, 2013; Ceccanti 1962; Della Piana and Testa 2009; Garrone 1914; Gatti 2008; Gulliver 1979; Lax and Sebenius 1986; Lewicki and Litterer 1985; Raiffa 1982; Rubin and Brown 1975) with a specific highly interdisciplinary line of studies called negotiation analysis, that is still a quite recent topic (Lewicki et al. 1996, 2014).

Some authors define negotiation as a decision-making process aimed at conflict resolution (Garrone 1914; Rubin and Brown 1975). Zartman (1977) defines negotiation as a joint decision-making process between two or more parties in order to combine conflicting positions in a single decision. Other authors (Gulliver 1979) introduce in their definition the new concept of interdependence among parties, resumed and expanded in the economic sphere. Pruitt (1981) and Raiffa (1982) place emphasis not only on classification as a joint decision-making process among interdependent parties, but also on the differences between the interests of the opportunistic and partially in conflict nature of parts. Gatti (2008), qualifying negotiation both as a way to take joint decisions between multiple parties and as a process, defines it as a joint decision-making process between two or more individual or collective actors.

Lax and Sebenius (1986) argue that this process can end up with an agreement achieved through an activity of creative research. Negotiation occurs in a situation where two or more parties have a conflict of interest, but at the same time share a zone of possible agreement (ZOPA) because of which differences can be resolved. In these cases, the parties prefer to resolve the conflict through a mutual agreement rather than taking harder and suffering methods (Ogliastri and Quintanilla 2016).

Studies relating to negotiation in management have focused mainly on the negotiation processes among companies, customers, and suppliers (Ceccanti 1962; Lax and Sebenius 1986). They usually adopt the following: (a) a normative approach (based on some classical economic concepts as the objective or absolute rationality and the maximization and optimization concepts), (b) a descriptive approach (based on the actual behavior of individuals and thus based on a deliberate and bounded rationality that leads to satisfactory decisions), and (c) a prescriptive approach (aimed at providing pragmatic advice, weighted on decision-makers and problem's characteristics, in order to improve decision-making process of limited rational

individuals). Raiffa (1982) points out that these orientations should be considered complementary and not alternative, in order to catch and exploit the possibilities of interaction.

Negotiation theory has a prescriptive nature, and it is configured as a synthesis of the economic-mathematical and socio-psychological approaches (Caputo 2011). The first works related may be considered two: Fisher and Ury (1981), which is closer to the psychological and behavioral doctrine, and Raiffa (1982), attributable to game theory and, more generally, to mathematical-statistics disciplines. Lax and Sebenius (1986) have sought to reconcile the two previous approaches, contributing to the spread of negotiation theory in management (Caputo 2011).

During the years, several theories regarding negotiation, its aspects and different solutions for its use in the most efficient and effective way have been developed. According to Fisher et al. (1991), four principles have to be followed in negotiation: separating people from the problem; focusing on the interests of the individual parts; create alternatives for a collective gain; define certain objective criteria. These authors follow a rational approach, advising negotiators to leave emotions out of the process as much as they can, as well as it happens with cognitive and process conflicts (Ogliastri and Quintanilla 2016).

Today many researchers instead focus on emotions in negotiation and on how emotions are linked with personal differences in the negotiation process. Pinkley (1990) argues that negotiators should focus on the following factors: the way to look at the parties in conflict and the interests they bring (incompatibility, emotions, results), the conduct of the conflict (winning or seeking compromise), and time that has to be taken into account (will there be relationships among parties even after the outcome of the conflict?). Pinkley and Northcraft (1994) also argue that these cognitive frameworks do not affect only the content of the agreement, but also the products of negotiation.

The negotiation theory implies not perfectly rational actors, with emotional and cognitive limits (Cyert and March 1963; Simon 1957) and without a perfect and collective knowledge of the situation, of the possible interests and of the counterparty behavior (Lax and Sebenius 1986).

Sebenius (1992) describes some key features of negotiation in management. He assumed that negotiating parties give feedback on probability of events and outcomes of negotiation, and therefore they do not depend on game configuration. In addition, he assumes that the outcome of negotiations depends significantly from subjects' perceptions of the parties (radical subjective perspective). In this formulation, the possibility of the existence of inefficient agreements (possibility that the parties leave value on the table) appears, and the need for a possible positive zone agreement in a way that the parties can reach an agreement is assumed (Zone Of Possible Agreement—ZOPA).

The ZOPA is the set-intersection of the sets representing the different configurations of interests of the parties involved. The ZOPA can be represented by a Euler-Venn diagram. Thus, in order to have the possibility of reaching an agreement among the parties that are negotiating, the ZOPA must necessarily exist (Fig. 1).

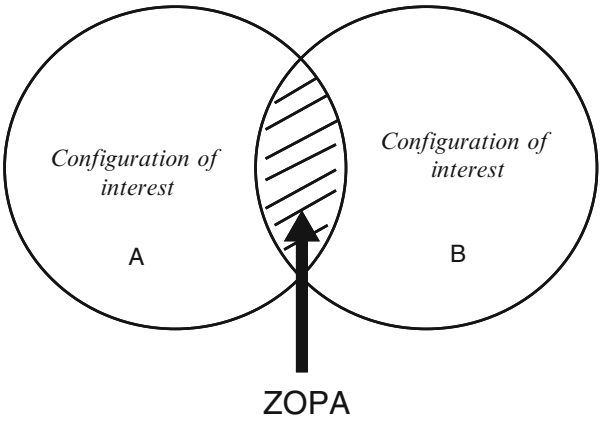

Fig. 1 The Zone of Possible Agreement (ZOPA) (Source: readapted from Caputo 2011)

Literature, over the years, has focused on locating, enlarge, or even create this ZOPA, in order to increase the chances of reaching an agreement among the parties involved in the negotiation. The main path identified to work on ZOPA is intervening on the elements of the negotiating structure. According to Gatti (2008), the negotiation structure is the set of components and relations among them that is the basis of negotiation as a joint decision-making process.

The negotiating structure is constituted of three basic elements: (a) number of parties involved; (b) number of issues of negotiation; (c) preferences and, therefore, the parties' interests. This approach allows the classification of negotiation according to the three above criteria.

Therefore, negotiations can be distinguished among bilateral or multilateral (Raiffa 1982) and parties, likewise, can be configured as individual or collective, depending on whether negotiation is carried out by either an individual or a group of individuals. Moreover, negotiations on an issue or more issues (Raiffa 1982; Sebenius 1983) and cases where conflicts relate to specific problems or matter of principle can be distinguished. Finally, negotiations can be divided into distributive or integrative.

The literature generally emphasizes how multilateral negotiations usually present very different development dynamics than bilateral, in the function of three dimensions: (1) greater amplitude, (2) greater complexity, and (3) greater heterogeneity. Multilateral negotiations are made by several heterogeneous parties, and each of which with its own configuration of interests and issues helps to expand the object of negotiation and thus to complicate the process.

In distributive negotiations (also called win-lose or fixed pie) the parties are in conflict and they have conflicting interests, so it is difficult to reach an agreement that is satisfactory for both parties. The distributive negotiation is therefore a process of negotiation in which the parties win or lose (Caputo 2011). The main feature of the distributive negotiation, widely used in the literature for educational purposes (game theory), is that the object of negotiation is not expandable. The value of the object of negotiation is fixed, and this value during the negotiation process is distributed

between the parties (Ogliastri and Quintanilla 2016). It follows that the negotiation takes place through the sharing of benefits arising from the object. The idea of distributing a value among parties leads to inefficiencies, tensions in relations and complicates the creation of value in the negotiation. Negotiations, therefore, will take place through a series of concessions by the parties in order to get closer to a satisfactory point of agreement. Raiffa (1982), in his laboratory experiments, identified how statistically the point of agreement between the parties falls around the average of the values announced as first offer by the negotiators. Other studies, however, focus on stock or resistance values (White and Neale 1991).

The integrative negotiations (also called win-win or expandable cake) offer the possibility to reach a satisfactory agreement for all parties (Caputo 2011; Pruitt 1981). In integrative negotiations the interests of parties are not totally opposed, and they are also characterized by an object of expandable negotiation. In these cases, the possibility to reach a better agreement for both is more likely in the supplementary negotiations than in distribution ones. Unlike distributive negotiation, the parties involved in the integrative negotiation can both maximize results before reaching the agreement. Since both can maximize their results, the object value of negotiation can be distributed among parties in an objective manner, avoiding disputes and tensions during the negotiation process (Ogliastri and Quintanilla 2016).

3.3 The Dual Concern Model

In order to categorize these concepts, the dual concern model, which is one of the most popular frameworks validated empirically (Rubin et al. 1994), can be used. This model finds its origins in the contributions of Blake and Mouton (1964) who, analyzing the micro-conflicts at the interpersonal level, showed that conflict management in companies is done in a different manner depending on whether the interests of the managers are production-oriented (then to the tasks and results of his efforts) or people-oriented (so to reports).

Thomas (1976) extends this model, arguing that the degree of attention and desire of a part determines the behaviors during the conflict situation. In particular, the behavior is determined by the degree of desire of the part toward their needs, interests, and goals (level of assertiveness to own interests) and the needs, interests, and goals of others (cooperation level).

After the contributions of Blake and Mouton (1964) and Thomas (1976), the dual concern model has been expanded to represent different styles of conflict, where every style is the tendency of an individual to manage the different type of conflicts in the same way (Rubin et al. 1994). The model includes two dimensions: on one hand the importance that the individual attributes to trading, on the other hand the importance that the individual relates to the relationship with the other party.

The result is the possible mapping of five trading styles (Fig. 2): accommodating, collaborative, avoiding, competitive, and compromise.

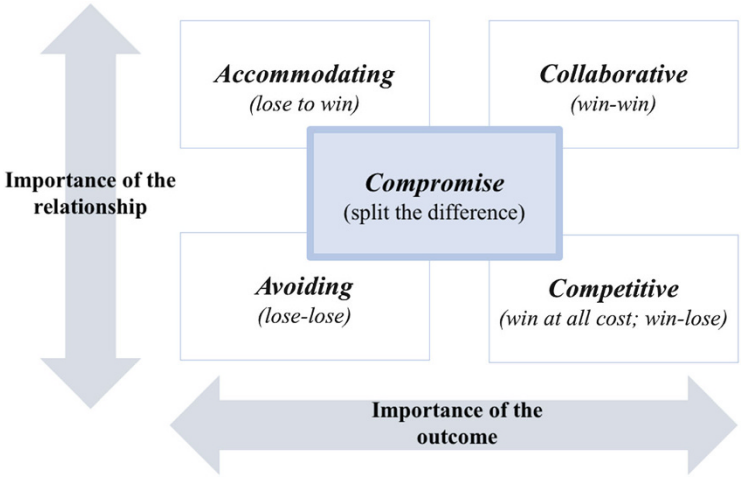

Fig. 2 The dual concern model (Source: readapted from Rubin et al. 1994)

The *accommodating* expresses a style according to which one is more concerned with the relationship than the outcome, therefore accommodating the requests of the other party. In these cases, the individual let the other individual win to obtain side benefits. The *collaborative* identifies an integrative style, where the individual has an interest not only for its own desired outcome, but also for the other party. The *avoiding* is the inactive style, in which the parties have little interest to achieve both their outcomes and to those of counterparts. The *competitive* is instead a competitive style where every individual pursues with determination personal result, showing little interest in the results of the other party. The *compromise* is a compromise style which shows a moderate effort, often combining tactics and behaviors of the other four styles. With this style parties seek to achieve not only their results, but also those of the other party. Unlike the integrative style, both sides are willing to give up something.

Pruitt and Rubin (1986) add that the decision to use a style is a strategic choice by the individual on the basis of the probability that the style will be successful in a given negotiation environment.

3.4 Conflict Strategic Management: From Distributive to Integrative Negotiation

Sebenius is one of the firsts that identified the possibility to change the characteristics during the negotiation process, and in particular the elements of the negotiating structure. These elements, during the negotiation process, may be subjected to

various changes. These changes may depend on the natural evolution of the negotiation process, or they can be strategically willed and determined.

The manipulation of negotiating structure elements is called negotiation arithmetic (Sebenius 1983) and allows to edit items in a strategic way. This strategic manipulation can be used in order to create value for the various parties involved, which means trying to turn a distributive negotiation in an integrative negotiation. This can be achieved by acting on the number of parties involved or the number of issues. Obviously intervening strategically on the negotiating structure aims to enlarge the ZOPA, in order to increase the chances that an agreement could be reached between the parties.

According to Sebenius, the number of parties can be modified in order to move the negotiation from a distribution setting to an integrative one. The number of parties can be changed by internal or external individuals. In some cases, the addition of a party may be required to reach the agreement, and this can happen for example if the added party has a material influence on other parties, or if the party has a personal interest in achieving agreement or if it allows to strengthen a coalition thanks to which it will be most likely to achieve the agreement. The output of the negotiating parties can also have positive effects: for example, it reduces the complexity of the negotiation process, because it reduces information costs, or because it increases the probability of reaching agreement by the majority of the original participants (Caputo 2011).

It is also possible to modify the number of negotiating issues. The number of question can be increased in order to create more convergence of interests between the parties and increase the chances that the agreement is reached. Increasing issues may also have negative implications, complicating the negotiating activities or eliminating the possibility of solving other important issues for the company. A decrease in the number of issues has positive effects because it simplifies the process of negotiations, thereby facilitating the achievement of an agreement.

However, intervening on the number of parts (increasing or decreasing) or the number of questions (increasing or decreasing) does not always lead to positive results, because there are trade-offs that must be properly assessed (Caputo 2011).

The distinction between integrative and distributive negotiations is useful for a simplified representation of the plurality of forms of manifestation of the negotiation processes, which in reality, however, often present an intermediate characterization between the two opposing configurations discussed so far.

In this perspective, beyond the adjustment on the number of parts and/or the number of questions, the mediation between the opposing interests, through the intervention of "a mutually acceptable third party" (Moore 2014) represents an alternative of great potential relevance to "soften" the gap between the diverging interests.

The mediation process represents an effective "extension of the negotiation process", aimed at "improve relationships, enhance communications and use effective problem-solving and negotiation procedures", in order to reach "voluntary and mutually acceptable understandings or agreements on contested issues" (Moore 2014).

Through the lever of improving communication, facilitating the growth of mutual trust, on the other hand, the subject called to carry out mediation should be able to understand "the dynamics of power in mediation and negotiation": if this essential conditions occur, mediator "will be best able to empower the parties to engage in a collaborative negotiation process" (Mayer 1987), effectively approaching the distributive to the integrative negotiation approach.

4 Conflicts in Family Business

The theme of conflict in family businesses is not new (e.g., Levinson 1971), and also more recently the academic debate proposed contributions on conflict management in family businesses (e.g., Alderson 2015; Stalk and Foley 2012). Family businesses, as in general also nonfamily ones, live internal conflicts among the members of the organization. However, the potential for conflicts in family businesses seems to be higher (Lee and Rogoff 1996). This is because family ties and business bonds among company members are intertwined, while in other types of business, family ties are kept outside the company. According to Harvey and Evans (1994), the potential for conflicts in family companies would be higher because it depends on the combination of conflicts in the company and conflicts stemming from the family. Interpersonal conflicts loaded of negative emotions such as resentment and animosity, if not handled in the right way, obviously hurt the performance of family business (Eddleston and Kellermanns 2007).

Among the various conflicts that may occur in family businesses, the transition of the company from the old to the new generation (generational change) can be considered one of the crucial. The intergenerational succession is a very delicate and risky phase and, unfortunately, it is often underestimated (Mazzola et al. 2008). If not planned in advance and managed well, this process can provoke failure as a result of conflicts even in prosperous and consolidate companies. Indeed, only 30% of family businesses survive after the first generation, and a large number of them very soon fail when the second generation acquires control (Davis and Harveston 1998; Handler 1990, 1992; Ward 1997). The reasons can be many: an unclear and badly organized planning succession, incompetent or unprepared successors, rivalry between members (Dyer 1986; Handler 1990, 1992, 1994; Morris et al. 1997). The lack of understanding between generations, and the conflicts that may arise, make dangerous the inheritance. The generation change involves: the choice of a successor, the assessment of its characteristics, the relationship between the predecessor and successor, the analysis of the phases that comprise the generational succession. Several studies have also shown that the intergenerational succession can be affected by factors that result from an inappropriate relationship between the older generation and the new generation (Gersick et al. 1997; Kets de Vries and Miller 1984, 1987; Kets de Vries 1996; Lansberg 1999; Miller 1991, 1993). According to Miller et al. (2003), this inappropriate relationship can result from a successor bonded to the past (conservative successor), or a successor that rejects the past (rebel successor), or an

incongruous mix of past and present that makes insecure and unstable the new leader. Therefore, the continuity of the company may be affected by unresolved conflicts between the past and the new generation.

The entrepreneurial succession is seen as a process, articulated in several stages, which winds along a fairly long period, involving a number of roles and contemplating a series of activities that can be observed simultaneously or sequentially (Cabrera-Suárez et al. 2001). A clear picture of the complexity of the dynamics that occur during the succession may be seen in the Handler model (1990, 1994), inspired by an organicistic vision of the company and based on the typical approach of enterprise life cycle models. The succession is presented as a slow and evolutionary process of role mutual adjustment between the founder entrepreneur and the next-generation members: each stage of this process is associated with specific behaviors role of the predecessor and the successor and the transition from one stage to another is guided by the transfer of these roles.

The intergenerational succession is a process that can create business development opportunities, but at the same time it is the moment when new problems emerge for the enterprise (Del Bene 2005). The literature has proposed various interpretations of what is meant by success of the generational change: for example, the maintenance of property in the hands of the founding family, the actual taking charge of the company by the designated successor, satisfaction of all stakeholders, and absence of conflict situations. These factors can all be considered as success causes of intergenerational succession.

Succession must be properly prepared through a specific training period of the successor, and also a period of co-management, where the outgoing and incoming entrepreneur share management areas to facilitate the transfer of corporate knowledge that invokes the concept of familiness (Cabrera-Suárez et al. 2001; Habbershon et al. 2003; Habbershon and Williams 1999). The designated successor, through a mentoring of the predecessor and direct and personal interactions, may autonomously manage the process of learning the job skills, which are mostly tacit and idiosyncratic. This set of knowledge and skills, which give specific content to the familiness (Bonti and Cori 2012), can be linked to the achievement of a specific product/service or a specific industrial sector, or may have purely an organizational nature related to the approach and methods of family relations management.

A greater or lesser propensity to delegation of managerial responsibility and the identification of independent decision-making areas are closely linked to the attitudes and the natural propensity to delegation of the outgoing entrepreneurs, rather than the possession or development of management skills on the part of the heir (Bonti 2012). When at this stage there is a reduced delegation to the successor, intergenerational conflicts may arise.

Some studies about long-lived family business (Bonti and Cori 2011, 2012; Rossato 2013; Giaretta 2014) highlight the importance of integration between traditional and innovative skills at each generational shift (Cori and Bonti 2014). With this integration, continuity can be ensured because the traditional knowledge that led to the achievement of the initial competitive advantage is maintained, but the

addition of new knowledge, which can be useful to keep strengthening the company's competitiveness, is not precluded.

The progressive integration between traditional and innovative knowledge can take place in three ways, and in each of them there are different potential conflicts (Bonti and Cori 2012):

- A lack of continuity from the incoming generation, which fells "captive" by an overly conservative culture; in these cases, the successor can implement, consciously or unconsciously, a "revenge" of the heir against the authoritarian approach of the predecessor, where the heir can categorically reject traditional knowledge replacing it with new knowledge; the risk is that changes after the intergenerational succession would be radical and unnecessary, and therefore risky for business continuity.
- Incoming and outgoing generation are consenting and collaborative in integrating traditional and innovative knowledge; in these cases, the succession is more careful and shared, reducing the risk of compromising business continuity.
- The new generation, in the case of several heirs, is divided into a conservative part and an innovative part; in these cases, the outcome is very uncertain, because the outgoing entrepreneur could ally with the new conservative generation; the risk is the procrastination of tensions which can be a source of uncertain trajectories of development and family continuity.

5 Conclusion: The Importance of Studying Conflict in Family Businesses and the Need to Integrate Such Field with Conflict Management Theory

As seen above, conflicts in family businesses can be very intense. This is because the company is controlled by individuals who are both organizational members (bound by owners and economic constraints) and relatives (so linked by ties of kinship). When making corporate decisions, then, unlike the nonfamily companies, the potential conflict arising from the owner bond is also increased by the potential conflict arising from parental tie. Moreover, it has been seen how the conflict can be intense in the case of intergenerational succession. Throughout the period of transfer of company control from the previous generation to the new generation, conflicts may arise.

Conflicts must be handled in the best way during the intergenerational succession. In fact, the succession is a very delicate moment: conflicts, skills, training, accountability must be managed, otherwise the risk of compromising business continuity at a time when control passes to the next generation (Caputo and Zarone 2019).

There are some high-profile cases of failures of familiar historical companies for the inability to manage the generation shift.

The Bancroft family owned the property of Dow Jones & Company until 2007. This company published statistics and DJ indexes and was also the owner of the *Wall*

Street Journal. It was a company belonging to the same family since the 1900s. Over the next generational succession, the heirs were primarily worried to receive dividends and annuities rather than engaging in the management, often preferring outside managers. The family lost control of the company after a takeover by Rupert Murdoch's News Corporation. In this case, it appears that the problem in the intergenerational succession consisted of failure from successive generations to assume the responsibilities of management.

Barings Bank was among the oldest commercial banks in the United Kingdom, founded in 1762 with more than 200 years of history. It was a family-owned bank. For a number of very risky investments made by an executive who was in charge of a branch in Singapore, they recorded losses of $1.3 billion, and the bank went bankrupt in 1995. The owners-heirs who controlled the company were unable to implement effective control systems on foreign branches, leaving to whoever was in charge too much discretion. In this case, it appears that the problem lay not in the intergenerational succession lack of accountability, but rather the people who had certain responsibilities were not enough trained and did not have certain skills.

Gucci is an Italian historical firm, founded in Florence in 1906 by Guccio Gucci. The two sons, Aldo and Rodolfo, continued the activities making it grow exponentially. The next generation saw the entry in the company of Giorgio, Roberto and Paolo (the sons of Aldo) and Maurizio (son of Rodolfo). With this third generation, however, very bitter internal conflicts arose. The bottom was reached when Paolo denounced his father Aldo for tax evasion, which ended up in jail and put the company in financial difficulty. Paolo Gucci, out of the company, created a Gucci alternative brand that made unfair competition to Gucci family company. After a denounce by the other family members, he was forbidden to produce with Gucci brand. The conflicts continued with subsequent generations, and this caused the leakage of family members who sold their shares until almost 50% of the property was sold to an Eastern investment banking company in 1988. Today the Gucci Group is owned by the French multinational Kering. In this case, the problem was the inability to manage conflicts between members of different generations and subsequently as a result, between members of the same generation.

In this chapter, the field on the intergenerational succession has been widely investigated. Moreover, the field related to conflict management and negotiation theory has also been extensively studied. However, it seems that today there are no sufficient scientific contributions dealing with conflict resolution techniques in family businesses, especially in terms of intergenerational succession, through the application of conflict management techniques and negotiation theory.

Many contributions that have addressed the issue of the problematic nature of intergenerational succession of conflicts in family businesses and their causes were presented. Some contributions have tried to address the issue of conflict in family businesses by proposing some solutions. However, it was never developed a general theory of conflict in family businesses. In other words, it seems that there is a gap in the literature that should be appropriately bridged. In particular, the unique characteristics of family businesses and the origin of their internal conflicts generate the

need to develop a general theory for the resolution of conflicts in the context of family businesses.

This goal can be achieved through an appropriate convergence and integration of the two fields (conflict management and conflict in family businesses) that are currently totally separate. The theory of the negotiations is a valuable tool, and its validity has a general nature, that can be applied to the resolution of general conflicts. However, the original and particular character of family businesses make these companies different from the others, and the conflicts that arise within them must be managed with conceived and designed tools taking into account these peculiarities.

According to the authors of this chapter, it is necessary to integrate the two research fields that so far have been developed separately: the field of conflict in family businesses and the field of conflict management.

A research agenda for future research avenues is proposed for the integration of these fields:

- Studying what are the major conflicts in family companies (type, causes, dynamics, type and number of people involved, intensity of the conflict).
- Studying what conflict management tools are most effective in the solution of these conflicts (type, effectiveness, individuals involved in the use of the tool, time to solve the conflict).
- Studying what conflict management tools are more effective in solving conflicts that arise during the intergenerational succession.

Following the authors' framework, by investing the research efforts on these issues, the two research fields, for too long divided, can be usefully integrated. This integration may result in a new line of study able to deal, through systematic studies, theories and technical solutions, to solve the old problem of conflict in family businesses.

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Part III
Passion and Entrepreneurial Decisions

Working Passionately Does Not Always Pay Off: The Negative Moderating Role of Passion on the Relationship Between Deliberate Practice and Venture Performance

S. Park, R. A. Martina, and K. M. Smolka

Abstract Deliberate practice, an iterative process that leads to expertise, is found to be positively associated with superior performance in domains such as sports, education, and entrepreneurship. At the same time, deliberate practice is also seen as being less than enjoyable and difficult to pursue consistently. As such, passion is considered to be a vital motivator of engagement in and maintenance of deliberate practice. Despite the evident importance of passion, the relationship between passion and deliberate practice in entrepreneurship has not been subject to sufficient empirical evaluation. Therefore, in this study, we consider the way in which passion moderates the relationship between deliberate practice and venture performance. We hypothesize that deliberate practice is positively related to venture performance and that passion positively moderates this relationship. We find support for our first hypothesis, in line with previous studies. However, contrary to our second hypothesis, we find that entrepreneurial passion *negatively* moderates the deliberate practice-venture performance relationship. In response to this finding, we provide possible explanations as to why this negative moderation effect was observed by drawing on Kolb's experiential learning cycle.

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1 Introduction

Studies of entrepreneurial expertise have increased in number over the last decade (Baron and Henry 2010; Dew et al. 2015; Mitchell et al. 2017) and have proven to be especially well-placed to show how entrepreneurial decision-making and behavior influence performance (Baron 2004). Findings in this area suggest that deliberate practice—seen as a process through which expertise is gained (Ericsson et al. 1993; Krampe and Ericsson 1996)—can account for improved performance. Deliberate practice is defined as "a highly structured activity, the explicit goal of which is to improve performance," where "specific tasks are invented to overcome weaknesses, and performance is carefully monitored to provide cues for ways to improve it further" (Ericsson et al. 1993, p. 368). Deliberate practice has been found to positively influence performance in education (Plant et al. 2005), business (Sonnentag and Kleine 2000), the performing arts (Krampe and Ericsson 1996), sports (Helsen et al. 1998), as well as entrepreneurship (Unger et al. 2009). The latter study revealed that entrepreneurs engaging in repetitive deliberate practice activities (e.g., consulting colleagues or experts, asking customers for feedback and professional reading) acquire more entrepreneurial knowledge and show improved venture performance. Recently, Dew et al. (2018) have suggested that the main deliberate practice activity performed by entrepreneurs is the effectual process of acquiring stakeholder commitments—the "effectual ask." Due to the granularity of the "effectual ask," this activity can be executed repetitively, and outcomes provide clear cues as to how to elicit stakeholder commitments.

Deliberate practices are effortful activities (Ericsson et al. 1993) that are fundamentally difficult to enjoy (Ericsson and Charness 1994). In light of this, studies find that motivational factors such as passion, defined as "an entrepreneur's intense affective state accompanied by cognitive and behavioral manifestations of high personal value" (Chen et al. 2009, p. 199), are essential in helping individuals commit to engaging in deliberate practice activities (Bonneville-Roussy et al. 2011; Duckworth et al. 2011). For example, passion motivates athletes in various sports to engage in and commit to deliberate practice (Vallerand et al. 2008). Moreover, it is suggested that passion aids entrepreneurs in overcoming difficulties and remaining committed (Cardon et al. 2009a). For instance, Murnieks et al. (2014) suggest that passion may act as a stimulant that motivates entrepreneurs to continuously pursue deliberate practice activities. Despite the apparently vital role of passion in consistently carrying out deliberate practice, there has yet to be any empirical study carried out of the effect of passion on deliberate practice in entrepreneurial settings.

Thus, to address this void, our study empirically investigates the question of how entrepreneurial passion affects venture performance when coupled with deliberate practice in the entrepreneurship context. In short, we ask: how does entrepreneurial passion moderate the deliberate practice-venture performance relationship? In addressing this question, we hypothesize that deliberate practice is positively related to performance and that entrepreneurial passion positively moderates this relationship.

To test our hypotheses, we empirically examine the relationship between deliberate practice and venture performance and the moderating role of passion on the basis of data gathered from 119 start-up founders in the Netherlands. Our findings provide support for the claim that deliberate practice is positively related to performance. However, to our surprise, we found that passion *negatively* moderates the relationship between deliberate practice and venture performance.

We seek to contribute to entrepreneurship literature on deliberate practice. In reaction to our finding that passion negatively moderates the deliberate practice-venture performance relationship, we provide the following explanation: when passion on the part of the entrepreneurs becomes obsessive or excessive, the positive effects of deliberate practice activities are eroded. In such cases, despite engaging in deliberate practice, entrepreneurial passion will not positively contribute to venture performance.

In what follows, we begin by reviewing the literature related to the key constructs included in our study: deliberate practice, venture performance and entrepreneurial passion. We then derive our hypotheses on the basis of research gaps identified in the literature review. Next, we describe the methodology used in our study. Finally, we breakdown the results of our analyses and discuss the implications that flow from them.

2 Literature and Hypotheses

2.1 Deliberate Practice and Venture Performance

Studies suggest that, in many cases, experience and performance are loosely related, only modestly correlated at best (e.g., Ericsson et al. 1993; Ericsson and Lehmann 1996). In contrast with straightforward experience, which is no guarantee of superior performance in and of itself, deliberate practice has the capacity to elicit superior performance (Ericsson et al. 1993).

Deliberate practice is defined as "a highly structured activity, the explicit goal of which is to improve performance," where "specific tasks are invented to overcome weaknesses, and performance is carefully monitored to provide cues for ways to improve it further" (Ericsson et al. 1993, p. 368). Similarly, Keith and Ericsson (2007, p. 142) highlight that deliberate practice activities are "undertaken with the explicit goal of performance improvement. Only effortful and challenging practice activities during which individuals push themselves are considered to constitute deliberate practice, in contrast to more playful activities." Shreve (2006, p. 29) defines deliberate practice as "regular engagement in specific activities directed at performance enhancement in a particular domain, where domain is some sort of skilled activity." These various definitions all share the perspective that deliberate practice is purposefully carried out to improve performance.

The literature supports the idea that deliberate practice activities should be closely linked to performance enhancement. This is because the fundamental constructs of

deliberate practice, such as the immediacy of feedback and a repetitive nature (Ericsson et al. 1993) serve to increase precision and speed in relation to cognitive, motor and perceptual duties (Fitts and Posner 1967; Gibson 1969; Welford 1968). To elaborate, the repetition aspect of deliberate practice fortifies the link between acquired knowledge blocks (Rock 1957). Moreover, the self-reflection process that follows the provision of immediate feedback inherent in deliberate practice is highly beneficial, since the process allows individuals to increase their awareness of their own experiences, thereby creating a self-teachable moment (Hullfish and Smith 1961). In addition, the demanding nature of deliberate practice activity may contribute to improved performance since more difficult/demanding tasks require more attention, which, in turn, can augment neuronal behavior and performance (Boudreau et al. 2006; Spitzer et al. 1988; Spitzer and Richmond 1991).

Nonetheless, debate exists regarding the effectiveness of deliberate practice in producing improved performance. Hambrick et al. (2014) point out that the effectiveness (in terms of performance) of deliberate practice is contingent upon the domain in which it is practiced. For instance, in one study, 34% of the variance in performance in the game of chess was explained by deliberate practice (Hambrick et al. 2014), while in another study, only 21% of this variance was explained in the domain of music (Macnamara et al. 2014). Still, despite differences in the degree of effectiveness found, the fact that deliberate practice entails unique activities that are expected to facilitate improved performance to some extent is quite well established. Deliberate practice enables the learner to construct an environment that is well-suited to learning and acquiring skills that arise through relevant knowledge absorption alongside prompt feedback (Ericsson et al. 1993). In addition, when engaging in deliberate practice, one is forced to accept challenges by venturing outside of one's comfortable learning zone (Ericsson 2002, 2006). Improvement as a result of overcoming challenges outside of one's comfort zone is what distinguishes deliberate practice from the acquisition of ordinary experience.

Superior performance as a result of long hours of deliberate practice can be observed in several domains, for instance, basketball (Vallerand et al. 2008), music (Ericsson et al. 1993; Krampe and Ericsson 1996), and entrepreneurship (Keith et al. 2016). Unger et al. (2009) find that deliberate practice is positively related to entrepreneurial knowledge and, as a consequence, related to venture growth as a measure of performance. The authors suggest that deliberate practice promotes the development of procedural knowledge, a type of knowledge that increases an individual's fluency in the execution of learning-based tasks (Anderson 1982; Sonnentag and Kleine 2000). Such augmentation of knowledge, in turn, fosters performance improvement (Sonnentag and Kleine 2000). Similarly, deliberate practice is conceptualized as a strategic activity that is technically geared towards selectively reiterating the best learning practices and methods, which, in turn, is associated with superior performance (Ericsson et al. 1993). Furthermore, Unger et al. (2009) suggest that deliberate practice positively influences entrepreneurial success. Therefore, we hypothesize the following:

Hypothesis 1: *Deliberate practice is positively related to venture performance.*

Deliberate practice is an effortful endeavor that can only be sustained for a limited time (Ericsson et al. 1993) because it requires high levels of concentration (Schneider 1993). It is not enjoyable and the rewards for engaging in it are limited to those that arise from resulting performance improvement (Ericsson et al. 1993). Unlike professional work, deliberate practice does not yield external or monetary benefits (Vallerand et al. 2007). Therefore, a driver, such as passion, is vital in terms of motivation.

2.2 Entrepreneurial Passion

Regarding the definition of entrepreneurial passion, Cardon et al.'s (2009a) meta-study shows that the concept can be defined in several different ways. To start with, entrepreneurial passion can be interpreted in light of the venture or work. For instance, Baum and Locke (2004, p. 588) illustrate the notion of entrepreneurial passion as "a genuine love for work," and Shane et al. (2003, p. 268) define it as a "selfish love of work." In a similar fashion, Baron and Hannan (2002, p. 10) explain it as "a sense of personal belonging and identification with the company." Other studies put more emphasis on the affective/emotional aspect of entrepreneurial passion in their definitions. For instance, Chen et al. (2009, p. 200) define it as "an entrepreneur's intense affective state accompanied by cognitive and behavioral manifestations of high personal value." Smilor (1997, p. 342) defines it as an "enthusiasm, joy, and even zeal that come from the energetic and unflagging pursuit of a worthy, challenging, and uplifting purpose." As this study focuses on understanding the emotional/affective push that passion provides, we rely on Chen et al.'s (2009) definition in this study.

Definitions of the nature of entrepreneurial passion rest on the theoretical foundation established by Cardon et al. (2009a) that entrepreneurial passion is an intense positive feeling that arises in response to the unique identity salience entrepreneurs possess. In emphasizing that entrepreneurial passion is about an individual's emotion and experience, Cardon et al.'s (2009a) theory focuses on the entrepreneurial being rather than simply a passion for venture processes or work. This theorization borrows from identity theory (Stryker and Burke 2000), which explains how the self-acknowledgement of one's identity (in our case, the identity of being an entrepreneur) triggers reflexive cerebration and action relevant to that identity. In accordance with this theory, entrepreneurs exhibit passion in their endeavors in inventing novel services or products and developing new ventures (Cardon and Stevens 2009; Cardon et al. 2013). Passion arises in situations in which entrepreneurs are engaged in meaningful, venture-related activities (Cardon et al. 2005, 2009a; Smilor 1997).

Entrepreneurial passion carries with it a wide range of positive effects. For instance, passion aids entrepreneurs in adapting to and withstanding difficulties that arise in their surroundings (Cardon et al. 2009a). In addition, it is suggested that passion is a strong motivator of drive and persistence (Brannback et al. 2018; Cardon et al. 2005), as well as a source of affective enjoyment (Cardon and Kirk

2015). Cardon et al. (2005) suggest that passion for a venture may blind entrepreneurs to hardship or, at least, prevent them from acknowledging it. Consequently, it helps to maintain enthusiasm when working toward a goal. This positive drive and enthusiasm are associated with an individual achieving a joyful state, stemming from passion (Chang 2002).

Considering the uplifting properties of entrepreneurial passion, it is possible that these factors might contribute to an entrepreneur being able to power through hard-to-sustain-and-enjoy deliberate practice activities. Deliberate practice can be difficult to sustain over time (Ericsson et al. 1993), yet the persistence that passion brings with it (Brannback et al. 2018; Cardon et al. 2005) can help overcome this. Moreover, the tedious nature of deliberate practice activities (Ericsson et al. 1993) may be tempered by passion's ability to make the seemingly unenjoyable enjoyable (Cardon and Kirk 2015; Chang 2002).

The motivational push toward deliberate practice that passion tends to provide has been observed in several domains. For instance, passion and perseverance in students have been found to help students engage in and sustain deliberate practice activities (Duckworth et al. 2011). Duckworth et al. (2011) posit that differences in student performance can be traced back to the degree to which a student is willing to sustain "hard-to-enjoy" deliberate practice activities, which, in turn, is contingent on the student's level of grit (a combination of passion and perseverance). In short, passion and perseverance are what enable individuals to reap the performance-related benefits that flow from deliberate practice. Similarly, passion has been found to help basketball players and swimmers engage in and commit to deliberate practice leading to improved performance in their respective sports (Vallerand et al. 2008). This is because passion enables individuals to concentrate on relevant achievement processes, which, in this case, are deliberate practice activities. Passion is also seen as being at play in the realm of entrepreneurship, as it is theorized that passion is intimately related to venture-related activities (Cardon et al. 2009a; Smilor 1997).

In summary, previous studies suggest that passion is highly beneficial in terms of improved performance when coupled with deliberate practice. It is also suggested that passion has a positive influence on the effectiveness of deliberate practice. Therefore, we suggest that entrepreneurial passion moderates the relationship between deliberate practice and venture performance. Passion helps entrepreneurs to persistently engage in deliberate practice, which, in turn, can contribute to venture success (Keith et al. 2016). Hence, we hypothesize the following:

Hypothesis 2: *Entrepreneurial passion positively moderates the relationship between deliberate practice and venture performance.*

In the following section, we will discuss the methodology used to test our hypotheses. We describe our sample and the procedures used to collect data, the techniques we used to construct our survey and the measures used for each variable of interest.

3 Methodology

3.1 Sample

We conducted a quantitative study of data collected from surveys of 119 start-up founders in the Netherlands. The sample was drawn from StartupDelta in the Netherlands, an initiative of entities including the Dutch Ministry of Economic Affairs, which provides a gateway to an extensive network of stakeholders in the Dutch start-up ecosystem. StartupDelta makes use of Dealroom.co's database that allows anyone to add their company's information. Each company is verified in an internal, manual curation process. We targeted 2042 start-up founders that were officially listed as of April 2016 and sent them an online survey. In the event of nonresponses after sending a follow-up email, we personally approached several entrepreneurs at start-up meetings. Each founder included started at least one company. In the event that an entrepreneur had founded more than one firm, we included the founder just once in our study, regardless of how many firms that individual had founded. Using this information, we conducted an analysis at the deliberate practice level. This means that we treated one observation as one deliberate practice activity. As such, in the event that an individual engaged in more than one deliberate practice activity, we treated each activity as a separate observation. As a result, our analysis is based on a sample size of 156 deliberate practice activities. The reason for this approach is that we were interested in understanding how each deliberate practice activity relates to venture performance rather than how a combination of deliberate practice activities affects venture performance.

Researching a sample like this is important from an academic standpoint because the sample consists of actual entrepreneurs. As the entrepreneur population is difficult to identify and relatively small (Neergaard and Ulhoi 2007), studies have, at times, had to make use of proxies of entrepreneurs, like students with entrepreneurial intentions, in spite of the drawbacks associated with doing so (Robinson et al. 1991). However, our study manages to avoid this potential pitfall and directly addresses the entrepreneurial topic of interest by observing entrepreneurs that were active in running their own businesses at the time of data collection.

3.2 Procedure

Data was collected online by approaching entrepreneurs via email, as well as through face-to-face communication. We began by sending out email surveys to every individual listed in the StartupDelta database. We managed to track down a number of nonrespondents by attending start-up events around the Netherlands (e.g., Let's Get Started 2017 in Amsterdam) attended by entrepreneurs seeking to promote their new ventures. At these events, we provided respondents with tablet computers on which they were asked to complete the exact same version of the survey that was

sent by the email. To mimic the conditions of the email survey, we did not interact with the respondents in the time in which they completed the survey other than to hand them the computers that were pre-loaded with the survey. De Leeuw (1992) states that differences in reliability and consistency of answers between different survey modes are minor, especially when the open questions are simple to answer, as was the case in our study (the open-ended questions included in our study only required one- or two-word answers). While the survey was carried out using two different modes, there is no major reason to suspect that a prominent mode effect has come into play here. In both cases (email and face-to-face), we made use of a media channel that minimizes human interaction and lets the computer facilitate the entire survey, provided the same user interface, and let the respondent be in control of the survey without interference (De Leeuw 1992). The overall response rate was 5.8%.

3.3 Survey Design

We employed several strategies in designing the questionnaire to address potential biases. Firstly, a commonly observed bias in survey design is the question-order bias (Bradburn and Mason 1964; Van de Walle and Van Ryzin 2011). This arises from the order in which questions are presented (e.g., easiest to hardest) in a survey, which may influence the respondent's choice of answers (Weinstein and Roediger 2010). To prevent such bias, McFarland (1981) advises ordering the questions in such a way that relatively more general questions precede specific ones and unaided questions are placed before aided ones. Our constructed survey followed suit by placing the more general and open-ended questions at the beginning and the more lengthy and detailed multiple-choice questions at the end.

Secondly, we took into account the possibility of social desirability bias. According to Podsakoff et al. (2003), a self-reporting survey is always prone to such a bias. Nevertheless, we argue that one can limit social desirability bias by incorporating validated scales from prior studies. As such, in this survey, we use established scales and metrics for all variables.

Thirdly, this survey was constructed and administered using a computer-based format, as it is known that computer-administered questionnaires diminish desirability bias better than other formats (Richman et al. 1999).

Finally, Huber and Power (1985) advise removing disincentives to answering the questionnaire by assuring anonymity. In this study, we informed the respondents of the potential benefits they could reap by participating, both in the introductory email and on the first page of the survey and stated that both confidentiality and anonymity were guaranteed.

3.4 Measures

Deliberate Practice To measure deliberate practice, we asked respondents to report the weekly activities in which they engaged in order to improve their performance and the frequency with which these activities were executed. We asked each individual to provide the average total hours of deliberate practice activities done per week for each unique deliberate practice activity he or she reported. For instance, one entrepreneur may state that he or she had done activity A for an average of 4 hours per week and activity B for an average of 7 hours per week. We then added up all weekly hours reported.

On the basis of the answers provided, we refined the list of reported activities to include activities that fit the deliberate practice criteria. These criteria were as follows: the activities were repetitive; instant and productive feedback was available; the activities were systematically designed to improve performance levels and the activities can be considered to be mentally demanding and not particularly enjoyable (Ericsson et al. 1993; Ericsson and Charness 1994; Krampe and Ericsson 1996; Vallerand et al. 2008). Additional validation was conducted by comparing the refined list with the deliberate practice activities previously identified by Unger et al. (2009). This measurement of deliberate practice is common in the study of entrepreneurship (cf. Unger et al. 2009; Keith et al. 2016) and business (cf. Sonnentag and Kleine 2000). This filtering led to the emergence of five distinct deliberate practice activities, namely reading, online education/training, mentoring/coaching, offline education/training and networking.

Entrepreneurial Passion Entrepreneurial passion was measured in accordance with Cardon et al. (2013). We used a measure that encompasses three dimensions of passion: passion for inventing, passion for founding, and passion for developing a venture. We measured passion for inventing by asking about "activities associated with scanning the environment for new market opportunities, developing new products or services, and working with new prototypes" (Cardon et al. 2013, p. 4). We measured passion for founding by asking questions related to the required monetary, human and social resources relevant to establishing a new venture (Cardon et al. 2009b). Finally, we measured passion for developing by asking questions about the processes that a venture experiences after being established, such as growth and development (Cardon et al. 2009a). In total, 10 questions that verify intense positive feelings in response to inventing, founding and developing new ventures were asked in the questionnaire and each participant responded using a 7-point Likert-type scale.

Venture Performance To measure venture performance, we measured growth. In particular, we used employment growth, as it is considered to be a safer and more conservative measure of business growth than financial growth, which can be subject to sporadic and volatile changes (Delmar 1997). Moreover, growth measures help avoid the potential problems inherent to static financial performance measures such as ROI or ROA, such as providing a distorted view of the health of new ventures that

stems from relatively smaller investment sizes compared to returns (Chandler and Hanks 1993). Additionally, the growth measure is seen as highly relevant to gauging venture performance levels (Chandler and Hanks 1993). Previous studies have shown that growth is the most common indicator of venture performance used (Brush and Vanderwerf 1992; Murphy et al. 1996; Baron and Tang 2009; Read et al. 2009; Arend et al. 2014). We use employee growth, in particular, to measure venture performance. Williamson's (1996) transaction cost perspective shows that an increase in the number of employees comes at a cost and would therefore not be implemented if the firm was not financially better off than before. In other words, employee growth can be seen as a strong indicator and signal that a firm has achieved certain financial objectives. In addition, from the survey participant's perspective, reporting may be more accurate, as specific numbers do not need to be estimated or meticulously calculated (Cooper et al. 1994). Finally, employee growth may be a better, less deceptive measure than financial growth in the context of new ventures. For instance, the growth of small innovative firms in terms of employee headcount can serve as a proxy for growth of legitimacy and value of technology or knowledge, even while showing zero sales revenue (Clarysse et al. 2011; Davila et al. 2003). Thus, using data on past growth—measured as number of employees—is considered to be a highly dependable measure of impending venture performance (Brush and Vanderwerf 1992).

Employee growth was measured using the exact worker headcount per year over the past 3 years. The employee growth formula ($\frac{\text{Year } x+1 \text{ headcount} - \text{Year } x \text{ headcount}}{\text{Year } x+1 \text{ headcount}}$ with x being 2014, 2015 and 2016) was adapted from Hanks et al. (1993). We calculated the average annual growth rates for the past three years. Although the applied growth formula is considered atypical, as the denominator is year $x + 1$ instead of year x, the difference is advantageous in the context of measuring the growth of very young firms, as new ventures are, which may have only been established recently (Hanks et al. 1993).

Control Variables We controlled for (co)-founders' previous successful/unsuccessful entrepreneurial exits, group-level deliberate practice and firm size. Firstly, the number of unsuccessful exits were incorporated into the study because venture failure experience has been seen to affect performance in several studies (Cope 2011; Ellis et al. 2006). Simultaneously, the number of successful exits was also included since such exit experiences may have negative performance implications for new ventures (Rerup 2005). Secondly, group-level deliberate practice was included as a control variable since team learning activities can foster adaptive behavior that leads to better team performance in businesses (Bunderson and Sutcliffe 2003). Finally, firm size was included since small firms are generally found to be more prone to failure (Bruderl and Schussler 1990; Dobrev 2001). Moreover, as larger firms are more likely to realize growth than smaller firms (Orser et al. 2000), we also included a firm size measure in our study.

4 Results

4.1 Descriptive Information

The average entrepreneur experienced 0.87 (less than 1) successful exit and 0.47 (less than 1) unsuccessful exit. The new venture headed by the entrepreneur had, on average, a headcount of 9.9 employees. Moreover, entrepreneurs devoted 3.26 hours to deliberate practice at the individual level per week. We observed high levels of entrepreneurial passion (i.e., 70% replied "strongly agree" or "agree" to questions that asked how passionate one is on a 7-item Likert-like scale). We conducted hierarchical linear regression analyses using this data to measure the main effect of deliberate practice and the interaction effect of entrepreneurial passion and deliberate practice on venture performance.

4.2 Hypothesis Testing

Prior to testing our hypotheses, we ran several tests to determine whether or not the basic assumptions of linear regression analysis were met. First, a test for multicollinearity showed that all predictor variables had a VIF value of under 10 with an average of 1.17. We were therefore able to conclude that there are no major issues with multicollinearity between the variables (Bowerman and O'Connell 1990; Myers 1990). Second, there were no influential cases (Cook's distance > 1) in our sample ($n = 156$) that Field et al. (2012) and Cook and Weisberg (1982) claim can distort an analysis. Finally, we conducted a Cronbach's alpha test for the 7-item Likert-like passion scale (Crook et al. 2010; Nunnally 1978). The result shows a good level of reliability ($\alpha = 0.80$). Table 1 provides information on the standard deviations, means, and bivariate correlations of all measured variables.

We then tested the main effect of deliberate practice on venture performance. The results show a significant positive relationship between deliberate practice and venture performance ($\beta = 0.011$, $p < 0.05$). The more hours people reported engaging in deliberate practice activities, the higher the employee growth rate was. As such, we found support for Hypothesis 1. At the same time, entrepreneurial passion was not a factor that explained venture performance in our study ($\beta = 0.001$, $p > 0.10$).

Next, we tested for interaction effects of entrepreneurial passion and deliberate practice. The results show that the interaction effect of entrepreneurial passion and deliberate practice on venture performance is significant, but *negative* ($\beta = -0.001$, $p < 0.01$; see Fig. 1). Contrary to our Hypothesis 2, in which we posit that entrepreneurial passion *positively* moderates the relationship between deliberate practice and venture performance, our results show that entrepreneurial passion *negatively* moderates this relationship.

Table 1 Descriptive statistics and correlation table

		Mean	SD	1	2	3	4	5	6	7
1	Firm size	9.924	33.856	—						
2	Successful exit	0.820	1.757	0.136	—					
3	Unsuccessful exit	0.470	0.999	−0.051	0.330**	—				
4	Group-level deliberate practice	1.591	3.026	−0.055	−0.050	−0.035	—			
5	Entrepreneurial passion	46.950	27.134	0.158*	0.203**	−0.069	0.242**	–		
6	Individual-level deliberate practice	3.259	4.709	−0.061	−0.072	−0.080	0.194*	0.308**	–	
7	Entrepreneurial passion *x* individual-level deliberate practice	192.090	301.480	−0.041	−0.047	−0.104	0.208**	0.384**	0.968**	–
8	Employee Growth	0.284	0.268	0.052	0.151	0.078	0.066	0.175*	0.217**	0.172*

SD standard deviation

$*p < 0.1$; $**p < 0.05$; $***p < 0.01$

Source: Table compiled by the authors

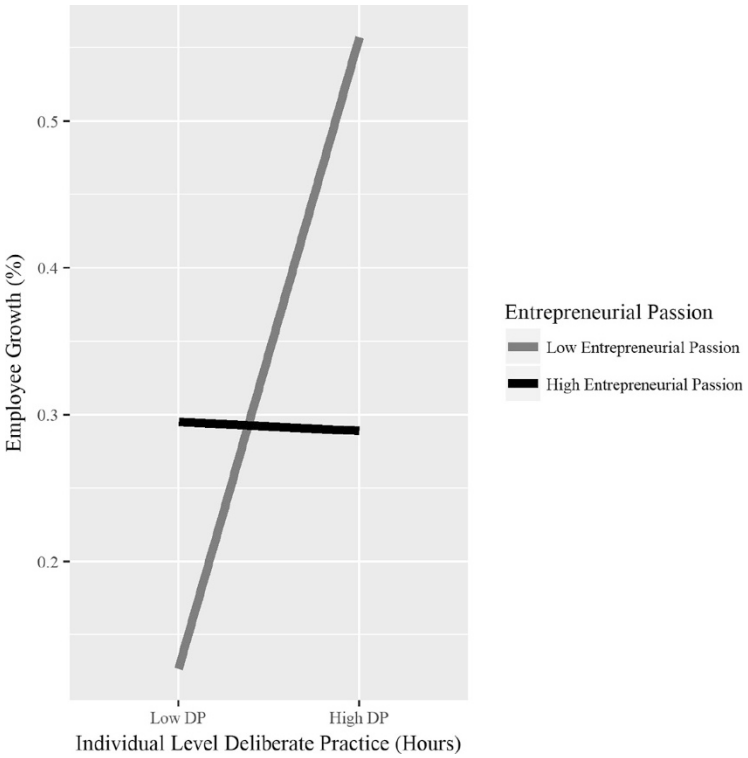

Fig. 1 Interaction graph of entrepreneurial passion with deliberate practice on venture performance. +1 standard deviation shown as high entrepreneurial passion. −1 standard deviation shown as low entrepreneurial passion. Source: Authors' own figure

The results of both the main effect and interaction effect are presented in Table 2. Illustrating the interaction effect, Fig. 1 shows how, in the case of lower levels of entrepreneurial passion, deliberate practice and venture performance have a directly proportional slope; however, in the case of higher levels of entrepreneurial passion, deliberate practice and venture performance have an inversely proportional slope. The slopes show the effect of deliberate practice on performance at −1 standard deviation and +1 standard deviation, based on Hayes' (2017) recommendation.

To ensure that the results presented indeed point to a moderation effect, we conducted a simple slopes analysis. The simple slopes analysis was conducted in line with Bauer and Curran (2005) and Cohen et al. (2013). For the slopes associated with deliberate practice interacting with entrepreneurial passion at +1 standard deviation, mean, and −1 standard deviation, all were shown to be significantly different from zero. Our choice of points of measurement follows those of multiple studies including Bauer and Curran (2005), Cohen et al. (2013), and Spiller et al. (2013).

Table 2 Main effects and interaction effect

	Venture performance	
	Main effects	Interaction
Constant	0.178***	0.135***
	(0.045)	(0.046)
Firm size	0.000	0.000
	(0.001)	(0.001)
Successful exit	0.020	0.023*
	(0.013)	(0.013)
Unsuccessful exit	0.006	−0.007
	(0.025)	(0.025)
Group-level deliberate practice	0.001	0.001
	(0.007)	(0.007)
Entrepreneurial passion	0.001	0.002**
	(0.001)	(0.001)
Individual-level deliberate practice	0.011**	0.063***
	(0.005)	(0.018)
Entrepreneurial passion *x* individual-level deliberate practice		−0.001***
		(0.0003)
Observations	156	156
R^2	0.085	0.135
Adjusted R^2	0.048	0.094
Residual std. error	0.259 (df = 149)	0.253 (df = 148)
F statistic	2.302** (df = 6; 149)	3.292*** (df = 7; 148)

Level of significance shown. Standard errors are shown in parentheses $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$
Source: Table compiled by the authors

5 Discussion

5.1 Implications

Relationship Between Deliberate Practice and Venture Performance Our findings show a positive effect of deliberate practice on venture performance. This result is consistent with the existing literature. For example, Unger et al. (2009) find that deliberate practice is positively related to venture growth. Several activities are seen as constituting deliberate practice in entrepreneurship. For example, consulting colleagues or experts, asking customers for feedback, professional reading (Unger et al. 2009) and effectually acquiring stakeholder commitments through asking (Dew et al. 2018). Engaging in these activities allows entrepreneurs to enter a learning cycle (Kolb 1981) and acquire the knowledge that is necessary to make informed decisions with the aim of improving venture performance.

Moderating Effect of Passion We hypothesized that passion positively moderates the relationship between deliberate practice and venture growth. To our surprise, our

results showed a negative moderation effect of entrepreneurial passion on the deliberate practice-venture performance relationship. For a theoretical explanation for this observed relationship, we rely on Kolb's (1981) theory on the learning cycle and discuss the various types of deliberate practice activities.

Deliberate practice is viewed as a strategic activity that includes reiterating learning practices (Ericsson et al. 1993). Delving deeper into the learning aspect, learning can be viewed as a cycle (Kolb 1981) that involves four essential phases in service of promoting knowledge acquisition (Holcomb et al. 2009; Minniti and Bygrave 2001). These phases are Concrete Experience (CE); Reflective Observation (RO); Abstract Conceptualization (AC) and Active Experimentation (AE). According to Kolb (1981), CE refers to exposing oneself openly and freely to new experiences. RO represents the act of taking on various perspectives through observation and reflective thinking. AC is the process of translating one's observations into rational and plausible theories. Finally, AE involves the use of established theories to find solutions to problems or in decision-making. Kolb (1981) suggests that effective learning is a combination of experience and experimentation (CE and AE), as well as reflection and making sense of experiences (RO and AC). In the same study, effective learning is defined as possessing the ability to carry out all four phases. This means that individuals have to proceed through all of the four phases in the learning process in order to learn effectively. However, *not* proceeding through all the four phases may also lead to knowledge acquisition. In other words, engaging only in activities related to a single phase, e.g., reflection, can lead to learning, but not in an effective manner.

Deliberate practice activities can also be categorized based on their level of passivity/activity, i.e., reflection versus experimentation (see Fig. 2). For example, online learning is considered, in many cases, to be devoid of the interaction aspect of learning that is commonly present in learning-by-doing (Koedinger et al. 2015). Moreover, receiving/giving mentoring or coaching is considered to be an indirect learning method that is different from direct accumulation of experience (Hallen

Fig. 2 Popularity of the different deliberate practice activities by frequency (*RO* reflective observation-based activity; *AE* active experimentation-based activity, adapted based on Kolb's (1981) experiential learning cycle. Source: Authors' own figure

et al. 2017). Similarly, the act of reading a textbook does not automatically entail learning-by-doing and is thus considered by some to be a passive activity for most individuals (Haussamen 1995). On the other hand, deliberate practice activities such as networking and offline education and training can be considered experimentation and active learning-by-doing (Birley 1985; Maxwell and Stephen 2018).

In sum, effective learning requires that individuals combine both active and passive learning activities. The same goes for deliberate practice, which is also comprised of both active and passive learning activities. In order for deliberate practice to be effective, individuals must combine both active and passive learning activities associated with deliberate practice. For example, entrepreneurs might combine reading textbooks with networking. However, deliberate practice activities may not lead to learning and acquisition of knowledge when entrepreneurs, due to their passion, are overly persistent in engaging in these activities. The reason is that passion may lead to inaction (Delisle and Prosnick 2003). Passion aids entrepreneurs in overcoming obstacles (Baum and Locke 2004) that arise in their surroundings (Cardon et al. 2009a). It is required to engage in and sustain effortful and unpleasant deliberate practice activities. However, passion does not only lead to positive outcomes; it can also erode the positive effects of deliberate practice. When passion becomes obsessive (Branzei and Zietsma 2003), it leads to rigid behavior (Vallerand et al. 2003). In this case, obsessive passion can drive entrepreneurs to commit to and prioritize the venture to a degree that can "blind" the entrepreneur from perceiving obstacles and hardship (Cardon et al. 2005) and even negative venture performance (Ho and Pollack 2014).

In the case of passionately engaging in deliberate practice activities, prioritizing reflection over experimentation can have detrimental effects on learning by making the learning cycle less effective. For example, Gemmell (2017, p. 17) finds that "high levels of RO can lead to rumination and retroflection [a Gestalt term referring to reflection turned back on itself instead of leading to action (Kolb 2015)]." In other words, obsessive passion may lead to inaction (Delisle and Prosnick 2003). The resulting inaction is in direct opposition to what experimentation entails, which is the action required to make decisions and solve problems (Kolb 1981). For this reason, high levels of reflection could be negatively related to venture performance which is consistent with Gemmell's (2017) study that shows how entrepreneurs having a preference for the AE mode of learning over the RO mode predicted performance improvement and how RO is negatively correlated with growth.

Applying these ideas to our study, we see that our data shows that deliberate practice that relies on the RO type of learning is more popular than the AE type (see Fig. 2). This implies that our study, which focuses on the deliberate practice level, may actually show how obsessive passion reinforces the RO-type learning at the expense of the AE type of learning, on the whole. In turn, the biased reinforcement of RO-type learning encourages rumination and retroflection and prevents the learning cycle from completing its full rotation. As a result, effective learning from committed deliberate practice may not take place, and venture performance may suffer as a result.

5.2 Future Research

In the course of carrying out our study, we identified several promising avenues for future research. First, research on matching the type of deliberate practice activity (networking, coaching/mentoring, offline education/training, online education/training, reading) with the type of processing used in experiential learning (AE or RO) should be considered. Effective learning occurs when entrepreneurs achieve a balance between reflective and experiential activities. However, effective learning may be difficult, as people have a tendency to choose one particular learning style (i.e., prioritizing experimentation over reflection, or vice versa) at the expense of another (Kolb 1981). While one can extract the generic properties of a deliberate practice activity and link it to either an AE-based or RO-based process, it could be beneficial for future studies to conduct empirical tests to verify whether or not this relationship holds true. Research along these lines may not only contribute to existing literature on deliberate practice and the entrepreneur's learning style, but it may also carry with it important practical implications. For instance, since Gemmell's (2017) study shows how entrepreneurs who prefer the AE mode of learning over the RO mode saw improved performance, identifying deliberate practice activities that are conducted in large part using AE type processing may help entrepreneurs improve their venture performance.

In addition, future studies could contribute to literature on entrepreneurial passion by further exploring the link between passion, deliberate practice and performance at a more granular level by uncovering constructs that are likely to come into play, beyond those in our model. For instance, one variable that needs to be examined more closely is the level of concentration. Ratelle et al. (2004) find that obsessive passion in gamblers deters them from concentrating on daily tasks or jobs. Moreover, Cardon et al. (2005) and Sonnentag (2003) argue that concentration is important since it is correlated with one's ability to overcome obstacles and achieve superior performance in the context of a particular task. Thus, it may be the case that entrepreneurs with lower levels of passion are able to concentrate better, allowing them to reap the benefits of deliberate practice that the more passionate group of people cannot.

5.3 Limitations

We were not able to assess the qualitative differences between deliberate practice activities conducted by different individuals. For instance, reading as a deliberate practice could be leisurely reading of an anecdotal business text that the reader does not take seriously. On the other hand, reading could also be serious hours invested in learning how to adopt a machine learning algorithm that can immediately be applied in one's business. Distinguishing between high-quality and low-quality engagement with the same activity may be important, as the effectiveness of that activity depends

on it (Ericsson 2002). However, since it is technically difficult to objectively measure quality, future research should work toward a study design that allows for scrutiny of this issue.

6 Conclusion

The main purpose of this study was to empirically examine the relationship between deliberate practice and venture performance with entrepreneurial passion as a moderating variable. Research has shown that deliberate practice helps to achieve superior performance (Ericsson et al. 1993; Krampe and Ericsson 1996; Unger et al. 2009). However, it is effortful, difficult to sustain, and unenjoyable. As such, passion is a vital component of committing to deliberate practice. Studies have found that passion is a predictor of deliberate practice and helps to sustain this practice in domains such as education (Duckworth et al. 2011; Vallerand et al. 2008). However, at the time of writing, there are no studies published that examine the effects of passion on deliberate practice in entrepreneurship.

We find that deliberate practice positively influences venture performance. This result is in line with other studies in entrepreneurship that have repeatedly demonstrated the close positive ties between deliberate practice and performance (Keith et al. 2016; Unger et al. 2009). However, our exploration of the moderating effect of passion on the deliberate practice-performance relationship produced unexpected results. While we hypothesized that passion would strengthen the positive relationship between deliberate practice and venture performance, our results show the opposite. To explain this result, we have drawn on Kolb's (1981) experiential learning cycle and the idea of obsessive passion put forward by Cardon et al. (2009a). We argue that a balance is necessary between experiential and reflective activities (Kolb 1981) in order for learning to be effective and ultimately lead to improved venture outcomes. Secondly, when the passion experienced by an entrepreneur becomes obsessive, the positive effects of deliberate practice activities are eroded. In these cases, despite engaging in deliberate practice, there will be no benefit to the venture.

Our study contributes to entrepreneurship literature by providing empirical insight on how the performance of a venture is affected when deliberate practice is affected by entrepreneurial passion. We do this in a way that adds a new perspective to existing theory on deliberate practice and passion. In other words, we not only provide an additional context of application of this theory, but also provide a context in which the theory's posited role of passion on deliberate practice is not fully applicable. As a result, this study serves as the starting point for better understanding why entrepreneurial passion is not always helpful to entrepreneurs and their endeavors when engaging in deliberate practice.

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Angel Investor-Entrepreneur Fit: The Nexus of Angel Motivation and Entrepreneur Personality and Passion

Kevin P. Taylor

Abstract Angel investor decision-making is different from that of venture capitalists. Though both groups invest in new ventures, angel investors are more concerned with agency risk, whereas venture capitalists are more concerned with market risk. More so than venture capitalists, angel investors largely succeed or fail based on their ability to make accurate judgments about the entrepreneurs they back—and decide not to back. Importantly, some angel investors appear to have noneconomic motivations to invest in risky startups. This chapter reviews the extant literature on angel investor motivations and decision-making and entrepreneur personality and passion so as to orient researchers on how these research streams may coalesce. The chapter ends with a discussion of both interesting research ideas and practical implications for angel investors and entrepreneurs.

1 Introduction

Growth-oriented entrepreneurs often seek outside investment to launch or grow their early-stage businesses. Though some small investments can come from friends and family, entrepreneurs turn to outside investors, angel investors, and venture capitalists (hereafter, VCs), for the larger funding rounds required to build and scale a business. Angels and VCs differ, though, in both their motivations for investing and their decision-making criteria. Whereas VCs are professional investors by definition, angels tend to be wealthy and financially sophisticated individuals who often have investment or managerial backgrounds (Wetzel and Seymour 1981) or who are themselves entrepreneurs (Aram 1989). Though not professional investors, angels contribute substantially to investment activity in the United States. According to Sohl (2017), in 2016, US angels provided $21.3 billion to 64,380 ventures, generating 263,950 new jobs. Given this impact on the entrepreneurial ecosystem, understanding angel motivations and behavior is an important area of scholarship. What

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motivates angels to invest in early-stage new ventures given historically low success rates? How exactly do angel investors decide in whom to invest? Though important scholarly work has been done in this area, gaps in knowledge remain, leading to an incomplete picture of the funding of new ventures. This chapter offers interested scholars an orientation to angel investment research, particularly how angels differ from VCs, angel motivations for investing, and how entrepreneur personality and passion influence angel investment decisions. The purpose of this chapter is to expose other scholars to these angel investor-related streams of research, generate interest, and encourage exploration of the research questions posed. Just possibly, our combined work may lead to more effective and more frequent "match-ups" between angel investors and early-stage founders.

When an entrepreneur launches a new venture, he or she must grapple with how to fund the firm's expenses. There are several financing options to consider. Bank loans have been a traditional source of startup funds but are becoming less available to certain entrepreneurs, particularly those lacking hard assets, good credit, or a well-understood business model (e.g., franchise store). For technology firms, the typical funding path circumvents banks altogether and instead taps the private venture marketplace: friends and family, angels, and VCs. Entrepreneurs pursuing private funding can expect a series of funding rounds at progressively higher valuations starting with (1) initial self-funding from the founders and close friends and family, (2) angel funding in amounts from several hundred thousand dollars up to about two million dollars, and (3) venture capital funding in amounts of several million dollars to hundreds of millions of dollars (Berns and Schnatterly 2015; Sohl 1999). At the consummation of a funding round, the founders exchange a portion of the firm's equity for cash that can be used to fund the company's *burn rate*, or negative cash flow. Though an entrepreneur might receive funding from angels and then later VCs, angels and VCs operate differently, and it is to an entrepreneur's benefit to understand these differences.

When making investment decisions, angels employ a different approach to evaluation and decision-making than the more extensively researched VCs. Whereas VCs are most concerned with protecting themselves from market risks, angels are concerned primarily with the entrepreneur (Fiet 1995). Is the entrepreneur trustworthy? Does the entrepreneur have the characteristics to succeed—to see the venture through to a successful conclusion (e.g., an acquisition or other liquidity event)? To make these determinations, angels rely, in part, on intuition (Huang and Pearce 2015) and signals detected from the personality and passion of the entrepreneur.

This chapter will briefly describe angels, using VCs as a literary foil to assist the reader in building a better understanding of angels and why angels take the investment evaluation approach that they do. Next, the effects on angels of agency risk and market risk are reviewed. Finally, angels are explored more deeply, specifically their motivations to invest and how entrepreneur passion and personality may affect their funding evaluations. The chapter ends with an explication of research ideas and implications for practice.

2 Angel Investors Versus Venture Capital Investors

In this section, I will briefly describe and contrast angels and VCs. It is helpful for researchers entering this area of study to understand that, though both angels and VCs invest in startups, it has been shown that angels evaluate ventures differently than VCs. Angels have different goals and available assets than their *professional* counterparts. These differences in both goals and assets lead to different investment processes, ultimately leading to a different emphasis on whether market or entrepreneur attributes will receive the highest priorities in the evaluation process.

Angels are individuals who invest their own funds (Osnabrugge and Robinson 2000) in private companies, using either debt or equity financial instruments. Angels are primarily college-educated, wealthy men, commonly with entrepreneurial or business backgrounds (Prowse 1998; Sudek 2006; Morrissette 2007). Angels typically invest in the earliest funding rounds in amounts as low as $5000 individually and up to about two million dollars when acting in groups, with an average holding period of three and a half years (Berns and Schnatterly 2015; Hudson 2016). Angels are thought to expect around 20% annual returns on their investments (Aernoudt 1999). Because they invest their own money, angels have no requirement to justify investment decisions (good or bad) to outside investors.

Venture capitalists, on the other hand, are professional investors. A typical VC firm is organized as a limited liability corporation (LLC) or limited partnership (LP) that provides general management and investment services to a series of separate funds, each organized as separated LLCs or LPs. Each fund is capitalized by passive investors, known as limited partners, who have no operational or decision-making authority in the fund in which they are invested. Limited partners are typically family offices, endowments, and wealthy individuals. VCs raise money for a fund and when the target capitalization of the fund is reached, it is closed to additional investments. The general partner (i.e., the venture capitalist) then has a fixed time frame (10 years is common) in which to allocate capital to new venture investments. Any unallocated funds are returned to the investors along with future liquidated principal and investment gains (minus any investment fees).

The partners in VC firms are responsible for all investment decisions. VCs tend to be staffed by men in their 30s with more than half possessing advanced degrees and business or engineering backgrounds (e.g., Franke et al. 2006). Since VCs have large capital reserves available that must be invested before the fund expires, their investments in new ventures skew toward larger series "A" rounds, the first professional investment round, or even later "B," "C," etc. rounds, where they can expect to engage millions of dollars per investment (Sohl 1999). VCs are thought to expect an overall 30–35% annual return on their investments (Aernoudt 1999).

3 Agency Risk Versus Market Risk

Agency theory is a long-standing and widely referenced theory in economics and finance. Eisenhardt (1989) describes the "agency relationship" where one party, the principal, delegates work to another, the agent, using the metaphor of a contract. She describes two problems addressed by agency theory. The first problem is the *agency problem* where the principal and agent have mismatched goals and the principal has a lack of visibility into the conduct of the agent, known as *information asymmetry*. In other words, the principal cannot confirm if the agent has fulfilled his or her obligations under the contract. This situation may arise in venture investing when the investor has limited visibility into the decisions and actions of the entrepreneur. The second problem addressed by agency theory, *risk sharing*, occurs when the principal and agent have different levels of risk tolerance. This problem can arise, for instance, when a firm has the opportunity to be acquired but the entrepreneur and investor hold different views on the desirability of the acquisition (e.g., the entrepreneur desires to reduce risk by selling, but the angel desires to maintain risk by holding with hopes for larger gains in the future).

A number of studies have employed agency theory to explain the decision-making differences of angels and VCs (Fiet 1995; Osnabrugge and Robinson 2000; Hsu et al. 2014). Fiet (1995) listed the following indicators of potential agency losses: potentially dishonest entrepreneurs; entrepreneurs knowing more than VCs; a great distance between the entrepreneur and investor; short-term self-interest seeking by the entrepreneur; numerous entrepreneurs to be monitored; the entrepreneur not performing as agreed; and game playing.

Whereas agency risk involves risks attributable to the entrepreneur, market risk reflects unforeseen conditions in the marketplace in which a firm is operating and is influenced by market characteristics such as size, growth, accessibility, and need for a given solution (Fiet 1995). Because VCs obtain more control over a firm's management through contracts, they are able to focus relatively more of their evaluation efforts on the market risks of firms under consideration (Fiet 1995; Wetzel 1983). Fiet (1995) lists the following indicators of potential market risk: technical obsolescence; many competitors; many potential new competitors; many substitute products or services; weak customer demand for a product or service; and, market attractiveness.

Angels have little governance control over their investments (unlike VCs). Angels often lack preferred shares or extraordinary voting rights that could allow them to replace a firm's management. They rarely sit on the board of directors. When an investment underperforms, the angel has little practical legal recourse. Because of their lack of resources, experience, and legal expertise, Osnabrugge and Robinson (2000) explain that angels rely on an *incomplete contracts approach* to controlling agency risk. Because the cost of putting in place a good contract is too high, the incomplete contracts approach involves angels focusing relatively more effort on evaluating a firm's leadership during the pre-investment stage in an attempt to screen out entrepreneurs who may exhibit signals of being unreliable stewards of the

investor's funds. An additional aspect of the incomplete contract approach to managing agency risk is that angels often seek post-investment involvement in firms, whether that involvement is an informal relationship with firm leadership, a formal advisory role, or resource sharing, such as the angel's network relationships. Angels tend to have entrepreneurial or business experience that they can offer to firm entrepreneurs and the "angel investment often becomes more personal for the investor, and [so] is distinct from VC investment" (Cardon et al. 2009, p. 3).

4 Angel Investor Motivations to Invest in Risky Startups

Angel investor motivations are more complex than VC motivations. Early-stage investment is a high-risk, high-potential investment arena. Returns, if they come at all, take years to return principal and investment gains. VCs take these risks because they are motivated to maximize fund returns as fiduciaries of the limited partners. Angel investors do not have third-party investors, as they invest their own capital.

Contrary to general investment theory built on a premise of investors as rational actors (Dessler 1980) driven to maximize returns and minimize risk (Markowitz 1952), some early research has suggested that many angels are driven to invest for reasons beyond mere financial returns (e.g., Sullivan and Miller 1996). These results suggest, in fact, that about half of angels are motivated primarily by return on investment (ROI), while the other half invest primarily for nonpecuniary social or altruistic rewards—and these motivations correlate with a preference for different opportunity attributes (e.g., investment size, social benefit, return potential).

Little research currently exists focused on angel investor motivations to invest in risky, illiquid new ventures. Two studies stand out for their attempt to address the question, though they use different approaches. Sullivan and Miller (1996) developed a motivation typology consisting of three general motivations to invest—economic, hedonistic, and altruistic—that presumably span an investor's deals. In other words, investor motivations to Sullivan and colleagues are static forces that do not change from deal to deal. According to their research, all investors seek to earn ROI, but economic investors seek ROI above all else because they approach angel investing closest to the manner of Dessler's (1980) *homo economicus* or other professional investors such as VCs. Hedonistic investors, on the other hand, also want to have some fun and participate in the action of the venture in which they invest (e.g., via advisory or personal relationships with firm founders). Finally, altruistic investors desire their investments to benefit a worthy entrepreneur, community, or cause.

Alternatively to Sullivan and colleagues, Lahti (2011) argues that investors are motivated by the deal. He categorized deals according to "deal and investor-related variables" (p. 51), arguing that an investor invests in a deal not because of an underlying static trait but in order to achieve a goal (e.g., maximize returns, minimize risk, help a cause, etc.) and the goal can change from deal to deal. The author categorized deals by the investment strategy employed, either conventional angel

investment, professionally safeguarded investment, due-diligence-driven investment, or gamble.

The two approaches to understanding angel motivations just discussed have little common ground, indicating the limited received wisdom in this area is fractured and in need of further work.

5 Angel Investor Evaluation

All investors examine the market opportunity, management team, and entrepreneur, but Maxwell et al. (2011) further categorized the factors considered by angel investors into product, market, entrepreneur, financial, and investment (deal structure). When examining entrepreneurs specifically, commitment, passion, trustworthiness, domain expertise, and track record appear to be the most important founder criteria, whereas revenue potential, market potential, barriers for entry, and exit potential are the most important market characteristics considered by angels (Cardon et al. 2009).

Angel investors appear to evaluate firms in stages and there have been several attempts to describe the stages. Paul et al. (2007) defines the angel valuation stages as:

- Familiarization: Consists of learning about the opportunity and entrepreneur.
- Screening: Hard and soft data about the opportunity and entrepreneur are examined.
- Bargaining: Due diligence and negotiations are finalized.
- Managing: Post-investment monitoring, advisory, or operational activities are conducted.
- Harvesting: This aspirational stage is rarely planned by angels, as most companies never reach an exit.

In a later model, Maxwell et al. (2011) break the angel investment process into 11 stages, including deal origination, selection, post-selection (investment return), post-selection (resident risk), entrepreneur assessment (managerial risk), relationship assessment (relationship risk), deal structuring, due diligence, agreement, managing, and harvesting. In both models, at each stage, certain criteria become more important, and other criteria become less important. See Fig. 1 for an illustration of how the two models relate.

Both models depicted in Fig. 1 generally include (1) prospecting activities, i.e., finding entrepreneurs and investment opportunities to evaluate; (2) screening activities, i.e., filtering deals in order to focus on the highest expectation deals; (3) dealmaking activities, i.e., due diligence, deal structuring, and negotiation; and (4) managing, i.e., ensuring the investment is successful and a liquidity event is reached. Although the entrepreneur is evaluated throughout the process, especially regarding their trustworthiness, in the earlier-to-middle stages of the investment process, angels tend to focus on the entrepreneur, whereas the details of the opportunity and deal structure become more important in the later stages when due diligence is conducted and final funding decisions are made.

Conceptual Stage	Paul, Whittam,& Wyper (2007)	Maxwell (2011)
Prospecting	Familiarization	Deal origination
Screening	Screening	Selection Post-selection — investment return risk Post-selection — resident risk Entrepreneur assessment — managerial risk Relationship assessment — relationship risk
Dealmaking	Bargaining	Deal structuring Due diligence Agreement
Managing	Managing Harvesting	Managing Harvesting

Fig. 1 Conceptual stages of the angel investment process as compared to prior research. Author's own elaboration based on Paul et al. (2007) and Maxwell (2011)

Very early in the fundraising process, entrepreneurs have the opportunity to use impression management skills to increase investor interest in their firm (Paul et al. 2007). Maxwell et al. (2011) explains that as a deal progresses, screening intensifies with angels looking for ways to quickly eliminate investments using "elimination by aspects" to identify fatal flaws that could justify elimination of the firm from further consideration. This is a low compensatory evaluation process, which means a firm weak in one characteristic (say, revenue potential) will not receive equal compensation for a strength in another characteristic (say, founder experience). Evaluation of the entrepreneur peaks in the screening stage when angel confidence in the entrepreneur is most critical (Paul et al. 2007). Maxwell et al. (2011) describes that as the deal

moves into the final dealmaking stage, different, more subjective criteria are used and factors are evaluated in a more compensatory manner (e.g., an angel might overlook weakness in revenue potential if the founder's experience is strong). At this point in the process, characteristics of most interest to angels regard the opportunity and deal specifics. Throughout the evaluation process, though, angels use heuristics, cognitive simplifications, and subjective perceptions to make quick decisions (Osnabrugge and Robinson 2000; Morrissette 2007; Maxwell et al. 2011).

As the deal reaches the final stages of evaluation, market factors become most important, in particular, angels seek deals with high return versus risk potential, high revenue potential, and clear exit routes (Sudek 2006; Berns 2016). Because of the prominence of the entrepreneur in angel evaluation, the next section will look in more depth at factors related to the entrepreneur.

5.1 Angel Investor Evaluation of the Entrepreneur

A new venture's leadership (entrepreneur and management team) is an important aspect of the evaluation process of angels and one of the main sources of deal rejections (Mason and Harrison 1996). Streams of research are now developing to further examine the important topic of how the entrepreneur and management team impact angel evaluations.

Trust (Sudek 2006), passion (Cardon et al. 2009; Mitteness et al. 2012; Chen et al. 2009), and even an entrepreneur's persuasiveness and presentation style (Clark 2008) have all been shown to positively influence investor perceptions of a new venture's leadership. This leads to several questions an angel might ask when evaluating the leadership of a venture. (1) Does the entrepreneur have the background and skills to succeed in this particular business? Angels evaluate the expertise of the entrepreneur and the entrepreneur's track record becomes more important as the deal progresses into its later stages of evaluation (Mason and Harrison 1996; Osnabrugge and Robinson 2000). In addition, angels are likely to reject entrepreneurs who display low levels of capabilities, experiences, or traits (Maxwell et al. 2011). (2) Do I trust the entrepreneur to be a good "agent" of my investment? Trust is an important aspect of angel evaluation (Sudek 2006; Osnabrugge and Robinson 2000). Because it takes time and cognitive effort for angels to audit the trustworthiness of an entrepreneur, though, this evaluation tends to be delayed until after an investment is not previously rejected for other reasons (Maxwell and Lévesque 2014). Though angels have shown that they will reject deals if entrepreneurs damage their trust, putting the right controls into place can mitigate broken trust (Maxwell et al. 2011). (3) Does the entrepreneur have the "right stuff," in other words, the personality and passion to persevere, overcome inevitable obstacles, and win in the marketplace? Both entrepreneur personality and passion have been examined in the literature. Passion is one of several dimensions (e.g., personality and personal affect) angel investors examine to judge whether an entrepreneur will deliver on their promises to ensure new venture success (Cardon et al. 2009). Next, a closer look at passion and personality will be presented.

5.2 Entrepreneur Passion

Evidence shows that there are positive relationships between passion and various outcomes beneficial for building successful companies, such as employee commitment (Breugst et al. 2012) and entrepreneurial self-efficacy (Cardon and Kirk 2015). But, it is not a straightforward construct, as several definitions of entrepreneur passion have posited entrepreneurial passion as either an affective state, motivation, or emotion.

Affective passion is the projection of an emotional state and when entrepreneurs display positive emotion, it can lead to more persuasive and confident interaction with angel investors (Baron 2008). Preparedness, on the other hand, is the projection of the results of hard work and is also thought to be positively related to investor evaluations (Mitteness et al. 2012; Chen et al. 2009). Vallerand et al. (2003) describe passion generally as "a strong inclination toward an activity that people like, that they find important, and in which they invest time and energy" (p. 575), i.e., a motivation. Murnieks et al. (2014) also describe entrepreneurial passion as a "strong inclination," or motivation, though domain specific (in this case, entrepreneurial-specific). Cardon et al. (2009) describe passion as a positive emotion for the entrepreneurial activities of inventing, founding, and developing. Clearly there is a need for convergence on a common definition from which further theory building can then proceed.

Entrepreneurial passion does appear to affect investors. Using conjoint analysis, Hsu (2007) showed that passion mattered to angel investors when evaluating investments, while others have also shown passion as an important consideration for angel decision-making (e.g., Sudek 2006; Osnabrugge and Robinson 2000).

5.3 Angel Investor Decision-Making and Entrepreneur Personality

There is widespread agreement that entrepreneur personality affects angel investor decision-making (e.g., Mason and Stark 2004), as angels are thought to attempt to mitigate the agency risk of an investment by evaluating its entrepreneur (Fiet 1995), making personality an important investment consideration (Osnabrugge and Robinson 2000; Sudek 2006).

Though it is thought that angels put a high priority on personality to determine if the entrepreneur will "say what they'll do and do what they say," exactly how entrepreneur personality impacts angel evaluations has only begun to receive scholarly attention (e.g., Cardon et al. 2009; Mitteness et al. 2012; Chen et al. 2009). Murnieks et al. (2015) addressed this question head on and found that angels prefer entrepreneurs with a particular personality, which Murnieks and colleagues referred to as the *entrepreneurial personality profile*. This profile consisted of the Five Factor Model (FFM) (McCrae and Costa 1999) traits of high extraversion, conscientiousness, emotional stability, low agreeableness, and openness to experience.

The rationale for this profile is that angels prefer to invest in a socially confident, self-confident, hard-working entrepreneur who is not a "push over" and who knows the road forward for their venture. Previous scholars using a configural approach to entrepreneur personality research (Obschonka et al. 2012; Schmitt-Rodermund 2007; Murnieks et al. 2015) have argued that a configural approach integrates all the personality dimensions into a more holistic view of a person (Murnieks et al. 2015).

The FFM has also been used extensively in assessing entrepreneurs. The literature shows some consensus on a positive relationship between entrepreneurial interest and high extraversion, high conscientiousness, high emotional stability, and high agreeableness (Schmitt-Rodermund 2004; Zhao and Seibert 2006; Brandstätter 2011; Zhao et al. 2010). Studies examining the relationship between personality and entrepreneurial outcomes, on the other hand, have found less consistent results (Brandstätter 2011; Zhao et al. 2010). So, some early evidence is indicating that angels prefer a certain personality profile in entrepreneurs, but evidence on the effect of that personality profile on entrepreneurial outcomes is lacking.

6 Future Research Opportunities

Though Gartner (1989) questioned the trait approach to the study of entrepreneurs, it is clear that in the preceding two decades personality research in entrepreneurship has delivered interesting results. This is likely because the tools have evolved, particularly the widespread adoption of the FFM, which delivers valid and reliable results that can be analyzed across studies, such as via meta-analyses.

While scholars understand entrepreneur personality better today and are making progress in understanding angel investors, understanding of how personality impacts angel investment decisions is still nascent, indeed. Though numerous studies report personality as an important criterion of angel evaluations, few have reported findings that help build an understanding of how personality impacts those decisions. Future researchers should seek to advance this understanding.

Entrepreneurial passion is still relatively new as a construct and there are at least three competing definitions. Is it a motivation, emotion, or affective state? To create an understanding, there will need to be convergence on a commonly accepted definition. This could mean one or more confounding variables are present in the current passion research, and if this is the case, those need to be revealed.

An anonymous reviewer suggested that there may be a need for research exploring the relationship between entrepreneurial passion and personality. This relationship does not appear to have been addressed directly, though some have looked at the relationship indirectly or via exploratory research (e.g., Mitteness et al. 2010).

Another area ripe for exploration is investor motivations. Why are investors drawn to invest in risky startups? It appears to be an economically irrational act, yet many seasoned business people and educated professionals pursue angel investing with the intention of achieving above-market returns. Investor motivations powerful enough to lead accomplished, educated people to expect 20% annual

returns from an investment class where the vast majority of individual investments end in the complete loss of the invested principal must be strong indeed. So, how do these motivations interact with entrepreneur characteristics (such as personality or passion) to positively or negatively influence angels' investment evaluations? Consider how investor motivations interact with entrepreneur personality.

6.1 The Interplay Between Investor Motivations and Entrepreneur Personality

As has been discussed previously, it is thought that angel investors have either economic, hedonistic, or altruistic motivations to invest but only economic investors are primarily concerned with ROI (Sullivan and Miller 1996). Prior evidence has shown that economic investors prefer investments with higher return expectations and shorter investment time frames, in other words, ROI. Because of this focus on ROI, economic investors should prefer to fund entrepreneurs who will maximize their returns and minimize their risks from an angel investment. Agency risk in this context represents the risk that the entrepreneur will not be a good steward of the investor's capital, e.g., the entrepreneur will be untrustworthy or will otherwise not make decisions aligned with the investor's best interests. Because economic investors are more concerned with ROI than hedonistic or altruistic investors, it seems they should be more concerned with controlling agency risk than other angel investors.

Angel investors attempt to control agency risk by evaluating the entrepreneur and entrepreneur personality is an important characteristic evaluated. The entrepreneurial personality profile of high extraversion, high conscientiousness, high emotional stability, low agreeableness, and low openness to experience (Murnieks et al. 2015) represents entrepreneurial personality investors relate to entrepreneurial success, hence, either higher returns or less risk. Because of this, it would follow that economically motivated investors would more positively evaluate entrepreneurs who measured high on the entrepreneurial personality profile than hedonistic or altruistic investors, who are less concerned with the return expectations of angel investments. The interplay of investor motivations and entrepreneur personality (and other entrepreneur characteristics) provides a rich canvas of potential research possibilities.

7 Practical Implications

In addition to opportunities to expand scholarly knowledge, practitioners may benefit from progress in the suggested research areas. For example, angels with a better understanding of their own biases have the potential to improve investment results by avoiding flawed evaluations. Likewise, if entrepreneurs understand that angel investors may perceive their personalities positively or negatively, they may

choose to employ impression management techniques (e.g., Parhankangas and Ehrlich 2014), in the short term to improve outcomes of investor pitches to angels (e.g., attempt to appear more extraverted). In the medium term, as suggested by Sullivan and Miller (1996), entrepreneurs may attempt to segment investors by predicting their motivations (whether economic, hedonistic, or altruistic) and choose to pitch only those who have complementary motivations, such as a social entrepreneur only pitching investors with altruistic motivations.

8 Conclusion

This chapter has described and contrasted angel investors with their professional counterparts. To recap, angels tend to focus more on agency risk than VCs. Angels, without the experience and resources of VCs, must protect themselves from an entrepreneur who is a bad actor or otherwise fails to act in the best interests of the angel. To protect their investments, angels focus more of their evaluation efforts on the entrepreneur and, also, seek active participation in their investments so as to increase their influence over a firm's outcome. In the process of evaluating the entrepreneur, the entrepreneur's passion and personality are important dimensions for an angel to consider.

Studies have shown that entrepreneurs are different from others, such as managers, because of the risks they take. Angels also take risks. It seems that angels might be different from others, also, and examining their motivations for investing in risky startups might be a fruitful area to explore.

The goal of this chapter was to review the extant literature on angel investor motivations and decision-making and entrepreneur personality and passion. In so doing, it was shown that there are many opportunities at the nexus of these research streams.

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Part IV
Development of Entrepreneurial Decisions

Entrepreneurial Intentions, Risk-Taking Propensity and Environmental Support: The Italian Experience

Francesco Scafarto, Sara Poggesi, and Michela Mari

Abstract Entrepreneurship is recognised as a powerful engine for employment and wealth for nations, to the point that, at the European level, institutions are, to date, particularly active in finding ways to stimulate young people's entrepreneurial skills. In line with this, this chapter aims at analysing the entrepreneurial intention (EI) of students, testing the theory of planned behaviour (TPB) introduced by Ajzen in 1988 and expanding it by adding two 'new' variables, i.e. risk-taking propensity and perceived environmental support. In doing so, a questionnaire has been developed and the answers from a final sample of 383 Italian undergraduate students have been analysed.

Results support the entrepreneurial intention model: most hypotheses have been supported, and the explained variance is notably high. These results are interesting both for academics and policy-makers, pointing out the pivotal role of the environment to develop and foster the attitude towards entrepreneurship among students.

1 Introduction

In Today's economy, it is a matter of fact that entrepreneurship, as well as small- and medium-sized enterprises (SMEs), plays a key role in the economic development worldwide. Interestingly, in the OECD countries, SMEs are the more widespread type of firm, representing approximately 99% of all firms (OECD 2017). Moreover, they are the principal source of employment, creating about 70% of jobs on average and more than 50% of value added (OECD 2016). Specifically focusing on Europe, similar data emerge: 99% of EU firms are SMEs and, since 2013, they have generated more than 80% of new jobs (European Commission 2018). Accordingly, the EU states that both SMEs and entrepreneurship are considered as 'key to ensuring economic growth, innovation, job creation, and social integration in the EU' (European Commission 2018).

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Despite these data and the several initiatives carried out in this regard (e.g. The European Commission Communication, adopted in 2005, 'Implementing the Community Lisbon Programme Modern SME Policy for 'Growth and Employment'; the 'Small Business Act', adopted in 2008; the 'Entrepreneurship 2020 Action Plan', adopted in 2013), entrepreneurial intentions are generally low in more developed economies, while they reach their highest levels in less developed economies (GEM 2017/2018), confirming the general idea that individuals start their own business out of necessity. Moreover, a recent Eurobarometer survey (2014) clearly shows that, for many young Europeans, entrepreneurship is not an attractive job solution.

Stemming from the political and academic awareness that entrepreneurship can represent a powerful engine for employment, the aim of this chapter is to analyse the entrepreneurial intention among a sample of Italian students, testing the theory of planned behaviour (TPB) introduced by Ajzen in 1988 and expanding it by adding two 'new' variables, i.e. risk-taking propensity and perceived environmental support.

Two different elements motivate the choice to analyse Italian students. On the one hand, investigations not grounded on Anglo-Saxon economies can enrich the discussion considerably around this issue; on the other hand, Italy in 2016 has been registered as having among the highest youth unemployment rate, floodlighting entrepreneurship as a possible solution.

By analysing a sample of 383 Italian undergraduate students using a PLS-PM analysis, the results highlight that most of the hypotheses are verified, thus confirming the entrepreneurial intention model.

The chapter is organised as follows: after this introduction, the theoretical framework and research hypotheses are described; therefore, a focus on the European and the Italian context is provided, then the statistical analysis is performed and the results are discussed.

2 Theoretical Framework and Hypotheses

Entrepreneurship is traditionally recognised as a fertile soil for innovation, as well as for the development of employment and economic growth opportunities (Audretsch 2012; Beugelsdijk 2007; Bjørnskov and Foss 2016; Bosma et al. 2018; Carlsson et al. 2009; Poh Kam et al. 2005; Zahra 1999). On this premise, academia has increasingly focused attention on the reasons behind the decision to pursue—or not—an entrepreneurial path undertaken by individuals.

In so doing, the entrepreneurial intention (EI)—i.e. the commitment to start a new business (Autio et al. 1997; Fayolle and Liñán 2014; Krueger and Carsrud 1993; Liñán and Chen 2009)—is a consolidated theoretical framework in the entrepreneurship research arena, adopted to test the effort made by a man or a woman to carry out an entrepreneurial behaviour, and it is frequently grounded in the theory of planned behaviour (TPB), proposed by Ajzen in 1991.

According to this theory, 'the stronger the intention to engage in a behaviour, the more likely should be its performance' (Ajzen 1991, p. 181), meaning that intentions

predict behaviour. Intentions are defined by Ajzen (1991, p. 181) as 'indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behaviour', and are determined by three antecedents: personal attitude (PA) towards behaviour, defined as 'the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question' (Ajzen 1991, p. 188); the subjective norm (SN), meaning 'the perceived social pressure to perform or not to perform the behaviour' (ibid, p. 188); and the perceived behavioural control (PBC), which is 'the perceived ease or difficulty of performing the behaviour and it is assumed to reflect past experience as well as anticipated impediments and obstacles' (ibid, p. 188).

As the process of starting new organisations should generally be intentional and planned (Krueger et al. 2000; Autio et al. 2001), according to many scholars (e.g. Lee et al. 2011; Liñán and Chen 2009; Schwarz et al. 2009; Tsai et al. 2016), entrepreneurship is an example of planned behaviour, consequently allowing the use of TPB to study it. Within this context, the EI has been defined as 'self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future' (Thompson 2009, p. 676). Personal attitude (PA) is generally referred to as the degree to which a person shows a positive or negative personal evaluation regarding being an entrepreneur (Autio et al. 2001; Kolvereid 1996). Subjective norm (SN) measures the perceived social pressure (e.g. family, closest friends, 'other important people') concerning the decision to become an entrepreneur (Heuer and Liñán 2013). Perceived behavioural control (PBC) is generally conceptualised as the perception of the ease or difficulty to become an entrepreneur (Shapero and Sokol 1982).

Accordingly, the traditional EI hypotheses, already used in the plethora of papers published on this issue (Alferaih 2017; Lortie and Castogiovanni 2015; Schlaegel and Koenig 2014), are employed in this chapter as follows:

H1 *Personal attitude positively influences entrepreneurial intention.*

H2 *Subjective norm positively influences entrepreneurial intention.*

H3 *Perceived behavioural control positively influences entrepreneurial intention.*

Interestingly, the influence of SN on EI is still an object of the debate in the literature on entrepreneurship. According to the literature review by Lortie and Castogiovanni (2015), such a relationship has received the lowest empirical support and, moreover, results are mixed. For example, Liñán and Chen's (2009) results, as well as those of Krueger et al. (2000), show no significant direct relationship between SN and EI. Conversely, studies from other scholars demonstrate that this relationship may exist. Tkachev and Kolvereid (1999), for example, in their study based on Russian data, find that SN is a significant predictor of EI, while Autio et al.'s (2001) study shows a weak relationship between SN and EI. Also, in Moriano et al.'s (2011) analysis SN emerges as a predictor of students' EIs, although with the smallest effect and, interestingly, it results in being the only predictor whose effect varied across cultures. Similar results are reported in other works comparing the entrepreneurial intention model across country contexts (Scafarto et al. 2017; Teixeira et al. 2018).

Within this scenario, the social capital literature can be a useful lens as it points out that the values, norms and beliefs transmitted by 'important people' do influence PA towards entrepreneurial behaviours as well as PBC (Heuer and Liñán 2013). Accordingly, we hypothesise:

H4a *Subjective norm positively and indirectly influences entrepreneurial intention via the mediation of personal attitude.*

H4b *Subjective norm positively and indirectly influences entrepreneurial intention via the mediation of perceived behavioural control.*

The above-depicted EI framework has been used by many scholars worldwide, and from the systematic literature review by Liñán and Fayolle (2015), it emerges that there is a tendency in academic studies on this issue to add new variables in the traditional EI model.

In order to expand the well-known—and tested—model, we have decided to add two factors to the overall model, one internal and one external to the individual. Specifically, the internal factor tested here is that of individual risk-taking propensity, while the external factor is a contextual one specifically labelled 'perceived environmental support'.

The risk-taking propensity is traditionally considered as a personality characteristic. In the seminal study by Brockhaus (1980, p. 513), it is defined as 'the perceived probability of receiving the rewards associated with the success of a proposed situation, which is required by an individual before he will subject himself to the consequences associated with failure, the alternative situation providing less reward as well as less severe consequences than the proposed situation'. The willingness to bear risk is a feature historically associated with the entrepreneur (e.g. Begley and Boyd 1987; Knight 1921; Mill 1848).

Regarding the inclusion of the risk-taking propensity in the EI framework, two different positions seem to emerge. On the one hand, the risk-taking propensity is hypothesised being a direct predictor of EI. Indeed, Douglas and Shepherd (2002) find that a low degree of risk aversion is related to a higher EI. Similarly, the meta-analysis by Zhao et al. (2010) points out that risk-taking propensity is positively associated with EI. On the other hand, the risk-taking propensity is hypothesised to be related to PA. Indeed, Lüthje and Franke (2003) highlight that risk-taking propensity, as part of the 'personality' of new entrepreneurs, influences an individual's decision to create a new self-owned venture. More recently, Gu et al. (2018) found that risk-taking propensity is positively related to EI, while self-efficacy (Bandura 1997) exerts a mediating role. In this regard, as pointed out by Liñán and Chen (2009), the concept of self-efficacy (Bandura 1997) can be considered as quite similar to PBC, as both refer to the individual perception of one's abilities concerning the fulfilment of new venture creation behaviours.

Accordingly, we hypothesise:

H5a *Risk-taking propensity is positively related to entrepreneurial intention.*

H5b *Risk-taking propensity is positively related to personal attitude.*

Finally, it is a matter of the fact that the context an individual is exposed to deeply affects his or her behaviour and this is true also when we refer to an individual's decision to become an entrepreneur. Specifically, the combined set of elements in the environment that can affect the growth or the fostering of entrepreneurship is traditionally labelled 'environmental support' (Gnyawali and Fogel 1994; Henry and Treanor 2013; Parry and Jones 2011). Scholars have recently referred to this environmental support by referring to the construct of the 'entrepreneurial ecosystem', whose main constitutive elements are generally recognised as cultural, social or material (Spigel and Harrison 2017).

Generally speaking, the environmental support comprises three main types of institutions: family, university and economic. The conceptualisation of the perceived environmental support stems from the traditional assumption that individuals cannot be considered as single and autonomous entities operating in isolation within the socio-economic environment. In their decision-making process to become entrepreneurs, they are instead parts of a broader context made up of a person's social networks, socio-cultural norms and institutions (e.g. Begley et al. 1997; Robinson et al. 1991; Schwarz et al. 2009).

Results show that external support is positively related to both EI (Lüthje and Franke 2003; Turker and Sonmez Selcuk 2009) and PA towards entrepreneurship behaviours (Lüthje and Franke 2003). However, the role of the perceived environmental support on EI still seems to be an object of debate in academia to the point that Schwartz et al. (2009, p. 276) declare: 'The partial inconsistency of the findings of previous research indicates that there is still a necessity to improve our understanding of the preconditions of entrepreneurial intention'. More recently, Bacq et al. (2017) found evidence that a munificent environment for entrepreneurship reinforces the association between risk-taking propensity, self-efficacy and EI, thus testing the positive role of environmental measures in supporting the potential entrepreneurship.

Accordingly, we hypothesise:

H6a *A supportive environment positively influences entrepreneurial intention.*

H6b *A supportive environment positively influences personal attitude.*

3 The European and Italian Contexts: A Brief Overview

European citizens have been facing challenging conditions concerning employment over the last decades. On this premise, national governments, together with European institutions, are to date working hard to reverse this trend. In so doing, institutions are particularly active in finding ways to stimulate young people's entrepreneurial skills, as entrepreneurship is recognised as a powerful engine for employment and wealth.

At the European level, recent data on youth unemployment are worrying, with the worst trends registered in Greece, Spain and Italy, where, in 2016, a youth unemployment rate higher than 35% was registered, in comparison to an EU average of 18.7% (for details see Table 1) (OECD/European Union 2017).

Table 1 European unemployment rate

Country	Unemployment rate (% labour force)	Youth unemployment rate (% labour force 15–24)
BE	7.8	20.1
BG	7.6	17.2
CZ	4.0	10.5
DK	6.2	12.0
DE	4.1	7.0
EE	6.8	13.4
IE	7.9	17.2
EL	23.6	47.3
ES	19.6	44.4
FR	10.1	24.6
HR	13.3	31.1
IT	11.7	37.8
CY	13.1	29.1
LV	9.6	17.3
LT	7.9	14.5
LU	6.3	19.2
HU	5.1	12.9
MT	4.7	11.1
NL	6.0	10.8
AT	6.0	11.2
PL	6.2	17.7
PT	11.2	28.2
RO	5.9	20.6
SI	8.0	15.2
SK	9.6	22.2
FI	8.8	20.1
SE	6.9	18.9
UK	4.8	13.0
EU 28	8.5	18.7

Source: OECD/European Union (2017)

Within this context, self-employment, and more generally entrepreneurship, seems to represent a feasible path to undertake. Such a solution is strongly advocated by scholars, that identify in entrepreneurship an instrument to boost national growth (e.g. Van Stel et al. 2005; Valliere and Peterson 2009), and by the European Commission, that generally defines entrepreneurship as a pillar of its actions and links it to job creation. However, a Eurobarometer survey (2014) shows that in Europe for many young people entrepreneurship is not an alternative solution to the job crisis. Indeed, 52% of the respondents stated they would not wish to start their own business, and only 22% declared that they would like to start a business even though it is perceived as difficult. Accordingly, only 4.1% of youth (15–24 years old) in employment in the European Union were self-employed in 2016 (OECD/European Union 2017).

Table 2 Entrepreneurial intentions in Europe

Country	Perceived opportunities	Perceived capabilities	Fear of failure	Entrepreneurial intentions	TEA
Bosnia Herz.	13.4	35.5	27.2	4.6	4.0
Bulgaria	19.5	38.4	20.9	5.0	3.7
Croatia	33.6	50.8	26.6	17.5	8.9
Cyprus	51.0	46.4	55.9	16.7	7.3
Estonia	61.0	49.7	31.8	18.1	19.4
France	34.1	36.3	39.1	17.6	3.9
Germany	42.0	37.5	36.3	7.2	5.3
Greece	13.7	43.4	55.5	7.1	4.8
Ireland	44.5	42.2	39.2	11.9	8.9
Italy	28.8	30.4	49.4	10.3	4.3
Latvia	36.3	49.0	42.3	17.3	14.2
Luxembourg	54.8	40.9	47.0	11.0	9.1
Netherlands	64.1	44.6	29.7	8.1	9.9
Poland	68.8	52.4	34.4	9.7	8.9
Slovakia	25.8	48.5	32.8	9.0	11.8
Slovenia	34.6	53.3	31.8	14.2	6.9
Spain	31.9	44.8	39.2	5.6	6.2
Sweden	79.5	34.5	36.7	8.1	7.3
Switzerland	47.2	42.1	29.5	10.5	8.5
UK	43.0	48.2	35.9	7.3	8.4
Canada	60.2	55.6	43.8	14.1	18.8
USA	63.6	54.3	33.4	14.5	13.6

Source: GEM (2017/2018)

More current data on EIs are collected by GEM (2017/2018) (see Table 2).

According to GEM definitions, perceived opportunities refer to 'the percentage of the population aged between 18 and 64 who see good opportunities to start a firm in the area where they live'. Perceived capabilities represent 'the percentage of the population aged between 18 and 64 who believe they have the required skills and knowledge to start a business'. Fear of failure is 'the percentage of the population aged between 18 and 64 perceiving good opportunities to start a business but who indicate that fear of failure would prevent them from doing so'. Finally, EIs represent 'the percentage of the population aged between 18 and 64 (individuals involved in any stage of entrepreneurial activity excluded) who are latent entrepreneurs and intend to start a business within 3 years'. TEA is the Total Early-stage Entrepreneurial Activity rate that shows 'the percentage of individuals aged 18–64 in an economy who are in the process of starting a business or are already running a newly established business that they set up within the previous 42 months'.

As can be seen from Table 2, perceived capabilities are generally higher if compared to perceived opportunities. In Europe, those countries that have experienced long-term economic difficulties show a large gap between the two indicators (see, e.g. the case of Greece) with capabilities higher than opportunities. Conversely, in Sweden, the latter is

higher than the former. These indicators must be read in correlation with TEA as results from GEM, which clearly shows that perceived opportunities and capabilities are positively related to the level of TEA and that the fear of failure can affect TEA negatively, although the association is weak (GEM 2014).

Regarding EIs, they are generally highest among less developed economies and lowest among developed economies, thus confirming the general idea that individuals start their own business out of necessity.

In this regard, OECD/European Union (2012) lists different barriers that can lower the younger generation's propensity towards the choice of undertaking an entrepreneurial path, namely 'social attitudes, lack of skills, inadequate entrepreneurship education, lack of work experience, under-capitalisation, lack of networks, and market barriers. Among them, our focus in this section will be on entrepreneurship education' (p. 10).

According to the European Commission Thematic Working Group on Entrepreneurship Education (agreed on in Geneva on 18 January 2012 by a working group that included representatives from ETF, GIZ, ILO, UNESCO and UNEVOC) entrepreneurship education 'is about learners developing the skills and mindset to be able to turn creative ideas into entrepreneurial action. This is a key competence for all learners, supporting personal development, active citizenship, social inclusion and employability. It is relevant across the lifelong learning process, in all disciplines of learning and to all forms of education and training (formal, non-formal and informal) which contribute to an entrepreneurial spirit or behaviour, with or without a commercial objective'. It is considered particularly important also by GEM; because a link between perceived entrepreneurial capabilities (skills) and the TEA has been verified, GEM stresses that such correlation 'indicates how all forms of education (formal, informal, non-formal) are important in developing entrepreneurial competences' (GEM 2014, p. 38).

Over the years, several actions have been pursued by the European Commission regarding entrepreneurial education. For example, in the 2003 'Entrepreneurship in Europe Green Paper', education is posited as a key factor for fostering entrepreneurship in Europe. This statement is also strengthened by the following 2012 'Entrepreneurship 2020 Action plan', where education is included among the three pillars to support entrepreneurship growth in Europe. More recently, the 2015 'European Parliament Resolution on promoting youth entrepreneurship through education and training' asks the European Commission to foster, through its programmes, the development of entrepreneurial skills at the Communitarian level. This resolution also pushes the Member States for using available European funding to support the development of entrepreneurial skills. Currently, the entrepreneurship education aims are identified in four areas, i.e. 'active citizenship, social entrepreneurship, venture creation and employability'.

Despite all the actions mentioned above, according to a report by Eurobarometer (2012), only 23% of respondents declared having partaken in any course or other activities at school related to entrepreneurship. The most positive answers are from Finland (39%), the Netherlands (36%), Slovenia (36%), Sweden (33%), Luxembourg (32%) and Austria (31%). The countries that record the worst are Malta and the United Kingdom (both scoring 15%), Italy (16%) and Greece (17%).

Table 3 Entrepreneurial education at the school stage (2017) and entrepreneurial education at the post-school stage (2017)

Country	Entrepreneurial education at the school stage	Entrepreneurial education at the post-school stage
France	3.0	5.4
Germany	2.6	4.2
Greece	2.8	4.3
Ireland	3.2	4.4
Italy	2.8	4.6
Latvia	4.3	5.0
Luxembourg	3.2	5.0
Netherlands	5.6	6.2
Poland	2.3	4.4
Slovak Republic	3.3	4.7
Slovenia	3.4	4.7
Spain	3.0	4.7
Sweden	4.1	4.3
Switzerland	3.7	6.3
United Kingdom	3.3	4.5
Europe (average)	3.4	4.8
Canada	3.3	4.8
USA	4.0	5.2
GEM (average)	3.2	4.8

Source: GEM (2017/2018)

These data are supported by the most updated GEM (2017/2018) report which evaluates the entrepreneurial education at both school and post-school stages (2017) (Table 3). In particular, at the European level, entrepreneurial education at school stage scores 3.4,[1] while entrepreneurial education at post-school stage scores 4.8.

In the case of Italy, data from GEM (2017/2018) show a TEA in Italy equal to 4.4% in 2016, the lowest among developed countries. By using the gender lens, Italy shows the second lowest male TEA (5.6%) and female TEA (3.3%) in Europe. Moreover, it clearly emerges that there is a paucity in terms of perceived opportunities to start a business: only 28.6% of respondents between 18 and 64 years old are confident about the idea of starting up a firm because of the perception of the existence of good opportunities in their country (Italy ranks in 51st position out of 64 countries). Concerning the perceived capabilities, data show that these are low: only 31% of the population from 18 to 64 years old is confident about having the needed knowledge and skills to start a firm (Italy ranks in 60th position out of 64 countries). Also, the fear

[1]Weighted average: 1 = highly insufficient, 9 = highly sufficient.

of failure is high: 49.4% of the population aged from 18 to 64, which perceives having good opportunities to start a firm, also show that the fear of failure would prevent them from setting up a business (Italy ranks in 5th position out of 64 countries). Finally, only 10.1% of the population declare having the idea to start a business in the next 3 years (Italy ranks in 52nd position out of 64 countries).

Data regarding entrepreneurial education in Italy are also attractive to analyse. According to the GEM report (2017/2018), the scores of Italy in the entrepreneurial education are, respectively, 2.8 at the school stage and 4.6 at the post-school stage, showing an improvement over the years.

However, the Global Talent Competitiveness Index 2018 ranking (INSEAD 2018), which measures the ability of countries to compete for talent, ranks Italy in 36th position out of 119 countries and at 23rd position in Europe out of 38. Furthermore, the Eurydice report (European Commission/EACEA/Eurydice 2016) clusters Italy among those countries that do not have a national policy devoted explicitly to entrepreneurship education and, in particular, in Eurydice document, it is directly stated that 'there are low levels of activity in Italy' (p. 55). The only activity that is cited for the country is the programme 'alternanza scuola-lavoro'. This activity was introduced by law no. 107/2015 and consists of a programme in which, during their last 3 years of school, students from the upper secondary school are required to strengthen their practical experiences, e.g. by means of apprenticeships or internships.

Finally, according to Eurobarometer (2012), only 36% of respondents in Italy agree that their educational path gave them the instruments, in terms of knowledge, useful to understand the role of entrepreneurs. This percentage is lower if compared to that of other countries such as Portugal (75%), Romania (69%), Finland (63%) and Spain (60%). Moreover, 26% of Italians agree on the fact that their school education contributed in stimulating the interest towards the possibility to become an entrepreneur, and this is a percentage almost in line with data from EU, where this percentage reaches an average of 28%. Finally, only 16% of Italians (against an EU average of 23%) declares having taken part in specific school programmes dealing with entrepreneurship issues.

4 Methodology

4.1 Sample and Method

The sample consists of students of the Bachelor Degree in Economics and Management at the Faculty of Economics, University of Tor Vergata, Rome, Italy.

The University was founded in 1982, and today it is articulated in 18 departments within six faculties: Economics, Law, Engineering, Humanities and Philosophy, Medicine and Surgery and Mathematics, Physics and Natural Sciences. Also, it is listed in The Times Higher Education Young University Rankings list, the world's

Table 4 Sample characteristics

Variables	N^a	%	Mean	S.D.
Age (years)	380	100.00	22.04	0.104
≤20	24	8.95		
21–22	263	69.21		
23–25	143	12.89		
>25	24	8.95		
Gender	383	100.00	0.53	0.026
Female	179	46.74		
Male	204	53.26		
Job experiences	381	100.00	0.67	0.024
No	127	33.33		
Yes	254	66.67		
Family business	380	100.0	0.32	0.024
No	257	67.63		
Yes	123	32.37		

[a]Different values for N are due to missing data. Source: Table compiled by the authors

best universities that are aged 50 years or under. The 2018 ranking includes 250 universities and Tor Vergata rank is 92.

As well as teaching and research, Tor Vergata has a third mission: promoting local social innovation and growth. The university sets up links with civil society and entrepreneurs to create innovative businesses that improve life for local people and provide students with employment opportunities. Accordingly, the number of academic spin-offs, founded by faculty members and other research personnel, is of 33.

To test the hypotheses, data were collected using a validated questionnaire based on 37 questions. A pre-test on 20 students was conducted, and these answers were not included in the final dataset. After the pre-test, only not relevant changes were made to the final questionnaire, which was administered in March 2018 during one class in the degree course of 'Economics and Management' at the Faculty of Economics. After cleaning the initial dataset from missing values, the final sample size was of 383 valid responses. The participation to the survey was voluntary and anonymous; moreover, no compensation was provided.

Table 4 provides a representation of the sample characteristics, showing that it is made of 179 women and 204 men. Moreover, the majority of the students was born in the age range 21–22 (69%) and has some job experience (67%), and in their families of origin, there is no entrepreneur (here intended as the presence of a family business) (68%).

To test the theoretical model, we decided to rely on the Partial Least Squares Path Modelling (PLS-PM) method (Wold 1980), which allowed us to obtain statistical analyses about both the validity of the measures and the significance of the hypothesised relationship.

The minimum sample size for the PLS-PM analysis was determined according to the rules reported in the literature (Barclay et al. 1995). We followed the step-by-step procedures suggested by Hair et al. (2017) and used the statistical package Smart-PLS 3 (Ringle et al. 2015). Then, our theoretical model was further processed by

considering the effects of heterogeneity in groups of respondents. This analytical approach, performed to uncover whether differences in such groups were statistically significant, is the multi-group analysis (PLS-MGA) (Sarstedt et al. 2011).

4.2 Measures

An Italian version of the Entrepreneurial Intention Questionnaire (Liñán and Chen 2009) was employed to capture the dimensions of the TPB.

Following Liñán and Chen (2009), the dependent variable, namely, the *entrepreneurial intentions* (EIs), was measured through six items. Five items measured the construct of *Personal Attitude* (PA). For *Subjective Norm* (SN), we used four items, while the measurement of *Perceived Behavioural Control* (PBC) drew upon six items. Concerning the other variables of our theoretical model, the *Risk-Taking Propensity* of the potential entrepreneurs was measured by a domain-specific short scale for entrepreneurial risk perception derived from the literature (Barbosa et al. 2007) (RTP, five reflective items on a 7-point Likert scale 1 = strongly disagree vs. 7 = strongly agree).

The measurement of *Perceived Environmental Support* (PES) was performed through a formative construct made of seven sub-dimensions related to the degree to which the support from external organisations was perceived (on a 7-point Likert scale) as adequate. To this end, we derived the seven indicators mentioned above by adapting the framework for entrepreneurial environments proposed by Gnyawali and Fogel (1994) to the influences of:

- Government incentives (PES01, i.e. rules and regulations governing entrepreneurial activities; incentives for research and development; tax incentives and exemptions)
- Government procedures (PES02, i.e. procedural requirements for business registration; provision of bankruptcy laws; the number of institutions for entrepreneurs to report to)
- Socio-economic conditions (PES03, i.e. public attitude towards entrepreneurship; the proportion of small firms in the population of firms)
- Supply of entrepreneurial skills (PES04, i.e. entrepreneurship education and training at the high school or the university level; acceleration/incubation programmes)
- Supply of business skills (PES05, i.e. business education and training; vocational and technical programmes)
- Financial assistance (PES06, i.e. the presence of a business angel or a venture capitalist; the willingness of financial institutions to finance small entrepreneurs; credit guarantee programmes for start-up enterprises)
- Non-financial assistance (PES07, i.e. counselling and support services from chambers of commerce; entrepreneurial networks through business associations; incubator facilities)

Finally, we used the following variables to control for variations in results: gender (Gender; 0 = Female; 1 = Male), job experience (Jobexp; 0 = No; 1 = Yes), the presence of a family business (FB; 0 = No; 1 = Yes) and age (Age; classes $\leq$20; 21–22; 23–25; >25).

5 Results

The PLS-PM technique allows two kinds of statistical results: the evaluation of the measurement models (reflective and formative) and the evaluation of the structural model. As to the measurement models, for the reflective constructs (PA, SN, TPB, EI, RTP), we report here reliability and validity assessment by multiple criteria (Cronbach's alpha, significance and relevance of outer loadings, average variance extracted, composite reliability, Fornell-Larcker criterion and heterotrait-monotrait ratio (HTMT)).

The results for the assessment of the reflective model are reported in Table 5.

As shown, the results for the reflective constructs show that almost all the measures were valid and reliable and respected the statistical thresholds,[2] except for four items (PA01, SN04, RTP04 and RTP05), which have not been retained for the next assessment of the relationships among the constructs.

For the evaluation of the formative measurement model, just for the PES construct, we first calculated the outer variance inflation factor (VIF) values to assess the collinearity among the indicators. Once the reliability and validity of constructs have been established, the PLS-PM technique evaluates the coefficients of determination R^2 as well as the size and significance of the loadings, the weights and the path coefficients. To perform this assessment, a bootstrapping procedure has been used.[3] For the formative indicators, the findings are illustrated in Table 6. When the VIF values were considered, we found that collinearity is not problematic.[4] Most of the outer weights for items of the PES were not significant, and therefore we computed the corresponding item loadings and looked at their significance.

Since several loadings were lower than 0.5, with one not significant, we considered the removal of three indicators (PES02, PES03, PES04 and PES05).

The structural model was assessed by considering the relevance and significance of the path coefficients and the R^2 values. The findings are shown in Fig. 1.

EI of students is explained by the direct and significant influences of PA and PBC. Subject norm affects EI indirectly via PBC. PA is the strongest antecedent of EI, with a standardised path coefficient of 0.499. PBC exerts a weak effect on the EI, as

[2] In particular, the outer loadings express the absolute contribution of each item to its assigned construct with their standardised value being higher than 0.7. The second indicator for the valuation of convergent validity of the measures is the average variance extracted (AVE), which is the degree to which a latent construct explains the variance of its items; here, the suggested threshold is 0.5. For the internal consistency, we report the composite reliability (CR) and the Cronbach's alpha, whose values should be between 0.6 and 0.9 (a value of 0.7 is generally accepted). Lastly, to assess whether each construct is genuinely distinct from the others, we followed two approaches: the Fornell-Larcker criterion, which verifies that the square root of each construct's AVE is higher than its correlations with all the remaining constructs, and the Heterotrait-monotrait ratio (HTMT), which is indeed an estimation of what the actual correlation between two constructs would be, if they were perfectly reliable (its value should be lower than 0.9).

[3] Bootstrapping is a resampling technique used to compute standard errors of coefficients and assess their significance without relying on distributional assumptions (i.e. multi-normality of data). Here 5000 sub-samples are calculated.

[4] A shared rule is that the VIF should be lower than 5 (or 10 if a more liberal approach is adopted).

Table 5 Results summary for the assessment of the reflective measurement models (constructs: PA, SN, TPB, EI, RTP)

Construct	Items	Retained?	Outer loadings* >0.70	AVE >0.50	CR 0.60–0.90	Cronbach's α 0.60–0.90	Fornell-Larcker crit. √AVE > correlations	HTMT <0.90
Personal attitude (PA)	PA01	No	0.405	0.633	0.891	0.839	Yes	Yes
	PA02	Yes	0.871					
	PA03	Yes	0.861					
	PA04	Yes	0.859					
	PA05	Yes	0.864					
Subjective norm (SN)	SN01	Yes	0.823	0.602	0.858	0.775	Yes	Yes
	SN02	Yes	0.811					
	SN03	Yes	0.772					
	SN04	No	0.677					
Perceived behavioural control (PBC)	PBC01	Yes	0.784	0.664	0.922	0.898	Yes	Yes
	PBC02	Yes	0.884					
	PBC03	Yes	0.834					
	PBC04	Yes	0.743					
	PBC05	Yes	0.815					
	PBC06	Yes	0.803					
Entrepreneurial intention (EI)	EI01	Yes	0.866	0.802	0.960	0.950	Yes	Yes
	EI02	Yes	0.924					
	EI03	Yes	0.838					
	EI04	Yes	0.934					
	EI05	Yes	0.884					
	EI06	Yes	0.922					
Risk-taking propensity (RTP)	RTP01	Yes	0.875	0.737	0.894	0.822	Yes	Yes
	RTP02	Yes	0.849					
	RTP03	Yes	0.850					
	RTP04	No	0.543					
	RTP05	No	0.544					

*All the loadings are statistically significant at a p-value level <0.001

Table 6 Results summary for the assessment of the formative measurement model (construct: PES)

Construct	Items	Retained?	VIF <5	Outer weights (sig.)	Outer loadings >0.5 (sig.)
Perceived environmental support (PES)	PES01	Yes	1.667	0.256^{ns}	0.393∗
	PES02	No	2.419	0.015^{ns}	0.342^{ns}
	PES03	No	2.534	-0.063^{ns}	0.263^{ns}
	PES04	No	2.869	0.289^{ns}	0.250^{ns}
	PES05	No	2.443	-0.135^{ns}	0.308^{ns}
	PES06	Yes	2.186	0.551^{ns}	0.560∗∗∗
	PES07	Yes	1.650	0.731∗∗	0.901∗∗∗

Source: Table compiled by the authors
ns not significant
∗Significant at a *p*-value level <0.1; ∗∗Significant at a *p*-value level <0.05; ∗∗∗Significant at a *p*-value level <0.001

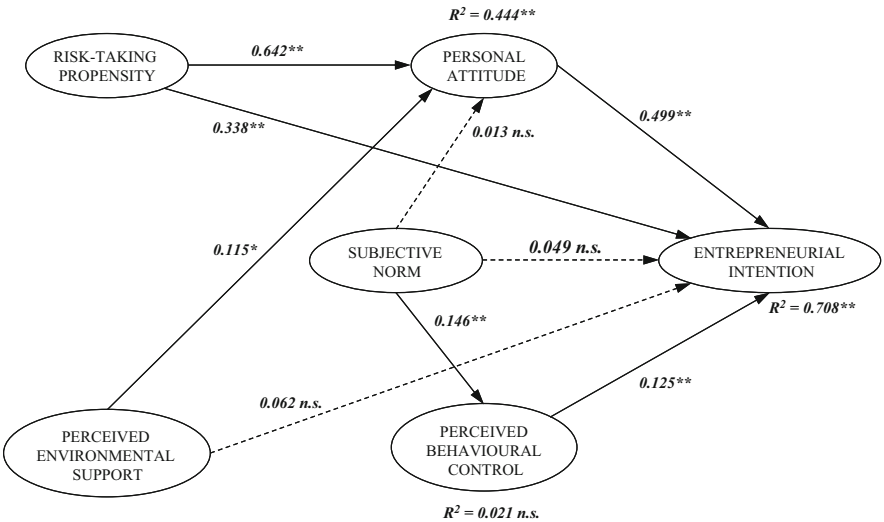

Fig. 1 Overall assessment of the structural model. ∗Significant at a *p*-value level <0.01. ∗∗Significant at a *p*-value level <0.001. *n.s.* not significant. Source: Authors' own figure

demonstrated by its regressor (0.125). As to the effects of the remaining exogenous variables, the risk-taking propensity is strongly correlated to PA (path coefficient = 0.642, significant) and moderately to EI (path coefficient = 0.338, significant). The environmental support, as perceived by students and measured here, does not directly influence EI, but also in this case the PA mediates the relationship (path

Table 7 Summary of the findings for the research model

Hypothesis	Causal relationship	Expected effect	Results
1	PA → EI	Positive	Supported
2	SN → EI	Positive	Rejected
3	PBC → EI	Positive	Supported
4a	SN → PA	Positive	Rejected
4b	SN → PBC	Positive	Supported
5a	RTP → EI	Positive	Supported
5b	RTP → PA	Positive	Supported
6a	PES → EI	Positive	Rejected
6b	PES → PA	Positive	Supported

Source: Table compiled by the authors

Table 8 Multi-group analysis for the significance of differences among path coefficients

Causal relationships	Age (<1997 vs. ≥1997)	Gender (Female vs. Male)	FB (Yes vs. No)	Jobexp (Yes vs. No)
PBC → EI	0.059	0.074	0.697	0.022
PES → EI	0.038	0.017	0.48	0.036
PES → PA	0.224	0.115	0.214	0.137
PA → EI	0.028	0.068	0.513	0.053
RTP → EI	0.073	0.002	0.338	0.036
RTP → PA	0.036	0.039	0.352	0.012
SN → EI	0.011	0.049	0.647	0.068
SN → PBC	0.052	0.170∗	0.137∗	0.037
SN → PA	0.093	0.006	0.078	0.009

Source: Table compiled by the authors
∗Significant at a *p*-value level <0.05

coefficient = 0.115, significant). The overall variance explained by the R^2 coefficient for EI is equal to 0.708, while for PA the corresponding value is 0.444.

A summary of the findings, as contrasted to the research hypotheses, is synthesised in Table 7.

We decided to perform an additional analysis by looking for variations in groups of respondents[5] by running the multi-group analysis algorithm (MGA-PLS) (Table 8).

After assessing the invariance of each couple of groups, we tested the significance of differences between the path coefficients of our research model. Findings prove that all the differences between the groups were not significant, except for SN on PBC for female vs. male students and those with vs. without a family business.

[5]For the variable AGE, a group was created following a dichotomous categorisation of students born before 1997 or from this year forth. For the statistical comparison, each subsample was balanced with its counterpart by using a weighting vector.

6 Discussion and Conclusion

This chapter is aimed at enriching the discussions on students' entrepreneurial intentions in two ways. Firstly, it builds upon the TPB and analyses both the well-known antecedents of entrepreneurial intentions (namely, personal attitude, subjective norm and perceived behavioural control) as well as two 'new' variables, i.e. risk-taking propensity and perceived environmental support.

These two sets of variables have been chosen as the most suitable in order to deeply understand the decision to pursue—or not—an entrepreneurial path undertaken by individuals.

Secondly, this work is grounded in Italy, a still under investigated country. However, because today entrepreneurship is considered a panacea for unemployment and recent data clearly show that in Italy, in 2016, the registered youth unemployment rate was higher than 35%, compared to an EU average of 18.7% (EU), the intentions, attitudes and perceptions of young Italians towards entrepreneurship seem worth studying.

Results from this work, which samples and empirically analyses the answers of 383 Italian undergraduate students, support the entrepreneurial intention model; indeed, most hypotheses have been supported, and the explained variance is notably high.

With respect to the traditional theoretical framework, results show that PA is significantly and positively related to EI and that PBC is significantly and positively related to EI, thus supporting H1 and H3. In contrast, SN is not directly related to intention—thus H2 is not supported—but it exerts its influence on PBC, which, in turn, affects intention (H4b). This means that when students understand that 'important others' approve of their decision to start their self-owned venture, they feel to be more able to perform it satisfactorily. Interestingly, results from the multi-group analysis for the path coefficients show that for the female students the effects of subjective norms on perceived behavioural control are higher than in the male group. A similar result emerges for those students living in families who hold an enterprise, as compared to those others who do not. These results are in line with the literature on the topic stating that, in the case of women, 'relevant people' (e.g. family or close friends), i.e. a locus of interaction of resources, social norms, attitudes and values, play a stronger role in influencing the venture process (e.g. Aldrich and Cliff 2003; Jennings and Brush 2013; Mari et al. 2016).

Moreover, the results related to family business confirm the consolidated literature, emphasising the relevance of the presence of entrepreneurs within the family of origin. Having parents or other family members as business owners themselves can help the future entrepreneurs to gain knowledge, expertise and skills that can positively boost entrepreneurial intentions (e.g. Sirmon and Hitt 2003), as relatives can act as mentors (Aldrich and Cliff 2003). According to the literature, this is particularly true for women who often have less societal legitimation to act as entrepreneurs than their male counterparts (e.g. Welsh et al. 2014).

Regarding the 'new' variables, results show that perceived environmental support is not directly related to intention but only to PA, which in turn affects intention. In other

words, when the environment is perceived to be able to support the endeavour, the students are attracted towards the option of entrepreneurship. However, the support received by the environment is not able to directly affect the EI. Risk-taking propensity results are related to both PA and intention, as has been hypothesised.

These results are interesting both for academics and policy-makers. Indeed, stemming from the awareness that students are the next generation of entrepreneurs, our results point out the pivotal role of the environment to develop and foster the attitude towards entrepreneurship among students. Along with this line, we agree with Etzkowitz (2003, p. 111) who states that 'a set of courses and practical applications can be organised that will set them on the path to firm formation'. Moreover, the role that 'important others' can play emerges, specifically about female students. Accordingly, a mentorship programme focused to females could be useful.

7 Limitations and Future Research Avenues

The present study has limitations that should be noted as they could represent future research avenues.

First, the data collection has been carried out at the Faculty of Economics and, more precisely, the sample is composed only of students enrolled in the second year of the Bachelor Degree in Management and Finance. Two different future trajectories can be identified in this regard. On the one hand, it could be interesting to analyse the entrepreneurial orientation of those students that are enrolled in the last year of the Master of Science in Business Management. These students are very close to concluding their university path, since they have studied for 5 years at the faculty of Economics, and thus could have more definite ideas regarding their future work intention. On the other hand, it could also be interesting to collect data from other Faculties of the University, where entrepreneurship and basic management courses in general are not usually provided. Notwithstanding, in non-business faculties, it could be challenging to understand if entrepreneurial intention however occurs, how it is strong and if there is room to satisfy potential needs through education and training activities.

Second, we grounded our research on only one university in Italy, located in a central region of the country. It could be useful to compare results from students enrolled in universities in the North and South of the country, in order to better understand the role played by the 'perceived support environment'. Moreover, it could be worth studying the comparisons between data collected in Italy and data collected in countries that show similar youth unemployment rates.

Third, we considered only the risk-taking propensity as the personality trait able to affect entrepreneurial attitude and intention. Other traits could be included in the analysis thus contributing to obtaining a clearer picture. We can refer to, for example, the locus of control, the need for achievement and the need for independence, which have already been tested and found to be indirectly related to intention and directly related to PA (Franke and Lüthje 2004).

Fourth, in this work, we have tried to operationalise the environmental support by using perceptual measures according to the classification of environments for entrepreneurship development proposed by Gnyawali and Fogel (1994). In this regard, and to the best of our knowledge, since this is the first tentative to employ and test such a broad second-level formative construct, we proved the reliability and validity of just three out of its seven sub-dimensions. Thus, the measurement of the perceived environmental support can be partially questioned, and it should be subject to further confirmatory tests with a new set of data. However, for the three sub-dimensions here used (government incentives, financial support and non-financial support), the results show a partial consistency with other empirical research that tried to investigate the effect of the institutional environment on entrepreneurship even though with alternative measures (e.g. Diaz-Casero et al. 2012; Ostapenko 2017; Schwarz et al. 2009; Urban and Kujinga 2017).

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Lifelong Learning in Europe: An Analysis of Raw Materials Professionals' Learning Needs

Francesca Ceruti, Laura Gavinelli, Roberto Chierici, and Alice Mazzucchelli

Abstract Professional refresher courses build decision-makers' self-knowledge, which can influence behaviours and choices. This work aims to illustrate the training needs of European professionals working in the raw materials sector, in order to identify any educational gap. A needs and target analysis is carried out within the context of the European project RefresCO—Professional Refresher Courses, funded by EIT Raw Materials. A sample of trade associations, entrepreneurs, and managers involved in raw materials was built using a bottom-up approach and a computer-assisted Web interview survey was conducted through the Limesurvey platform. Results show the existence of the 'ROW (Return Over Waste) educational cube', which combines technological aspects of waste treatment and economic aspects helping professionals to identify related business opportunities. The research identifies similarities and differences in training needs in the Italian versus the European context. The chapter provides an original contribution to the debate on lifelong learning, underlining some priorities in the raw materials industry. The methodological approach creates a new future research path since the work can be extended to other fields in order to plan and manage an overarching professional educational system in Europe.

1 Introduction

In recent decades, intangible and knowledge aspects have assumed increasing importance as competitive factors within a globalized environment (Bengtsson 2014). In order to compete in a knowledge-based market, the European Union (EU) has been promoting lifelong learning as a 'key competency' to foster a sense of initiative and

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entrepreneurship (European Commission 2008). In the literature, there are several interesting studies focusing on policies devoted to education programmes both in Europe (Dahlstedt and Fejes 2017; Bengtsson 2014; Hytti and O'Gorman 2004) and in other countries (Brunila 2011).

The concept of lifelong learning was introduced in an UNESCO report (Faure et al. 1972). From the report's perspective, the whole of society can learn and improve in a continuous, lifelong process. Lifelong learning 'implies a fundamental transformation of society, so that the whole society becomes a learning resource for each individual' (Cropley 1979, 105). When learning, both learners and the external context—the environment—change. This is also true in business situations, where entrepreneurs and managers, while seizing business opportunities, make decisions that can impact both the economic and the social environment (Valliere 2013).

Although there is a wide range of literature devoted to professionals' behaviour, very little exists on professionals' learning needs focusing specifically on the industry of raw materials. This is quite surprising if we consider the development of Europe, as well as its Member States' need for a sustainable and secure supply of non-energy and non-agricultural raw materials.

The dependence on raw materials from non-European countries, and the need for a sustainable and safe supply, represents a double challenge for the EU in terms of the development and competitiveness of its Member States. Many industries today—such as aerospace, automotive, chemicals construction, electronics, equipment, machinery, and renewable energy—depend on raw materials. In Europe, all these sectors produce added value of 1000 million euros and provide employment to more than 30 million people (Laurent et al. 2016).

For this reason, the development of adequate skills and knowledge in the raw materials industry is assuming fundamental importance. Given the limited contributions in this area, the research presented here is highly explorative. The objective of the work is twofold. On the one hand, it investigates the training needs of managers and professionals in the raw materials sector using a bottom-up approach that allows operators to drive the planning of the education process. On the other hand, it aims to identify whether there are any analogies and differences between different European countries. The results show that the need for knowledge and training is multidisciplinary, underlining the importance of both economic skills and technical competences while pursuing sustainable goals. In addition, the work detects a variation in learning needs across different geographical contexts. By considering the training needs of European professionals working in the raw materials sector, this work enriches the debate on lifelong learning and entrepreneurial and managerial education, identifying priorities and need-specific learning programmes that are currently lacking. Moreover, the same methodological approach can be enriched and replicated in other fields, and thereby opens a new research path that will lead to an overarching professional educational system in Europe.

The chapter is organized as follows: the 'Background' section outlines the evolution of lifelong learning in Europe, illustrating the activities of the Raw Materials Academy as a tool for education in raw materials and presenting the activities of a

specific lifelong learning project (RefresCO). 'The bottom-up approach to identifying learning needs' illustrates the approach used to identify learning needs. The 'Methodology' section presents the application of the bottom-up approach, as well as the research steps followed to realize data collection and processing. The section titled 'Results' outlines the findings of the research and provides details on univariate and inferential statistics. The 'Discussion' section sums up the principal managerial implications of the research, while the 'Conclusion' section provides suggestions for future research.

2 Background

2.1 Lifelong Learning in Europe

Guimaraes (2017) provides an interesting contribution regarding the evolutionary path of lifelong learning in Europe. Since the 1990s, the EU has invested in the continuous training of workers and the creation of a seamless European learning area. In the professional field, the EU has produced guidelines that each Member State is expected to incorporate and enforce within adult education programmes. However, the specific national contexts, with their history and peculiarities, have produced a wide heterogeneity in practices (Guimaraes 2017; Field 2000). This has resulted in a variety of different educational systems and educational programmes (Jakobi 2012).

The Lisbon Strategy (European Council 2000) includes the objective of combatting the high unemployment rate of many European Member States through the development of a knowledge-based economy, sustainable growth, and social cohesion, as well as through wider access to training and education programmes (Field 2000).

In the Memorandum on Lifelong Learning (European Commission 2000), education and learning are indicated as drivers of economic growth (Guimaraes 2017). The underlying objective of this strategy is twofold: to foster the growth of professional figures via knowledge-based skills and to integrate these professionals into the various economic and social sectors (European Commission 2000).

In 2004, 'Education and Training 2010' (European Commission 2004) highlighted that investments in human capital and lifelong learning can enhance economic development (Morgan-Klein and Osborne 2007). The key role of learning as an instrument to qualify workers is also expressed in the communication 'Adult Learning: It is Never too Late to Learn' (European Commission 2006). In 2007, the EU identified the 'challenges' in adult learning (European Commission 2007), proposing specific actions to professionalize workers (Jutte et al. 2011).

The document 'Europe 2020' (European Commission 2010) consolidates the link between education, training, learning, and the economy. Among the goals are programmes devoted to worker mobility between Member States, high-level education and training, social engagement, citizens' participation, and creative and innovative entrepreneurship. Beyond mobility, both 'Education and Training

2020' (European Council 2009) and the 'Renewed Agenda for Adult Learning' (European Council 2011) encourage the inclusion of entrepreneurship at all levels of education and training, confirming the tight link between education and sustainable growth (Rasmussen 2014; Špolar and Holford 2014).

More recently, both the Council of the EU and the European Commission (2015) created a list of priorities to be obtained by 2020: a higher employability rate through lifelong learning for competences, skills and knowledge, and innovation. Currently, the Working Group on Adult Learning is working on new guidelines for the policy on adult learning in the workplace.

2.2 *European Education in Raw Materials: The Role of the Raw Materials Academy*

The European Innovation Partnership (EIP) on raw materials, launched in 2013, is a stakeholder platform that includes enterprises, universities, public administrations and organizations, as well as research centres and nongovernmental organizations (NGOs). The EIP's mission is to support the operators involved in raw materials through a high-level and innovative approach. In doing so, the EIP translates its strategic policy framework into actions to be taken by the diverse stakeholders. The EIP thinks that training courses for raw materials professionals need to be greatly improved by providing deeper knowledge on production processes, management, operations, resource recovery, and recycling.

The EU supports the competitiveness of the raw materials sector through financial instruments. One of these is the European Institute of Innovation and Technology (EIT), which is the largest consortium in the world dedicated to raw materials. Its mission is to promote the development of the competitiveness and growth of enterprises operating in the European Member States, as well as the diffusion of innovation and the growth of entrepreneurship through educational approaches. The members of the EIT consortium are involved in activities at various levels: (1) networking and matchmaking; (2) acceleration and validation; (3) business creation and support; and (4) learning and education.

Within the learning and education initiatives, the EIT has established the 'Raw Materials Academy', which runs a wide range of innovative education projects that are developed by the Innovation Community's partners within a number of centrally operated projects. The innovative approach enables the learners—master's and PhD students, industrial partners, professionals within the raw materials sector, and wider society—to experience new ways of learning and new interactive teaching techniques. In particular, the Raw Materials Academy aims to (1) introduce society as a whole to the importance and relevance of raw materials and raise interest in topics related to them; (2) train current and future stakeholders in the technical standards required by the raw materials industry across the entire value chain; and (3) foster entrepreneurial capacities, innovation skills, knowledge, and attitudes among entrepreneurs.

The educational offering of the Raw Materials Academy is organized into three main strands. The first is master's and PhD education, which is addressed to students who want to gain technical expertise, entrepreneurial and innovation skills, problem-solving skills, and managerial capacity. The second strand is the 'Wider Society Learning' programme, which is addressed to all stakeholders of the community—policy-makers, NGOs, civil society, and school pupils. In this case, the goal is to raise awareness and deeper knowledge on the raw materials sector. The third strand of education is titled 'Lifelong Learning'. This strand is aimed at professionals, and its goal is to make them more reactive and proactive to the market, acquiring decision-making capacity and adopting a more innovative approach.

2.3 The RefresCO Project

The lifelong learning courses in the EIT Raw Materials Academy are developed by project teams. Each educational project enables learners to acquire new knowledge and skills, foster their expertise, and grow their network of contacts in the raw materials sector. Among the lifelong learning projects, RefresCO was born to cover a lack of dedicated and multidisciplinary courses on raw materials for professional operators in Europe.

The project consortium is multinational.[1] All partners belong to the three categories of the innovation triangle—research, industry, and education; they cover a wide range of knowledge, competences, and experiences over the full life cycle of raw materials and give complementary know-how to the consortium.

RefresCO is aimed at public administration, private companies and professionals and designs specific training courses based on local requests. The goal of the project is to impart a wide set of expertise that is traditionally offered through separate courses. The 36-month project is ongoing.

The main objective of RefresCO is to provide on-demand professional refresher courses (PRCs) in the field of non-energy raw materials. Target end customers can be enterprises, public administrations, or professionals (e.g. consultants). The overall scope of the project is to implement tailored PRCs to target audiences, using a multi-disciplinary approach. By combining in a single course themes that are normally delivered separately (e.g. technological aspects, together with market issues), RefresCO offers a complete picture of the raw materials sector to its professionals. Each course can be delivered according to one or more methods and tools, such as e-learning platforms, webinars, learning-by-doing, workshops, and so on.

[1]The project consortium is composed of Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico, ENEA (IT); Bay Zoltan Non profit Ltd. For Applied Science (HU); University of Milano-Bicocca (IT); Zanardi fonderie spa (IT); Padova University (IT); Commissariat a l'Energìe Atomique et Aux energies Alternatives (FR); University of Limerick (IE); and Mineral and Energy Economy Research Institute of the Polish Academy of Sciences (PL).

According to the implementation plan, RefresCO has adopted a bottom-up approach, which also follows Abell's model (1980). Under this method, a business matrix can be identified according to three dimensions: target (who will be served by the business), topic (customer needs that will be met), and tool as a technology or distinctive competencies (that will enable these needs to be met). Applying these definitions to RefresCO, potential participants of a course with a specific learning need represent the customers (the target dimension); the subjects of the course represent how the project can meet the needs of its learners (the topic dimension); and the tool dimension represents techniques that are employed to meet learners' needs. Taken together, targets, topics, and tools can be considered the three dimensions that identify an educational cube (EC). Of course, more than one EC can converge into a single PRC.

2.4 The Bottom-Up Approach to Identifying Learning Needs

Gillam and Murray (1996) propose a classification of needs that includes felt needs (what people say they need), expressed needs (actions to take), normative needs (defined by experts), and comparative needs among groups. Some scholars argue that the needs of entrepreneurs differ from those of other people. When considering entrepreneurs, needs can vary depending on the personal traits of the entrepreneur—age, previous experience, directional style, etc.—or the characteristics of the company, size, years of activity, corporate culture, organizational complexity, etc. All these particularities, together with the need to make specific decisions, influence the training needs of decision-makers (Sexton et al. 1997).

Considering education, the debate on the definition, purpose, validity, and methods used to assess learning needs is still intense (Stufflebeam et al. 1985). Effective planning of educational programmes must start from the specific needs of learners, as professionals have particular requirements. These types of requirements arise from the environment in which professionals operate and from the constant interaction that they have with their counterparts (Grant 2002). For this reason, it is essential to design training courses that respond to specific training needs and to use a bottom-up approach that investigates the real needs and expectations of the course recipients.

In general, the bottom-up approach analyses the 'multitude of actors who interact at the operational (local) level on a particular problem or issue' and focuses on the 'strategies pursued by various actors in pursuit of their objectives' (Sabatier 1986, 22). It is commonly used as an alternative to the top-down approach, which originates from outside of the entity. In this specific case, a top-down approach would have foreseen the preparation of training courses created by RefresCO's partners, rather than identifying potential participants.

Evidence confirms that a bottom-up approach brings advantages when spreading information and implementing training courses. A bottom-up process may be more transparent and information more easily shared. At the same time, people may feel more engaged (Oliver et al. 2017), and local relationships may help them gather the

information necessary to make the right decisions (Perni and Martínez-Paz 2013) or foster innovation, effectiveness, social acceptance, and trust between the counterparts involved in the training initiative (Beierle and Konisky 2001; Ostrom 2010; Graversgaard et al. 2017).

Some scholars provide an insight on the conditions—or antecedents—of the bottom-up approach (Micha et al. 2018). These conditions have been adapted in the present research, as follows.

Condition 1: No predefined choices by the analyst In this first condition, the aim is twofold: on one hand, the lack of predetermined choices makes the planning of customized solutions more objective and in line with the specific needs of stakeholders; on the other hand, costs and benefits of the identified solutions are calculated, taking into account the perceptions of the involved actors.

Condition 2: Identification of relevant stakeholders The results produced via the bottom-up approach can also depend on the selected set of stakeholders and their specific interests, as well as the way they perceive problems (Micha et al. 2018). Due to the high number of stakeholders, to meet condition 2 (Billgren and Holmén 2008; Colvin et al. 2016) only a subset of relevant stakeholders can be included in the process. However, if the number of relevant participants is excessive, it may be necessary to define additional criteria, such as geographical and demonstrative stipulations (Reed et al. 2009).

Condition 3: Representative scale The system has to include all relevant stakeholder groups, verifying that they are sufficiently comprehensive and represent all the involved parties adequately.

If conditions 1–3 cannot be satisfied, it is advisable to adopt a partial bottom-up approach.

The bottom-up approach can be even more effective to the eyes of professionals when it integrates local and context-specific knowledge in response to specific conditions (Carolus et al. 2018). Moreover, stakeholders providing more contextualized information can offer more useful knowledge compared to external experts (Perni and Martínez-Paz 2013; Kochskämper et al. 2016).

3 Methodology

With the aim of investigating the learning needs of professionals, managers, and entrepreneurs operating in the raw materials sector, the present explorative research adopts a bottom-up approach. It should be noted that hereinafter the terms entrepreneurs, managers, and professionals are used as synonyms, because they are all decision-makers in firms involved in the raw materials industry.

3.1 Application of the Bottom-Up Approach

As illustrated above, the conditions that should be met to apply a full-scale bottom-up approach are threefold: no predefined choices, identification of relevant stakeholders and representative scale.

In order to meet the first condition—no predefined choices—a focus group was conducted with the partners of RefresCO. Subsequently, six topics were identified as priorities in the raw materials industry by the project partners: innovative and advanced technologies for recovering metals from urban waste (UWASTE); innovative and advanced technologies for recovering metals from industrial waste (IWASTE); supply chain management (SC); innovative and advanced technologies for metals substitution to reduce Critical Raw Materials' (CRMs) consumption (CRMSUB); business opportunities and relative market of recovered metals (BUS); and environmental impact of metals (ENV). Each of these topics has a subset of potential courses, which were also identified during the focus group.

The second condition of the bottom-up approach is the identification of relevant stakeholders. In order to deliver adequate courses to address the current lack of information, the RefresCO consortium drew up a list of 'Golden Contacts' that had relations with operators and professionals in the raw materials field who might be interested in these types of courses. The aim was to investigate the preferences of the operators who were directly involved in the raw materials sector in terms of hypothetical training courses.

The third requirement concerns the representative scale. The consortium used a non-probability sampling approach for reasons of time and convenience (Molteni and Troilo 2007), and collected e-mail addresses for the Golden Contacts. Although the list covers diverse European countries and various raw materials operators—including enterprises and professional associations—it was possible to cover just a subset of relevant stakeholders. Consequently, the research undertook a partial bottom-up approach, satisfying two out of three conditions.

3.2 Data Collection

Following email collection from the Golden Contacts, a survey was carried out, as well as a review of the literature and data collection from the focus group. Questionnaires seem to be the most commonly reported method for needs assessment (Myers 1999); however, it should be noted that, to the best of the authors' knowledge, no previous research has been conducted in the field in such a specific way, and hence no validated scale could be found in the literature. Thus, the questionnaire was created from the focus group, exploiting the knowledge and skills of the project partners. These partners agreed to create a short survey suitable for completion by the different decision-makers (entrepreneurs, managers, professionals). The resulting questionnaire included two sections: the first concerned respondents' general information

Table 1 Description of respondents

Gender		**Country**		**Role**	
M	73.7%	Belgium	5.3%	Director	21.1%
F	26.3%	Finland	10.54%	R&D	26.3%
Age		France	15.8%	Project Manager	10.5%
<35	10.5%	Hungary	15.8%	President	26.3%
35–44	31.67%	Italy	42.1%	Executive Secretary	10.5%
45–54	26.3%	Span	5.3%	Other	5.3%
55–64	10.5%	Sweden	5.3%		
>64	21%				

Table compiled by the authors

(i.e. gender, age, role in the organization); the second section was about learning needs, going into detail on topic evaluation, choices regarding a specific course, number of people potentially involved, duration of desired course in terms of number of hours, and willingness to pay for a course. The study used a five-point Likert scale to determine how important each of the six topics identified during the focus group (UWASTE, IWASTE, SC, CRMSUB, BUS and ENV) was to respondents.

For each contact in the database, a personal invitation was sent by e-mail, from which the recipient could directly access the questionnaire. Thus, each participant received a unique link through which they could complete the questionnaire. This allowed the researchers to collect clear answers, and track each respondent and their answers. In the second stage of the project (course delivery stage), this will enable the consortium to identify and contact specific targets to which ad hoc learning solutions can be proposed.

The questionnaire was distributed to the 58 Golden Contacts. Every Golden Contact is a top manager of a company or a category association representing managers who must make decisions within their organization on a daily basis. Data collection was carried out via the Computer Assisted Web Interview (CAWI) method.

The collected data were processed and presented in an aggregated way, while fully respecting the privacy of the respondents.

The survey return rate was 32.8% (19 out of 58 Golden Contacts) (return rate including partially completed questionnaires was 41.4%).

As shown in Table 1, the respondents are mainly male (73.7%) and 35–54 years old on average (57.9%). The majority of respondents are Italian (42.1%), followed by French and Hungarian (both at 15.8%), and Finnish (10.5%). Belgian, Spanish, and Swedish compose the remaining part of the sample (each at 5.3%). Regarding the professional role within the organization, nearly half of the responding sample are managers; 26.3% of the sample are presidents, 26.3% work in R&D, and 21.1% are directors.

3.3 Data Elaboration

The results of the CAWI were elaborated according to descriptive (first stage) and inferential (second stage) statistics. Descriptive statistics were derived in order to present the answers of the Golden Contacts using means and standard deviations, thereby providing an overview of the respondents' preferences. Inferential statistics were obtained in order to measure the average evaluation of a single topic, with respect to the average evaluation of all other topics. As mentioned above, each topic was evaluated according to a five-point Likert scale. It is reasonable to assume that a respondent who assigned a value not lower than 2 considered the investigated topic useful, and identified a training need in that topic.

In order to set the inferential framework, a number of steps were taken. First, a dummy variable (Utility) was created. This variable assumes a value of 0 when the topic was not considered useful (values below 2) and 1 when the topic represented a need (value higher than or equal to 3). Second, the statistics of the dummy-utility variable were calculated for each topic. Third, a standard mean-comparison test (Casella and Berger 2002) was carried out in order to compare the usefulness of courses related to the topic.

The standard null hypothesis can be defined as follows:

$$H_0 : \mu_x = \mu_y$$

Where μ_x is the average of the variable Utility of a certain topic and μ_y is the average utility of all other topics. H_0 was tested against the following alternative hypotheses:

$$H_{1a} : \mu_x < \mu_y$$

$$H_{1b} : \mu_x > \mu_y$$

A t-test was conducted twice, first to compare the average Utility among the Golden Contacts, without any distinction of nationality and then to identify any similarities and differences in learning needs between Italian respondents and those from other countries (Italy vs. foreign countries).

The authors focused on identifying a lack of knowledge among Italians because Italy has one of the lowest participation rates in education and training programmes in Europe. In fact, in 2017 the Italian participation rate was 41.5% against a European average of 45.1%; top countries included the Netherlands, which registered a participation rate of 64.1%, Sweden (63.8%), and Norway (60%) (Eurostat 2016).

Table 2 Univariate statistics about topics

	Usefulness			Number of potential participants			
	Mode	Mean	Std. deviation	Min	Max	Mean	Std. deviation
UWASTE	4	4.05	.830	0	12	4.26	14.982
IWASTE	4	4.37	.357	0	20	5.37	25.135
SC	5	3.68	1.450	0	30	4.74	51.538
CRMSUB	4	3.84	.696	0	15	4.58	19.146
BUS	5	4.05	.719	1	30	5.11	46.766
ENV	4	4.11	.766	0	20	5.58	38.257

Table compiled by the authors

4 Results

4.1 Univariate Statistics

The survey contained a question concerning the usefulness of the topics, in order to identify whether each individual Golden Contact perceived a learning need in their field of activity (evaluation on a five-point Likert scale). Results show that the respondents were interested in all six fields, with a clear concentration of preferences on the 4- to 5-point evaluation (Table 2). The statistical mode was 4 for the fields of UWASTE, IWASTE, CRMSUB, and ENV and 5 for the fields of SC and BUS. In particular, the first two fields with the highest average evaluation on the usefulness of courses were IWASTE (4.37 average score) and ENV (4.11 average score).

Table 2 also presents some data regarding the number of potential participants. Each respondent could have within his or her organization one or more person who could take a training course. The results show an average participation of 4–6 people in training courses in all six fields. The field with the highest average participation was ENV (six people).

The survey also went into detail regarding each above-mentioned field in terms of the interest of respondents in each possible training course. For each field, the survey proposed a multiple-choice question on a selected list of possible courses.

For SC (Fig. 1), the top three courses in terms of preference were 'Innovation & Product Development to develop and improve processes, and to speed up time to market' (12 respondents), 'Development and introduction of modern logistic optimization tools in scraps collection, selection & supplying' (10 respondents), and 'Materials & Surface Sciences expertise' (7 respondents).

Figure 2 shows the preferred courses in the field of UWASTE. The top two courses refer to methods of metal recycling, in terms of recovery and purification. In particular, the course 'Methodological and operative approach for the development of recovery processes and purification of metals from urban waste through hydrometallurgy' was selected as a preference 12 times, while the course 'Methodological and operative approach for the development of recovery processes and purification of metals from urban waste through electrochemistry' was selected seven times. Following this was 'Solvents and solubilisation' (five respondents), 'Specific ion at

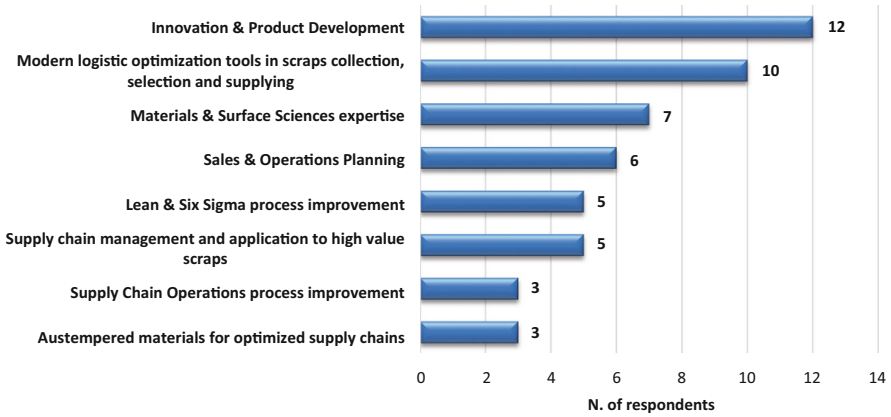

Fig. 1 Courses selected in the training field SC (supply chain management). Authors' own figure

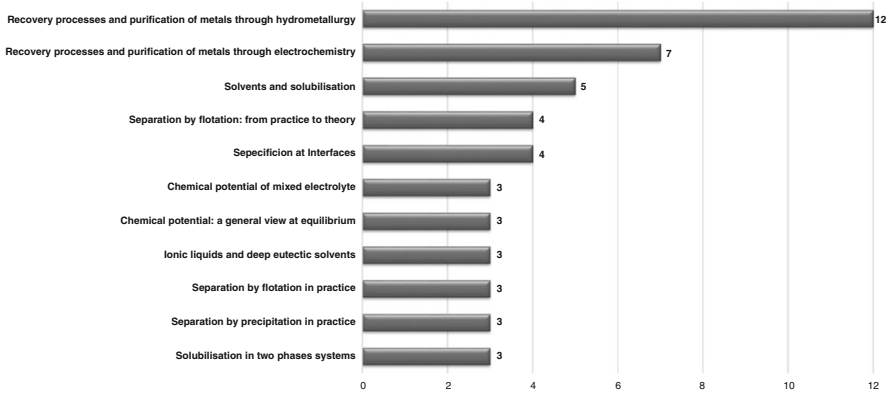

Fig. 2 Courses selected in the training field UWASTE (innovative and advanced technologies for recovering metals from urban waste). Authors' own figure

interfaces' (four respondents), and 'Separation by flotation in practice' (four respondents).

The third field investigated was IWASTE (Fig. 3). In this case, the training course with the highest preference rate was 'Methodological and operative approach for the development of recovery processes and purification of metals from industrial waste through hydrometallurgy', selected by 15 respondents. This course had the highest interest of the entire questionnaire.

The fourth field was CRMSUB (Fig. 4). The top two courses in this case were 'Structural, compositional, and morphological characterization of substitute materials' (nine respondents) and 'Material properties of austempered materials, for lightweight and material-efficient components, with a reduced or null amount of CRM in substitution of high-strength steels and aluminium alloys' (seven respondents).

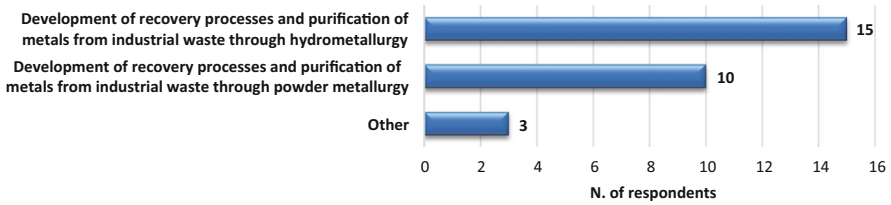

Fig. 3 Courses selected in the training field IWASTE (innovative and advanced technologies for recovering metals from industrial waste). Authors' own figure

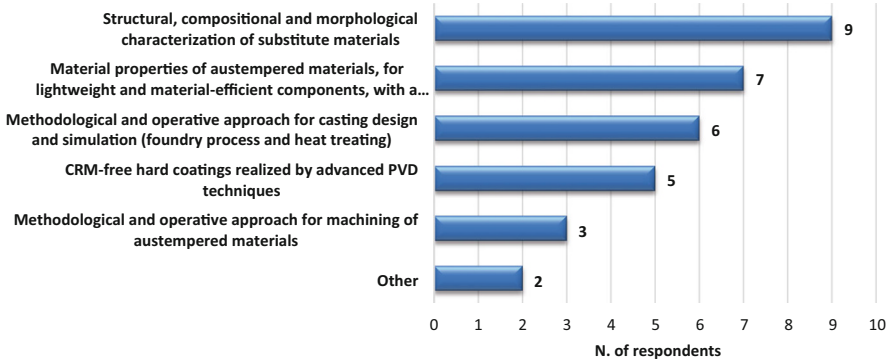

Fig. 4 Courses selected in the training field CRMSUB (innovative and advanced technologies for metals substitution to reduce CRM consumption). Authors' own figure

The fifth field was BUS (Fig. 5). In this field, the top courses were 'Business opportunities in total cost analysis of components' and 'Business opportunities in metal recycling' (11 respondents for each). These were followed by 'Assessment methodology of cost-effectiveness, financial feasibility and investment risk of innovative technologies for recovering metals from waste' (eight respondents) and 'Funding opportunities for projects related to investment in innovative and advanced technologies for recovering materials from waste' (seven respondents).

The sixth and last field was ENV (Fig. 6). In this case, the first two courses selected by the respondents were 'Eco-innovations—challenges for SMEs' (12 respondents) and 'Life-cycle assessment (LCA) of technologies for recovery of metals from waste' (10 respondents). Following these were 'Environmental evaluation of CRM: methodological approach' (nine respondents) and 'Assessment of environmental benefits for metals recovery from waste electrical and electronic equipment (WEEE)' (eight respondents).

The level of interest in specific training courses was also detected, in terms of length (number of hours) and willingness to pay for a course. Regarding course length, the results were consistent: 32% of respondents indicated that they would like to attend courses longer than 25 h, while 26% indicated a preference for 17- to 24-h courses.

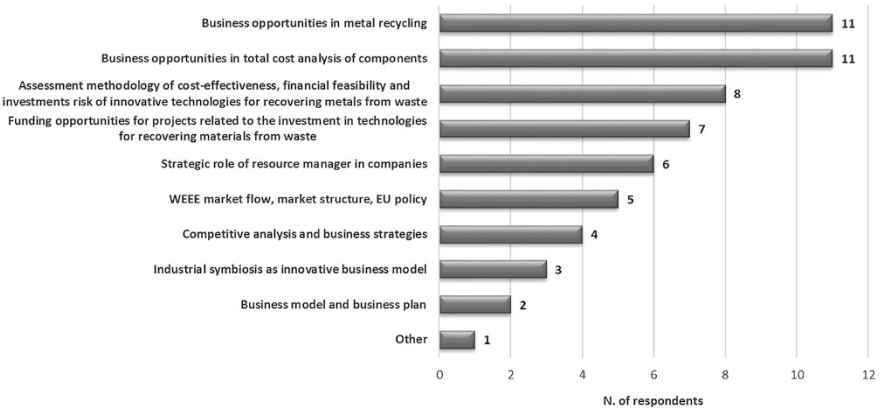

Fig. 5 Courses selected in the training field BUS (business opportunities and relative metal market). Authors' own figure

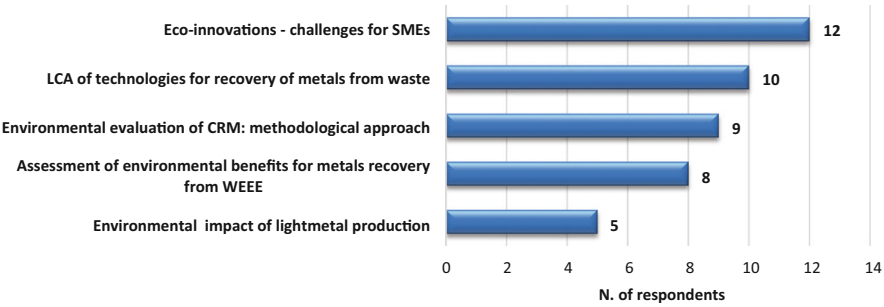

Fig. 6 Courses selected in the training field ENV (environmental impact of metals). Authors' own figure

The number of hours indicated by the fewest respondents was 30 h, while those indicated by the most respondents was 150 h.

In short, the figures confirm that there was a strong interest within the responding sample in RefresCO courses. A high propensity (68%) of respondents indicated a willingness to pay for this training.

4.2 Inferential Statistics

The second stage of the analysis used a standard mean-comparison test (Casella and Berger 2002) in order to compare the usefulness of courses. In detail, the average usefulness of a course—measured as a proportion of those who declared a learning need, as defined in the methodology section of this chapter—was compared with the

Table 3 Inferential statistics (overall)

	Utility average μ_x (std dev)	Utility average μ_y (std dev)	H_0	H_{1a} Pr $(T < t)$	H_{1b} Pr $(T > t)$
UWASTE	.895 (.315)	.947 (.090)	Not rejected	.244	.756
IWASTE	1 (0)	.926 (.119)	Rejected	.995	.0054***
SC	.842 (.375)	.958 (.0838)	Rejected	.0985*	.902
CRMSUB	.947 (.229)	.937 (.116)	Not rejected	.570	.430
BUS	1 (0)	.926 (.119)	Rejected	.995	.0054***
ENV	.947 (.229)	.937 (.116)	Not rejected	.570	.430

Table compiled by the authors
$*p < 0.10$; $**p < 0.05$; $***p < 0.01$

average usefulness of all courses. The following results refer to a limited number of respondents and should be considered carefully, since a higher number of observations is required to strengthen the casual effects. Table 3 summarizes the results of the test on an overall level.

All respondents (100%) recognized the usefulness of the IWASTE topic compared to the average of all the other topics (92.6%). The null hypothesis is thus rejected in favour of alternative hypotheses. In particular, it appears that IWASTE represents a learning need that is statistically significant in the sample ($T = 2.689***$). At the same time, BUS was considered fundamental by the entire responding sample, in comparison to the average of the utility of all other topics (92.6%). Also in this case, the null hypothesis is rejected and the field BUS represents a statistically significant learning need in the sample ($T = 2.689***$).

The topic SC was considered useful by 84.2% of respondents compared to the average of the other courses (95.8%). Although the high mode (5), the standard mean-comparison test reveals that the respondents did not consider it as a priority. The null hypothesis is thus rejected in favour of H_{1a} ($T = -1.315*$). The UWASTE topic was considered useful by 89.5% of respondents compared to the average of the other courses (94.7%). Even though it seems that UWASTE is perceived as a less important learning need, the null hypothesis cannot be rejected. Therefore, UWASTE does not represent, in relative terms, a learning need within the sample. The same consideration can be made for the topics CRMSUB and ENV (both 94.7%), whose null hypotheses also cannot be rejected.

Comparing the results of Italy to those of foreign countries (Table 4), it should be noted that both groups considered the IWASTE topic useful compared to the average of all the other topics (95% for Italian respondents, 90.9% for foreign respondents). In particular, it appears that IWASTE represents a learning need that is statistically significant for both the Italian group ($T = 1.528*$) and for the foreign group

Table 4 Inferential statistics (Italy vs. foreign countries)

	Utility average μ_x (std dev)	Utility average μ_y (std dev)	H_0	H_{1a} Pr $(T < t)$	H_{1b} Pr $(T > t)$
UWASTE					
Italy	.875 (.354)	.975 (.071)	Not rejected	.222	.777
Foreign countries	.909 (.302)	.927 (.101)	Not rejected	.244	.756
IWASTE					
Italy	1 (0)	.950 (.093)	Rejected	.926	.075∗
Foreign countries	1 (0)	.909 (.138)	Rejected	.980	.020∗∗
SC					
Italy	.875 (.354)	.975 (.071)	Not rejected	.222	.777
Foreign countries	.818 (.945)	.947 (.093)	Not rejected	.161	.839
CRMSUB					
Italy	1 (0)	.950 (.093)	Rejected	.926	.075∗
Foreign countries	.909 (.302)	.927 (.135)	Not rejected	.429	.572
BUS					
Italy	1 (0)	.950 (.093)	Rejected	.926	.075∗
Foreign countries	1 (0)	.909 (.138)	Rejected	.980	.020∗∗
ENV					
Italy	1 (0)	.950 (.093)	Rejected	.926	.075∗
Foreign countries	.909 (.302)	.927 (.135)	Not rejected	.423	.572

Table compiled by the authors
$*p < 0.10$; $**p < 0.05$; $***p < 0.01$

($T = 2.193**$). Likewise, both groups perceived the fundamental utility of BUS: for both, the null hypothesis is rejected and the field BUS represents a statistically significant learning need, albeit with different p values (Italians $T = 1.528*$, foreign respondents $T = 2.193**$). An additional similarity in the two groups lies in the non-consideration of UWASTE and SC as priority subjects. The null hypothesis cannot be rejected for either of these topics.

The results also reveal some differences between Italian and foreign respondents with regard to CRMSUB and ENV. Only the Italian group stated that they had a training requirement regarding these two topics. All Italian respondents considered these very useful compared to the average of all the other topics (95% for both CRMSUB and ENV). In particular, for CRMSUB the null hypothesis is rejected and the field represents a learning need that is statistically significant in the Italian subsample ($T = 1.528*$). The same is true for ENV, which is relevant for the Italian group.

5 Discussion

In a competitive environment characterized by strong and sudden changes and progressive globalization (Friedman 1999), the raw materials sector faces a range of challenges. A first challenge is that of moving from an 'end-of-pipe' approach to a more holistic and managerial approach that considers the entire value chain. This approach requires new technical, economic, social, and environmental skills among its operators (Ferreira et al. 2006). Raw materials are closely linked to the socio-environmental balance of the context in which they are involved and used; for this reason, environmental professionals of today must be able to recognize and interpret the environmental and economic problems of the local context, and have a proactive attitude for the development of integrated solutions (Ferreira et al. 2006).

The purpose of this chapter is to illustrate the training needs of European professionals working in the raw materials sector. The results of the study show that issues related to the recovery of materials and metals from industrial waste and to entrepreneurial and managerial education are priorities, and need specific learning programmes, which are currently lacking.

According to previous studies, professionals have already defined their needs regarding what to learn and how to learn it (Sexton et al. 1997), where education is considered an incremental and holistic learning process (Hager 2004) in which learners come to 'understand things and developing increased capacities to do one wants or needs to do' (Schoenfeld 1999, 6).

By cross-referencing the topics identified as priorities and the number of potential participants for each course (Table 5), it is possible to identify the four most desired courses as signalled by the professionals involved in raw materials: (1) recovery processes and purification of metals from industrial waste through hydrometallurgy (95 professionals); (2) business opportunities in metal recycling (64 professionals); (3) business opportunities in total cost analysis of components (63 professionals); and (4) recovery processes and purification of metals from industrial waste through powder metallurgy (60 professionals).

To summarize, the educational cube derived from the bottom-up approach of the research could be called the 'Return Over Waste' (ROW) educational cube. It combines technological aspects (hydrometallurgy and powder metallurgy applied to waste) with economic aspects (cost–benefit analysis and business opportunities), which can also help professionals develop their business in a sustainable way.

Table 5 Genesis of the Return Over Waste educational cube

Topic	Course	Prospects
IWASTE	**Recovery processes and purification of metals from industrial waste through hydrometallurgy**	**95**
IWASTE	**Recovery processes and purification of metals from industrial waste through powder metallurgy**	**60**
BUS	Strategic role of resource manager in companies	40
BUS	Industrial symbiosis as innovative business model	9
BUS	**Business opportunities in total cost analysis of components**	**63**
BUS	**Business opportunities in metal recycling**	**64**
BUS	Assessment methodology of cost-effectiveness, financial feasibility and investments risk of innovative technologies for recovering metals from waste	56
BUS	Funding opportunities for projects related to the investment in innovative and advanced technologies for recovering materials from waste	40
BUS	WEEE market flow, market structure, EU policy	21
BUS	Competitive analysis and business strategies	32
BUS	Business Model and Business Plan	14

Table compiled by the authors
The bold indicates the top two courses for each topic with the highest number of prospects

Table 6 Perceived learning needs

	Overall	Italy	Foreign countries
UWASTE			
IWASTE	Yes	Yes	Yes
SC			
CRMSUB		Yes	
BUS	Yes	Yes	Yes
ENV		Yes	

Table compiled by the authors

Thanks to the ROW educational cube, professionals can develop both economic skills and technical competences, while pursuing sustainable goals. In this way, they can play an important role not only in their own organization but also in society, making an important contribution to sustainability (Ferreira et al. 2006).

The ROW cube could also support professionals in their learning process by providing courses on innovation for sustainability; optimization of available resources and a circular economy; and economic issues such as managerial skills, business models and cost–benefit analysis.

In addition, the research highlighted that the Italian operators' training needs were indicated as being far higher than those of their European colleagues on the same topics (Table 6). In fact, the Italians perceived a lack of knowledge and skills in the topics CRMSUB (innovative and advanced technologies for metals substitution to reduce CRM consumption) and ENV (environmental impact of metals), unlike their counterparts located elsewhere.

This result is in line with those found by other authors who detect variation in learning needs when considering different geographical contexts (Arulampalam

et al. 2004). However, this diversity may depend on different interpretations of lifelong learning. Previous studies argue that in each country or region differences of perception regarding lifelong learning may arise from specific contextual aspects that might be translated into differing education policies (Lima and Guimarães 2011; Guimarães and Antunes 2014).

In Italy, for instance, the wider lack of knowledge has pushed the RefresCO consortium towards developing integrated solutions that are capable of improving management of the entire raw materials industry, including CRMs, energy, eco-efficiency, and organizational and economic issues.

Beyond the highlighted need for knowledge and training that emerges from this research—and that is broader among Italian respondents—the tendency in teaching seems to be multidisciplinary. On this theme, Warburton (2003) argues that the variety and interconnectedness between environment, society, and economy necessarily requires an interdisciplinary and holistic approach to sustainability. The natural consequence of this is a need for in-depth learning in all these aspects, unlike traditional learning approaches (Grauerholz 2001).

6 Conclusion

The research presented in this chapter is explorative and focuses on European professionals operating in raw materials—an industry that is widely recognized as fundamental in the EU strategy and planning for the next years.

The research provides interesting evidence on the learning needs underlying a possible educational model. It also compares the learning needs of Italian and foreign respondents. This work contributes to the general knowledge on education of adults in different areas, providing insights for both academics and practitioners.

First, it enriches adult education literature by identifying the priorities in learning needs and the delivery methods that are preferred by professionals. Second, by providing market information on course offers for education programmes, this research can be used to develop a series of courses or modules that could foster efficiency and effectiveness in the raw materials industry. Third, the work adopts a bottom-up approach that can support participatory processes and generate additional local knowledge that goes beyond existing information. This may serve as input to facilitate better and more well-informed decision-making processes. Supporting participative educational planning is in line with the growing trend of embedding people into decision-making (Koontz and Newig 2014; Pascoe and Dichmont 2017). Finally, the methodological approach adopted in this work can be extended to other fields in order to build a comprehensive European educational system based on specific professional needs.

Since lifelong learning is also a subject of great interest and relevance for the EU, it would be advisable to extend the research to other stakeholders that are active in Europe in order to determine whether there are any differences in orientation in diverse geographical contexts. Furthermore, additional observations would increase the

informative power of the tests proposed, thereby improving the casual interpretation. In addition, the implementation of a qualitative phase could deepen understanding of the individual local context and identify the specific educational gaps and course demand. Moreover, future research could focus on monitoring and evaluation techniques to measure the outcomes of course delivery. Finally, further studies could verify the feasibility of creating a certification system on the training objectives reached by learners—based on their knowledge and skills acquired—once they have finished the course. In this sense, certification could help professionals maintain or strengthen their position in the labour market, as well as position their organization or enterprise more competitively in the raw materials sector.

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Part V
External Context of Entrepreneurial Decisions

The Relationship Between Entrepreneurship, Innovation and Growth in Italy

Massimo Arnone

Abstract This chapter considers innovation driven by academic entrepreneurship a strategic lever that can accelerate the development of weaker local economies especially in Southern Italy. The analysis of this form of entrepreneurship follows multidimensional approach of the "strategic entrepreneurship" to capture possible correlation between the single analysis approaches widespread in the literature (teleological, psychological, environmental and relational).

1 Introduction

This chapter aims to investigate some determinants of entrepreneurship, in particular the academic one, and its manifestation channels that can produce positive effects for the growth of local economies. The determinants identified are the entrepreneur's objectives, the characteristics and distinctive traits of a successful entrepreneur and the degree of influence of the environment (especially of a hostile environment) on entrepreneurial activity and entrepreneurial networks, that is, the set of all the relationships established by the aspiring entrepreneur.

If entrepreneurship manifests itself through the creation of new ventures, several studies have shown that start-ups born within the academic environment are able to achieve better performance than traditional start-ups in terms of a higher employment absorption, a greater presence in high-tech sectors, a greater push towards innovation and higher levels of investment (Shane 2004; Kolvereid and Isaksen 2005).

From some recent studies that, from time to time, use the expression "entrepreneurial universities", "university entrepreneurship" and "academic entrepreneurship" emerges a greater diversification of the role of the universities that sees alongside the two traditional missions (teaching and research) a third. This new mission can manifest itself from time to time as the ability to create business, to commercialize the knowledge produced inside and to establish partnerships with the industries. The

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sustainability of the universities would be strengthened by being able to use knowledge as a lever of social and economic development (Audretsch 2014; Sam and van der Sijde 2014; Guerrero et al. 2014, 2015, ; Guerrero and Urbano 2012; Abreu and Grinevich 2013; Urbano and Guerrero 2013; Mainardes et al. 2011; Kirby et al. 2011; Nelles and Vorley 2011; Etzkowitz 2013; Mazdeh et al. 2013; Abreu and Grinevich 2013; Mars and Rios-Aguilar 2010; Wright 2014; Wood 2011; Guenther and Wagner 2008). The role of an entrepreneurial university does not replace the two previous missions and, to be effective, puts universities in the face of the challenge of new governance and management models, conducting research activities and encouraging interdisciplinarity and further institutional capacities that promote greater interactions with industries and government structures (Phillpot et al. 2011; Goldstein 2010). The characteristics of the entrepreneurial university have been the focus of several studies. According to Goldstein (2010), the entrepreneurial university has three aspects: (1) greater involvement in the processes of development and commercialization of knowledge; (2) changes in internal regulations, remuneration and incentives and behavioural and governance rules that may hinder to manifest fully the individual skills of researchers; and (3) research centres/institutes engaging in behaviour that leads to the commercialization of university-generated knowledge. Kirby et al. (2011) argue that the business university faces two challenges: (1) make changes to organizational arrangements to adapt more quickly to the external environment and (2) promote entrepreneurial culture at all levels. For Mainardes et al. (2011), the main characteristics of the entrepreneurial university are (1) the ability to satisfy the stimuli coming from the external environment, (2) the ability to clearly encode their mission and objectives, (3) a business focused on culture and an organizational structure characterized from numerous compartments and very professional management, (4) shared governance models for the implementation of adaptive strategies and (5) strong leadership. For Etzkowitz (2013) this new university must constantly interact with the industries and the government, be a relatively independent institution, create hybrid organizational forms able to resolve the tensions between the principles of interaction and independence and continuously renew the structure internal response to changes in industry and government. For other authors (Rothaermel et al. 2007; Abreu and Grinevich 2013; Guenther and Wagner 2008), academic entrepreneurship manifests through patents, licenses, creation of incubators, science parks, university spin-offs and investment in start-up.

The topic of entrepreneurship is rather complex for several reasons that have also aroused some interest in the scientific debate. This complexity can be traced back to its extremely subjective nature, to the multiplicity of its sources (economic, technological, internal and external). This justifies the proliferation of numerous studies that have tried to solve the problem of the absence of a uniformly shared theoretical framework. In this regard McMullen and Dimov (2013) suggest to formulate a definition of entrepreneurship as a process, trying to understand its beginning and its conclusion, the variables that impact on the functioning of this process and which variables remain constant throughout the process. Another factor contributing to make more complex entrepreneurial studies has been highlighted by Thomas (2008), namely, the bidirectional nature of the relationships that can link this phenomenon to the socio-economic well-being of a territory. Davidsson and Wiklund (2001) and MacMillan and Katz (1992) point out that this phenomenon cannot be

decomposed into different sub-parts subject to separate analysis; rather it must be studied as a single object. According to MacMillan and Katz (1992) another feature of entrepreneurship theories is the all-encompassing. This adjective refers to the fact that any entrepreneurial theory to be defined as such must contemplate various elements within it. Among the elements identified in the literature are the objective of the entrepreneur, or the creation of a new organizational unit useful to pursue an opportunity; the managerial process, which is the set of strategic choices and the corresponding actions implemented by the entrepreneur necessary to the achievement of the goal; and the aspiring entrepreneur with his portfolio of knowledge/skills (Bygrave and Hofer 1991). The joint analysis of all these three elements makes it possible to define an "ideal model of entrepreneurship". This approach is also followed by subsequent studies (Shane and Venkataraman 2000; Shane 2003; Phan 2004) which argue that the subject and the object of entrepreneurship, i.e. the relationship between "individual and entrepreneurial opportunities", are two aspects that must be analysed as a single body.

The geographical focus of this chapter is represented by science and technology parks and research spin-offs in Italy. Both these two environments, if they can fill the traditional gap between the academic and business world, can contribute significantly to the economic development of a territory, to an intensification of investments in scientific research, to an increase in employment and to a revision of the responsibilities of the different local actors within the boundaries between basic and applied research.

This chapter tries to answer to the following research questions:

- What is entrepreneurship? And what are the key factors of its genesis and subsequent development?
- Can academic entrepreneurship be considered a strategic lever to strengthen the competitiveness of the regions of Southern Italy compared to the objectives of the growth strategy "Europe 2020"?

In particular, the construction of the theoretical system on this theme aims to overcome one of the critical issues that, in our opinion, mark the previous studies on entrepreneurship. These last; in fact, they analysed the problem favouring, from time to time, only one of the four theoretical approaches (teleological, psychological, environmental and relational) that allow identifying the elements necessary to guarantee the success of a business project.

Compared to the existing literature, this study follows a multidimensional approach that finds its theoretical reference substratum in the field of "*strategic entrepreneurship*[1]" (McGrath and MacMillan 2000; Meyer and Heppard 2000;

[1]This theoretical approach represents the synthesis of two fundamental concepts: entrepreneurship and strategic management. According to these studies entrepreneurship is understood as the ability to put into practice a behaviour useful to pursue an entrepreneurial opportunity not yet identified or exploited by others. Strategic management, on the other hand, encompasses all the functional actions for implementing strategies necessary for maintaining a competitive advantage over a long-term time horizon. These actions take on a crucial importance in the presence of continuous changes in the market. The strategic entrepreneurship therefore represents the pursuit of an entrepreneurial opportunity and the attainment of a competitive advantage. It therefore allows to observe a close relationship between the entrepreneur's decisions and the identification, selection and exploitation of an entrepreneurial opportunity.

Ireland et al. 2001; Hitt et al. 2001, 2002; Venkataraman and Sarasvathy 2001). We are aware that the application of this approach is not very simple due to various critical issues. Among the critical issues, one is connected to the possibility of calibrating the areas of entrepreneurship study; in fact, it is necessary to avoid neglecting or completely ignoring the areas considered less important and not even adopting the ceteris paribus condition that treats all the others as elements that do not undergo any variation over time. Another critical issue is that the interconnection relationships between the four analysis approaches are not one way (one to one or one to many) but multidirectional (many to many). All four approaches influence each other until the entrepreneurial process is completed producing value from exploiting the entrepreneurial opportunity. A third element of criticality concerns the difficulty of transforming the different approaches (target, subject, environment and network) into typical phases of the entrepreneurial process (identification, selection and exploitation of entrepreneurial opportunity) in quantitative variables that provide a more precise measurement of the entrepreneurship phenomenon. To further aggravate this criticality is also the observation that the study of entrepreneurship should not be referred to a precise moment (i.e. it is not a spot phenomenon) but rather to a period of time. Therefore, it would be necessary to have a longitudinal database of the above variables.

The contribution architecture consists of five sections. The first is a review of the topic of the entrepreneurship. The second section proposes an application of the "environmental" approach to the entrepreneurship with reference to the case of science and technology parks. The fourth section contains an empirical analysis aimed at launching a reflection on the role of the university in the creation of entrepreneurship as a vehicle to reduce the development gap between Central/Northern and Southern Italy compared to the targets set by Europe 2020. The fifth section contains final remarks.

2 The Concept of Entrepreneurship in Literature

In this section the review contains four possible approaches for the analysis of entrepreneurship: (1) teleological, (2) psychological, (3) environmental and (4) relational.

The studies that follow the teleological approach privilege as a starting point for the reflections, the goal that the entrepreneur aims to achieve.

The conception that the entrepreneur's action was aimed at pursuing a goal had already been introduced by Schumpeter's seminal study (1911) which provided an identification of the innovating entrepreneur. According to the author, the actions of the entrepreneur are aimed at achieving two objectives: on the one hand the introduction of innovations that can find a profitable location in the economic system (final objective) and on the other the creation of a new enterprise (objective intermediate/instrumental).

Kirzner's study (1973) represented the starting point for later studies that believe that the entrepreneur's goal is to identify an entrepreneurial opportunity. This author defines the entrepreneur as a "pure entrepreneur whose entire role arises out of his alertness to

hitherto unnoticed opportunities". Subsequent contributions have investigated the possession of specific qualities by the aspiring entrepreneur who can facilitate it in the perception of new business opportunities. Robichaud et al. (2001) interviewed North American entrepreneurs and showed that there are four types of motivations for the aspiring entrepreneur: extrinsic premiums (monetary results), independence/autonomy, intrinsic premiums (personal needs) and security of the family and the workplace. Benzing et al. (2009) in their study on entrepreneurs in Turkey have carried out a comparative analysis of the results of numerous research on the motivating factors of entrepreneurs in different countries (Vietnam, Romania, India). In this study, for example, it is highlighted that in the survey conducted by Swierczek and Ha (2003), the most important motivation for starting up entrepreneurial activity on Vietnamese entrepreneurs was the challenge and success rather than necessity and safety. On the other hand, in other studies focusing on Romania (Benzing and Chu 2005; Benzing and Chu 2005), Turkey (Ozsoy et al. 2001) and Africa (Chu and McGee 2007), the need to increase their monetary revenues and job security were the primary objectives of the entrepreneur's strategic guidelines. In contrast to these results, Roy and Wheeler (2006) found that owners of microenterprises in West Africa were motivated by the desire to satisfy basic psychological needs (food and shelter). Drawing on recent work (Zivkovic et al. 2009; Zivkovic and Zivkovic 2009), Stefanovic et al. (2010), considering entrepreneurs in south-eastern Europe, in particular Serbia, identify four motivational factors (greater business achievement, independence, intrinsic factor and job security) and seven factors of success (position in society, interpersonal skills, approval and support, competitive product/service, leadership skills, always to be informed and business reputation). While the former are generic for any developing country, the latter are characterized by a wide variety depending on the local context. By conducting its business in a developing country, the entrepreneur intends to mainly meet the short-term objective, first of all increasing his income. Since in these territories potential customers do not have a high purchasing power, the most important factors of success of the entrepreneurial activity are to offer a quality service to customers and good products at competitive prices.

Within the teleological approach, it is possible to delineate a contrast between the authors that privilege the creation of a new business as an objective of the entrepreneur and others that focus on the perception of an entrepreneurial opportunity. Morris (1998) has attempted a joint re-reading of the two theoretical approaches. According to Morris, the perception of an entrepreneurial opportunity is an instrumental and defined objective before the start of the project to build a new business. Instead, the latter represents the ultimate goal/result of the entrepreneurial process. In light of the model of Morris (1998), Bygrave and Hofer (1991) and Westhead and Wright (2001) define the creation of a new enterprise as a result of the entrepreneurial process that also includes the perception of an entrepreneurial opportunity, the first step of this process. Conversely, the theory of Cooper (1995), Davidsson and Wiklund (2001) and Shane and Venkataraman (2000) fail to outline the traits of such an intense and bidirectional relationship between the perception of an entrepreneurial opportunity and the creation of a new business. D'Este et al. (2010) as part of the activities of the Research Group "DRUID (Danish Research Unit for

Industrial Dynamics)" have identified a number of factors that might influence the capacity of academic researchers to recognize and exploit entrepreneurial opportunities. These factors are (1) knowledge of the marketplace and collaboration with users, (2) prior entrepreneurial experience, (3) extent of research network, (4) integration of multiple fields of research and (5) impact of academic research. The collaborations with potential users (in particular, businesses) have a stronger impact on the development of the skills required for entrepreneurship, while research collaboration networks seem to have a minor impact on the development of these skills. Moreover, prior experience in collaboration with users has a much stronger impact in shaping the exploitation of entrepreneurial opportunities (as opposed to identification of entrepreneurial opportunities). Therefore, it would seem that these authors are opposed to sympathizers of the environmental approach to the study of academic entrepreneurship. The academics who combine multiple bodies of knowledge in their research activities and are able to find associations between their research expertise and business-related activities will be better equipped to exploit the commercial opportunities resulting from their research. Finally, they observe a significant impact of scientific excellence in an academic researcher on the identification of entrepreneurial opportunities; we find no significant impact of scientific excellence on the exploitation of entrepreneurial opportunities. Sloka et al. (2014) investigate the success factors of the decision to create a new business in Latvia compared to Canada, the United States and Mexico. Their conclusion is that success factors do not change in different countries. The most important factors influencing business success are good client service, honesty reputation, charisma and friendliness with clients and good management abilities, and among the less important factors are political support and interest.

The second approach to the study of entrepreneurship, the psychological one, privileges the characteristics and the distinctive traits of the entrepreneur's personality as an analysis point of view. Also for this approach Schumpeter's contribution (1911) is the starting point; in fact, one of the characteristics that is identified by several authors is the ability to be innovative of the entrepreneur.

The nature of the contributions that followed this approach is quite heterogeneous; in fact, as pointed out by Zanni (1995), some of these studies have a purely subjective nature trying to outline the personal characteristics of the entrepreneur, while other studies have a more functional nature trying to identify the performed functions or the possessed requirements of the entrepreneur. Also Zahra (2007) shows that the issue of entrepreneurship is difficult to analyse because researchers often apply theories developed in other disciplines and grounded in assumptions that reflect the nature of distant phenomena, actors and sites. In particular, combining two dimensions, one that contrasts the entrepreneurial theories (old and new) and the other that looks at the practical problems to be faced (old and new), they identify four possible scenarios for the development of studies on this topic. The first scenario consists in the application of a consolidated theory on a known phenomenon (e.g. the use of agency theory to explain the motivations of middle managers to support (or sabotage) corporate venturing activities). The second provides for the application of consolidated theories to explain new phenomenon (e.g. the social network theory to explain the early and rapid internationalization of new ventures). The third is exactly the opposite of the

previous one (e.g. "the knowledge-based view" to explain the competitive strategies that new high-technology ventures follow in a given industry). The last scenario is the one that connotes for a theoretical advancement because it involves the application of a new theory to a new phenomenon (e.g. the study of entrepreneurial activities in emerging markets).

The studies produced in the 1990s place greater emphasis on those requirements that the entrepreneur must necessarily possess in order to operate successfully in a market that is becoming increasingly competitive. These features are incorporated under the expression "entrepreneurial talent" and determine the size of the business (van Praag and Cramer 2001). These include, for example, flexibility, a passion for work, excessive security/presumption, a realistic attitude, effectiveness, optimism and the ability expectancies, networking skills with other local actors, problem-solving skills and ability to organize resources (Brandstätter 2011; Frese 2009; Stewart and Roth 2001; Littunen 2000; Erikson 2003; Simon et al. 2000; Lowe and Ziedonis 2006; Hmieleski and Baron 2008; Baum and Locke 2004; O'Donnel et al. 2001; Greve and Salaff 2003).

The ability to network is one of the characteristics that will be taken up by entrepreneurship theories that follow the relational approach and therefore allow us to glimpse a first interconnection between the two approaches to analysis. A highly ambitious entrepreneur, confident in his skills and optimistic about the future of his business, is characterized by a strong risk appetite. The empirical analyses that verified the presence of a significant relationship between risk appetite and business success have come to results that are not always consistent. For example, the study of Zivkovic and Zivkovic (2009), conducted in Serbia, showed the need for entrepreneur net formation in order to facilitate the possibility of necessary innovation involvement, which could enable survival, growth and development of SMEs. According to several authors (Parlich and Bagby 1995; Weber 1997; Weber and Hsee 1999), there are three possible determinants of risk propensity: the perception of the specific risk related to the business project that you intend to start, the expected benefits related to this project and personal predisposition to the assumption of this risk. Within these studies it is possible to glimpse an element of interconnection between the psychological approach and the environmental approach. The risk appetite involves the initiation of some assessments by the entrepreneur on the manageability of the risk prior to the decision to take on or not the risk. These evaluations also depend on the interpretation of the environmental context of entrepreneurial activity.

Another characteristic of the entrepreneur that has been identified by some studies is called "locus of control", i.e. the ability to control the present and condition the future (Begley and Boyd 1987; Hamilton and Harper 1994). The concept of locus of control, in some way, incorporates the security feature discussed above which can take two forms called self-efficacy and self-esteem. The first term refers to the perception that the entrepreneur has of his/her abilities (Boyd and Vozikis 1994; Krueger and Brazeal 1994; Chen et al. 1998; Hmieleski and Corbett 2008), while the second relates to how the entrepreneur evaluates his/her skills (Rosenberg 1965). It is possible to distinguish between an internal and an external control. The presence of an internal locus of control is a more favourable condition to the entrepreneur's freedom of action. The latter has a proactive behaviour and exerts a certain influence

on the context in which it operates, making it easier to achieve the pre-established objectives. On the contrary, the presence of an external locus of control is a constraint for entrepreneurial action. The entrepreneur is a passive subject to environmental conditioning and has no power or ability to modify the current situation.

The environmental or situational approach to the study of entrepreneurship is so named because it analyses the degree of influence of the context on entrepreneurial action. The basic assumption is that any environment can influence the behaviour of the individual differently depending on their degree of entrepreneurial vitality. According to several studies (Benzing et al. 2009; Reynolds et al. 2002, 2003; Autio 2005; Lichtenstein and Lyons 2001), the intensity of the entrepreneurial vitality of the environment depends on the following factors: the sharing of entrepreneurship culture, the idea that within the environment there are entrepreneurial opportunities, the presence of individuals able to identify these opportunities and enhance them, the presence of a series of conditions that stimulate entrepreneurial action, easier access to funding sources and support for entrepreneurial projects, the satisfactory government support, the access to capital and support of family and friends.

The assessment of entrepreneurial vitality can turn out to be an uneasy task since, in a country or a region, significant differences can occur. Therefore, to make it easier, the studies have delimited the environmental context to the realities of industrial districts and business incubators.

In this phase we will limit ourselves to describing the results by the studies concerning the business incubators, while in a subsequent section the contributions on the industrial districts will be illustrated because they will be the logical premise for the application of an environmental analysis of entrepreneurship. An interesting taxonomy of the various types of structures that incubators can take was developed by Ciappei et al. (2006) that identify substantially two macro categories: non-profit incubators and profit-oriented incubators. Examples of the first type are science and technology parks, business innovation centres and university incubators. Examples of the second type are corporate business incubators and independent private incubators.

In this chapter we limit ourselves exclusively to the treatment of non-profit incubators and in particular of science and technology parks since they constitute a privileged environment in which universities and research centres can effectively play the role of incubators of new companies that, if able to achieve excellent performances, can make more territories in a context that is not only national. According to several studies (Lacave and Foresti 1997; Westhead 1997; Sancin 1999; Siegel et al. 2003; Chan and Lau 2005; Bigliardi et al. 2006; Matricano 2011), the parks have as their last objective the development of the territory through applied research aimed at exploiting the technological innovations previously produced by basic research. For example, for Lacave and Foresti (1997), the aim of the science park is at first a greater attractiveness of the territory achieved thanks to a greater concentration of several subjects within it and subsequently its development. The processes of knowledge transfer and technological transfer as actions for the development of the territory are activated at a later stage by the science and technology parks.

In our opinion, the most interesting results produced by this approach have been produced by those studies that analyse the conditioning of a hostile environment on entrepreneurial activity (Ucbasaran et al. 2001; Welter 2011). At an empirical level the results are quite conflicting, leading to the belief that it is not possible to identify a linear and unambiguous relationship between the hostile environment and entrepreneurship (Zahra and Garvis 2000). For example, for some studies, the entrepreneur who operates in an environment takes a risk-averse attitude and is more cautious, less competitive and aware enough that certain difficulties cannot be overcome despite his dedication to entrepreneurial activity (Miller and Friesen 1983; Miles et al. 1993). Of course, none of these contributions comes to the conclusion that a hostile environment causes a reduction in the entrepreneurial vitality of a context. This conclusion would feed a strong pessimism towards the opportunities for development of geographical areas such as those of Southern Italy, marked by significant delays.

The last analysis approach, the relational one, is so named because it tries to explain the presence of an entrepreneurial behaviour on the basis of the entrepreneurial network composed by all the subjects with which the aspiring entrepreneur stipulates relationships. For Huggins and Thompson (2015) the network capital, in the form of investments in strategic relations to gain access to knowledge, is considered to mediate the relationship between entrepreneurship and innovation-based regional growth. They underline that relationship between entrepreneurship, innovation and regional economic growth is governed by a series of network dynamics relating to (1) the nature of the firms established by entrepreneurs, (2) the nature of the knowledge accessed by firms and (3) the spatial nature of the networks existing between those accessing and sourcing knowledge. The knowledge networks held by entrepreneurial firms is a key driver of regional rates of innovation and subsequently growth. Thanks to the network capital, the entrepreneurial firms with a greater capacity to access high-quality knowledge through selected routes and channels regardless of the geographic location of knowledge sources will achieve higher rates of innovation. In other words, the innovation capability of entrepreneurial firms is partly a function of their capacity to access superior, excludable and miscible forms of knowledge regardless of the geographic location of knowledge sources. One implication of this is that endogenous models of regional growth should seek to incorporate variables to account for interregional flows of knowledge.

One result that unites the different contributions that follow this approach is the belief that the network does not have a definable ex ante and static structure throughout the life cycle of the firm. The network structure changes in an ex ante phase in the light of the objective that the entrepreneur wants to satisfy: the creation of a new business or the perception of entrepreneurial opportunity. With reference to the first objective, Pirolo and Presutti (2010) empirically verified the existence of positive impact of both strong and weak interorganizational social capital on the growth of start-up's economic performance during all its life cycle. Hoang and Antoncic (2003) made a synthesis of the literature produced over the last 15 years on the impact of social networks on entrepreneurship, in particular by analysing three expectations: (1) the nature of the content that is exchanged between actors, (2) governance mechanisms in relationships and (3) the network structure created by

the cross-cutting relationships between actors. According to these authors, the most important weakness of the research on network is the lack of a core theory to understand (1) how networks affect the entrepreneurial process and how they lead to positive outcomes for the entrepreneur or their firms (networks as independent variables) and (2) how entrepreneurial processes and outcomes in turn influence network development over time (networks as dependent variables). To make a theoretical advancement in the relational approach, the authors suggest the adoption of more qualitative studies that pay more attention to network dynamics.

To pursue different objectives, different relational networks are built. Furthermore, goals can change even over time. Therefore the entrepreneur makes constant changes to his network of relationships, and this is often the termed as "flexible networking" (Elfring and Hulsink 2003; Johannisson 1998) or "fluid reality" (Palmieri and Rullani 2008). These first considerations may represent an element of interconnection between two approaches to entrepreneurship analysis, illustrated above: the teleological and the relational.

3 The Endogenic or Exogenic Nature of Scientific Parks

After literature review on different approaches to the analysis of entrepreneurship, this section proposes an application of the environmental or institutional approach to start a reflection on how the context, understood as an industrial district, can influence the genesis of research networks, for example, poles of innovation, science and technology parks, research spin-off, etc.

The district has a social/relational nature, since the network of relationships between the involved people in its business activities is an essential condition for its development (Sforzi 2008; Welter and Smallbone 2011). If this network of relationships is effective, the district will ultimately produce an "industrial atmosphere" that will fuel the propensity of the members of the same territory to undertake business activities. Therefore, industrial districts can be considered a favourable environment in which entrepreneurship (both as a creation of new businesses and as a perception of entrepreneurial opportunities) can easily occur (Debernardi 2005).

In this section the analysis is divided into two steps.

Through a preliminary mapping (Table 1), it is clear that the Northern Italian regions are characterized by very complex research systems composed of 821 research structures between high-tech districts, innovation poles, science and technology parks, public research bodies and research spin-offs. A lesser presence of these protagonists of the research sector can be found in the macro-regions of Central and Southern Italy (479 and 508).

In the first step, the sectoral specializations of high-tech districts and science and technology parks are compared (Table 2, first column). Currently, in Italy, 29 technology districts have been recognized by MIUR. Five other districts are being negotiated in the Lombardy, Liguria, Marche, Sicily and Sardinia regions.

Table 1 Research and innovation bodies in Italy: a mapping

Regions	High-tech districts	Innovation poles	University	Science parks	Centres of excellence	Public research bodies	Total
Piedmont	1	17	4	5	1	21	49
Veneto	1	3	4	1	0	15	23
Friuli Venezia Giulia	2	4	2	2	0	10	22
Valle D'Aosta	0	1	1	0	0	0	2
Lombardy	4	6	14	4	1	35	59
Trentino Alto Adige	1	1	3	0	0	5	10
Emilia Romagna	1	10	4	0	1	17	35
Liguria	3	4	1	0	0	13	20
Tuscany	1	2	7	3	1	33	48
Umbria	1	0	2	2	0	5	8
Marche	1	3	5	1	0	2	9
Lazio	3	2	12	3	1	47	72
Abruzzo	1	3	3	0	0	5	13
Molise	1	1	1	1	0	0	4
Campania	1	2	7	1	2	30	46
Puglia	4	1	5	0	0	28	39
Basilicata	1	0	1	0	0	3	5
Calabria	2	9	4	1	0	12	27
Sicily	3	4	4	2	0	27	39
Sardinia	2	2	2	2	1	14	22
North	**13**	**46**	**33**	**12**	**3**	**116**	**821**
Centre	**6**	**7**	**26**	**9**	**2**	**87**	**479**
South with islands	**15**	**22**	**27**	**7**	**3**	**119**	**508**
Italy	**34**	**75**	**86**	**28**	**8**	**322**	**1808**

Source: Our elaboration on ISSiRFA-CNR, MIUR, ADITE, CNR, ATLAS, APSTI data

Cross-analysis of the data contained in the Italian Technological Atlas 2012 and some contributions in the literature (Balconi and Passannanti 2006; Ferrara and Mavilia 2013; Cantù 2013; Liberati et al. 2014), which contain the distinction between real parks and parks virtual, has allowed to monitor 28 parks included in the first case, then equipped with infrastructure for local businesses. Among these, 12 are located in the northern regions, 9 in the centre and 7 in the south. It is above all the regions of Piedmont and Lombardy that distinguish themselves for a greater presence of science and technology parks. Thanks to this comparison, it will be possible to distinguish between "endogenous vocational and scientific parks" and

Table 2 The nature of science parks

Region	Sectoral analogies of high-tech districts and science parks	Science parks: strong points	Science parks: weak points	Science parks: nature
Piedmont (12)	ICT	Ability to create start-ups	Networking	Political/ exogenous
		Internationalization	Impact on the labour market	
		Relationships between universities and research centres	Capacity to access funds	
Veneto (14)	Nanotechnology	Ability to create start-ups	Patents	Vocational/ endogenous
		Capacity to access funds	Relations with local productive fabric	
		Networking	Relations with the scientific world	
Friuli Venezia Giulia (8)	Biomedicine	Relations with the scientific world	Relationships between universities and research centres	Political/ exogenous
		Capacity to access funds	Relations with local productive fabric	
		Internationalization	Ability to create start-ups	
Lombardy (8)	Biotech, ICT, advanced materials	Networking	Internationalization	Political/ exogenous
		Relationships between universities and research centres	Openness degree	
		Relations with the scientific world	Capacity to access funds	
Tuscany	ICT, life sciences, energy	Collaborations with internal and external companies	Capacity to access funds	Political/ exogenous
		Ability to create start-ups	Patents	
		Participations to national networks and consortia	Internationalization	
Umbria	–	Networking	Openness degree	Political/ exogenous
		Internationalization	TAV	
		Ability to create start-ups	Patents	
Marche	–	Relationships between universities and research centres	Relations with the scientific world	Political/ exogenous
		Networking	Ability to create start-ups	
		Capacity to access funds	Internationalization	

(continued)

Table 2 (continued)

Region	Sectoral analogies of high-tech districts and science parks	Science parks: strong points	Science parks: weak points	Science parks: nature
Lazio	Aerospace, life sciences	Relationships between universities and research centres	Ability to create start-ups	Political/ exogenous
		Relations with the scientific world	Networking	
		Internationalization	Risk capital	
Molise	Agribusiness	–	–	Vocational/ endogenous
Campania	Materials sciences	Nd	Nd	Vocational/ endogenous
Calabria	–	Nd	Nd	Political/ exogenous
Sicily	Nanotechnology	Capacity to access funds	Poor participation of private individuals to research	Vocational/ endogenous
		Networking	Ability to create start-ups	
		Relations with the scientific world	Patents	
Sardinia	Biomedicine	Ability to create start-ups	Relationships between universities and research centres	Vocational/ endogenous
		Internationalization	Capacity to access funds	
		Networking	Patents	

Source: Our elaboration

"political exogenous" parks. The vocational parks draw their foundations from an endogenous drive exerted by successful technological districts rooted in their territory and are generally constituted in those territories where the entrepreneurial spirit gives life to strong and long-term initiatives. The political/exogenous parks arise as a result of an exogenous drive that shows the will of the political and governmental institutions to make the territory a leap in quality by promoting innovation in high-tech sectors far from those consolidated in the territory, for example, through the constitution of entrepreneurial agglomerations. The ultimate goal of these agglomerations is to make it easier to access financing from the structural funds and/or to open up venture capital to the market. The presence of technological districts in the territory where the parks are established is not a conditio sine qua non for the development of science and technology parks. As we can see through the rating conducted on the basis of specific variables by a research group of the Sole 24 Ore, the parks could compensate for this absence by enhancing their other characteristics/ strengths. Considering jointly the presence of sectoral analogies of the parks with respect to the technological districts and their strengths and weaknesses, in particular those related to their ability to network with the scientific and business world, it was

possible to identify how many of the parks are purely vocational in nature/endogenous rather than political/exogenous. As can be seen, three of the four monitored parks in Northern Italy are the result of a development and innovation strategy designed by the local political class. The presence of successful technological districts operating in their territorial basin has not fulfilled a function of towing technology transfer and knowledge by the parks. The exogenous genesis of the parks unites all the parks of Central Italy, while a greater presence of vocational/endogenous parks has been observed in the south (4 cases out of 5).

The second step (Table 3, first column) proposes a comparison between the sectoral specializations of industrial districts and research systems (innovation poles, high-tech districts, science and technology parks, centres of excellence, public research bodies). This comparison confirms the vocation of the first to operate in a purely traditional and less science-based sector. Therefore in a few cases, the industrial districts have carried out a driving action (or "district effect") in favour of the establishment of high-tech districts, science and technology parks, research spin-offs and other examples of research networks. Exceptions are represented in Northern Italy by the chemical sector in Piedmont and mechanics in Lombardy, at the centre by musical instruments in the Marche and to the south from food in Abruzzo, Puglia and Sardinia, from rubber products and plastic materials in Campania and from logistics and cultural heritage in Calabria.

4 Research Spin-Offs and Competitive Gaps Between Italian Regions: An Empirical Exercise

This section proposes to start a reflection on the effectiveness of the role of the university in the production process of knowledge spillovers and the creation of new entrepreneurship. The creation of new companies by university researchers is one of the possible ways of implementing these mechanisms for disseminating knowledge.

A generally shared definition of research spin-offs is the following: "firm operating in high-tech sectors consisting of (at least) a university professor/researcher or a graduate student/contractor/university student who has carried out long-term research activities on a specific theme, the object of the creation of the company" (Netval 2009).[2] The research spin-offs differ from the company spin-offs for the different parent organization that generates the new enterprise. The genesis process also has a different nature: for business spin-offs the term "business pull" is used for "technology push" research spin-offs. While business spin-offs are created by the will of individuals who already work in different ways, operating in the competitive

[2]In fact, in the literature numerous definitions of research spin-offs have been produced according to the privileged characteristic: the identity of the promoter of the new business, university or public research body (Chiesa and Piccaluga 2000), the relationship between researchers-entrepreneurs and the research centre and the relationship between researchers-entrepreneurs and lenders (Clarysse and Moray 2004).

Table 3 The sectoral specializations shared by industrial districts and research networks

Regions	Sectoral analogies of industrial districts and research networks
Piedmont	Chemistry
Veneto	–
Friuli Venezia Giulia	–
Lombardy	Mechanics
Tuscany	–
Umbria	–
Marche	Musical instruments
Lazio	–
Molise	Agribusiness
Campania	Chemistry: rubber products and plastic materials
Calabria	Logistics: cultural heritage
Sicily	–
Sardinia	Food

Source: Our elaboration

market and wanting to exploit an entrepreneurial opportunity, research spin-offs originate from a business idea that is identified and developed through the activity of knowledge production conducted by internal staff at the universities and/or research centres.

These considerations make us understand that research spin-offs can be conceived as a tool to be adopted to simplify the commercialization of the produced technology and therefore allow a more rapid transformation of knowledge from precompetitive basic research to its industrial application (Dell'Anno and Del Giudice 2002; Dell'Anno 2010; Clarysse and Moray 2004). Rasmussen et al. (2011), following the creation and early growth of four university spin-offs within the United Kingdom and Norway from two contrasting research disciplines (biological sciences and engineering), identified three competencies of opportunity refinement, leveraging and championing that appeared crucial for the creation of new ventures to gain credibility with potential investors and partners. The credibility threshold was defined as both establishing an entrepreneurial team and achieving external private sector finance in order to sustain the venture development. The cases of spin-off selected are projects in the early stage of development, with an incomplete entrepreneurial team and no external investors. The three competencies of opportunity refinement, leveraging and championing follow different development paths, and contributions from different actors are needed to build each competency. To acquire the competencies of opportunity refinement, the career academic entrepreneurs need to attract new team members with industrial experience who can identify and interact with industrial partners. For the second type of competencies, the career academic entrepreneurs interact with the entrepreneurial team with external resource providers, and here the parent university organization, the university technology transfer office and public support schemes can assist the entrepreneurial team. The championing competency is needed to identify with the venture and to convince others to contribute to its development. For this competency, there is a distinctive need to evolve the

championing competency from the entrepreneurial team and the internal university context to also include champions within external resource providers. Lockett and Wright (2005) seek to evaluate the managerial and policy implications produced by the rising phenomenon of spin-offs produced by public research institutions. Above all their focus is the "knowledge gap" of various units of analysis (research public institutions, technology transfer office, incubator, team, venture, individual) passing through a number of phases as the venture develops (research, opportunity, preorganization, reorientation, sustainability). In this way they conjecture that there may be a knowledge gap which threatens the successful development of the spin-off. Di Gregorio and Shane (2003) concluded that the most important determinants of start-up creation are faculty quality and the ability of the university and inventor(s) to assume equity in a start-up in lieu of licensing royalty fees. Markmann et al. (2005) assess the determinants of innovation speed, or time to market, in the context of 91 transfer technology offices in the United States. The faster office can commercialize technologies that are protected by patents, and the greater the returns to the university, the higher the rate of start-up formation. Furthermore, there are three key determinants of speed: technology transfer office resources, competency in identifying licensees and participation of faculty-inventors in the licensing process. On the contrary, Ensley and Hmieleski (2007), comparing 102 high-technology start-ups that are affiliated with university incubators and technology parks and an observationally equivalent sample of 154 ventures that are unaffiliated with such facilities, do not give a decisive role to incubators and science and technology parks for the success of a new business. They, recalling the institutional isomorphism theory, predict that a university-affiliated new venture top management team will be more homogenous in composition, display less developed team dynamics and, as a result, be lower performing than those without university affiliation.

In this section, an empirical exercise is proposed aimed at verifying whether the research spin-offs, established in the period 2009–2012, can have a significant economic impact on the reduction of development gaps compared to the targets of the "Europe 2020" strategy which penalize regions of Southern Italy compared to those in Central and Northern Italy.

With reference to the gap calculated with respect to the target of R&D investment set at 3% of GDP at the European level, it is possible to observe that in the south of Italy all regions have a negative sign confirming that none of them has reached and exceeded this objective. Looking at the size of these gaps, they assume a more worrying average size in the southern regions (2.24 vs. 1.85 in the centre and 1.70% in the north). Considering only the south of Italy, a gap can be observed from this objective higher than the figure recorded for Italy (−1.74%). Precisely because this objective was considered a goal too difficult to achieve, it has been reduced with reference to Italy and set at 1.53% of GDP, as can be read in the 2014 National Reform Program (PNR 2014). The average size of these gaps has the following distribution: −0.77 in the south, 0.38 in the centre and 0.23 in the north. At the national level, positive gaps only characterize the territorial areas of Central and Northern Italy (Piedmont, Province of Trento and Lazio) (Table 4).

Table 4 R&D objective in the Europe 2020 strategy: the gaps between the Italian regions

	Target 1	Target 2	Gap 1	Sign	Gap 2	Sign
REGIONS	3	1.53	2012	2012	2012	2012
Piedmont			0.33	+	−1.14	–
Valle d'Aosta			−0.9	–	−2.37	–
Liguria			−0.1	–	−1.57	–
Lombardy			−0.22	–	−1.69	–
Provincia Bolzano			−0.84	–	−2.31	–
Provincia di Trento			0.34	+	−1.13	–
Veneto			−0.49	–	−1.96	–
Friuli-Venezia Giulia			−0.09	–	−1.56	–
Emilia-Romagna			−0.11	–	−1.58	–
Tuscany			−0.31	–	−1.78	–
Umbria			−0.61	–	−2.08	–
Marche			−0.79	–	−2.26	–
Lazio			0.21	+	−1.26	–
Abruzzo			−0.62	–	−2.09	–
Molise			−1.04	–	−2.51	–
Campania			−0.28	–	−1.75	–
Puglia			−0.77	–	−2.24	–
Basilicata			−0.88	–	−2.35	–
Calabria			−1.07	–	−2.54	–
Sicily			−0.69	–	−2.16	–
Sardinia			−0.81	–	−2.28	–
Italy			−0.27	–	−1.74	–

Source: Our elaboration on Eurostat data

On the basis of the information obtained from the NETVAL reports ("Network for the Valorisation of Public Research")[3] and the regional statistics EUROSTAT, a panel dataset was constructed because each of the 21 Italian regions was observed for the years between 2009 and 2012. On this dataset a regression has been estimated using the fixed effects panel estimator (or "fixed effects").

The dependent variable measures the relative annual distances of current investments in research and development compared to the Europe 2020 target set for Italy by the 2014 National Reform Program at a value of 1.53% of GDP. This variable highlights the lower competitiveness of the regions of Southern Italy

[3]NETVAL gathers 57 Italian universities and 8 non-university public research institutes: the National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), the National Research Council (CNR), the Italian Aerospace Research Centre (CIRA), the Council for Research and Experimentation in Agriculture (CREA), the National Institute for Nuclear Physics (INFN), AREA Science Park and two IRCCS, the Oncological Reference Centre (CRO) and the Ca' Granda Foundation, Policlinico di Milano, supporting the enhancement of research results through training and networking with institutions, business and finance. Born as an informal network in 2002, it became an association in 2007.

compared to those of the north in the research and development sector. This variable was chosen because the main objective of the social and economic impacts of research spin-offs, highlighted in the literature (Goldman 1984; Mustar 1997; Wickstead 1985; Shane 2004), can be enucleated reduction of these north-south development gaps. As pointed out by Shane (2004), university spin-offs are important entities because, being their local activity, they produce significant multiplier effects on local economic development. According to Lowe (2002) the impact of spin-offs on the territory can be magnified as they often act as catalysts for the formation of geographic clusters of new companies, in particular technologies. For example, university spin-offs like Chiron and Genentech have led to the formation of a biotech cluster in the San Francisco Bay area. According to Shane (2004), the effects produced by research spin-offs can occur through four possible channels. The first channel consists in the production of significant economic value through innovative products that satisfy the wishes and needs of customers. With reference to this channel, Dahlstrand (1997) found that, on average, the spin-offs of the Chalmers Institute of Technology produced more patents than other Swedish technology companies. Similarly, Blair and Hitchens (1998) found that university spin-offs in the United Kingdom produce more new products and services than new non-university high-tech companies. The second channel manifests itself through the increase in employment especially for highly qualified people. Cohen (2000) estimated that, from 1980 to 1999, the spin-offs of American academic institutions produced 2800 jobs, with an average of 83 spin-off jobs, registering a greater ability to generate employment than small businesses present in the United States. In the United Kingdom too, spin-offs generate an average of 44 jobs above the small business (Charles and Conway 2001). Blair and Hitchens (1998) found that university spin-offs had three times the level of high-tech non-spin-off graduates in the United Kingdom and Ireland. The third channel consists in encouraging further investments in the development of university technology, promoting the progress of this technology. Pressman (1995) found that MIT spin-offs received 77% of the next investment in technology development by MIT licenses, but only constituted 35% of licenses. In addition, university spin-offs are much more intensive than research and development than typical start-ups, with R&D intensity of over 20% of sales in many cases (Mustar 1997). Analog Blair and Hitchens (1998) report that the costs of research and development of university spin-offs in the United Kingdom are more than double that of other new high-tech companies. The fourth channel refers to the fact that they have a highly localized economic impact. With reference to the latter channel, Cohen (2000) points out that, from 1980 to 1999, American spin-offs generated $33.5 billion of added economic value (approximately an average economic value of $10 million). About the direct effects of spin-offs on local economic development, Goldman (1984) found that 72% of high-tech companies in the Boston area in the early 1980s were based on technologies originally developed at MIT's laboratories. Similarly, Mustar (1997) estimated that 40% of all high-tech companies established in France between 1987 and 1997 were university spin-offs. Wickstead (1985) found that 17% of the new technology companies established at Cambridge University in the United Kingdom were university spin-offs. McQueen and Wallmark (1991) noted that the establishment of spin-off

companies in Göteborg, Sweden, led to the economic diversification of the area, making the economy less dependent on individual companies or particular industries, such as shipbuilding, improving so the economic stability.

The explanatory variables capture some characteristics of the research spin-off expression of a more or less elevated dynamism in the R&D activity promoted by the universities and local public research institutions (EPR).

The variable "SPIN" can be understood as a measure of the density of the spin-off number by region and therefore a proxy of the territorial spillovers fundamental for the occurrence of aggregation mechanisms between high-tech companies. This variable has an expected negative effect in the sense that a more intense growth of academic entrepreneurship, through the creation of research spin-offs, increases the level of investment in research and development shortening the distances from the target/target of Europe 2020.

The variable called "AGE" represents the average age of spin-offs in years since the establishment. With regard to the expected effect, in this case too we expect a negative impact on the dependent variable in the sense that the more the new company is far from the start-up phase, the greater the possibility of finding a more consolidated and effective policy/management of investment in research and development and therefore a greater possibility that the produced scientific and technological knowledge will be incorporated into innovative products and services to be allocated to the market.

The third variable called "HIGH-TECH" provides a measure of the diffusion of high-tech sectors, typical of Italian technological districts and spin-offs. For the identification of which of the spin-off sectors of activity can be classified as high-tech, reference has been made to some contributions in the literature (Lazzeroni 2011). Also for this variable, a negative effect is expected in the sense that a greater specialization of the new spin-off companies in these sectors can reduce the R&D gap and act as a driver for the development of high-tech districts, giving a strong stimulus to the development path of the Italian regions towards Europe 2020. In this regard, Vincett (2010), with reference to the spin-off companies in engineering and natural sciences, has shown that they have produced positive impacts on the growth of gross domestic product in Canada. This growth probably would not have been possible without the exploitation of research outputs by the new spin-off companies.

Each of these explanatory variables has been crossed with territorial dummy variables (called "Regio") that make it possible to identify the territorial basin for the establishment of new spin-off companies in the centre/north rather than in the south of Italy (Tables 5 and 6).

The estimated model assumes the following formalization:

$$dpnr2020 = \beta_1 + \beta_2\ \mathrm{SPIN}_{it} * \mathrm{Reg} + \beta_3\ \mathrm{AGE}_{it} * \mathrm{Reg} + \beta_4\ \mathrm{HIGHTECH}_{it} * \mathrm{Reg} + \varepsilon_{it}$$

Looking at the results obtained on the first variable "SPIN", it would seem that, in both macro-regions, the creation of a greater number of research spin-off companies does not play a crucial role in the processes of territorial convergence (Capello 2015) outlining an intense and significant relationship between R&D activities and creation of spin-off companies. In other words, the growth of entrepreneurship, thanks to the

Table 5 The variables

Variable	Description	Expected effect
dpnr2020	It measures regional distances with respect to the objective of bringing investment in research and development to 1.53% of GDP set at national level by the Pnr 2014	
Spin	Number of constituted spin-offs	–
Eta	Average age of spin-offs in years since the establishment	–
High-tech	It identifies specialized spin-offs in the "high-tech" sectors	–

Source: Our elaboration

Table 6 Descriptive statistics

Variable	Average	Standard Deviation	Min	Max
$spin_{nORD}$	51.77	38.83	0.00	123.00
$spin_{SUD}$	23.17	21.13	3.00	80.00
eta_{NORD}	5.34	2.67	0.00	9.10
eta_{SUD}	4.87	1.31	1.80	7.60
high-$tech_{NORD}$	10.4	36.54	0.00	267.00
high-$tech_{SUD}$	25.8	27.94	3.8	89.00

Source: Our elaboration

spinning-out processes, does not produce statistically significant impacts in terms of reducing the gap between the centre/north and the south compared to the research and development objectives set by Europe 2020 (Table 7) .

The "AGE" variable is statistically significant only for the centre/north, confirming that academic entrepreneurship through research spin-offs is still a young phenomenon in the regions of Southern Italy. The expected effect is negative, corroborating that, to a greater seniority of the spin-off companies, a more consolidated dynamism can be associated in the research activity as required by the Europe 2020 growth strategy. This evidence recalls Link and Scott (2003) who had shown that research spin-off training was more frequent in older science parks than in newer ones as these have developed the expertise to facilitate opportunity recognition and development.

The specialization in sectors with high innovative potential represented by the third variable "HIGH-TECH" is statistically significant only in Northern Italy. The expected effect is negative, confirming the existence of a negative correlation between the greater incidence of these spin-off activity sectors located in this macro-region and the distances of annual research investments compared to the Europe 2020 targets (Table 7).

The absence of a statically significant correlation between the dependent variable and the first explanatory variable ("SPIN") confirms that, still in Italy, academic entrepreneurship is rarely used (Cafferata and Dossena 2012; Arrighetti et al. 2013). Certainly, the delays in the investments in research and development that distinguish the south of Italy most exert a non-inconsiderable influence on the choice of creating a new enterprise on the part of the academic staff. This first

Table 7 The results

Dependent variable: dpnr2020			
Explanatory variable	*B*	S.E.	*t*-ratio
$Spin_{Nord}$	−.012608	.0196413	−0.64
$Spin_{Sud}$	−.0225085	.0308273	−0.73
Eta_{Nord}	−.0362095**	.0143331	−2.53
Eta_{Sud}	−.0078452	.0143376	−0.55
$High\text{-}tech_{Nord}$	−.0007687**	.0003599	−2.14
$High\text{-}tech_{Sud}$	−.0002045	.0022157	−0.09
Costante	−.2510484	.109069	−2.30

Source: Our elaboration. Number of observations: 84
**Significant values at a confidence level of 5%

result can be traced back to a lack of new companies in terms of networking capabilities and routine. The first expression refers to the post-creation difficulty that these new companies have to face in order to promote relation networks with partners outside the academic world that possess managerial, entrepreneurial and financial skills necessary for the commercial exploitation of scientific knowledge produced by researchers (Sorrentino 2008; Dagnino 2005; Walter et al. 2006; Radosevic 1995; Lockett et al. 2003; Franklin et al. 2001).

To overcome these difficulties, a possible strategy goes under the name of "surrogate entrepreneurship". According to this strategy, the choice fell on subjects with previous entrepreneurial experiences and managerial skills, often referred to high-tech sectors (e.g. private business incubators and technological science parks). In this case, the university transfers the results of the research to the external entrepreneur in the hope of increasing the probability of success of the initiative (Radosevic 1995; Franklin et al. 2001). No agreement has yet been reached on the benefits associated with the adoption of this strategy. Some studies (Lockett et al. 2003; Oakey et al. 1988; Chrisman et al. 1995) argue that surrogate entrepreneurship allows the spin-off to achieve greater performance and size compared to cases where the spin-off is managed by academic staff, especially when the latter continues to perform its usual role of knowledge production through basic research and assumes the role of advisor of the new enterprise. In general, as highlighted by Sorrentino (2008), among the benefits of this strategy, there are the presence of a profile more compatible with the motivational and psychological traits of subjects who want to carry on the business, the availability of entrepreneurial experience and the possibility of benefiting from previous professional, industrial and commercial networks, which is less dependent on the source research structure. However, there are also disadvantages such as, firstly, the fact that the external entrepreneur not having carried out the research personally does not possess the intangible cognitive assets (tacit knowledge) and context that are important in the processes of transformation of the scientific results in technologies, products and processes. The lack of such scientific and technological skills could induce the strong industrial partner to direct the spin-off towards a specific direction, making it perhaps neglect other more interesting alternatives in

the medium term (Lazzeri and Piccaluga 2003). To justify the need for this collaboration with external financial and industrial partners by the academic founders of spin-offs in literature, the expression "knowledge disparity" (Cantner et al. 2011) was used.

The post-creation success of the spin-offs requires a perfect horizontal (related to the various scientific-technological competences on which the various innovative products/services are intended to be realized) and vertical (i.e. integrating scientific, managerial and business knowledge) integration. The first form of integration is easier to implement given the genesis of research spin-offs. With the expression routine, Lockett and Wright (2005) define the level of experience achieved by universities in creating spin-offs. Alongside the experience, Compagno et al. (2008) highlight other critical resources of the processes of academic entrepreneurship such as relational capital, research funds obtained outside the academic world, fertility of research and development, the size of the laboratory, the presence of researchers with a higher propensity for economic risk and greater cohesion with the research group. The logic of the routine denotes that a persistent involvement of universities in technology transfer activities facilitates the development of a stock of experience that produces as a final result a greater ability to start spin-off processes and greater efficiency in their management.

The results obtained for the second explanatory variable "AGE" suggest that the older spin-off companies have already overcome the critical issues related to their first evolutionary stage (related to the definition of entrepreneurial opportunity) and are found in the second (related to the creation of a preorganization) or in the third stage (to enter the market). This confirms the updated data provided by Spin-Off Italia database for which a total of 1155 new companies were born from university projects in the last 15 years, of which 49.9% in the northern regions (Lombardy, Piedmont and Emilia in particular), 26.9% in the centre (particularly in Tuscany) and the remaining 23.2% in the south and islands of Italy (in particular in Puglia). On the basis of another authoritative source for the monitoring of spin-offs in Italy (Netval 2014), it is possible to observe the differences in terms of average age from the establishment of these companies: about 6 years for companies in the north, 5.7 years for companies in the centre and 4.2 years for companies in the south. Reading the data offered by this second source makes it possible to state that the older spin-off companies are specialized precisely in the typical sectors of technological districts. In particular, the electronics sector (average age equal to 9.4 years) followed a short distance from industrial automation (7.4 years), ICT (7), biomedicine (6.1), nanotechnology (5.6) and aerospace (5.5).

The lack of significance of high-tech in Southern Italy shows a certain delay in the rates of business creation in sectors with a high level of knowledge. The scientific area is fundamental: physicists, engineers and biotechnologists can more easily travel research routes that lead to spin-off opportunities, while corporatists and jurists can cover the knowledge needs necessary for business activities (O'Shea et al. 2005). These authors focusing on the creation of 141 US universities distinguish among four types of resources: institutional, human capital, financial and commercial.

As also emerged from the considerations regarding the first variable, the lack of synergy between the technical and management dimensions can compromise the dimensional growth of the spin-off company, even before its birth. This has led the universities to assume a "third mission" to be added to the role of training and research. In the literature (Lazzeroni and Piccaluga 2003; Piccaluga 2001; Etzkowitz and Leydesdorff 2000), the term "entrepreneurial university"[4] is used to define this new university, which should originate to work in close contact with innovative companies. According to other works, paradoxically universities are generally ill-suited to develop new ventures due to potential conflicts of interest with their traditional roles of research and teaching (Ambos et al. 2008; Shane 2004).

The birth of this new university will contribute to the definition of new local development circuits such as greater enterprise-university partnerships, more spin-off companies and more university patents, more research in the form of short-term and finalized contracts and greater attention to results. This new university therefore intends to promote a more favourable humus/relational space to the mechanisms of disseminating knowledge and creating innovation. In this way it would be easier to remedy the lack of commercial and managerial skills of spin-off companies in the Italian context as they often pay more attention to technical-scientific aspects (Iacobucci et al. 2011).

The presence of a larger team of researchers within spin-offs can be interpreted as both a strength and a weakness. The company would benefit from a more diversified set of skills and experience. However, especially for younger spin-offs, a larger team could hinder the identification of entrepreneurial figures, i.e. those researchers who actually show interest in starting an entrepreneurial career and taking on roles of responsibility in the new business. In this regard, Iacobucci et al. (2011) point out that there is a problem of excessive homogeneity of the entrepreneurial team with a clear prevalence of figures with technical-scientific skills but with little commercial and managerial experience. This situation has made it more difficult, in recent years, to offer consultancy services to SMEs, which have therefore faced greater difficulties in establishing a direct and lasting relationship with universities. This report represents a crucial element in the genesis of technological clusters and, more generally,

[4]The distinctive traits that make it possible to identify this new university mission, according to Etzkowitz (2013), are (1) the capitalization of knowledge, (2) interdependence, (3) independence, (4) hybridization and (5) reflexivity. The first characteristic refers to the fact that the university must know how to commercially exploit the results of its research and favour the economic development of its territory of belonging. The university must interact with the industry and the public actor, thus avoiding being isolated and self-referential (second characteristic); it must however remain an independent institution and not represent the already existing organization (third characteristic); it must create hybrid organization models that allow it to interface with the territory (fourth feature); it must know how to renew and adapt to the new challenges of innovation coming from the market by exploiting relations with industry and the public actor (fifth feature). Kirby (2006) has identified a series of barriers to the development of the entrepreneurial university such as the hierarchical structure and the different levels of approval present in the universities, a conservative culture and little openness to the entrepreneurial spirit and inadequate compensation mechanisms between the various forms of enhancement of research.

research networks with high innovative potential, according to the "Triple Helix" model of Etzkowitz and Leydesdorff (2000).

5 Conclusions

This contribution focused on research spin-offs and science and technology parks, examples of formal mechanisms through which the university can combine the traditional training and research activities with the technological transfer and knowledge necessary for the creation of new businesses (the so-called third mission or entrepreneurial university).

From the monitoring of the science and technology parks, it emerged that, even in Italy, the contrast between parks with a bottom-up ("vocational/endogenous") or top-down ("political/exogenous") genesis is quite clear. Sixty-two percent of the cases observed (corresponding to eight parks) are political/exogenous parks, while the remaining 38% are represented by vocational/endogenous parks. The predominant vocational/endogenous nature in the regions of Southern Italy may highlight a lower dependence of the science and technology parks located in these territories by public funds. This observation is confirmed by recent literature (Liberati et al. 2014) according to which the share of public funds allocated to the financing of the 39 monitored parks is 31% (average value) and 22% (median value) highlighting a good financial independence of the parks. Moreover, seven of them have further reduced the use of public funds in recent years. A scarce ability to develop relationships and collaborations between universities and industry is particularly common in the parks of Southern Italy. This criticality, if it does not see its intensity reduced in the future, can prevent the aforementioned parks from playing a decisive role on the paths of life and development of spin-offs (Ferretti et al. 2009).

The empirical analysis confirms the idea that only the north represents a favourable environment for the development of entrepreneurship, thanks to the presence of innovative regions, technological districts, innovation poles, centres and research laboratories of excellence, incubators, science and technology parks and offices specialized in technology transfer activities. This idea is, in some way, rejected by the environmental approach that focuses on the manifestation of entrepreneurship in the so-called hostile environments. In these environments, in fact, the difficulties that arise can become a stimulus for the entrepreneur pushing him to take a proactive behaviour towards the achievement of a goal.

The spinning-out process by academic staff is not yet a consolidated practice in Southern Italy. The greater diffusion of this process in the regions of the centre/north is allowed by the combination of resources such as the number of patents and financial resources allocated to research with rather consolidated routine skills within their organizational structure. In addition, the sectors with a high level of knowledge have shown a greater propensity to create new businesses in the form of research spin-offs, especially in Central and Northern Italy.

Therefore we are still very far from applying a multidimensional approach to entrepreneurship that considers scientific and technological parks and research spinoffs as privileged places for the development of entrepreneurial skills. This approach encourages the realization of a dynamic "network building" process that represents the trait d'union between the objective of entrepreneurial action (teleological approach), the entrepreneur (psychological approach), the context (environmental approach) and the network (relational approach). The adoption of this approach allows to avoid the risk of neglecting the reciprocal conditioning between all the different variables related to the phenomenon of entrepreneurship. This risk represents the main problem of one-dimensional approaches to the study of entrepreneurship. The multidimensional approach would allow to study the phenomenon of entrepreneurship considering a set of rather wide internal (e.g. those related to the objective and personal characteristics of the entrepreneur) and external (the environment and the relational network) variables. The definition of the objective of entrepreneurial activity represents the glue between the other three elements (individual, context and network). These elements, combining with each other and influencing each other, sometimes positively and others negatively over time, give rise to hybrid business organizations. Therefore, another advantage linked to the multidimensional approach is the possibility to carry out a weighting of the analysis scheme adopted according to the objective one wants to achieve. This weighting would allow to focus on the most functional strategic actions to a particular area without however ignoring all the others that influence it (e.g. with reference to the objective of the creation of a new business or the perception of an entrepreneurial opportunity or the exit from a state of crisis or its international growth, with reference to the subject sex or age groups, with reference to the context of the economically developed or developing countries, with reference to the public, private or multiethnic network).

The adoption of a multidimensional approach to research spin-offs could be made easier thanks to the action of a control room or bridging institution. It will have to supervise all the elements related to the objectives to be met through the creation of new business activities by the research parks and spin-offs (teleological approach), the personal skills of the individuals involved in the operation of the parks and spin-offs (approach psychological), the relationship with their environment of settlement (environmental approach) and the ability of companies to enter into collaborations in research projects but also collaborations with universities and private research centres, with the financial and political world (approach of the network or relational).

This chapter did not consider the impact of science and technology parks on the reduction of development gaps between the Italian regions in the research and development sector. Therefore, a possible future enlargement of this chapter foresees, at first, a mapping of the science and technology parks in Italy in order to observe the main characteristics of their activity and of the companies hosted. Subsequently, an empirical analysis similar to the previous one will be conducted where the dependent variable is the same while the explanatory variables capture the previous characteristics. In this way it will be possible to compare the intensity of the economic and social effects of these two structures of academic entrepreneurship.

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What Start-Up Firms Are More Likely to Obtain Public Funding Support? A Systematic Analysis of the Funding Program Promoted by the Abruzzo Region in Italy

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Abstract The chapter aims to investigate the profile of start-up firms, in terms of features of the entrepreneur and entrepreneurial project, with regard to their likelihoods of obtaining support through public funding. Using data of 214 start-ups applied to the public call for the funding program implemented with the 2013–2016 "Start-Up Start-Hope" program promoted by the Abruzzo Region in Italy and funded by the European Social Fund, the main result from the estimated logistic model is that, generally, the key factor determining the probability of receiving public funding support is the entrepreneurs' age. Specifically, older entrepreneurs and entrepreneurial teams have a lower probability to be awarded by the public program compared to younger ones. Nevertheless, the other project and firm selected variables for the analysis (firm size, project value and type of financing based on the stage development of the firm) are not significant factors determining the probability of receiving public funding support.

1 Introduction

It has been remarked that European Union (EU) denotes emerging and relatively significant innovative gap compared to the USA, which is linked also to a lower diffusion and development of a dynamic and resilient entrepreneurial environment.

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In particular, the creative destruction process advanced by the seminal work of Schumpeter (1942), at the base of persistent growth and forthcoming evolution, seems delayed in the European knowledge economy, raising diffused barriers to entry, exit and innovate for young start-ups (Bartelsman et al. 2000).

However, young start-ups have a pivotal role in the technological and economic development. According to Baumol's view, private sector innovations come from two different sources: first, from the activities of large firms and, second, from the innovative efforts of small and independent firms, especially in the case that these last are several and denote high-growth potentials (Baumol 2002, 2010). Baumol stresses that the active interaction between both large and independent start-up firms improves the whole innovation process since their activities are complementary, with the independent inventors/entrepreneurs who focus on breakthrough innovations and with the R&D divisions of larger firms that improve these breakthroughs and add their global effectiveness. Further, Baumol claims that the radical innovation of start-ups has also a crucial part in the Schumpeterian dynamics, in an economy which develops and exploits new products, technologies and services that might revise the structures of that same economy.

Nevertheless, the European entrepreneurial context seems to be less effective in the fundamental complementarity among small and large companies in the innovation system (Schneider and Veugelers 2010). In details, by analysing a sample of young innovative firms using German CIS data, Schneider and Veugelers (2010) show that innovative start-ups reach superior innovative performance than other innovative firms, especially those involved in radical innovation that are fundamental for technological progress. However, they find that access to funding is the most critical element that impedes these start-ups to innovate, more than other innovating companies. In this emerging setting, the public policies for innovation at national level seem to be ineffective because deemed too broad and without a dedicated focus on innovative start-ups and their idiosyncratic features.

Additionally, as noted by McGuire and Smith (2008), the increasing globalization forces and the rapid development of the national innovation systems at global scale, especially with regard to Japan, Singapore, India, Taiwan and China, also push well-developed economies of Europe and the USA to rethink and continuously improve their innovation system and innovative capabilities. Indeed, the globalization of knowledge and the rising of the knowledge economy shifted the focus of the innovative competitive advantage from the production to the technological knowledge. This poses new challenges with regard to the public policies for innovation in the USA and, especially, Europe, which need to enhance the innovative capabilities of the economies through a better focus on the key elements and fundamental basis of technological knowledge: young and innovative start-ups.

In order to expand their innovative and development capability, several EU countries launched in the last years governmental programs to support start-up firms (Bertoni and Tykvová 2015; Román et al. 2013), especially innovative ones (usually called Young Innovative Companies (YICs) (Czarnitzki and Delanote 2012). In details, these measures aim to support the establishment and development of the above-mentioned firms, mainly by easing their access to funding sources and improving their innovation capability (BEPA 2008).

Although supportive public programs across countries may diverge in their structures, they lie onto two fundamental assumptions: (1) the capital provided by the private sector to new firms is inadequate, and (2) the government has the ability to recognize firms which investments are going to yield high social and economic returns in the long run (Lerner 2000).

While these programs have been implemented for years, their evaluation has not been fully investigated (Lelarge et al. 2010). Indeed, previous literature focused on the evaluation of the performance of directed lending programs [as Bach (2005) and Prantl (2006) for France and Germany, respectively] or start-up grants for the unemployed (Crépon and Duguet 2002). In particular, the knowledge about the process of allocation of innovative incentives and subsidies to start-ups requires further and systematically analysis. Indeed, governments and policymakers express a need to get reasonable proof and feedback about the usefulness and the output potentials of the above-mentioned programs; nevertheless, it seems that this prominent emphasis on effects of supportive program evaluations has distracted the focus from the problem related to their (effective or not effective) allocation (Tanayama 2007). In order to obtain consistent proof about the success and effectiveness of governmental programs to support start-up firms, it is necessary to better explore the participation process of the firm in the program, such as financing program (Heckman and Smith 2004).

Nevertheless, although the prominence of the allocation of public funding, only a part of academic literature has only partly investigated the different criteria used by governmental authorities to select ventures (Hsu et al. 2003; Lee et al. 1996; Lee and Om 1997; Takalo et al. 2013; Barajas and Huergo 2010).

In details, the study of Hsu et al. (2003), analysing the selection of government-sponsored frontier R&D projects, shows that differences about each criterion of selection used in their emerging model exist among various groups. Furthermore, to assess the effect of R&D grants in Finland, Takalo et al. (2008) model the functioning of an R&D grant program in terms of the actions of companies applying for grants and those of the public agency deciding on the grants. Using an R&D project-level dataset, they estimate the decision rules of the agency about the grants. Barajas and Huergo (2010), using data about the participation of Spanish companies in R&D consortia within the EU Framework Programme, analyse the determinants of granted and rejected proposal. Their results show that the likelihood to be granted depends on some firm-specific characteristics, such the leader capability and previous experience in R&D cooperation.

Nevertheless, also the few previous studies that analyse selection criteria of the public funding programs does not focus on start-up firms and are mainly directed on R&D activity of the firms. These two elements constitute crucial knowledge limitations in the current literature that call for a better investigation about the selection criteria with specific regard to the key engine of innovation and forthcoming economic growth, i.e. start-up, and on public programs aimed to support the overall innovation financing needs of the firm, not only R&D (also because only a part of firms perform formal R&D activity but several of them generate innovation anyway). In detail, the investigation about which start-up is selected for the supportive

program is a critical knowledge in the understanding of the selection process, of the type of firms that participate, of the different characteristics of the selected the firms in respect to the non-selected ones, as well as of the public behaviours and decision-making in the allocation process. Additionally, a better understanding of dynamics involving the selected firms will be beneficial also in terms of redefinition and improvement of the selection criteria settled by the government for the supportive programs.

Furthermore, it is to note that the study of the decision process needs databases that collect accurate data at firm level. The absence of proper availability of such data is one of the main reasons for a low level of empirical analyses on this topic (Huergo and Trenado 2008, 2010; Barajas et al. 2012), leading to uncompleted knowledge about how start-ups access to public funds.

This chapter aims to fill, although partially, the previous literature gaps by investigating the criteria underlying the funding program implemented with the "Start-Up Start-Hope" project promoted by the Abruzzo Region in Italy. This program is a response to the arising need from the Abruzzo Region to reactivate the awareness of the socio-economic context, with specific regard to the support of young and unoccupied people, of the quality of the territory, and of the natural resources, and above all, to stimulate the valorization of the entrepreneurial context.

The program provided to start-ups with funding according to specific criteria and aimed to stimulate the birth and development of new businesses and create new jobs. Obviously, firms that have applied for the call are heterogeneous in their nature and industry, and only some of them have been funded. The applicants may be both already established firms and firms to be formed.

To this regard, academic literature shows that asymmetric information about the quality of an innovative venture exists between the entrepreneur and the financing entity, and this leads to a cost of funding that is higher than internal one, resulting in a funding gap. This last may inhibit start-ups to be involved in sustainable innovative activity, resulting in a constraint to growth (Takalo and Tanayama 2010). In view of these funding limits, many governments have launched focused programs to reduce the above-mentioned constraints. Hence, the study of a public funding program for start-ups is significantly important and prominent to this topic.

More specifically, the chapter aims to study the objective criteria, namely, evaluable criteria, which help to determine the typical profile of the selected and funded start-up.

In this context, the Italian experience is very interesting. In Italy, the issues related to innovation and start-up firms have been underestimated in the policy debates for a long period. Actually, Italy, similarly to other EU countries, has never ensured a national financial support program totally directed to young and innovative firms in any economic sector of activity (Storey and Tether 1998; Colombo et al. 2013). Only in recent times, as consequence of the global financial crisis and in order to renovate the country's ability to grow, central and local governments started to implement target programs (Giraudo et al. 2016), such as Crescita 2.0 (Auricchio et al. 2014), intended to boost the establishment and development of innovative start-ups.

Additionally, a study conducted by the Global Entrepreneurship Monitor remarked that the capability of Italy to launch new ventures is hampered by the

fear of failure: 58% of the business have not been founded due to the fear of failing, one of the largest percentages in the European context (GEM 2014). This calls for a systematic investigation and potential further refinement of the supportive programs for innovation and entrepreneurship.

Our study makes some contributions to the existing literature, which can better deepen the current knowledge about the selection schemes and impact of public funding on the growth of young start-ups. First, the study enlarges the current literature about the selection process for the public funding program at the start-up firms, highlighting the firm determinants that affect the selection schemes of public authorities for the provision of grants. Compared to the current literature on the topic, which focuses on R&D grants without a clear distinguish among small and large firms—or among start-ups and well-established firms—this analysis constitutes a critical precondition to determine the actual impact and effectiveness of public programs focused on start-ups and their growth and innovation prospects. Second, the study makes a methodological contribution. Indeed, the majority of the previous empirical studies about public funding program cannot differentiate between the companies that do not submit an application and those that have ineffectively applied. This occurs because the data in public archives simply discloses whether or not the firms have received support. Conversely, our dataset also includes data about rejected applications; thus, we can distinctly analyse which elements affect the selection process.

Third, the analyses of both formed but new firms and firms to be formed constitute an important novelty in the literature on the topic, since previous research lacks a dedicated study that involved also firms to be formed about the selection process of public programs directed at financing and supporting start-ups. This additional analysis may provide new insights in the literature about the validity of nascent entrepreneurial projects through the decision made during the selection process (based on the key factors influencing it) and highlight possible improvement aspects both from the entrepreneurs' and public agencies' views.

The remainder of the chapter proceeds as follows. In the next sections, we provide a brief review of the literature on start-ups' financial constraints. Additionally, we discuss the effectiveness and effects of public support for start-ups, as well as the public programs' key factors in the selection process of start-ups. Section 3 describes the data and econometric methodology used in the empirical analysis. Section 4 reports the empirical results, while Sect. 5 concludes and discusses the empirical results and implications of the study.

2 Theoretical Background

2.1 Reasons Behind the Financing Constraints of Start-Ups

Previous studies suggest that start-ups, and generally innovative entrepreneurial firms, have limited and inadequate access to internal financial resources, since they

cannot use large previous income accumulations or a stable cash inflow from a wide and well-known product portfolio, for financing their innovative activities (Czarnitzki and Delanote 2015; Cassar 2004). In fact, innovative investments in small and new firms, especially technology-based ones, are sensitive to cash flow (Bond et al. 2003; Bougheas et al. 2003; Hall et al. 2016). Hence, the external funding is generally required, but start-ups face some troubles in attracting investments (Kerr et al. 2011). Some theoretical assumptions, as the agency costs theory (Jensen and Meckling 1976), the pecking order theory (Myers 1984) and the signaling hypothesis (Myers and Majluf 1984), clarify the reasons why start-ups frequently have concerns in accessing the external source of funding to improve their innovative activities. Small and new firms are likely to be constrained by the market failures, basically referring to the weak appropriateness (Arrow 1962) and uncertainty (Dixit and Pindyck 1994), which lead to information asymmetries between the entrepreneur and the financier, especially when funding is directed to an innovative asset and resources (Arrow 1962; Stiglitz and Weiss 1981; Canepa and Stoneman 2007; Nitani and Riding 2013). Indeed, the asymmetric information about the value of an innovation project, generally due to the soft information of R&D projects that is hard to verify, creates a higher cost of the external capital compared to the internal one. This generates a funding gap and related adverse selection issues (Hubbard 1998; Freel 2007). Moreover, the innovation assets derived from cost capitalization often cannot work as collateral, thus, further intensifying banks' aversion to risk. Consequently, start-ups and innovative entrepreneurial firms are usually credit-constrained for their innovative activities (Lööf and Nabavi 2016; Himmelberg and Petersen 1994).

This remark has called for increasing public involvement as a trigger to reduce start-ups funding gap (Takalo and Tanayama 2010).

2.2 *The Effectiveness and Effects of Public Support to Start-Ups Development*

Literature has been interested in the study about the need for public programs aimed to solve or alleviate the barriers to growth and innovation of start-ups. As remarked in the previous section, overcoming financing barriers linked to the financial market failure mainly represents a critical drive for governmental action, which is usually related to the provision of financial incentives and facilities, for example, grants or subsidy (Kerr et al. 2011).

The planning of specific policies for start-up companies needs to take into account the idiosyncratic nature of start-ups market failure. Nevertheless, the contingent uncertainty and emerging risks related to the changing markets, along with their imperfect or asymmetric information nature, raise the probability of unsuccessful and useless public interventions.

There is remarkable debate about the performance, effectiveness and influence of public programs on start-ups creation and development (Mas-Verdú et al. 2009).

Previous empirical research tests the effect of subsidies on private investments in innovation, analysing the crowding-out assumption. In particular, scholars remark a general support for the absence of crowding-out, although relevant methodological concerns affected the majority of studies conducted on the topic (David et al. 2000).

Additionally, scholars investigate the rationality of such supportive patterns, suggesting that public programs can boost ineffective ventures (Pellegrino et al. 2011). To this regard, other authors (Aghion 2011) have shown their aversion to entrepreneurship policies, arguing that they violate the principles of free competition.

Another part of the literature, however, remarks the positive effect of public subsidies to innovation and entrepreneurship, supporting the crowding-out effect (Almus and Czarnitzki 2003; Takalo et al. 2008; González et al. 2005).

Further, scholars claim that subsidies are not contrary in any case to the postulates of free competition for the reason that new start-ups could rise the competition level of an industry and boost innovative activity as a result (Krueger and Tuncer 1982). The increasing diffusion of firms in an industry stimulates the development of their competitive advantage and rises the innovation in that industry through inter-organizational links and knowledge/technology transfer activity (Prahalad and Hamel 2006). Hence, structured and focused subsidy programs can decrease concerns related to fostering businesses (Kirzner 2011). Such programs should selectively encourage only capable ventures with superior growth potentials.

To our knowledge, the identification of the effects of public programs on the firm performance and innovation is not completely investigated in previous studies. In particular, literature calls for a full and systematic analysis whether or not a more focused program concerning particular type of companies, such as new and small firms, generates positive effects. Colombo et al. (2008) study the effect of public subsidies and growth on 550 Italian new technology-based firms (NTBFs) and remark the heterogeneous impact of public funding based on the stage of the development of the firm. In details, their findings suggest that young NTBFs benefit more in terms of growth than mature NTBFs from public financial support, especially in the case of funds assigned through a selective evaluation process.

2.3 Public Programs' Key Factors in the Selection Process of Start-Ups

This section tries to deepen the understanding of the different criteria adopted by governmental evaluators to select new business projects. First, we posit that the selection process reveals the actual purposes of policymakers in supporting start-ups. Then, they define the features of those business projects that progress and, subsequently, the achieved outcomes.

With the purpose of better analysing the decision process, it is necessary to collect data at a project level. Some scholars (Takalo et al. 2013; Barajas et al. 2012; Segarra and Teruel 2014) followed this approach, and using a two-step method aimed to

evaluate the likelihood of obtaining a public subsidy, they showed that this last is related to a set of specific characteristics at firm level.

Our study investigates the following key factors in the selection process of public programs directed to funding and fostering start-ups: age of the entrepreneur, size of the firm, size of project and development stage of the firm.

Literature remarks the importance of the entrepreneur's characteristics of the, with particular regard to the entrepreneur's age (Van Praag 2011). Indeed, previous research empirically analysed that individuals older than 40 usually act more entrepreneurially than younger one, postulating that older individuals are more expected to generate a company (Shane and Khurana 2003). Similarly, Klofsten and Jones-Evans (2000) remark that most researchers were older than 40 when they started up their enterprise. However, a part of the literature considers that young people are particularly qualified of generating great and innovative entrepreneurial ideas (Jones et al. 2014), especially in the new technology sectors. Among the positive remarks of young entrepreneurs in terms of technology and innovation, young individuals are usually cognitively sharper, distracted in a smaller extent by family or further responsibilities and more open to changing mindsets that stimulate entrepreneurship (Dietrich and Srinivasan 2007; Weinberg 2006).

Nevertheless, several authors (Robertson et al. 2003; Ceptureanu and Ceptureanu 2015; Au et al. 2016) reveal that younger entrepreneurs face several difficulties in attracting the investment needed to launch an entrepreneurial project. Additionally, they may have deficient know-how and familiarity in running firms, comprising the successful managerial and organizational actions at different levels in the company, as well as lack of sector-specific experience about consumer needs, regulatory limitations or tactical prospects—as part of "market familiarity" that may be critical to effective growth and innovation (Azoulay et al. 2018). Indeed, in hard and high-level scientific areas, young entrepreneurs may lack the appropriate technical experience to generate or achieve successful innovation (Jones 2010).

To this regard, policymakers may increase consciousness of this financial, managerial, organizational and knowledge barrier and perform positive discrimination on young entrepreneurs who run new firms.

This is particularly true if we take into account the theoretical arguments discussed in Section 2.1 about the financing constraints of start-ups, for which the public support might represent a valuable mechanism to alleviate at least the funding limitations, but which constitutes a valuable input to further recover managerial and organizational capabilities.

In view of this consideration, we assume a greater chance of obtaining public support for the younger entrepreneurs, supposing a negative effect of the entrepreneurs' age.

With regard to firm size, new and larger companies have potentially superior development possibility than new and small companies, because of their greater availability of a minimum efficiency threshold, under which organizations typically fail (Fritsch et al. 2006). Indeed, the improvement of innovations may implicate fixed set-up expenses, which may be sunk at least partially. This will define a minimum bulk of economic returns or sales for cost-effectiveness to be positive. To this regard, firm size contributes in overcoming constraints related to fixed cost

and consequently constitutes a critical element in clarifying the likelihood of conduct R&D and innovation activity (Blanes and Busom 2004).

Previous studies about the effect of firm size provide mixed results. Barajas et al. (2012) show that smaller companies have higher chances of applying to a public program, but the empirical works of Huergo and Trenado (2008) and Huergo et al. (2015) remark that firm size generates a positive effect on the chance of applying. In the same line, Görg and Strobl (2007) and Takalo et al. (2013) assume that larger companies have superior likelihoods of obtaining public support and subsidies.

Nevertheless, it is to note that larger companies may have R&D units with a sufficient aptitude to carry out innovation projects. Hence, larger companies typically have more resources with which to undertake R&D projects and exploit innovation (Huergo et al. 2015). As literature points out, in Italy, the entrepreneur owns the greater part of funding assets (Samson and Gurdon 1990; Doutriaux 1991; Chiesa and Piccaluga 2000) that are scarce. Additionally, small and medium companies are typically affected with a superior extent by innovation-related market failures (Huergo et al. 2015). Indeed, R&D investment typically implicates superior risk than investment in tangible physical assets and that asymmetric information between the entrepreneur and financiers has chiefly significant and negative effects in the case of small firms, since their lack of collateral assets that henbit the aptitude of external suppliers of finance to invest in small firms, especially in the form of debt. This is related to the emerging imperfect capital markets, which are expected to lead to an underfinancing of the smaller firms, constraining the innovative process and preventing them to undertake R&D projects without an effective external funding support (Blanes and Busom 2004).

Therefore, policymakers and government evaluators may prioritize small firms, and their benefits from public support could be greater compared to larger firms. But, at the same time, larger firms have more aptitude to be eligible for R&D grants and public funding for innovation in view of their usually superior well-defined and formalized R&D departments that can easily satisfy the public agency requirements during the selection process, especially in case of the absence of a specific public support targeted for small or large firms.

However, in view of the heterogeneous arguments about firm size, its predictable effect of the chance of obtaining the public subsidy is quite unidentified.

Additionally, it could be generally argued that project value, in terms of project budget and number of project hours, may have a significant and positive effect in the selection process (Heijs 2005). Acosta and Modrego (2001) show that government evaluators are more apt to select large projects. Other studies show similar results about the actual and positive effect of the project budget, but with some differences considering the emerging context of analysis (Huergo and Trenado 2008; Santamaría et al. 2010). In detail, Santamaría et al. (2010), by studying a systematic model of the selection process for R&D cooperative projects in order to investigate the dynamics that prompt public project selection and provide funding by means of two distinctive financial tools (subsidies and credits) about project inputs, show a different influence of project value (measured in terms of number of working hours planned and project budget). The public agency reveals a high tendency to select

projects characterized by a great number of working hours and tiny budgets. However, in case a differentiation between financial instruments is used, the empirical results show that projects characterized by large budgets are given consistently less funding via both kinds of instrument and that projects characterized by great numbers of work hours typically obtain some support in terms of subsidies.

Henceforth, the effect of project value in the selection process for public funding programs depends on the emerging instrument used to support the firms, but which generally assumes a positive effect on the public agency decisions. Indeed, it could be argued that the project value may constitute a revealing proxy about the success prospect of the same work hours, based on critical inputs such as project budget, and other related relevant and key resources of firm growth and innovative development. Consequently, public agencies may be more apt to positively evaluate applicants characterized by a high project value of the entrepreneurial proposals.

Another key and critical element—although often undervalued—in the selection process, is stage development of start-up applying to the public program. Throughout a firm's development, initial finance comprises interactions between public and private finance, from pre-commercial process to commercial process. In details, especially in the pre-seed and seed phase, university (chiefly if the firm operates in a technology transfer process), several funding programs and public subsidies, but also associates of the entrepreneur ("fff" family, friends, fools), typically provide funds (Majava et al. 2017; Cumming and Johan 2009; Ayoub et al. 2017). However, in start-up, expansion and follow-on phases, the private equity and venture capital investors have a more effective and central role, because they are more suitable in fostering and boosting the growth and innovative potential of the entrepreneurial companies during their active development stage of organizational life (Mason and Harrison 1995; Sensoy et al. 2014; Hsu 2006). Similarly, start-up firms in the seed phase show a higher investment risk than firms in a more advanced financing stage. Indeed, in the last case, firms have assets for collateral and an acknowledged cash flow that permits investors and financiers to evaluate in a better and systematic extent the entrepreneurial risk. Hence, considering its business nature, the risk profile of a firm in the seed phase is much harder to evaluate compared to a firm in the start-up, expansion or follow-on phase.

Another key element to take into account is that the seed stage is a fundamental phase from which depends the success of the subsequent phases. Indeed, in terms of nominal investment, the seed phase is characterized by general low financing needs compared to the start-up expansion or follow-on phases—at least initially— however, the critical activities involved require an optimal funding base that may lack in the majority of the entrepreneurial initiatives in this premature phase, and its magnitude is usually proportional to the advancement of the business project. In detail, the seed phase needs the development of a systematic business plan clarifying how the business will be established and function. Additionally, in this phase a legal entity for the firm is advanced, which will outline the boundaries about the operative approach the firm will perform. Also, feasibility analyses, development of prototypes, assessment of market prospective and protection of intellectual property about the innovation generated are usually performed in the seed phase (Majava

et al. 2017; Cumming and Johan 2009; Ayoub et al. 2017). All these activities call for an increasing financing need that typically the entrepreneur is not able to fully and timely assure, since the effective start-up growth in a competitive environment requires rapidity in the time to market, from the innovative idea to the commercialization process. In this case, public support in the form of subsidies may alleviate the financing needs required to assure a quick and successful seed phase, supporting the firm in the subsequent stages of development.

Hence, we may expect that start-ups in the seed phase have more chance in obtaining public funds in a public supportive program.

In view of the above arguments, the following research hypotheses have been advanced:

H1: *Entrepreneur's age has a negative effect on the probability to obtain the funding support from a public program.*

H2: *Firm's size and investment amount have mixed effect (undefined) on the probability to obtain the funding support from a public program.*

H3: *Project value has a positive effect on the probability to obtain the funding support from a public program.*

H4: *Seed phase of the start-up development has a positive effect on the probability to obtain the funding support from a public program.*

3 Methodology

In order to analyse the selection criteria underlying the funding program implemented with the "Start-Up Start-Hope" program, we collected data through the application forms as they have been completed by the formed but new firms and firms being formed applying to the Start-Hope call (Article 22 EU Reg. No. 651/2014). In details, the sample consists of 214 firms, for which firm-level information are available.

The main aim of the empirical study is to understand and evaluate which variables are associated with obtaining funding support for the applied start-ups. These variables may be related both to the entrepreneur and to the start-up. Therefore, a binary dependent variable is used taking value 1 if the firm obtained the funding support, 0 if the firm did not obtain the funding support (FUNDING).

With regard to the independent variables used in the study, firstly, the age of the entrepreneur is employed (ENTR AGE). Secondly, the amount of the start-up investment is used in order to measure the firm size (FIRM SIZE). Third, we use the value of the entrepreneurial project (PROJECT VALUE), and, finally, we use the type of financing based on the stage development of the firm: (1) SEED CAPITAL, (2) START-UP CAPITAL, (3) EXPANSION CAPITAL and (4) FOLLOW ON.

To empirically validate the study, the statistical approach used is articulated into two phases. In the first phase, descriptive statistics and Pearson's bivariate correlation are performed. This explorative study, i.e. association tests, aims to examine the correlation between each of the explanatory variables and the binary response

variable. However, this control study cannot allow for all the potential associations between the explanatory variables. For this reason, in the second phase of the empirical analysis, a logistic regression (logit model) has been estimated to investigate the probability of receiving funding support. Logit model is a well-known and suitable econometric estimating technique that involves dichotomous dependent variables (Harrell 2013; Carey et al. 1993). Indeed, in the case of dichotomous variables, the use of the method of ordinary least squares (OLS) for regression analysis is inappropriate because the range of possible values are delimited on two sides in the interval [0-1] (Kieschnick and McCullough 2003). Instead, the binary logit regression method provides estimates that are generally more reliable and rational than those generated by the OLS method.

Hence, we used the following equation:

$$y_i = \begin{cases} 1 & \text{if } y_i^* = (x_i\beta + \mu_i) > 0 \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

where y_i^* is the latent dependent variable, x_i are the determinants of the selection process, β relates to the vector of coefficients to be estimated and μ_i is the error term which follows $N(0, \sigma^2)$.

4 Results

4.1 Descriptive Statistics

Table 1 shows the descriptive statistics of variables used in the study. The results indicate that the sample shows about 20% of firms obtaining the funding support from the public program implemented with the "Start-Up Start-Hope" funding program. This evidence remarks that almost ¼ of the start-ups applying for the program call have been selected and awarded. However, the reasons behind this result need to be further explored with the following empirical statistics.

With regard to the firm size, measured in terms of the amount invested, the sample shows an average of 559,330 euros, denoting the medium size of the start-ups participating at the program. However, the sample reveals a moderate dispersion in the values (S.D. = 330,676.60).

With regard to the value of the business project, this is on average higher of the firm size (about 2,567,785), although also in this case a moderate dispersion in the sample is detected (S.D. = 5,534,967), revealing a medium-high heterogeneity in the firms sampled about this variable.

Additionally, we note that the entrepreneur's sample shows an average age of 41 years, denoting that the firms are applying to the program call referring to relatively young entrepreneurial team, which is in line with the characteristics of start-ups. The sample, with regard to the ENTR AGE variable, shows a medium-low dispersion (S.D. = 8.8284).

Table 1 Descriptive statistics

Variable	No. of observations	Mean	S.D.	Min.	Max.
FUNDING	214	0.2056	0.4051	0	1
ENTR AGE	214	41.2103	8.8284	22	75
FIRM SIZE	214	559,330	330,676.6	4,500	1,500,000
PROJECT VALUE	214	2,567,785	5,534,967	10,000	67,238,750
SEED CAPITAL	214	0.1449	0.3528	0	1
START-UP CAPITAL	214	0.5701	0.4962	0	1
EXPANSION CAPITAL	214	0.2477	0.4327	0	1

Source: Table compiled by the authors

Referring to the type of financing based on the stage development of the firm, the sample shows that a greater part of firms require start-up capital (about 57%), followed by firms requiring expansion capital (about 25%) and seed capital (about 14%).

Table 2 reports the correlations statistics among the all investigated variables. The findings reveal a slightly positive correlation between the firm size and the dependent variable, i.e. firms obtaining the funding support from the program implemented with the "Start-Up Start-Hope" program, as well as between the value of project and the dependent variable. These findings suggest the potential association between the size of firm/project and the probability to obtain a funding support, although these two correlations are both not statistically significant.

A slightly negative correlation arises between the entrepreneur's age and the dependent variable. This result may reveal the less probability to obtain funding support for old entrepreneur; nonetheless, also in this case the correlation is not significant from a statistically point of view.

With regard to the type of financing based on the stage development of the firm, there are slightly negative correlations between seed capital and the dependent variable, as well as between start-up capital and the dependent variable. However, the correlation between expansion capital and the dependent variable is slightly positive. These findings suggest the potential association between the firms in their growth stage of development and the probability to obtain funding support. Nevertheless, also in this case, these correlations are not statistically significant.

However, the above correlation statistics need to be integrated with those emerging from the defined regression logit model, which could better highlight the potential causal relations among the previous variables. Figure 1 shows the scatterplot matrices of the correlation statistics.

Furthermore, it has been checked for multicollinearity, formally using VIF statistics. It has been found that the VIF scores did not exceed 7.09, and this value is not close to the rule of thumb "threshold" value of 10 (Hair et al. 1998)—and an average

Table 2 Correlations

		1	2	3	4	5	6	7
1	FUNDING	1.0000						
2	FIRM SIZE	0.0788	1.0000					
3	PROJECT VALUE	0.0457	0.2386**	1.0000				
4	ENTR AGE	−0.0620	0.1208*	0.0722	1.0000			
5	SEED CAPITAL	−0.0123	−0.2312**	−0.0991	−0.2691*	1.0000		
6	START-UP CAPITAL	−0.0720	0.1547**	0.0021	0.1611*	−0.4740*	1.0000	
7	EXPANSION CAPITAL	0.0831	0.0480	0.0644	0.0195	−0.2361*	−0.6607*	1.0000

*Significant at 5%
**Significant at 10%
Source: Table compiled by the authors

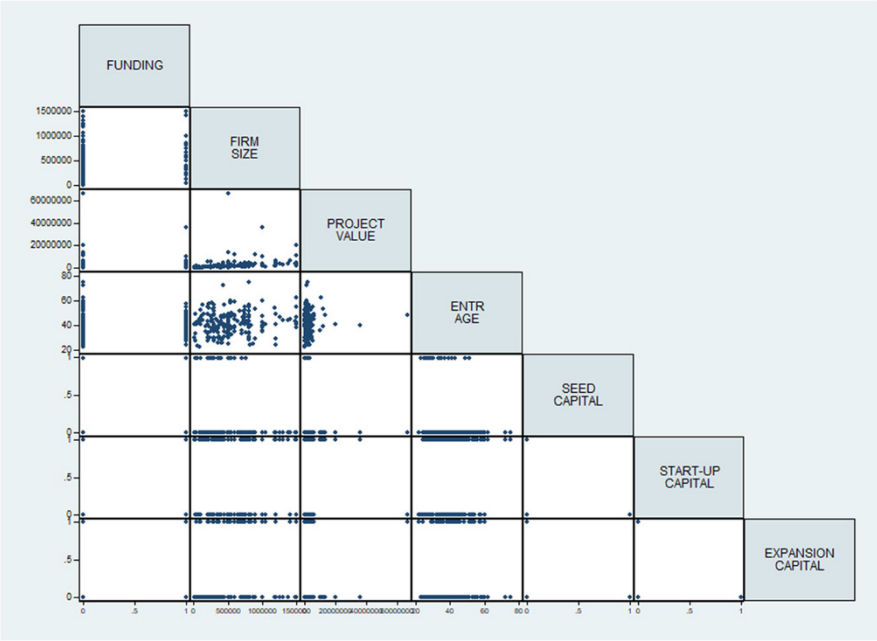

Fig. 1 Scatterplot matrices of the correlations statistics. Source: Authors' own figure

of 3.41. In addition, the "tolerance" level shows an acceptable value higher than 0.10 in all the models, suggesting that multicollinearity is not a critical problem; henceforth, multiple regression analysis can be used.

4.2 Logit Model Estimation

Table 3 shows the results of the logit regression model in order to evaluate the impact of selected firms and entrepreneurial characteristics on the probability to obtain the funding support from the public program implemented with the "Start-Up Start-Hope Fund".

From the model, the estimated coefficient of the variable ENTR AGE is negative and statistically significant (coeff. $= -0.0277$, $p < 0.10$). This finding remarks that older entrepreneurs have less probabilities to obtain a funding support compared to younger entrepreneurs, suggesting the aim of the policymakers to support relatively younger and promising start-up and entrepreneurial team. Hence, the H1 is supported.

Nevertheless, the estimated coefficients for the remaining independent variables are not statistically significant, pointing out the less effectiveness of these factors to determine the probability of a start-up to obtain a funding support.

Table 3 Estimates of the defined logit regression model

Dependent variable: FUNDING	
FIRM SIZE	6.05e−07 (5.32e−07)
PROJECT VALUE	1.01e−08 (2.77e−08)
ENTR AGE	−0.0277472∗ (0.0143767)
SEED CAPITAL	−0.6995704 (0.6672267)
START-UP CAPITAL	−0.7601356 (0.646774)
EXPANSION CAPITAL	−0.2846594 (0.6673788)
DF	6
Log likelihood	−106.6518
Observations	214
Wald chi^2	63.09
Prob > chi^2	0.0000

Standard errors in parenthesis
$*p < 0.05$
Source: Table compiled by the authors

In particular, both the firm size and the project value show slightly positive estimated coefficients (although not statistically significant), remarking the little capability of these variables to affect the dependent variable. However, for the type of financing based on the stage development of the firm, the estimated coefficients are negative and significant in practical term but not in statistical term.

In general, the estimated model reveals the low capacity of the selected firms and entrepreneurial characteristics to affect the probability to obtain the funding support from the public program implemented with the "Start-Up Start-Hope" program. Only the entrepreneurial age has a high and negative role in the above relation.

Figure 2 shows the plotted regression coefficients of the logit model, with confidence intervals.

5 Result Discussion and Conclusions

This chapter investigates the profile of start-up firms, in terms of features of the entrepreneur and entrepreneurial project, with regard to their likelihoods of obtaining public support in the form of funding. This study tries to find whether public programs are a virtuous fit with the particular features of start-ups.

Literature rises the attention of policymakers about the necessity of studying the factors of selection process in entrepreneurial projects. This chapter uses data of a public call for the funding program implemented with the "Start-Up Start-Hope"

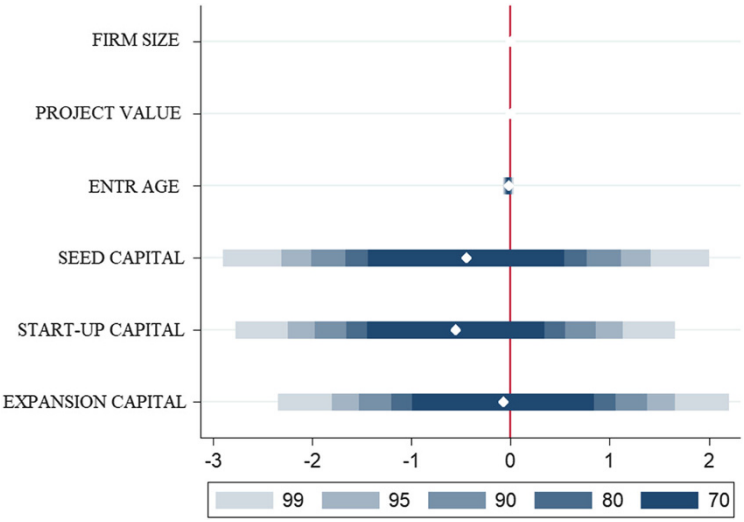

Fig. 2 Plotted regression coefficients with confidence intervals. Source: Authors' own figure

project promoted by the Abruzzo Region in Italy and funded by the European Social Fund.

From the empirical analysis of 214 start-ups, the main result from the estimated logistic model is that, generally, the key factor determining the probability of receiving public funding support for the start-ups is the entrepreneurs' age. In particular, older entrepreneurs and entrepreneurial teams have less probability to be awarded by the public program compared to younger entrepreneurs and entrepreneurial teams. Hence, this study suggests that public policies appear to take note of the entrepreneur's age. Findings reveal that, since younger entrepreneurs face several difficulties in attracting the investment needed to launch an entrepreneurial project, policymakers seem to increase consciousness of this financial barrier and perform positive discrimination on young entrepreneurs who run new firms.

Nevertheless, the other project and firm variables selected for the analysis (viz. firm size, project value and type of financing based on the stage development of the firm) are not significant factors determining the probability of receiving public funding support for start-ups.

As most of the above features are relatively standard requirements for the effective development of start-up firms, one may assume that public policies stimulating new venture creation show a high level of horizontal approach, because they do not target a particular entrepreneurial, firm and project profile. This appears rational since public policies aim to the promotion and development of start-up companies, rather than supporting the establishment of "winners" through preferring larger firms or high-valued business project, in terms of investment capacity.

In the case of this research, the only exception is the entrepreneurial age, which calls for a deeper and more detailed investigation.

The findings emerging from the study yield some central implications in defining public policies for start-ups. This study reveals that only few characteristics of start-ups considerably affect whether start-ups receive funding support. In light of this remark, local and national governments could improve the effectiveness of their efforts to endorse new firm formation and development by designing such programs. Policymakers could achieve this goal by categorizing selective programs into agendas that fit the necessities of each entrepreneurial project, contingent on that entrepreneurial project's features.

This study is not free of limitations. First, the chapter investigates only one form of start-up policies (funding supports), but actually other effective actions for stimulating start-up formation and development exist. In this regard, future research can take advantage in using additional or combined dependent variable with the purpose of incorporating other policy mechanisms, such as the access to and provision of structural and innovative-related resources at organizational level, in order to facilitate the development of start-ups through technology transfer and linking facilities. Second, the study considers only the analysis of start-up firms, while a comparison among policies aimed to stimulating start-ups and other types of enterprises is required. Third, measures of the human and social capital at the organization level are required, chiefly related to the entrepreneurial team, which may further improve the data quality for a better investigation about the selection process of public policies.

Finally, the empirical findings may not be generalized to other regions or countries with different characteristics from those of the Abruzzo Region in Italy. This might represent a good chance for future research that may include inter-regional and cross-country analysis.

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Nurturing Innovation Through Entrepreneurial Ecosystems: What Does the Literature Say?

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Abstract This chapter presents a literature review about entrepreneurial ecosystems and their relationship with entrepreneurship and innovation. Reviewed studies were aggregated into clusters and interpreted through the Neck et al. (J Small Bus Manag 42(2):190–208, 2004) framework, providing a systematised summary of the surveyed literature.

1 Introduction

As an interdisciplinary concept, the definition of entrepreneurship is evolutionary, one that has evolved alongside sociocultural, political and economic developments. The fundamental historical changes within the twentieth century altered the viewpoint of entrepreneurship and the entrepreneur from a one-dimensional actor within the peripheries of economic theory to an individual recognised as a 'risk-taker', 'an innovator', a 'decision-maker' (Ferreira et al. 2017)—a rounded individual who is able to connect different markets and answer market deficiencies. Furthermore, the purpose of entrepreneurship has evolved from solely 'finding and exploiting opportunities' to deriving its theoretical objective in growth and development (Isenberg 2014) via innovation. For example, Du Plessis and Boon (2004) refer to innovation as the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving business processes and to create market-driven products and services. Others highlight that understanding the interconnection of entrepreneurship and innovation requires an understanding of the environment in which entrepreneurs operate—with a support infrastructure for entrepreneurial activities determining the quality and quantity of results (Feldman et al. 2005).

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When viewing entrepreneurship through the lens of regional (economic) development, the notion of entrepreneurial ecosystems is applied to describe a 'dynamic, self-regulated network' (Isenberg 2014), particularly when explaining the influence of regional and economic factors being supplemented by the entrepreneurial process (Dubini 1989).

For the purpose of this research, the following definition will be utilised throughout—of an entrepreneurial ecosystem as a set of interdependent factors coordinated in such a way that they enable productive entrepreneurship within a particular territory (Stam and Bosma 2015). Within entrepreneurial dimensions, ecosystems focus on the relation of economic, social and cultural attributes, with such interdependent actors interacting and developing over time to create regional enhancement and prosperity (Spigel 2017).

Within academic literature, discussion of entrepreneurship within the context of 'ecosystems' has gained incremental popularity; a noticeable rise is evident post 2008–2009, following the global financial crisis. This is largely due to the recognition of entrepreneurial ecosystems as having huge potential on regional economic growth, job creation and regional and national competitiveness (Spigel 2017).

The topic of entrepreneurial ecosystems is rising in importance for management, entrepreneurs and policymakers, since decision-making focused on ecosystem investment requires a thorough understanding of these dynamic and complex communities (Ross Brown and Mason 2017). However, there is limited published literature on innovation maximisation in the direct context of entrepreneurial ecosystems—due to the niche nature of the topic of interest (Cohen 2006). This systematic literature review aims to synthesise research evidence on entrepreneurial ecosystems, whilst tying entrepreneurship and innovation together through the identification of ecosystem aspects which maximise innovative capacity.

In order to do this, a review of the literature will be conducted to ascertain the evolution of entrepreneurial ecosystem discussion. A dataset of journal articles encompassing both qualitative and quantitative data will be selected and reviewed. Comparisons will be drawn between all articles, based on research methodologies, their theoretical basis, analysis types and results. The results are drawn together to establish which mentioned aspects of entrepreneurial ecosystems maximise innovative capacity.

2 Theory: An Evolution of the Topic from Clusters to Current Perceptions

The focus on the external environment and its impact on the firm began primarily with the study of clusters, as introduced by Porter (1985). The cluster approach focuses on 'geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (. . .) in particular fields that compete but also co-operate' (Porter 1998). The primary

focus was on the role of innovative firms in enhancing regional and national competitiveness—particularly by using regional productivity as a measure of national competitiveness (Stam and Bosma 2015). However recent academic research on 'clusters' has shifted to a focus on 'ecosystems' and has a more interdisciplinary nature.

The initial focus of the topic was aimed at identifying the various structural components of an 'entrepreneurial ecosystem'. Van de Ven's (1993) focus on the creation of the entrepreneurial ecosystem stressed the holistic stance with which entrepreneurship should be approached. Regarding the institutional theory, North (1990) stressed the role of institutions as facilitators of market relations and instigators of societal progress. This highlighted the role of governance within ecosystems, alongside the role of individual entrepreneurs, investors, venture capitalists, organisations, incubators and universities as being critical junctures within entrepreneurial ecosystems (Bahrami and Evans 1995).

Additionally, others (Douglas and Shepherd 2000; Florida and Kenney 1988; Spilling 1996) stressed the importance of the interactions between interdependent components of the ecosystem which cannot be overlooked—after which, research adopted a holistic stance on the relative contributions of ecosystem components to the entire system. Furthermore, the role of network theory is particularly notable during this period—specifically social, formal and informal connections—in shaping the course of entrepreneurial ecosystem research. This is a vital point in the development of the topic, since it eliminated the physical boundaries which cluster theory heavily implemented on the function and scope of entrepreneurial ecosystems and disproved current theorists on their depiction of entrepreneurial ecosystems as geographically bounded areas (Auerswald 2015). Furthermore, it embedded branches of social sciences within entrepreneurship-based research (Baycan Levent et al. 2003; Lefebvre et al. 2015)—a key moment for the topic, since it contextualised the topic beyond the peripheries of economic theory.

Literature defines 'innovation ecosystems' (Markman and Baron 2003) as interconnected networks of entities that co-evolve capabilities around a shared set of knowledge and skills and work cooperatively but competitively. Although not dissimilar from the definition of entrepreneurial ecosystems, there is an attempt in recent literature to create a disparity when associating innovation and entrepreneurship—most notably with the development of the MIT REAP framework. This framework refers to entrepreneurs and innovators as separate entities, although the two actors share similar skills and characteristics: both being opportunity spotters, using the process of learning and discovery to create value whilst being able to operate in uncertain environments with a high tolerance for ambiguity (Sarasvathy et al. 2008). The incremental disassociation of innovation from the entrepreneur counters the valuable theoretical basis for entrepreneurship and must retain close association (Dahlstrand and Stevenson 2010).

A number of entrepreneurial ecosystem frameworks exist in current literature. Spearheaded by Isenberg (2014) thirteen-factor ecosystem model, literature began to incorporate factors relating to social sciences into their models: for example, Spigel's

(2017) framework categorised its components into three sections: material, social and cultural types of attributes which constructed the framework.

The chosen framework for the review was the Neck et al. (2004) model of entrepreneurial ecosystem components: the authors were one of the first to create a holistic presentation of the interaction of multiple ecosystem components (Cohen 2006), since the framework was developed during the emerging years of entrepreneurial ecosystem literature. Rigorous research and comparisons made against other frameworks confirmed Neck et al. (2004) to be an effective basis framework for the literature review. Neck et al. (2004) produced a clear taxonomy of ecosystem components, with diverse categories making it applicable for the study of a large selection of articles, whilst the clarity of the model makes it effective when comparing several studies.

3 Method

The systematic literature review was chosen as appropriate method for this research. A systematic review seemed more applicable than other styles of literature reviews since its aim is to answer a predefined research question, based on 'what' and 'how' (rather than 'why') questions (e.g. Abatecola et al. 2013; Caputo 2013a). The aim of the research was to collate as many relevant existing studies on the chosen discipline and to assess the extent to which they adhere to the selected theoretical framework by Neck et al. (2004).

Consistently with the principles of systematic literature review (Tranfield et al. 2003), after the initial creation of a research protocol to promote the transparency of methods, the literature review was completed through a three-step process. The formed review panel consisted of an academic with specialist knowledge in the field, in addition to complimentary experience in the use of systematic reviews. The panel proved useful in aiding the selection of the correct style of literature review, most applicable for the topic of interest. Additional help was focused on exploring the boundaries of the research methodology, as well as helping to determine the inclusion and exclusion criteria.

The review was limited to published journal articles (reviewed) in English language—specifically, both empirical and theoretical articles discussing the topic. The focus of these case studies could be on ecosystems in all levels of development (i.e. growing or maturing), with a particularly preference for ecosystem examples composed of representatives from several industries—since this made the outcome of the research applicable to more than one industry. The articles were selected from one search platform, Scopus. In order to ensure the relevance of the selected articles, the search criteria were limited to sources from Economics and Management disciplines only. Research on selected articles was conducted on the Abstract during the initial screening. The search for the articles was completed through a refined search string, developed from previous knowledge acquired from the preliminary literature search, as well as guidance from the expertise of the panel. The final search string of *TITLE-*

ABS-KEY (entrepren∗ OR start∗up∗) AND (ecosystem∗ AND innov∗) was selected, on the basis that it produced articles with these keywords in the title or the abstract, as well as allowing flexibility in the breadth of discussion. This produced 427 results.

The initial review was conducted by searching through the 'Author Key Words' tab on the exported dataset, to eliminate articles from disciplines stated in the protocol's exclusion criteria (e.g. Social Sciences). A total of 70 articles were exported from Scopus, having been published between the years 2006 and 2017. A critical analysis was carried out next, by searching the abstracts for specific keywords, which would determine whether they would be included/excluded from the dataset. An example exclusion keyword is 'clusters', since it is often associated with the topic of entrepreneurial ecosystems yet has close affiliations with theory of entrepreneurial clusters (Delgado et al. 2010). Other articles eliminated from the dataset were those which contorted the meaning of 'ecosystem' on a regional level: specifically, by referring to industry ecosystems or national ecosystems. Originally, the exclusion criteria of eliminating studies based on emerging economies were applied throughout the screening process—however, this was reversed once the value potential of these case studies was evident, since these articles were the ones most likely to present an evolutionary perspective on the development and maturity of ecosystems. This holds great value to the topic of interest, since there is potential to identify those elements of entrepreneurial ecosystems which maximise innovative capacity over time and how these evolve with ecosystems.

Following this elimination, a total of 47 articles were taken into consideration for a full-text screening. During this part of the method, objective inclusion and exclusion criteria were strictly adhered to, since there was a high level of ambiguity within some studies, as to how they could be valid for inclusion. Each article was read in full at least twice, in order to gain full familiarity with the content, thus ensuring sound judgement with minimal subjectivity and bias. Two articles were eliminated following a critical appraisal of the dataset, 13 articles were excluded due to conditions set out by close adherence to the exclusion criteria, and 5 articles had restricted access and therefore were requested through interlibrary loans and personal requests to authors. Out of those received ($n = 5$), two were included in the final dataset, whilst the remaining three were deemed either irrelevant or had a predominant focus on patent pools (Vakili 2016).

During the secondary scoping of literature, each article was assigned to at least one Neck et al. (2004) framework component, based on what the content of each study had affiliated with as the aspect(s) which maximised innovative capacity of entrepreneurial ecosystems.

3.1 Characteristics of the Final Dataset

The dataset consisted of 23 empirical studies, four theoretical and two using a mixed research approach (both theoretical and empirical). This size is consistent with some

previously published research in management literature (Abatecola et al. 2012; Caputo 2013a, b; Caputo et al. 2016).

Within this population, 22 used qualitative methodology when collecting data, one used a solely quantitative approach, whilst five used a mixed methodology. Of the 22 studies using a qualitative research design, most of these conducted primary research, whilst five used a mixed method approach: i.e. integrating primary and secondary research on a case study ($n = 2$). Primary research was characterised by open-ended interviews ($n = 8$), questionnaires ($n = 3$) and surveys ($n = 2$), which were later synthesised, systemised or coded to support data analysis. The proportion of qualitative methodologies is advantageous since these simplify and manage large amounts of data without destroying complexity and context (Atieno 2009). The one article which used a quantitative research design (Samila and Sorenson 2010) conducted a longitudinal study, spanning 9 years, covering 328 metropolitan statistical areas in the USA—out of the dataset, it is the article with the highest number of citations ($n = 47$) yet openly seeks a correlation between public funding and fostering innovation in ecosystems. It is interesting to note that those studies using a mixed research approach primarily focused on the role of networking within ecosystems and advocated the need to code large amounts of qualitative data, before a qualitative analysis.

4 Clusterisation of Findings by Theory

The dataset was segmented into respective clusters (See Table 1). First, those articles which utilised theory ($n = 23$) as a lens to explore the topic of interest were assigned to a theoretical cluster. The clusters identified were represented by four respective theoretical settings: innovation systems theories, variance theories and network and

Table 1 The distributions of articles across clusters

Cluster	Authors
Innovation systems $N = 11$	van den Heiligenberg et al. (2017), Brem and Radziwon (2017), Dubina et al. (2017), Van Gils and Rutjes (2017), Brown (2016), Euchner (2016), Guerrero et al. (2014), Merrie and Olsson (2014), Kim et al. (2012), MacGregor et al. (2010)
Network theory $N = 6$	Huang-Saad et al. (2017), Cannavacciuolo et al. (2017), Schaeffer and Matt (2016), Carayannis et al. (2016), Kantarelis (2009)
Variance theory $N = 5$	Ansari et al. (2016), Stough (2016), Fernández Fernández et al. (2015), Carayannis et al. (2015), O'Connor et al. (2012)
Agency theory $N = 1$	Hayter (2016)
No theory $N = 6$	Baroncelli and Landoni (2017), Ferreira et al. (2017), Usman and Vanhaverbeke (2017), Tietz et al. (2015), Letaifa and Rabeau (2013), Samila and Sorenson (2010)

Source: Table compiled by the authors

agency theory. These clusters were identified on the basis that they represented the theoretical components of all articles within the dataset well, whilst providing a snapshot of various relationship types between ecosystem components presented by these theories. For the benefit of comparability, each article was assigned to one cluster only.

4.1 Innovation Systems

Studies grouped in the 'innovation systems' cluster viewed ecosystem components within a holistic perspective of system agents and their environment, where the principal goal is to develop and diffuse innovations.

The innovation systems cluster was dominated by three streams of studies: the triple helix concept (Brem and Radziwon 2017; Dubina et al. 2017; Kim et al. 2012; MacGregor et al. 2010), regional innovation systems (Brown 2016; van den Heiligenberg et al. 2017) and models constructed by the authors specifically for the geographical context discussed in these articles (Euchner 2016; Merrie and Olsson 2014; van Gils and Rutjes 2017).

The triple helix refers to a growing triadic relationship between university-industry-government. This is a concept commonly discussed within the context of innovations systems, yet the chosen articles apply these dynamic relationships to entrepreneurial ecosystems. Moreover, the authors discussed recognise the contribution of triple helix configurations to the maximisation of innovative capacity within ecosystems—by exemplifying that the successful interaction between the ecosystem members emerges at the intersection of national culture, the political and legal systems and entrepreneurial cognition (Nambisan and Baron 2013). Dubina et al. (2017) utilise the triple helix lens to identify how ecosystems can develop in a sustainable way, in the context of economies in transition (i.e. Russia). Contrasting to Brem and Radziwon (2017), the authors state the role of universities as 'initiators of innovation', thus crediting these institutions as heavy contributors to maximisation of innovative capacity within these ecosystems.

The second dominant theory within the innovation systems cluster is regional innovation systems (RIS)—a theoretical basis which frames innovation as an output of various combinations of political, cultural and economic forces within geographic proximity. Within this grouping, RIS theory has been used to discuss regional competitive advantage, university-industry collaboration (UIC) through the lens of a multidimensional policy framework and the role of universities as epicentres of such systems. Much like the triple helix concept, the RIS theoretical lens highlights the role of connectivity between ecosystem components, particularly with universities—a central source of innovative development (Charles 2006).

It is interesting to note that the remainder of the articles within the innovation systems cluster do not frame their studies through a single theoretical lens; however, a trend is evident in the way they perceive their case studies—this is through central focus on the diffusion of innovation. These articles indicate that the need to consider

how innovative ideas are diffused throughout the ecosystem is imperative—especially once ecosystem relationships are formulated and established.

4.2 Network Theory

The theoretical cluster of 'network theory' focuses on the type of relationships which define the characteristics of entrepreneurial ecosystems—viewing networks as facilitators of knowledge flows within and across regions, to act as a key source of innovation and growth (Huggins and Williams 2011; Huggins and Johnston 2009). Within the dataset, networks are viewed as a form of capital amongst ecosystem members through the establishment of valuable connections between individual entrepreneurs, agents and institutions. Naturally, this contributes to maximising the innovative capacity of ecosystems—the following explores the various forms of networking illustrated within the cluster.

Within this grouping, once again, the role of universities is highlighted as a central player in innovation maximisation—particularly entrepreneurial universities seeping information and innovation into the ecosystem via spin-offs and knowledge spillovers. Huang-Saad et al. (2017) investigate the network opportunities which universities create via university-entrepreneurship programmes aimed at cultivating entrepreneurial graduates, through the creation of a direct network between university innovations and entrepreneurial initiatives (Huang-Saad et al. 2017). Schaeffer and Matt (2016) credit the role of technology transfer offices (TTOs) set up by universities, as intermediaries within non-mature ecosystems, leading to the progressive development of innovative intermediaries within ecosystems to accommodate the exchange of entrepreneurial resources (Spigel 2017).

Although the network theory cluster is dominated by discussion of university spillovers to industry through network intermediaries, one study (Cannavacciuolo et al. 2017) focuses on the emergence of collaborative networks in entrepreneurial ecosystems as determined by the way entrepreneurs exchange knowledge. It places responsibility on the entrepreneur to create such networks and enhance these by learning through business transactions with other entrepreneurs. It is interesting to highlight the connection between learning and the development of networking capabilities, since the authors claim that network systems are learning systems.

Overall, two perspectives dominate the cluster—the networking opportunities instigated by institutions (i.e. universities) and those opportunities sought and created by entrepreneurs themselves. Although both are vital to the exchange of ideas and the creation of collaborative knowledge to form inevitable innovations, it is clear that this cluster stresses the importance of different tiers of networking within ecosystems, to create a baseline for maximising innovative capacity within an ecosystem.

4.3 Variance Theory

The 'variance theory' cluster explores the basic fundamentals of how variance in dependent variables within the ecosystem was based on changes of one or more independent variables. This is an important theoretical aspect since it understood that the agents within an entrepreneurial ecosystem do not necessarily change over time, but their properties and value potential do, and that these variations are what drive ecosystem relationships. Ansari et al. (2016) discuss the notion of disruptive innovations within an ecosystem dominated by a single industry and make a case for considering the impact of each ecosystem actors' action on how it will impact the rest of the ecosystem—thus highlighting the downside of interconnectedness. The remainder of the articles within the cluster focus on the creation of stable ecosystem conditions to supplement the creation of links between its actors, to form a sustainable entrepreneurial ecosystem (Fernández Fernández et al. 2015; O'Connor et al. 2012).

4.4 Agency Theory

Articles assigned to the 'agency theory' cluster exclusively explored the relationship between principles and agents in the ecosystem—more specifically, exploring the problems that occur when one agent represents a principle, especially when the principle and agent do not share the same goals (e.g. government-university relationships).

The one article assigned to this cluster mainly discusses the role of networking in complimenting the progressive capabilities of the ecosystem: much like Schaeffer and Matt (2016), Hayter (2016) investigates the role of knowledge intermediaries—specifically, academic and non-academic contacts who connect faculty and students to other social networks important to spin-off success.

5 Clusterisation of Findings According to the Neck et al. (2004) Framework

The allocation of studies to different components of Neck et al.'s (2004) framework is presented in Table 2. The table helps to identify the framework component with the highest concentration of articles supporting its ability to maximise innovative capacity within an ecosystem.

The number of allocations totalled 73—meaning that the 29 articles in the dataset were allocated to at least two model components on average (i.e. more than one aspect was believed to have had an effect on the maximisation of innovative capacity). As evident from Table 2, the framework components with the highest

Table 2 The allocation of all articles to applicable framework components

Neck et al. (2004) framework	Authors reviewed in the study
University $N = 13$	Baroncelli and Landoni (2017), Brem and Radziwon (2017), Guerrero et al. (2014), Huang-Saad et al. (2017), Hayter (2016), Brown (2016), Stough (2016), Schaeffer and Matt (2016), Kim et al. (2012), O'Connor et al. (2012), Kantarelis (2009)
Government $N = 11$	Guerrero et al. (2014), van den Heiligenberg et al. (2017), Brem and Radziwon (2017), Dubina et al. (2017), Brown (2016), Stough (2016), Carayannis et al. (2015), Letaifa and Rabeau (2013), Kim et al. (2012), O'Connor et al. (2012)
Capital services $N = 10$	Baroncelli and Landoni (2017), van den Heiligenberg et al. (2017), Dubina et al. (2017), Schaeffer and Matt (2016), Carayannis et al. (2015), O'Connor et al. (2012), Kim et al. (2012), Samila and Sorenson (2010), MacGregor et al. (2010)
Professional and support services $N = 9$	Baroncelli and Landoni (2017), Usman and Vanhaverbeke (2017), Huang-Saad et al. (2017), Schaeffer and Matt (2016), Hayter (2016), Brown (2016), MacGregor et al. (2010)
Formal network $N = 8$	Usman and Vanhaverbeke (2017), Guerrero et al. (2014), van den Heiligenberg et al. (2017), Brem and Radziwon (2017), Van Gils and Rutjes (2017), Euchner (2016), Huang-Saad et al. (2017), Hayter (2016)
Incubator $N = 4$	Baroncelli and Landoni (2017), Van Gils and Rutjes (2017), Tietz et al. (2015), Fernández Fernández et al. (2015)
Culture $N = 5$	Van Gils and Rutjes (2017), Stough (2016), Hayter (2016), Merrie and Olsson (2014), Leteifa and Rabeau (2013)
Large corporations $N = 4$	Usman and Vanhaverbeke (2017), Euchner (2016), Stough (2016), Kantarelis 2009
Informal network $N = 3$	Brem and Radziwon (2017), Van Gils and Rutjes (2017), Hayter (2016)
Talent pool $N = 3$	Usman and Vanhaverbeke (2017), Huang-Saad et al. (2017), Carayannis et al. (2015)
Physical infrastructure $N = 1$	Kim et al. (2012)

Source: Table compiled by the authors

concentration of article allocation are university ($n = 13$), government ($n = 11$) and capital services ($n = 10$). This implies that institutional presence and input to the ecosystem had the highest impact over innovation maximisation. For example, Stough's (2016) research highlights how 'regional governance and institutions are particularly critical components of regional entrepreneurial ecosystem performance', whilst Kim et al. (2012) highlight the positive synergistic effects of interactions between regional government, university contributions and capital availability for entrepreneurial activity.

The next group of framework components with the highest allocation of articles consist of: professional and support services ($n = 9$), formal network ($n = 8$), the culture of the ecosystem ($n = 5$) and incubator spin-off relationships ($n = 4$). Despite

the lower proportion of articles allocated to these framework components, aspects such as 'culture' should be interpreted with care, since it is a more miscellaneous and general contributor to innovation maximisation—acting as a general indication of the norms and attitudes of individual, prior to the birth of the entrepreneurial ecosystem itself (Godwyn and Gittell 2011). 'Support services' should also be considered with caution, since the variety of such resources is an indication of the attitudes towards entrepreneurial activity within the ecosystem. These framework components are indicative of the social support and encouragement of entrepreneurial activity within the ecosystem—despite the lower allocation of dataset articles to these components, they are vital contributors towards innovation maximisation within an ecosystem, since favourable attitudes and encouraging support services for entrepreneurs will encourage innovative products and services to be brought to the market, whilst encouraging firm survival within a dynamic environment (Coduras et al. 2008).

With respect to formal networks, Usman and Vanhaverbeke's (2017) discussion is focused on the potential for innovative output when start-ups and large firms collaborate—specifically, how management of these relationships can maximise innovative output. On the other hand, Hayter (2016) presents an expansive perspective on formal networks, highlighting the contribution of institutional and individual intermediaries (such as incubators) to innovation and entrepreneurial ecosystems—particularly using the role of academics acting as intermediaries in 'connecting faculty and students to other social networks important to spin-off success'. A similar perspective is held by those articles allocated to the 'incubator' component of the Neck et al. framework; however all authors highlight that advantages derived from incubator presence within the ecosystem must be supported by available resources (services and resources) and access to capital, whilst incubator self-protectionism and bureaucracy can act as a significant barrier to innovative output within ecosystems (Tietz et al. 2015).

Large corporations ($n = 4$), informal network ($n = 3$), talent pool ($n = 2$) and the physical infrastructure ($n = 1$) had the fewest allocations from the article population. The low weighting of articles allocated to these components is likely justified by the fact that these framework components acted as secondary allocations—meaning that these were discussed in the context of more prevalent components identified as maximising innovative capacity within an ecosystem (Euchner 2016; Kantarelis 2009; Usman and Vanhaverbeke 2017; van den Heiligenberg et al. 2017). For example, those articles focusing on 'informal network' highlight its importance in maximising the innovative capacity of an ecosystem, in the background of formal network discussions (van Gils and Rutjes 2017).

Although most articles present one aspect of the framework as being most dominant in maximising the innovative capacity of entrepreneurial ecosystems, it is important to note the context within which these framework components are discussed in. More importantly, it should be noted that a single framework component cannot maximise innovative capacity of an ecosystem without working in conjunction with at least one other aspect of the framework. Although contributions from institutions, the government and capital services hold great value in encouraging and facilitating innovative projects, these would not be sustained without

interconnectivity with the remainder of the framework components and would therefore inhibit the formation of incremental and/or radical entrepreneurial innovations.

6 Conclusion

Universities, capital services and the government seem to have the largest impact on maximising innovative capacity of an entrepreneurial ecosystem, based on the high proportion of articles allocated to the components of the Neck et al. (2004) framework. Although this is a close combination to the triple helix model, analysis of article results reveals more preeminent conditions for innovation maximisation. It was a common theme through the analysis that contextual considerations of each ecosystem are equally as important—just as the habitat conditions are vital to sustain growth within biological ecosystems, maintaining the interconnectedness of ecosystem actors and encouragement of entrepreneurial activity through the culture, incubators and support services is equally as important as institutional presence and capital availability.

Neck et al. (2004) framework proved highly effective as a model used within the review with the selected dataset. It is composed of at least one ecosystem component mentioned within the articles, whilst presenting a wide range of options to generate insightful and meaningful results. However, there is potential for its improvement through the contribution of the dataset research—since many articles identified ecosystem aspects which were not mentioned in the framework. A prominent factor mentioned amongst five of the articles was the role of defining and implementing a proactive ecosystem strategy which firms, institutions and individuals can use when forging the direction of innovations. This way capital, academic and entrepreneurial input will be used more efficiently, with a clear strategy which will create direction and support transparent cooperation. Finally, a strong collaborative ethos between institutions and circles of networks is repeatedly highlighted as encouraging of innovative activity—especially since industry-institutional collaborations will implement knowledge exchange benefitting both parties.

While this research contributes to our knowledge of entrepreneurial ecosystems by clarifying the aspects of these which increase innovative capacity, the most valuable finding is that innovation *maximisation* derives from a holistic perspective of ecosystem components and actors, working towards a common strategy—rather than focusing investment on a select few aspects, the ecosystem should be viewed as a single entity, with investment and policy initiated to integrate and mutually benefit.

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