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Instituto Universitário de Lisboa

Business Research Unit (BRU-IUL)

Uncovering the business opportunity prototype: Cognitive and learning aspects of entrepreneurial opportunity recognition in higher education

A Thesis presented in partial fulfillment of the Requirements for the Degree of Doctor in Human Resources Management and Development

by

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ABSTRACT

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The research project underlying this thesis focuses on three main aspects of entrepreneurship. First, we focus on opportunity recognition as the point of departure for entrepreneurial thinking and entrepreneurial activity. Secondly, we propose that basic perceptive cognitive structures (such as prototypes) are fundamental to recognize opportunities at early stages of development of the entrepreneurial mindset. Third, we focus on cognitive and learning aspects of opportunity recognition with individuals in higher education. To explore these topics, the present thesis is divided in two parts. Part I focuses on the theoretical and empirical development of the topic on business opportunity prototype for opportunity recognition and includes three studies. Study 1 provides a systematic literature review of prototypes in entrepreneurship research. A theoretical model based on this analysis is presented and empirically tested on the remaining studies of the thesis. Study 2 explores the role of the context of business opportunity recognition on the identification of its prototypical features. Study 3 proposes a simplified business opportunity prototype to describe how individuals with no entrepreneurial experience perceive business opportunities from early stages of the entrepreneurial mindset. Part II focuses on the training and learning aspects of cognitive structures regarding opportunity recognition and includes one empirical study. Study 4 focuses on the effect of cognitive training and experiential learning on the development and accuracy of the business opportunity prototype. Moreover, the moderator role of positive affect towards entrepreneurship is tested in the learning process.

This thesis aims to contribute to the enrichment of entrepreneurship as a field of research from a theoretical and conceptual, empirical, and practice perspectives.

Keywords: *entrepreneurial cognition; opportunity recognition; cognitive structures; business opportunity prototype; cognitive training.*

JEL Classification System: L260 Entrepreneurship; M130 New Firms; Startups

RESUMO

RESUMO

O presente trabalho de investigação foca três aspetos principais da investigação em empreendedorismo. Primeiramente, este trabalho foca o reconhecimento de oportunidades como o ponto de partida para o pensamento e atividade empreendedores. Em segundo lugar, propomos que estruturas cognitivas básicas, como os protótipos, são fundamentais para reconhecer oportunidades de negócio numa fase inicial do pensamento empreendedor. Em terceiro lugar, focamos aspetos relacionados com a aprendizagem e desenvolvimento destas estruturas cognitivas em indivíduos no ensino superior. Esta tese está organizada em duas partes. A Parte I destina-se ao desenvolvimento teórico e empírico sobre o protótipo de reconhecimento de oportunidades de negócio e inclui três estudos. O estudo 1 apresenta uma revisão de literatura sistemática sobre protótipos na investigação em empreendedorismo. O estudo 2 analisa o papel do contexto de reconhecimento de oportunidades de negócio na identificação das suas características prototípicas. O estudo 3 propõe um modelo simplificado de protótipo de reconhecimento de oportunidades de negócio para explicar a forma como indivíduos em estados iniciais da experiência empreendedora percecionam oportunidades. A Parte II foca o desenvolvimento e aprendizagem cognitiva com foco no reconhecimento de oportunidades de negócio. Esta parte inclui um estudo empírico (estudo 4) que analisa o efeito do treino cognitivo e aprendizagem por experiências no desenvolvimento e utilização eficaz do protótipo de reconhecimento de oportunidades de negócio. O papel moderador dos afetos positivos relativamente a atividades empreendedoras é explorado neste processo de aprendizagem.

Esta tese pretende contribuir para o enriquecimento teórico, conceptual e empírico da investigação em empreendedorismo, fornecendo igualmente importantes contribuições para a prática da atividade empreendedora.

Palavras-chave: *cognição empreendedora; reconhecimento de oportunidades; estruturas cognitivas; protótipo de oportunidade de negócio; treino cognitivo.*

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"Nobody said it was easy
Oh, it's such a shame for us to part
Nobody said it was easy
No one ever said it would be so hard
I'm going back to the start"

Coldplay – The Scientist

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(...) "most important, have the courage to follow your heart and intuition. They somehow already know what you truly want to become. Everything else is secondary."

Steve Jobs, 2005, Stanford Commencement Speech

GENERAL INTRODUCTION

GENERAL INTRODUCTION

Entrepreneurship is an increasingly growing field of research. Over the last decades, research about entrepreneurship has evolved in such a way that the amount, but also quality, of the knowledge produced in this research field is remarkable (e.g., Aldrich, 2012; Landström, Harirchi, & Åström, 2012). Entrepreneurship has the particularity of being a multidisciplinary field of research and a relatively young, legitimate, independent academic discipline (Meyer, Libaers, Thijs, Grant, Glänsel & Debackere, 2013). Even though, entrepreneurship is a well-known phenomenon which, especially in the recent years, has been trendy. The actors in the entrepreneurship research field, similarly to other research fields, have the responsibility of producing knowledge, interesting, relevant and pertinent conceptual and empirical research, as well as connect it to practice. Specifically, entrepreneurship has an important impact on the development of the economy both at regional and national levels. Moreover, it shapes the way the job market is organized and promotes different and alternative ways of employment. Entrepreneurship is also relevant for education purposes, as it provides a different way of perceiving the world, where individuals have an active role on the development of their careers, for example. The fact that entrepreneurship is an eminent knowledge domain and that it has such a powerful impact in society puts a higher emphasis on the responsibility of the field to inform and being informed by practice. Generally, this thesis represents an effort to contribute to the enrichment of entrepreneurship as a field of research from a theoretical and conceptual, empirical, and practice perspectives.

It is currently accepted that entrepreneurship is a process where individuals and opportunities are brought together (Shane & Venkataraman, 2000). This relationship between individuals (entrepreneurs) and the environment surrounding them is described in the literature as the individual-opportunity nexus (Shane, 2003) which is crucial to comprehend the phenomenon of entrepreneurship. Several scholars have approached entrepreneurship from an individual perspective and others have focused on the opportunity side of the nexus. From the individual perspective, since the beginning of the research in this field, questions have been asked such as "who is the entrepreneur?", based on which the traits of the entrepreneur have been described (e.g., Rauch & Frese, 2007). Other questions focusing on the individuals and their behavior such as "what do

entrepreneurs do?" have also been asked (Gartner, 1988). On the opportunity side of the nexus questions regarding how opportunities come into existence have been asked as well. Specifically, there is some debate on whether opportunities exist objectively or on whether they are created by the individual (e.g., Baker & Nelson, 2005; Baron, 2006; Baum, Frese, Baron, & Katz, 2007; Chiles, Tuggle, McMullen, Bierman, & Greening, 2009). Entrepreneurial cognition, i.e., the use of concepts and theories on the domain of cognitive psychology to explain entrepreneurial phenomena (Mitchell et al., 2002, 2004, 2007), has been focusing on how these two key variables, individuals and opportunities, come together to trigger the process of entrepreneurship. Entrepreneurial cognition is defined as "the knowledge structures that people use to make assessments, judgments or decisions involving opportunity evaluation and venture creation and growth" (Mitchell et al., 2007, p. 97) and it puts emphasis on the question "how do entrepreneurs think and act?" (Mitchell et al., 2007; Mitchell et al., 2004) and on the understanding of the entrepreneurial mindset (Krueger, 2003, 2007).

The cognitive perspective has contributed to a great extent to uncover how entrepreneurs recognize opportunities (e.g., Baron & Ensley, 2006; Baron & Ward, 2004; Baron, 2004, 2006; Eckhardt & Shane, 2003; Grégoire, Barr, & Shepherd, 2010; Grégoire, Corbett, & McMullen, 2011). Three main core ideas about the individual-opportunity nexus can be drawn from the literature on entrepreneurial cognition. First, opportunities consist of information and changes in the environment (e.g., Baron & Ensley, 2006; Grégoire et al., 2010). Second, the individual has an active role in recognizing opportunities around him or her (e.g., Anderson, 2003). Individuals recognize these seemingly unrelated events as a pattern of opportunities by employing their cognitive structures which, in turn, are developed throughout their unique life experiences and knowledge acquisition (e.g., Baron, 2004; Gielnik, Krämer, Kappel, & Frese, 2014; Gielnik, Zacher, & Frese, 2012). Third, the ability to recognize opportunities is not inherited, but it can rather be trained by developing one's entrepreneurial cognition (e.g., Baron, 2004; Corbett, 2005, 2007; DeTienne & Chandler, 2004; Palich & Bagby, 1995). In this sense, deeper knowledge on how opportunities are recognized by individuals is of high importance. For example, to understand how the cognitive structures are developed and used since early stages of the entrepreneurial activity is a crucial prospect of research. From a practice perspective, more insights on how opportunity recognition can be learned

and under which circumstances, represents a step forward in the development of the field. The present work represents an effort to address some of these questions in entrepreneurship research.

This thesis aims to approach the phenomenon of opportunity recognition from a cognitive perspective. Specifically, the focus of the present work is on understanding the development and use of the cognitive structures responsible for opportunity recognition from the beginning of the entrepreneurial process. To do so, the research project of this thesis comprises conceptual and empirical research studies concerning the business opportunity prototype, a cognitive structure responsible for the analysis of new information in the environment and its eventual categorization as a business opportunity (Baron & Ensley, 2006). This thesis aims to contribute not only to the development of entrepreneurship theory but it draws also important insights for the practice of entrepreneurial activities, especially regarding entrepreneurial education. To accomplish these goals, this thesis is organized in two parts and five chapters.

Part I, entitled "The Business Opportunity Prototype: Theoretical, Conceptual and Empirical Considerations", focuses on placing this thesis within the entrepreneurship research field and on introducing the business opportunity prototype as a fundamental cognitive structure to opportunity recognition. Part II entitled "Entrepreneurial Education and Cognitive Training: Theoretical Overview and Empirical Testing" explores the topic of how cognitive structures, such as the business opportunity prototype, can be learned by individuals, as well as the moderator role of internal affective variables in this learning process. While Part I focuses on the theoretical enrichment of the specific topic of the business opportunity prototype for opportunity recognition, Part II focuses on the development of this cognitive structure providing insights to the practice, especially for the entrepreneurial actors concerned in raising entrepreneurial awareness and increasing success in opportunity recognition (as educators, trainers, high education institutions among others).

Each part contains several chapters focused on different research questions. Part I contains three chapters. Chapter 1, entitled "Overview on the history of entrepreneurship research - From the Classics to the Business Opportunity Prototype" is a theoretical chapter focusing on the literature about the business opportunity prototype in entrepreneurship research. This chapter begins with an overview of the history of

entrepreneurship research, narrowing it down to the specific topic of opportunity recognition using the business opportunity prototype. To do so, a systematic literature review on this topic is presented (Study 1). The chapter concludes with a theoretical model to explore the factors influencing the development, use, structure and accuracy of this cognitive framework.

Chapter 2, entitled "The role of different opportunities in the activation and use of the business opportunity prototype" presents an empirical study (Study 2), which explores the effect of the nature of business opportunities (i.e., the context of recognition) on the use of the business opportunity prototype. Although the literature has examined the reasons why some individuals, but not others, identify business opportunities, little is known about the influence of different opportunities on the development and use of cognitive structures. Additionally, little is known about the activation and use of relevant cognitive structures by groups of potential entrepreneurs, i.e., with little to inexistent entrepreneurial experience. To address these gaps the study on Chapter 2 takes university students as a proxy for potential entrepreneurs and uses an experimental approach to provide a deeper understanding of the activation and use of cognitive structures with different stimuli during opportunity recognition.

Chapter 3 is entitled "Business opportunity recognition among Portuguese and German students: A simplified prototype" and presents another empirical study (Study 3). Study 3 explores the underlying structure of the business opportunity prototype of university students, as potential entrepreneurs. This study explores the assumption that the business opportunity prototype of university students is a simplified structure concerning two of the five dimensions indicated in the literature as describing the business opportunity prototype of experienced entrepreneurs. Additionally, this study tests the proposed structure between Portuguese and German students and among students who have prior experience in recognizing business opportunities and those who do not. This study provides important insights on the description of the prototypical dimensions of business opportunities more salient for university students.

Several studies point out that universities are privileged settings for entrepreneurial education (e.g., Anderson & Jack, 2008; Bae, Qian, Miao, & Fiet, 2014) and that higher education is a predictor of entrepreneurial activity and success (e.g., Bae et al., 2014; Block, Hoogerheide, & Thurik, 2011; Rauch & Rijsdijk, 2013; Souitaris,

Zerbinati, & Al-Laham, 2007). The empirical studies of Part I (Chapters 2 and 3) provide important insights on how students, who might be potential entrepreneurs, perceive business opportunities from a cognitive perspective. These theoretical and empirical contributions can be taken into consideration for training programs designs, for example. Following up on this reasoning, the second part of this thesis (Part II) focuses on the topic of entrepreneurial education, specifically concerning cognitive training towards opportunity recognition.

Part II consists of two chapters. Chapter 4, entitled "Entrepreneurship education and the development of entrepreneurial cognition – An overview" provides an outline of the literature on the topic of entrepreneurship education exploring three main topics: firstly, a summary of the different perspectives emergent in the literature are presented which naturally connect to the evolution of entrepreneurship as a research field. Most studies focus on what and how entrepreneurship should be taught, but there is little consensus about the methodologies or even conceptual foundation for entrepreneurship education. This situation raises challenges for the practice of entrepreneurial education. Thus, as a second point, this chapter provides an overview of the challenges for entrepreneurship education. Third, the chapter focuses on the potential of entrepreneurial cognitive training as a way of answering the question "what should entrepreneurship education teach?" combined with techniques of experiential learning to answer the question of "how should entrepreneurship be taught?". Following up on this theoretical considerations, Chapter 5 entitled "Developing the business opportunity prototype – A training perspective" empirically tests the effect of Cognitive Entrepreneurial Training on Opportunity Recognition on the development of cognitive structures responsible for opportunity recognition (i.e., the business opportunity prototype) (Study 4). Additionally, considering the literature demonstrating that positive affect can have a positive impact on entrepreneurial cognition development, on this chapter the moderator role of individuals' positive affects towards entrepreneurship, in this case entrepreneurial passion, on the process of learning and developing entrepreneurial cognitive skills is also explored. The study presented in this chapter used an experimental design with a pre and a post-test with an experimental and a control groups, which represents an important methodological approach in the field of entrepreneurship.

Table 1 displays synopsis of this thesis, presenting the main research questions and key findings.

Table 1. *Synopsis of thesis' parts, chapters and research studies*

		Research goal/Research question	Theoretical framework	Study type	Methodologies /design	Key findings
PART I – THE BUSINESS OPPORTUNITY PROTOTYPE: THEORETICAL, CONCEPTUAL AND EMPIRICAL CONSIDERATIONS	Chapter 1 - Overview on the history of entrepreneurship research - From the Classics to the Business Opportunity Prototype Theoretical overview on the history of entrepreneurship research and definition of key concepts for this thesis.					
	Study 1 - Connecting the Literature Dots – A systematic literature review of the business opportunity prototype	Systematization of the literature of prototypes in entrepreneurship research.	Prototype theory and entrepreneurial opportunity recognition	Conceptual	• Systematic Literature Review	Context, entrepreneurial thinking and cognitive training as predictors of the business opportunity prototype development, structure and accuracy. Positive affect towards entrepreneurship as moderator in this process.
	Chapter 2 - The role of different opportunities in the activation and use of the business opportunity prototype (Study 2)	What is the effect of different business opportunities on the use of the prototypical dimensions of the business opportunity prototype?	Pattern recognition; business opportunity recognition; Early phases of the entrepreneurial process.	Empirical	• Qualitative and Quantitative • Quasi-Experimental design	The context in which an opportunity is recognized affects the identification of its prototypical features, specifically the ones regarding customers and risk.
	Chapter 3 - Business opportunity recognition among Portuguese and German students: A simplified prototype (Study 3)	What is the underlying structure of the business opportunity prototype of university students?	Business opportunity recognition; Prototype theory; High education as a predictor of entrepreneurial activity and success.	Empirical	• Quantitative • Quasi-Experimental design	The business opportunity prototype of university students is best described by a simplified model consisting of two dimensions: solves customers' problems and generates positive net cash flow. This structure is invariant across countries and across different level of prior experience in entrepreneurial thinking.

PART II – ENTREPRENEURIAL EDUCATION AND COGNITIVE TRAINING: THEORETICAL OVERVIEW AND EMPIRICAL TESTING	Chapter 4 - Entrepreneurship Education and the Development of Entrepreneurial Cognition – An Overview Overview of the literature on the topic of entrepreneurship education (perspectives, challenges and reflections on what and how entrepreneurship may be taught).					
	Chapter 5 - Developing the Business Opportunity Prototype – A Training Perspective (Study 4)	Does Cognitive Entrepreneurial Training on Opportunity Recognition have an effect on the development of the business opportunity prototype? Is this relationship moderated by entrepreneurial passion?	Business opportunity recognition; Entrepreneurial education; Experiential learning; Entrepreneurial passion.	Empirical	• Quantitative • Experimental design (pre and post-test with a control group)	Cognitive training affects the accurate use of the business opportunity prototype upon opportunity recognition. This learning process is moderated by the intense positive feelings caused by engaging in entrepreneurial activities.

Notes about current or previous versions of the research studies included in this thesis (see complete information on chapters' pages):

[1]Study 1 - Costa, S., Caetano, A., & Santos, S. (2014). Connecting the literature dots: A review of the business opportunity prototype. Article presented at the 2014 European Summer University on Entrepreneurship, Lund, Sweden. – Awarded Best Paper.

[2]Study 2 – Costa, S., Ehrenhard, M., Caetano, A., Santos, S. (submitted). The role of different opportunities in the activation and use of the business opportunity prototype. Article presented at the 2014 High Tech Small Firms conference, Enschede, The Netherlands.

[3]Study 3 – Costa, S., Wach, D., Santos, S., & Caetano, A. (submitted). Business opportunity recognition among Portuguese and German students: A simplified prototype. Article presented at the 2014 Academy of Management Meeting, Entrepreneurship Division Session, Philadelphia, Pennsylvania, USA.

[4]Study 4 – Costa, S. Wach, D., Caetano, A., & Santos, S. (submitted). The Effect of Cognitive Training and Entrepreneurial Passion on the Business Opportunity Prototype. Previous version entitled "I think, therefore I am" an Entrepreneur – The role of entrepreneurial cognitive competencies in opportunity recognition: A training approach was presented at the symposium In Search of the "Entrepreneurial Mindset": Insights from Neuroscience at the 2014 Academy of Management Meeting, Philadelphia, Pennsylvania, USA.

The overall research project of this thesis has been awarded Best PhD Research Proposal at the Entrepreneurial Universities Conference 2012, Münster University, Germany.

In general, this thesis aims to contribute to the further explanation and understanding of how individuals and opportunities come together and trigger the beginning of the entrepreneurial process. Specifically, this thesis focuses on the business opportunity prototype as a crucial cognitive framework for opportunity recognition, entrepreneurial awareness and the development of the entrepreneurial mindset. Aware of the necessity of keeping research and practice hand in hand, this thesis intends to contribute theoretically to the development of the entrepreneurship field but also to the development of applied entrepreneurship in the specific case of higher education.

PART I – THE BUSINESS OPPORTUNITY PROTOTYPE: THEORETICAL, CONCEPTUAL AND EMPIRICAL CONSIDERATIONS

INTRODUCTION TO PART I

Part I aims to frame the research developed in this thesis within the entrepreneurship research field by defining key concepts according to their theoretical roots and by conducting empirical research related to these concepts. To do so, Part I includes three chapters.

Chapter 1 provides a brief outline of the entrepreneurship research field from an historical perspective. We do not attempt to comprehensively cover all aspects of the history of entrepreneurship research. We rather provide an overview of entrepreneurship as a research field in order to allow the reader to place the research developed in this thesis within the field. Within this chapter we reflect upon the central questions that have driven entrepreneurship research. Afterwards we narrow down to the specific field of entrepreneurial cognition. Entrepreneurial cognition focuses on the description of the entrepreneurial mindset (Haynie, Shepherd, Mosakowski, & Earley, 2010; Krueger, 2007) or, in other words, on answering the question "how do entrepreneurs think?" (Mitchell et al., 2007). Since the entrepreneurial process begins with opportunity recognition (e.g., Baron & Shane, 2008), entrepreneurial cognition has been focusing mainly on this stage to understand how entrepreneurs think and perceive the world in order to trigger the entrepreneurial process.

Entrepreneurial cognition scholars consider that the individual has an active role in transforming their experiences and their perception of the world into opportunities. To do so, cognitive frameworks are essential, such as prototypes. Although there are some relevant studies combining prototype theory with entrepreneurial opportunity recognition (e.g., Baron and Ensley, 2006) there is no overview of both theoretical and empirical studies on this perspective applied to entrepreneurship. We consider this to be fundamental as a pre-requisite to develop empirical testing of such theory in entrepreneurial research. Therefore, Chapter 1 includes a systematic literature review (Study 1) of the prototype theory applied to entrepreneurship research and its key findings. The chapter concludes with a theoretical model proposing to explore the factors influencing the development, use, structure and accuracy of the business opportunity prototype. These relations are tested on the following chapters of the present thesis. A

note about the appropriate research designs and samples to be used is also presented on Chapter 1.

Chapter 2 presents an empirical study (Study 2) focusing on testing how the nature or context of different opportunities affects the use of the dimensions of the business opportunity prototype at a very early stage of its use. The literature is still scarce in explaining the activation and use of relevant cognitive structures by groups of potential entrepreneurs, i.e., with little to inexistent entrepreneurial experience. On this study university students are considered as a proxy for potential entrepreneurs and an experimental approach is used to provide a deeper understanding of the activation and use of cognitive structures with different stimuli upon opportunity recognition.

To further explore the factors that can determine the development and structure of the business opportunity prototype, Chapter 3 presents another empirical study (Study 3) exploring the underlying structure of the business opportunity prototype of university students, as potential entrepreneurs. This study explores the assumption that the business opportunity prototype of university students is a simplified structure concerning two dimensions. Additionally, this study tests the proposed structure between Portuguese and German students and among students who have experience in recognizing business opportunities and those who do not. This study provides important insights on the description of the prototypical dimensions of business opportunities more salient for university students.

CHAPTER 1 - OVERVIEW ON THE HISTORY OF ENTREPRENEURSHIP RESEARCH - FROM THE CLASSICS TO THE BUSINESS OPPORTUNITY PROTOTYPE

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Summary

Cognitive theory has become of great importance in entrepreneurship literature, especially to answer such questions as "why are some people entrepreneurs and other are not?" and "how do entrepreneurs identify business opportunities?" Although we acknowledge the existence of multiple cognitive perspectives on opportunity identification, we consider that the business opportunity pattern recognition, using mental prototypes, is a relevant perspective. Firstly, it positions entrepreneurial activity in the logic of the individual-opportunity nexus, where both environmental conditions and individual characteristics are recognized. Secondly, pattern recognition, contrary to other perspectives, argues that business opportunity recognition is a cognitive process that can be developed and learned by individuals.

In this chapter we provide an overview of entrepreneurship research, which we consider fundamental to place this thesis' research. Secondly, we narrow our analysis to the field of entrepreneurial cognition, to then focus on an overview about the business opportunity prototype: a cognitive structure crucial to perform opportunity recognition. As a third step we acknowledge the need of exploring this approach from its original roots (i.e., cognitive psychology). Hence, we provide the results of a systematic literature review on how this theory has been applied to entrepreneurship research. The goal of this literature review is twofold: (1) to identify which articles discuss the prototype perspective in entrepreneurship research and (2) draw a theoretical model addressing research questions to be explored. We finish by reflecting on the methodological and sample demands to test such assumptions.

A part of this chapter was presented at the 2014 European Summer University on Entrepreneurship organized by the Sten K. Johnson Centre for Entrepreneurship at the Lund University School of Economics and Management, Lund, Sweden. At this conference, this study was awarded with the Best Paper Award. The present version includes relevant feedback provided by researchers in entrepreneurship.

Reference: Costa, S., Caetano, A., & Santos, S. (2014). Connecting the literature dots: A review of the business opportunity prototype. Article presented at the 2014 European Summer University on Entrepreneurship, Lund, Sweden.

1.1 Entrepreneurial Cognition as a Research Topic – Context and Overview

1.1.1 A Historical Overview of Entrepreneurship Research

Entrepreneurship has since long been recognized as a multidisciplinary field of research. The nature of entrepreneurship as a field of research derives from the circumstances of its development, which can only be fully understood in an historical and cultural context. As noted by Fayolle, Kyrö and Ulijn (2005), entrepreneurship research resulted from two main transition periods. The first was described as the modern transition. This phase occurred during the industrialization period (at the end of 18th century and first half of the 20th century). During this phase, the entrepreneurship debate took place mainly in Europe and was dominated by a western European cultural influence, characterized by industrial and liberal orientations. Entrepreneurship was mainly studied from an economic perspective and was seen as a mean to create new welfare and work by free individuals. The cultural character of this phase in entrepreneurship research caused that its development was gradual from country to country (Fayolle et al., 2005). It is, however, in this period that basic notions of entrepreneurship emerged and that still have an impact on today's research. The work of Schumpeter is crucial for the development of entrepreneurship as a research field. Schumpeter (1934) described the entrepreneur as an innovator and as someone who uses resources in new and innovative ways, causing a disequilibrium in the market. Also in this first era of entrepreneurship research, Knight (1942) introduced the notion of uncertainty and risk to describe the context of entrepreneurial action (Caetano, Santos, & Costa, 2012; Landström & Lohrke, 2010).

After this first period of modern transition, the world faced a decline in growth in the 1970's. The notions of unpredictability and complexity in the economic systems was a characteristic of this period. Also the notion that small businesses were better able to create new jobs rather than large companies has had profound impacts on entrepreneurship as a research field. For entrepreneurship research this represented two main changes. First, the impact of notions mainly developed within the European culture lost strength and the debate on entrepreneurship research found new ground in the United Stated of America. Second, the unit of analysis of entrepreneurship suffered a shift from large companies to small business and the individual. Entrepreneurship research was now approached from other scientific perspectives, like Psychology and Sociology, aiming to identify the personal traits of entrepreneurs, their background, but also to understand the

different functions of small businesses (Fayolle et al., 2005; Landström & Lohrke, 2010; Landström, 2005). A management perspective has its debut in entrepreneurship research also in this phase, and the shift in the research topics is clearly observed by the notions of Kirzner on entrepreneurship, which contrast to the ones introduced before by Schumpeter. Kirzner (1973, 1979) defended that entrepreneurs were able to identify opportunities based on gaps between supply and demand. Although later the author has acknowledged that innovation can also be involved in this process, at first innovation was put out of the explanation of entrepreneurship phenomenon by the author. It is also in this period that Psychology gained a strong role in the explanation of entrepreneurship and entrepreneurs as individuals. In this period, McClelland (1961) introduced an approach based on competencies to understand entrepreneurship, which contributed to the advancement of the field. Specifically, McClelland emphasized the importance of motivational aspects in entrepreneurship. However, it was trait theory that was mostly used from a Psychology perspective, representing an attempt to describe the individual entrepreneur as being different from the non-entrepreneur (e.g., Rauch & Frese, 2007). The main question of research in this sense was "who is the entrepreneur?" The debate on entrepreneurship research on whether personality traits can actually predict entrepreneurial behavior and entrepreneurial success is still an ongoing one. Although some scholars still defend that personality not only can predict specific entrepreneurial behavior, if the traits chosen for analysis are theoretically related to enterprising activities and are considered within context (e.g., Rauch & Frese, 2000); other scholars considered that applying personality traits theory to explain entrepreneurial activity was of no use, since no variability could be found (e.g., Gartner, 1988). Gartner (1988) was the main opponent of traits theory by proposing that asking "Who is the entrepreneur?" is the wrong question. The author introduced two main discussion topics in the field of entrepreneurship. The first was the notion of heterogeneity in the entrepreneurship phenomenon. Gartner considered that entrepreneurship occurs in many forms. Demonstrating that the literature has no consensual definition of entrepreneur, the samples considered in empirical studies have probably more internal variability among them than between the samples and non-entrepreneurs. Therefore, his second suggestion was that research would stop asking who the entrepreneur is, and would focus on what the entrepreneur does. This was the beginning of the behavioral approach in entrepreneurship research: the behavior to be

observed was the creation of ventures and that should be the level of analysis in the field (Gartner, 1988).

A third phase of entrepreneurship - the post-modern era - as a research field was observed between the 1970's and the end of the 20th century in a postmodern transition (Fayolle et al., 2005). This period was characterized by the re-emergence of a European view, although still with a strong influence of the American perspective. Besides the fields of research that had emerged in the entrepreneurial scene before (Psychology, Sociology and Economics) at this point a managerial and marketing perspective started gaining strength. In this sense, the goal of entrepreneurship research shifted to organizational processes and increasing efficiency in organizations and growth stimulation. Entrepreneurship started to be conceptualized as a process where different stages occur and where the contexts and environment dynamics play a role in new venture creation. In this respect, the work of Peter Drucker was of utmost importance. Drucker (1985) conceptualized entrepreneurship as systemic innovation and considered that entrepreneurship is a competence which can be learned. These notions were essential to the evolution of the field as we know it today.

It is not this section's aim to fully describe the History of Entrepreneurship research. Those notions and fundamental knowledge have been broadly described in other works by authors like Aldrich (2012), Fayolle and colleagues (2005), Landström and Benner (2010), Landström and Lohrke (2010), Landström (2005) and Meyer and colleagues (2014), to mention a few. We provide, however, on Figure 1.1 an overview of the historical approach of entrepreneurship research and the main contributors to the field as we know it nowadays.

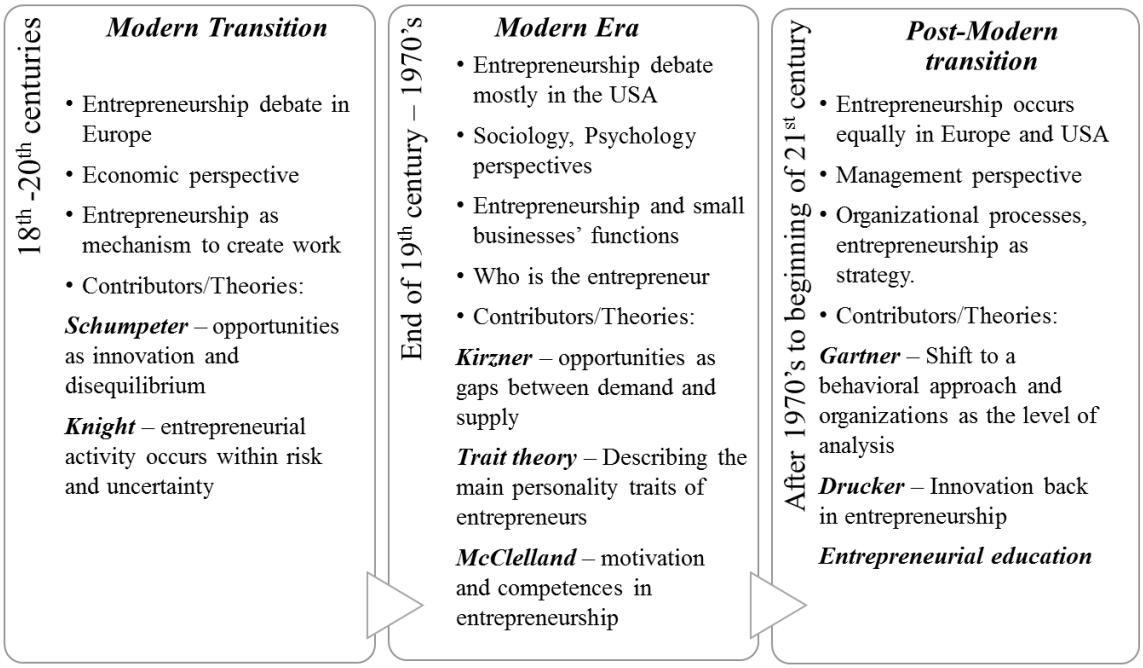

Figure 1.1 *An overview of the history of entrepreneurship as a research field (adapted from Caetano et al., 2012; Fayolle et al., 2005).*

Currently, the most accepted definition of entrepreneurship is the one proposed by Shane and Venkataraman (2000) which is also central in this thesis: "entrepreneurship is the process of discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate and exploit them" (Shane &Venkataraman, 2000, p. 218). From this definition three main assumptions are taken into consideration in most of the conceptual and empirical work currently being developed: first, entrepreneurship is best understood in a process perspective; second, opportunities are central to understand the entrepreneurship phenomenon; and third, the individual plays a key role in entrepreneurial activity. The notion that entrepreneurship occurs as a process rather than a single moment in time is currently a central assumption in the field. This, in turn, provides many avenues for research. Several authors have described the entrepreneurial process, and in general six main stages are considered: 1) business opportunity recognition; 2) decision to launch a venture; 3) gathering resources; 4) business launch; 5) business management and 6) exit and harvesting rewards (Baron & Shane, 2008). These stages are not independent from each other and the process does not generally occur in a linear way between these stages. The fact that each stage corresponds to specific

activities has risen different topics of research since opportunity recognition, entrepreneurial decision making to entrepreneurship as a management strategy, and entrepreneurial failure. It is also known that different types of variables affect the entrepreneurial process, such as individual level variables (mainly at recognition and decision stages), group level variables (for example, team processes, organizational factors among others) and societal level (for example, large scale variables, such as governmental influences, economy and markets).

1.1.2 Cognition in Entrepreneurship Research – Entrepreneurial Cognition

As noted above, psychology has been a perspective used to understand entrepreneurship. Rauch and Frese (2000) provided a pertinent overview of the topics borrowed from psychology to explain entrepreneurial activity and success. These include personality traits, in which the most frequently studied are need for achievement, risk-taking and internal locus of control. Human capital is also pointed out as an important variable to understand entrepreneurial success. Several scholars have been demonstrating the relationship between human capital variables (such as education and personal experience) with the outcomes of entrepreneurship, arguing that higher levels of education and instruction can predict involvement in entrepreneurial activities and success (e.g., Rauch & Frese, 2000; Unger, Rauch, Frese, & Rosenbusch, 2011). Other variables from the psychology field include goal setting, strategic orientation, competence-based approach, individual-environment interaction, leadership theories, and organizational lifecycles, among others.

One of the topics from psychology that has contributed in a great extant to explain entrepreneurial activity is cognition (e.g., Grégoire et al., 2011; Krueger, 2003; Meyer et al., 2014; Mitchell et al., 2004; Rauch & Frese, 2000). Gartner (1988) introduced a shift in the entrepreneurship research by changing the research question from "who is the entrepreneur?" to "what do entrepreneurs do?" Being ascertained that entrepreneurial activity involves different ways of acting and thinking, the cognitive approach asks "How do entrepreneurs think, reason, and behave such that they create value and wealth through the identification and implementation of market opportunities?" (Mitchell et al., 2007, p. 5), which in most cases is simplified to "how do entrepreneurs think?"

According to cognitive theory, everything individuals do is dependent on mental processes and information is categorized in mental structures that individuals develop during their unique life experiences (Gielnik et al., 2014; Palich & Bagby, 1995). Mitchell and colleagues (2002) defined entrepreneurial cognition as "the knowledge structures that people use to make assessments, judgments or decisions involving opportunity evaluation and venture creation and growth" (p. 97). Mitchell considers that entrepreneurial cognition puts emphasis on the individual throughout the entrepreneurial process. In fact, the definition presented above involves three main elements: knowledge structures, decision making processes and opportunity identification and evaluation. It should also be stresses that these elements are always put into context and should be understood according to the characteristics of a specific environment. In this sense, entrepreneurial cognition brings the entrepreneurship field a step further from Gartner's question. Entrepreneurial cognition, aims to understand how the individual entrepreneur acts and thinks in a given situation and context. This means that cognition and recognition processes are not formal operations, but rather situated activities where the individual has the main role in this activity as an acting being (Anderson, 2003). This has been shown by a number of approaches used in entrepreneurial cognition to explain entrepreneurial behavior and thinking. Table 1.1 summarizes these approaches.

Table 1.1 *Overview of topics most frequently debated in the literature of entrepreneurial cognition*

Concept	Assumptions	Contribution to Entrepreneurship Field of Research	Main authors
Heuristics	Simplifying strategies that individuals use to make decisions. The literature states that entrepreneurs employ these shortcuts often to make decisions. They are subjective, depend on informal processes and experience and are influenced by internal beliefs.	Entrepreneurial decision making	Baron (1998); Busenitz & Barney (1997); Busenitz (1999); Tversky & Kahneman (1973, 1974)
Alertness	The idea of alertness was primarily introduced by Kirzner, who considered that individuals are alert to identify gaps in the market. Entrepreneurial alertness is defined as set of perceptual and cognitive skills responsible for processing information resulting in the opportunity identification process.	Opportunity identification	Gaglio & Katz (2001); Kirzner (1979, 1997)
Pattern Recognition	Individuals are able to "connect the dots" between seemingly unrelated events, such as changes in technology, markets, politics and society. By combining these, individuals are able to recognize opportunities by engaging in a categorization process, which allows them to match this information with their cognitive representations of opportunities (prototypes).	Opportunity recognition	Baron (1998, 2004, 2006)
Entrepreneurial Expertise	Entrepreneurs develop unique knowledge structures and process information in a different way from non-entrepreneurs. They possess specific cognitive structures and schemas. Entrepreneurs develop an expert's	Description of the entrepreneurial mindset	Krueger (2007); Smith, Mitchell, & Mitchell (2009)

	entrepreneurial mindset and this depends on the specific experiences that they live.		
Effectuation	This perspective acknowledges that entrepreneurs make decisions in an environment of uncertainty, as pointed out by Knight. The effectuation approach assumes that thinking and acting happen simultaneously, contrasting to causation based approaches.	Entrepreneurial decision making	Sarasvathy (2008)
Learning	The idea that entrepreneurship is a competence which can be learned was first introduced by Drucker. Other scholars argued that if the entrepreneurial mindset is described and if the stimuli that ignite entrepreneurial alertness and recognition processes are described, other individuals can be oriented to perceive the same aspects. This is best accomplished, according to the literature, by the promotion of contacts with examples and of relevant experiences as in, for example, experiential learning.	Entrepreneurial learning	Baron (2004); Corbett (2005); Kolb (1981); Kuratko (2005)
Knowledge and mental structures	Knowledge and experiences are key to the development of mental structures. These, by their turn, provide a framework to interpret and make sense of new information. Several scholars have demonstrated that prior knowledge leads to better defined cognitive frameworks, such as prototypes, which allows entrepreneurs to better and more effectively recognize opportunities.	Opportunity recognition	Baron & Ensley (2006); Shane (2000)

Note: Summary based on Frese and Gielnik (2014), Grégoire and colleagues (2011), Krueger (2003) and Meyer and colleagues (2014).

To do justice to the field of entrepreneurial cognition we must say that Table 1.1 provides a very brief overview of the topics mainly discussed in the literature of this research field. Nevertheless, this overview highlights three main points. First, it is

notorious that entrepreneurial cognition represents an effort to deeply understand how entrepreneurs think and act. More than differentiating the entrepreneur from the non-entrepreneurs, there is a concern in entrepreneurial cognition research to understand the reasoning processes underlying individuals thinking and acting in entrepreneurial contexts. Second, and worth of note is that entrepreneurial cognition borrows its assumptions from classics of entrepreneurship research, such as Knight, Schumpeter and Kirzner, in combination with principles from cognitive psychology. In fact, as pointed out by Mitchell, Busenitz, Lant, McDougall, More and Smith (2004), the conceptual domain of entrepreneurial cognition as a research field, lies in the overlap that exists between the research fields of cognitive psychology and entrepreneurship. In this sense, it is fundamental that every time entrepreneurial cognition approaches a theme borrowed from the cognitive psychology research field, the researchers are accordingly informed about those perspectives, rather than using them at a very superficial level. Finally, the third aspect deriving from the analysis on entrepreneurial cognition research overview, is that the field approaches the entrepreneurial phenomenon mainly from the individual point of view, as a way to understand why and how some individuals engage in entrepreneurial activities and others do not. To do so, entrepreneurial cognition focuses mainly on three entrepreneurial phases: opportunity recognition, decision making and strategy orientation. The fact that many studies in entrepreneurial cognition focus on opportunity recognition is worth of further attention.

1.1.3 Entrepreneurial Cognition and Opportunity Recognition

Shane (2012) stated that "…the field appears to have moved toward consensus around the core idea that entrepreneurship is a process that depends on both opportunities and individuals" (p.18). As Venkataraman (1997) suggested, the central issue in entrepreneurship is understanding how opportunities bring about future goods and services, and how opportunities are discovered, created and exploited, by whom, and with what kind of consequences. Besides the individual entrepreneur, opportunities are essential for the whole process to unfold. The intersection between the elements of the environment that can be identified as an opportunity and the individual who recognizes the opportunity is described in the literature as the individual – opportunity nexus (e.g. Shane & Venkataraman, 2000; Shane, 2003; Shane, 2012). In addition, business

opportunity recognition is the first stage of the entrepreneurial process and occurs at an individual, subjective level (Baron & Shane, 2008; Ramos-Rodrígues et al., 2011), attaching an increased interest in understanding how business opportunities are identified.

Opportunity identification has been receiving much attention in entrepreneurship research because it explains how entrepreneurs start their new ventures (e.g., DeTienne & Chandler, 2004; Forbes, 1999; Zahra, Korri, & Yu, 2005). Several perspectives on entrepreneurship literature have been offered to explain opportunity identification. On the one hand, some scholars adopt a constructivist approach, such as the case of entrepreneurial bricolage (e.g., Baker & Nelson, 2005) or effectuation theories (e.g., Sarasvathy, Kumar, York, & Bhagavatula, 2013; Sarasvathy, 2001). On the other hand, other scholars stress the importance of cognitive structures, the role of the individual but also of the context of opportunity recognition (e.g., DeTienne & Chandler, 2004; Rae, 2003). As for the existence of opportunities, there is a stream of literature assuming that opportunities can be created by individuals using their imagination and inductive thinking, and by creating opportunities in their minds (e.g., Baker & Nelson, 2005; Chiles et al., 2009; Cornelissen & Clarke, 2010; Frederiks, Ehrenhard & Groen, 2014); whilst others stress that opportunities are objective and that their elements pre-exist before they are identified (e.g., Baron, 2006; Baum, Frese, Baron, & Katz, 2007; Shane &Venkataraman, 2000).

The definitions of business opportunities are broad and diverse, and in literature there have been several attempts to describe typologies of opportunities (e.g., Eckhardt & Shane, 2003). In order to address the opportunity side of the nexus, individual-opportunity research has focused, over the past decades, on the definition, processes and determinant factors of business opportunities (Baron, 2004; Grégoire & Shepherd, 2012; Hansen, Shrader, & Monllor, 2011; Shane, 2003; Short, Ketchen, Shook, & Ireland, 2009). In entrepreneurship literature, the conceptual approaches to opportunity have been theoretically rich and included a multitude of theories, with coherence theory (e.g., Shepherd, McMullen, & Jennings, 2007), creation theory and discovery theory (e.g., Alvarez & Barney, 2007), organizational learning (e.g., Dutta & Crossan, 2005), research on affect (e.g., Baron, 2008), social cognitive theory (e.g., De Carolis & Saparito, 2006) and structural alignment (e.g., Grégoire et al., 2010) among them. The literature also shows that entrepreneurial opportunities can be expressed in different forms: the creation

of new ventures (e.g., Bhave, 1994; Gartner, 1985), self-employment (e.g., Patzelt & Shepherd, 2011), job creation (e.g., Grilo & Thurik, 2005) and the expansion of new businesses inside organizations (e.g., Antoncic & Hisrich, 2003; Antoncic et al., 2001). Thus, understanding business opportunities processes has become a core issue in entrepreneurship research (Gaglio & Katz, 2001; Shane & Venkataraman, 2000; Shane, 2003).

We do not our aim to provide an extensive overview of all the perspectives on opportunity identification. Following the rationale of the individual-opportunity nexus and the premises of entrepreneurial cognition, we will address the process of opportunity recognition throughout this thesis and our reasoning is twofold. First, opportunity recognition assumes that there is information in the environment that is crucial for the existence of opportunities (Baron & Ensley, 2006; Baron & Ward, 2004; Baron, 2006; Grégoire, Barr, et al., 2010; Grégoire, Shepherd, & Lambert, 2010). According to cognitive theory, everything individuals do depends on mental processes and on information that is categorized in cognitive structures that individuals develop during their unique life experiences (Gielnik et al., 2012; Palich & Bagby, 1995). The opportunity recognition perspective is in accordance with this view on cognition and with the opportunity-individual nexus perspective of the entrepreneurship phenomena. In line with this view, opportunity recognition is described in the literature as the process of identifying meaningful patterns in the environment (Baron, 2006) and as being related to the experience and development of individuals' cognitive structures. Opportunities result from relevant information (Kirzner, 1997) and changes (Baron, 2006). These changes, by their turn, cannot be considered opportunities by themselves, but by individuals making use of their entrepreneurial cognitive structures who can recognize these changes as an opportunity (Forbes, 1999). For example, according to Baron (2006), opportunities are recognized by individuals who analyze important information, "connecting the dots" between seemingly unrelated events around them, such as changes in technology, society, demographic, economy and politics. Baron (2006) proposed that this process, called pattern recognition, is crucial to recognize opportunities. Applying the idea of pattern recognition to entrepreneurship and, more specifically, to opportunity recognition, is to say that entrepreneurs analyze information from the environment and apply their cognitive structures in order to recognize business opportunities. If, on the one hand, it is

important to analyze this information and the changes from where business opportunities derive (Baron, 2006), it is also important to analyze the cognitive frameworks that are responsible for entrepreneurial awareness, as they guide individuals to be alert to specific stimuli in the environment towards opportunity identification (Baron, 2004, 2006). Cognitive frameworks are particularly relevant in opportunity recognition, i.e., the first stage of the entrepreneurial process (Baron & Shane, 2008; Forbes, 1999; Santos, Curral & Caetano, 2010).

Thus, secondly, we will consider opportunity recognition because it assumes an active role of individuals who will analyze the information of the environment using their cognitive structures (Baron, 2004; DeTienne & Chandler, 2004; Palich & Bagby, 1995). Cognition and recognition processes are not formal operations, but rather situated activities where the individual has the main role in this process as an active being (Anderson, 2003). Applying this idea to entrepreneurship and, more specifically, to opportunity recognition, is to say that entrepreneurs analyze information from the environment and compare it to their abstract representations, in order to recognize it as business opportunities. To perform the categorization process underlying pattern recognition, individuals use their mental prototypes: abstract representations of objects or concepts to perform such evaluation. These abstract representations, in turn, are a result of individuals' life experiences and knowledge.

Recognizing business opportunities depends thus on individual cognitive structures, such as prototypes, which are developed within the unique life experiences of individuals (Baron & Ensley, 2006; Baron, 2004, 2006). This means that opportunity recognition is more complex than the mere encounter of stimuli and individuals. On the contrary, the individual has the main role in recognizing opportunities, as individuals, based on their particular and subjective experiences, are the ones making sense of information as opportunities. The individuals' competencies and cognitive structures allow them to play a part in entrepreneurial activities and, more specifically, in opportunity recognition.

Since entrepreneurial cognition aims to explain how entrepreneurs think, addressing the origin of the process is essential. Therefore understanding cognitive structures underlying entrepreneurial activity, such as prototypes, may help to uncover how entrepreneurs think (Baron & Ward, 2004; Baron, 2004, 2006; Grégoire et al., 2010;

Haynie, Shepherd, Mosakowski, & Earley, 2010; Krueger, 2007). For instance, Krueger (2007) highlighted the idea that cognition and the development of cognitive structures lay beneath what he defines as entrepreneurial thinking. Consequently, to stimulate entrepreneurial thinking, entrepreneurial agents must put effort in identifying more and better opportunities (Krueger, 2007). Since entrepreneurial activity depends on entrepreneurial thinking and starts with opportunity recognition (e.g., Baron & Shane, 2008), describing the cognitive mechanisms underlying this activity is of utmost importance. In Table 1.1 we can observe that there are several theoretical frameworks commonly used to explain opportunity recognition: knowledge and cognitive structures/schemas. The role of prototypes as cognitive structures/schemas is thus worth being further explored in order to provide a better understanding of opportunity recognition.

In this sense, we would also like to point out that the literature on entrepreneurial cognition raises several questions still to be answered regarding the cognition of entrepreneurs and especially regarding the cognitive structures responsible for opportunity recognition. For example, some of the most well-known scholars in the field of entrepreneurial cognition research, such as Mitchell, Busenitz, Bird, Gaglio, McMullen, Morse, Smith and Brock (2007) pointed out some challenges for the future of entrepreneurial cognition in three different domains: at the individual level, in the situation/context and at the metacognitive level (i.e., "thinking about thinking" –p.13). At the individual level, the authors consider that a point still needed to be explored is how do individuals acquire and learn their cognitive structures. Another concern is directed to which are the best methods of learning to develop such cognitive structures. Finally, the authors consider that another point of further reflection is on whether different contexts and the way the individual interacts with them affects the development and learning of entrepreneurial cognitive structures. These suggestions for future research are also corroborated by Grégoire, Corbett and McMullen (2011) who defended that "to better understand the role of cognition in entrepreneurship (…) we encourage future research to pay attention not only to the consequences of relevant cognitive variables, but also the origins and development of such variables" (p. 1456). Therefore, a deeper understanding of: a) the concepts of cognitive psychology borrowed by entrepreneurship research, such as cognitive structures and b) the development and learning of such cognitive structures

in the context of entrepreneurship, are key to answer the general question of entrepreneurial cognition research field: "how do entrepreneurs think?"

As mentioned before, Mitchell and colleagues (2004) argued that there are distinct and inclusive topics in both cognitive psychology and entrepreneurial cognition fields of research. Including topics from the domain of cognitive psychology into entrepreneurship research demands an accurate and deep understanding of those concepts (Wiklund, Davidsson, Audretsch, & Karlsson, 2011). In addition to this, understanding the origins of cognitive structures in an entrepreneurial context is of utmost importance to develop further entrepreneurship field of research (Grégoire et al., 2011). From a practical point of view, the understanding of cognitive structures underlying opportunity recognition, such as prototypes, may provide important insights that can help individuals who are willing to become entrepreneurs to be more alert to specific stimuli in the environment. Therefore, in section 1.3 - Prototypes in the rough – back to the original theory, we present *a)* an overview of the original prototype theory developed by Rosch (e.g., 1973, 1975, 1978); and *b)* a systematic literature review of the topic of prototypes in entrepreneurship research. We conclude with an overview of our findings and a theoretical model on how prototype theory can contribute to better understand opportunity recognition in entrepreneurship.

1.2 Prototypes in the Rough – Back to the Original Theory

Prototype is a concept introduced by Rosch (e.g., 1973, 1975, 1978) to explain categorical perception by individuals. According to Rosch (1973, 1978), categorization is a perception process that individuals use for the sake of cognitive economy and in order to store information from the external world in memory by perceiving it as a structured reality, rather than arbitrary stimuli. Category systems have a vertical and horizontal dimensional organization: the vertical dimension refers to the levels of inclusiveness of a category. This means that categories are composed by a number of objects that are considered equivalent. These categories along the vertical axis belong to a taxonomy where they are related to one another. In this system, the higher the inclusion of a category, the higher its level of abstraction and each category within the taxonomy is entirely included with its higher category. The level of abstraction of the category, i.e., its level of inclusiveness, is determined by a category's cue validity (Tversky & Gati, 1978;

Tversky, 1977) which consists of the probability of a given characteristic being associated to a given category. The same is to say that categories with high cue validity are more differentiated from other categories than a category with low cue validity. Applying the principles of cognitive economy to the vertical dimension of a categorization system is to say that there are categories more inclusive than others, and better defined or more useful. In this sense, in a taxonomy of categories, there will be superordinate categories, with low total cue validity, because they are very broad; basic-level categories which, are the most inclusive and with most high cue validity, as they represent an object at its most abstract level; and finally, there will be subordinate categories which have a low abstraction level and low cue validity because they are very specific for a given object. Following this reasoning, the horizontal dimension refers to the segmentation of categories at the same level of inclusiveness. Applying the principles of cognitive economy and perceived structure of the external world to the logic of the horizontal dimension of categorization systems is to say that categories have to be defined in terms of prototypes or prototypical instances. Only by means of prototypes containing attributes of the most representative items inside a category and less representative of the attributes outside of it, it is possible to have distinctiveness and flexibility among categories at the same level of inclusiveness (Rosch, 1973, 1975). Thus, prototypes represent the "clearest category membership defined operationally by people's judgment of goodness of membership in the category" (Rosch, 1978, p. 36). Figure 1.2 summarizes the process of categorization described above.

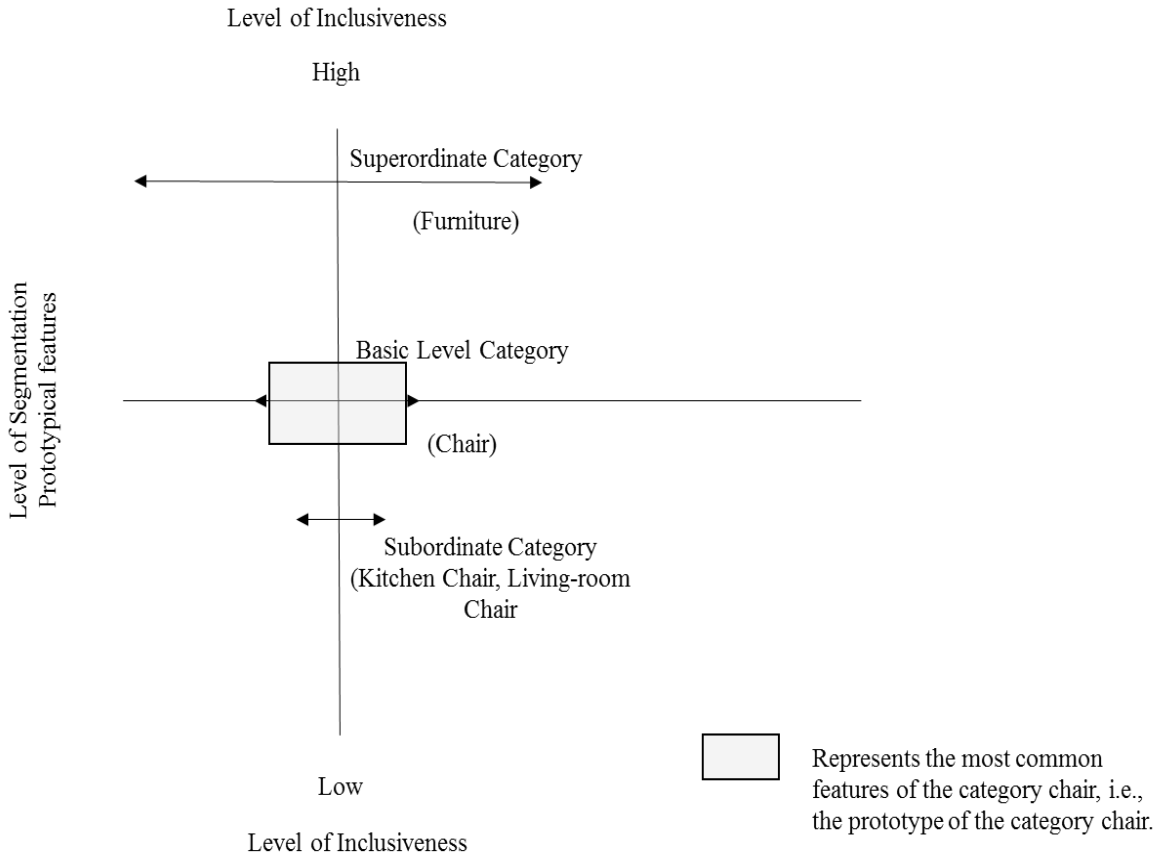

Figure 1.2 *Graphic representation of the categorization process using "chair" as an example of a basic-level category.*

Note: In this example, the vertical dimension shows a taxonomy of categories where "furniture" is the superordinate category, i.e., it is a most abstract category in this taxonomy and, therefore, it has the lowest cue validity: its members share only a few attributes between each other (for example "bed", "cabinet"). Chair is the basic-level category: it is the most inclusive and has high cue validity because several cues of several specific chairs will be predictors of identification of this category ("legs", "seat", "back rest"). It is at this level of abstraction that the most salient features of the category "chair" can be found (grey rectangle). Finally, the subordinate category ("kitchen chair") has again a low cue validity, as it is very specific and has a lower abstraction level, thus lower inclusiveness level.

On the following section we summarize a series of considerations regarding prototypes and relevant topics of research developed in this thesis, such as prototypes and context, prototypes and the individual's role in their development and the importance of prototypes in learning.

1.2.1 Prototypes: The Importance of Context, the Individual and Considerations for Learning

Classical views on categorization theory considered that categories have fixed boundaries (Fiske & Taylor, 2013). In fact, classical views on categorization are considered to be top-down, i.e., conceptually or theory driven, assuming that individuals simplify reality by just merely storing reality information in knowledge schemas based on prior knowledge. However, more attention has been given to bottom-up process, or data-driven, which assume that individuals are sensitive to the specific qualities of a given stimuli or event. The individual is, therefore, active in the perception process and categories provide expectations that facilitate that perception. Fiske and Taylor (2013) provide a good example to explain how categorization systems facilitate perception: "Consider the seemingly objective alternative of operating within situations and with people about whom we have virtually no expectations or prior knowledge. Arriving a new campus the first day, coming into an unfamiliar culture for the first time, or meeting a stranger whose gender, age, and role are mysterious – all these are disorienting encounters that challenge our ability to function without the normal level of prediction and control provided by expectations." (p. 104). Categories are thus necessary to perceive the world, but this does not mean that the individual is inactive in this process: expectations emphasize our active construction of reality (Fiske and Taylor, 2013). Therefore, in the given examples, having a map of the campus, a travel guide or being introduced to a stranger by a friend demonstrate an active role on the individual side and that help perceive the new information, based on expectations. In contrast with the classic views on categorization, the Gestalt theory, for example, added to these notions the importance of context: each stimuli is perceived differently according to context, hence the whole is more than the mere sum of the parts. Also Gibson (1966, 1979) presented a theory for ecological perception stressing the link between perception and action, connecting an individual to its environment in accordance to its meaning. Thus, there is an individual

active effort to generate a meaningful pattern from the perceived features of the environment in its structural characteristics. With this brief explanation of the complexity of the phenomenon of categorical perception, we can return to the first argument of this section: although common sense and classical theories on perception argue that categories have fixed boundaries, in fact natural categories have fuzzy sets and are not always clear (Fiske & Taylor, 2013; Rosch, 1973, 1978). Some instances are more central or more typical than others in a category: the prototype of a category, i.e., the central tendency or average of the category members. Individuals abstract the most typical features of a given event or object and then decide if a new instance fits the same category by resembling to the prototype: this is called family resemblance. The more features a stimuli shares with other category members, the faster, more consistently and consensually it is identified as belonging to the category (Rosch, 1978). However, within-category, not every given feature is present in every member, therefore categories are fuzzy and rely on the prototype. Between-categories, it is considered to exist a hierarchical organization, as different levels of categories are useful for different purposes (Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976).

It is also consensual that experience and culture shape the contents and organization of our categories (Fiske & Taylor, 2013). In fact, Rosch (1978) claims that categories and prototypes can only be fully understood within a given culture. Moreover, it is important that prototypes are not dissociated from the process in which they occur. The same is to say that prototypes are abstract representations of members of categories. In this sense they have to be seen in context and not as an actual mental framework existing in one's brain. This abstract representation, however, finds overwhelming agreement between individuals in the same context or culture (Rosch, 1978).

Prior experience in contacting with prototypical features of a given object has also implications on the speed and accuracy of identifying new stimuli as prototypically representative of a category. Rosch and colleagues (1976) demonstrated that individuals learning categories and prototypical features of objects tended to perform more accurate and faster categorization processes. In addition, aspects typically considered to be more prototypical of a given category are firstly learned than aspects which are not. Rosch emphasized two important aspect regarding these findings that we consider important to point out as well. First, it is important to understand that experience in contacting with

prototypical features increases the probability of recognizing new objects as a member of a given category. This demonstrated again the importance of the individuals and their active role in perceiving the world. For example, Smith (2014) suggested that individuals will determine category belonging more often and correctly if they use a prototype as a comparative standard for categorization. Secondly, it is important to understand that although prototypes are learned they do not constitute a theory of learning *per se* (Rosch, 1978). The same is to say that although individuals can learn prototypical features of a given object or category, prototype theory does not constitute a learning process by itself. However, it is in the contact with examples and analysis of its dimensions that prototypes are developed. Therefore it can be argued that learning methodologies focusing on critical experiences can have positive effects on prototypes' development and their accurate use.

Prototype theory includes some central aspects, which are appealing for entrepreneurial research. As we have described above, context, experience and learning are closely related to this basic perceptive mechanism. Therefore, the understanding of these variables on the development of prototypes within entrepreneurial activity is of utmost relevance. For example, prototypes can provide information on how a specific group of people (entrepreneurs) perceive the world around them and interpret that information in terms of categories (for example, "is this idea a member or not of the category business opportunity?"). Second, since prototypes depend on prior knowledge but are also sensitive to the individual's experience, they can help answering some important questions on entrepreneurship research which account for the differentiation between individuals who recognize opportunities and those who do not (For example, "why do some people, but not other recognize business opportunities?"). Finally, prototypes are learned and both experience and personal variables have effects on that learning. Therefore, knowing the prototypes of entrepreneurs for perceiving, for example, business opportunities, can be used as a frame of reference by new perceivers with less experience.

1.3 Study 1 – Connecting the Literature Dots – A Systematic Literature Review of The Business Opportunity Prototype

1.3.1 Method of Review

Following the overview about prototype theory, we performed a systematic literature review on the use of prototypes on entrepreneurship research.

For the first step of the review, we started with a search on the Thomson Reuters Web of Science databases for all articles related to entrepreneurship and prototypes. We used multiple searching terms in order to cover all possibilities, related to entrepreneurship (entrepreneur*) and prototypes (prototyp*, mental schema, cognitive schema, mental framework, cognitive framework, mental structure, cognitive structure). We also considered important to complement our search with a look on the articles referring only to pattern recognition. We limited our search to a specific amount of journals considered important for entrepreneurship research in general and cognitive entrepreneurship in particular. We started by selecting the journals pointed by Pearce II (2012) as the most cited and premier in entrepreneurship research. However, knowing that entrepreneurship research has other important outlets, we considered also the procedure taken by Forbes (1999) who used a list published by Shane (1997) about the journals considered adequate as entrepreneurship research outlets. Finally, we added some journals besides these two lists, which have been considered by the Association of Business Schools as the most relevant journals for entrepreneurship publication. In the end, our search was performed over 31 journals. The search about prototypes generated 81 results and the complementary search on pattern recognition generated 77 results. After analyzing the abstracts for identification of mismatches (in entrepreneurship literature there are several articles referring to the use of prototypes as experimental products, or patterns in information search, behaviors and other phenomenon not related to cognitive theory), 41 articles were left. When analyzing these articles we identified the ones that, more than mentioning the term (or similar constructs), reflected upon the utility of prototypes in entrepreneurship theory development or empirical studies, narrowing our analysis down to 11 articles.

1.3.2 Key Findings

Table 1.2 provides an overview of the articles analyzed.

Table 1.2 *Studies on entrepreneurship literature using the concept of prototype*

Entrepreneurial Process Phase	Study	Type of article	Level of analysis	Relation to other variables	Relation to other cognition aspects
Gathering resources (information)	Cooper, Folta, & Woo, 1995	Empirical	Individual	Confidence Information search	Bounded rationality
Opportunity identification and exploitation	Palich & Ray Bagby, 1995	Empirical	Individual	Risk perception	Categorization process
Opportunity recognition	Baron & Ward, 2004	Theoretical	Individual	Knowledge structures Alertness	Pattern recognition
Opportunity recognition	Baron, 2006	Theoretical	Individual	Prior knowledge Experience Alertness Active search	Exemplars Pattern recognition
Opportunity recognition and decision	Baron & Ensley, 2006	Empirical	Individual	Level of experience	Pattern recognition
Entrepreneurial intentions and beliefs (prior to action)	Krueger, 2007	Theoretical	Individual	Entrepreneurial mindset	Knowledge structures
Opportunity recognition	Baron, 2008	Theoretical	Individual	Affect Creativity	Creative cognition
Opportunity recognition	Grégoire, Barr, & Shepherd, 2010	Empirical	Individual	Prior knowledge	Structural Alignment
Opportunity recognition Entrepreneurial Action	Mitchell & Shepherd, 2010	Empirical	Individual	Self-images	Decision making
Opportunity recognition Strategic Management	Durand & Paolella, 2013	Theoretical	Individual Organizational	Organizational Success Market segmentation	Categorization process Cognitive congruence
Opportunity identification	Wood & Williams, 2014	Empirical	Individual	Opportunity attractiveness	Intuition and learning, as side cognitive mechanisms to prototypes responsible for opportunity identification

From this analysis we can observe that in 1995, Cooper, Folta and Woo developed a study analyzing the processes through which entrepreneurs gather information. The authors used the principle of bounded rationality (i.e., the expectation that less entrepreneurial experience leads to less information search and that higher entrepreneurial experience leads to higher levels of information search) to explain how entrepreneurs look for information. The authors concluded that bounded rationality principle is applicable, because on their empirical testing, they could observe that entrepreneurs with previous experience and those venturing in fields they previously knew, engaged in a more intensive information search because of their richer mental schemas and their greater awareness of the necessary information. Although inexperienced entrepreneurs developed a pattern of information seek bounded to the rational model as well, when the context of the venture was unknown to them, this information seek would not be so intensive as the ones of experienced entrepreneurs, due to less developed schemas. Although this study does not put emphasis directly on prototype theory, it shed light on entrepreneurship research about the role of past experience on knowledge structures and schemas and its effect on information search.

The article of Palich and Bagby (1995) brought the concept of prototype to entrepreneurship research, bringing up some questions related to cognitive theory that until today are still in the center of cognitive entrepreneurship research. For example, the authors reflected on the use of cognitive theory to explain why some individuals are entrepreneurs and others are not, especially to explain entrepreneurial risk-taking. Prototypes, as mechanisms for the categorization process, are essential for entrepreneurs to find new opportunities. The authors considered, however, that with equivocal information, entrepreneurs tend to evaluate new situations significantly more positively than other individuals. This possible bias can be overcome by, for example, training on the development of such structures and on how to use them accurately in business opportunity appraisals. The authors also state that cognitive frameworks, such as prototypes, can be trained for using a "frame of reference" in training, i.e., by using the framework of experts as a reference. To make this point, Palich and Bagby (1995) actually stated that “unlike personal traits, cognitive processes can be changed” (p.426), raising another important dot on entrepreneurial research: that cognition is more accurate to

describe the differences between entrepreneurs and non-entrepreneurs than personality traits and that it can be changed not being bounded solely to internal variables.

Although our search did not include Baron's article (1998) about cognitive mechanisms in entrepreneurship in this analysis, it is important to mention it as well. Baron develops further the idea introduced by Palich and Bagby (1995) that cognitive processes are more likely to explain why some individuals, but not others, are entrepreneurs. Especially because research on personality traits and their predictive value of entrepreneurial activity had reached a point where no significant differences in personality traits between entrepreneurs or non-entrepreneurs had been found (Baron, 1998). At the end of the 90's of the twentieth century, the cognitive perspective was considered a viable alternative to explain entrepreneurial activity and rationale.

The importance of knowledge structures in entrepreneurship kept gaining support with the article of Gaglio and Katz (2001), describing schemas as dynamic, evolving mental models representing an individual's knowledge and beliefs about how physical and social worlds work. The authors introduced the concept of entrepreneurial alertness, borrowed from the notions of Kirzner. Building on this idea, Baron and Ward (2004) suggested how research can include other inputs from cognitive theory, such as reaction time, priming, working memory and creative cognition. The authors referred to schemas and pattern recognition as important cognitive mechanisms to opportunity recognition, indicating also the mental schema of alertness suggested by Gaglio and Katz (2001) as fundamental for this process.

It is in 2006 that Baron introduces the idea of pattern recognition for opportunity identification. Pattern recognition, according to the author, consists in connecting the dots between seemingly unrelated events in the external world. To do this, Baron describes two important cognitive models that are essential to perform this task: prototype models and exemplars models. The first consist in a mental framework representing the most typical member of a category. New events or stimuli are compared with existing prototypes to determine whether they belong to the same category. According to Baron this is useful for opportunity identification, because the patterns identified in the external world by entrepreneurs are perceived as opportunities using the prototype of business opportunity. Exemplars model, on the other hand, helps individuals to compare new stimuli with specific examples of a same category and related to them. For entrepreneurs

with experience, this can be particularly useful, as they can immediately compare new ideas with examples they already know. However, according to Fisk and Taylor (2013), individuals actually use both processes to categorize new stimuli: "people can rely on direct experience with exemplars or on previously provided prototypes to classify new instances, depending on the task and the information available" (p.113). Baron's article (2006) was the starting point to the study that most significantly contributed to the prototype theory applied to entrepreneurship. Until then, the literature had been evidencing the following: first, entrepreneurial experience has a significant role on the development of cognitive frameworks of entrepreneurs, and second, the understanding of such cognitive structure, such as prototypes, would be useful as a frame of reference that can be used to training on opportunity recognition. Thus, one question still remained: what were the most salient features of the prototype of business opportunity employed by entrepreneurs to recognize new opportunities? Baron and Ensley (2006) conducted a study where they identified the dimensions (i.e. the most salient features) of the business opportunity prototype. Ten dimensions constitute the business opportunity prototype of entrepreneurs; the first five dimensions refer to the most salient features of a business opportunity upon recognition: solves customer's problems; positive net cash flow; manageable risk; superior product; industry change. The other five referred to the feasibility of business development: overall financial model; advice from experts; unique product; big potential market; intuition (Baron and Ensley, 2006). The authors also concluded that the prototypes of experienced entrepreneurs are better defined and are richer in content, than the ones of novice entrepreneurs.

After the study of Baron and Ensley (2006) other perspectives on prototypes and entrepreneurship have also aroused in the literature. For example, Krueger (2007) refers to the prototype of entrepreneur as the mental image that individuals might have of an entrepreneur, even if it refers to themselves. Besides prototypes, the author stresses the importance of knowledge structures related to entrepreneurship. These suffer a critical development through experience and it is their modification from a novice state towards an expert's one that constitutes the development of the entrepreneurial mindset: the ability to act and think as an entrepreneur. The debate on why entrepreneurs are different from other individuals based on cognitive approaches carried on with, for example, Dyer, Gregersen and Christensen (2008) who developed a study comparing innovative

entrepreneurs versus executives, concluding that the first differ from the second because entrepreneurs engage in four processes that enable them to store new knowledge in their memory and recognize opportunities: questioning, observing, experimenting and networking ideas. Also Smith, Mitchell, and Mitchell (2009) referred to expert's scripts, which were described as dynamic knowledge structures that are susceptible to change, like the idea presented by Krueger (2007) about the entrepreneurial mindset. These are action-based knowledge structures used by entrepreneurs. At the same time, Baron (2008) continued stressing the idea that mental frameworks, such as prototypes, are crucial for understanding entrepreneurial phenomenon. The author suggested that positive affect can enhance creativity in a process described as "creative cognition". This is a process where existing mental frameworks are expanded or combined, resulting in the generation of new ideas not previously available. According to Baron, this is how many new ideas for products and services arise.

Mitchell and Shepherd (2010) borrowed the term "image" from Beach and Mitchel's decision theory (Beach & Mitchell, 1987; Mitchell & Beach, 1990), admitting that it is the same as "prototype" in cognitive theory, to point out an important differentiation: the importance of images related to the individual; and images related to opportunities when identifying new ones. Images of the self have an impact on decision making related to opportunities. The authors claimed that decisions to act upon opportunities are based on the following characteristics of an opportunity: (1) to be valuable, (2) to be based on knowledge similar to their own and (3) to have wide opportunity windows with many choices. Moreover, the self-image of vulnerability and capability significantly impact entrepreneur's images of opportunity.

However, in 2010, Grégoire, Barr and Shepherd conducted an empirical study where they concluded that entrepreneurs do not use prototypes to recognize opportunities but rather a set of mental connections, of which structural alignment (i.e., the process through which individuals compare new information to the one they previously acquired with experience and prior knowledge and make sense out of it) is the most relevant one. The authors also found that the dimension "solves customer's problems" from the business opportunity prototype was referred by the participants. The authors suggested that the prototype dimensions might be more related to evaluation rather than to the antecedents of opportunity recognition. Whether the author's proposal indeed generates

a conundrum in the cognitive entrepreneurship research is debatable, as we will address on the coming section of this chapter.

Recently, Durand and Paolella (2013) reflected on how research on the categorization process theory impacts on organizational success. The authors consider, however, that other theories, besides prototypes, might have a higher explanation power to clarify, for example, multi-category membership of stimuli, which has consequences for strategic management and entrepreneurship, especially in terms of understanding relations between markets, producers and other actors involved. The authors claimed that a "category stretching" should be considered in organizational studies when considering categorization. The authors considered the categorization process at the individual level, but Glynn and Navis (2013) considered that the reflections carried by Durand and Paolella can actually be extended to a social and cultural level. Finally, Wood and Williams (2014) presented an article referring prototypes as one of the individual mechanisms to identify opportunities. They consider that identifying opportunities is a necessary but not sufficient condition for entrepreneurship. Therefore, the authors suggest a rule-based thinking perspective to evaluate opportunities and their attractiveness. This means that instead of prototypical dimensions for recognition, the authors claim that entrepreneurs make use of socially constructed rules to evaluate the attractiveness of an opportunity, as for example: novelty, resource efficiency, and worst-case scenario which are affected also by the personal notion of opportunity market and technology knowledge. The role of such personal and also affective variables, lead us to the work of Cardon and colleagues (2009, 2012) who developed the concept of entrepreneurial passion. The authors consider that entrepreneurial passion refers to an internal status and positive predisposition to engage in entrepreneurial activities and which can have a positive influence in entrepreneurial cognition. Therefore, as defended by Wood and Williams (2014) such social but also internal variables influencing the attractiveness of entrepreneurial activity in general and of business opportunities in particular, are of extreme importance to better understand entrepreneurial cognition.

1.4 Discussion and Directions for Research – The Context of the Present Thesis

On the previous section of this chapter we provided an overview about the use of prototype theory in entrepreneurship research, by conducting an extensive literature

review over the most relevant journals for entrepreneurship and entrepreneurial cognitive research.

This overview on the use of prototype theory on entrepreneurship research leads to five major conclusions. First, prototypes appear in the literature as knowledge structures, which account for an explanation of entrepreneurial specific attributes, such as risk perception, information gathering and alertness. Besides their explanation capacity, prototypes are seen as able to be modified and trained, thus an alternative to personality traits. Secondly, most of the studies referring to prototypes are focused on the opportunity recognition stage of the entrepreneurial process. Some refer prototypes even at an earlier stage of opportunity recognition, such as intention or entrepreneurial thinking, indicating that prototypes are more appropriate to describe the entrepreneurial phenomenon at its early stages. Third, although there are connections with several cognition aspects, prototypes are more often regarded as knowledge structures and essential to perform pattern recognition rather than mere categorization. However, pattern recognition can be seen, as Baron described it, as a process for categorization where the perceiver makes sense out of the new information relating it to the existing cognitive structures. Therefore, prototypes might be used differently within different contexts (external variables) and/or depend on the prior experience and knowledge of the entrepreneur (individual variables).

A fourth conclusion from this literature review is that at least one article referred to prototypes in entrepreneurship to suggest an alternative theory for opportunity recognition: structural alignment. This is an important point of discussion, to our view. Markman and Gentner (1993) described structural alignment as "similarity comparisons lead subjects to attend to the matching relational structure in a pair of items" (p. 431). Grégoire and colleagues (2010), by their turn, described structural alignment as "a cognitive tool that people use to compare things and to draw implications from the comparison" (p. 416), adding that when individuals face new stimuli, they compare their structure of attributes to the other objects that they might have seen before. Thus, structural alignment can be considered as a process highly dependent on prior knowledge, even more than categorization. Therefore, structural alignment might be useful for high levels of experience and prior knowledge but it is more limited in providing insights on how entrepreneurs think and how to learn from it. Rosch (1973, 1978) demonstrated that

prototypes have an effect on categorization reaction time and priming, meaning that provided central information about a category, individuals are faster and more accurate categorizing new stimuli. This is not possible to do with structural alignment if prior knowledge is not provided as well. Structural alignment is responsible for comparing new stimuli with existent experiences, based on their structure and similarities (Markman & Gentner, 1993). At an earlier stage of entrepreneurial experience, prototypes, as abstract representations, are necessary to place a new experience in a category of others that are similar to it (Rosch, 1975). Therefore, we suggest that categorization using prototypes is a pre-condition to perform structural alignment. Without the mental framework, the process is not possible. Thus, recognition using prototypes precedes recognition via structural alignment. Analyzing business opportunities within a basic framework such as a prototype is useful from a cognitive perspective, because it allows a faster and more accurate analysis of a given object. With experience, entrepreneurs progressively perform this process faster and more easily. Initial experiences are crucial to the development and use of the cognitive structure, whereas experience and knowledge affect the process. This perspective could explain why Baron and Ensley (2006) found differences between experienced and novice entrepreneurs, and why Grégoire and colleagues (2010) consider that structural alignment provides a more complete explanation to the opportunity recognition process, since their sample was composed solely of experienced entrepreneurs. So, in our view, structural alignment, more than an alternative to prototype theory for opportunity recognition in entrepreneurship, may be a complementary approach on how opportunities are recognized by experienced entrepreneurs. In the literature prototypes are more often referred for the early stages of the entrepreneurial process, such as intentions, attitudes and opportunity recognition. Therefore, categorization, as a basic perception tool, is essential when individuals are at the beginning of their entrepreneurial experiences and they might even be a facilitator of later structural alignment tasks in the process.

Finally, a conclusion regarding the recent studies including prototype theory is that they put attention on the individual as an active actor in the pattern recognition process, where not only prototypes of opportunities play a role but also prototypes about the self as well as social constructed norms. This finding calls attention to the importance of internal predispositions towards entrepreneurship. These are of extreme importance to

understand entrepreneurial activity (Cardon et al., 2012, 2009). We consider that further exploring prototype theory in entrepreneurship research is crucial to better understand the process of opportunity recognition. The article of Baron and Ensley (2006) was essential to tap the main attributes and dimensions most frequently recognized by entrepreneurs. However, we consider that further developments are necessary to be able to answer some of the questions raised by scholars in entrepreneurial cognitive research. As pointed out by Mitchell et al. (2007) and Grégoire et al. (2011), understanding the origins and basic contents of cognitive structures, the context in which they are developed and how (through which methods) individuals learn to develop these structures is of utmost relevance to the understanding of opportunity recognition processes. Following up on our conclusions from this literature review in combination with the challenges for future research pointed out by scholars in the field of entrepreneurial cognition, we draw a research model which will be explored through different empirical studies on the present thesis (Figure 1.3).

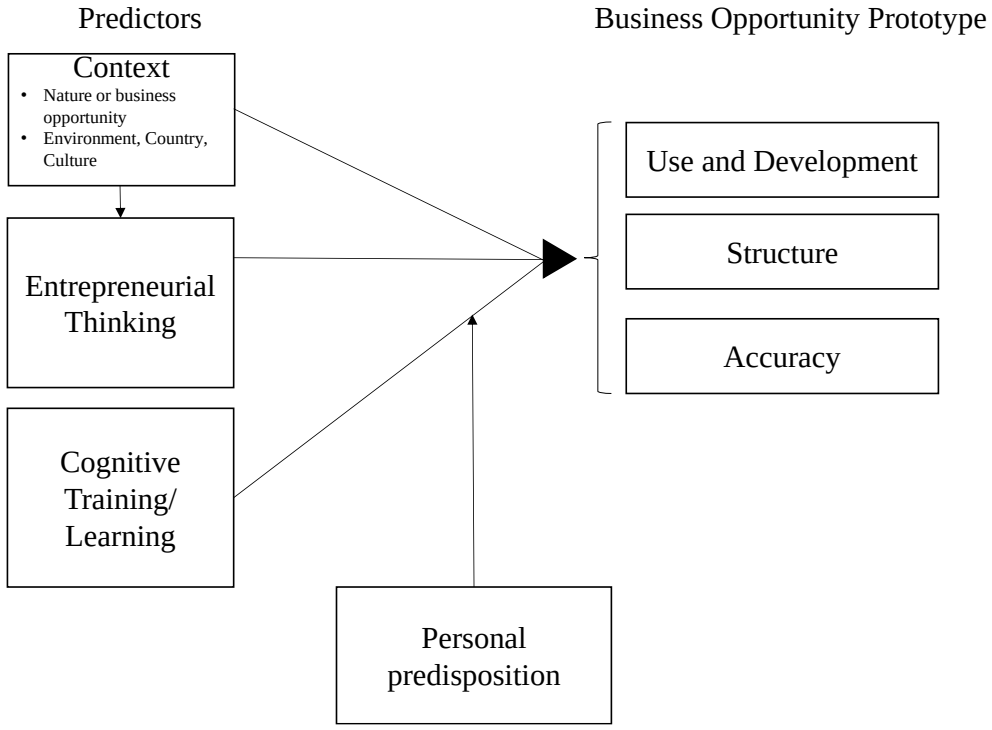

Figure 1.3 *Theoretical model for deeper understanding of the cognitive structure responsible for opportunity recognition – business opportunity prototype.*

Figure 1.3 depicts the theoretical relationships that we drew from our conclusions. As shown in the literature review previously presented, several studies point out to the fact that the context has an effect on the development of the prototypes. By context we consider the nature of different business opportunities as stimuli, but also broader influential factors, such as the country, culture and other macro variables. For example, we consider of extreme importance to explore the role of different contexts of opportunities in the recognition of prototypical dimensions of opportunities (see Chapter 2, Study 2, where this research question in explored further). Our conclusions also lead us to argue that the prototype of business opportunity is rather used at a very early stage of the entrepreneurial activity, as a basic perception tool for business opportunity. The literature also shows that the business opportunity prototype is naturally linked with the recognition stage of the entrepreneurial process, but also to even earlier stages of the entrepreneurial process, such as entrepreneurial intentions or the development of

entrepreneurial thinking. Therefore, experiences consisting of reflecting and thinking about entrepreneurship prior to engaging in tangible entrepreneurial activity (i.e., launching a venture) are also relevant to the development of cognitive structures regarding opportunity recognition, such as prototypes. It is important to analyze how past experience in recognizing opportunities, for example, influences the development of the prototype and if the prototype differs between individuals who recognize a business opportunity for the first time and those who have done so before (this research question is further explored on Chapter 3, Study 3). This can contribute to understand if the prototype is immediately developed into the level of an expert (an entrepreneur) or if it goes through different stages where different prototypical attributes are emphasized. Once again, this point has a link with context: it is important to observe if the prototype and the attributes most often recognized in a business opportunity are dependent on background variables such as an individual's country or culture. Finally, it is argued that prototypes can be learned by individuals. However, some questions remain unanswered regarding how and through which methods. Since prototypes are developed based on experience, we argue that providing individuals critical and significant entrepreneurial experiences can contribute to the development and accuracy of the prototype regarding opportunity recognition. We do not assume, however, that every individual is willing to develop their entrepreneurial cognition, simply because not every individual aims to become an entrepreneur. Therefore, and also in light of the literature review presented previously, we consider that internal, affective variables towards entrepreneurship have to be taken into consideration when an attempt to develop and learn prototypical features of business opportunities is presented. For example, entrepreneurial passion, as a personal predisposition to positively consider entrepreneurial activities might moderate the relationship between learning and developing a business opportunity prototype (see empirical testing of this argument on Chapter 5, Study 4).

1.4.1 Note on Methods and Samples

We would also like to present a note on the research methods and samples to be considered in testing these models. Regarding methodology, we consider that experimental settings can provide important results in testing our theoretical model. Our reasoning is twofold. First, experimental designs are an increasingly used method in

entrepreneurship research as they can increase the internal validity of empirical testing (Acs, Audretsch, Desai, & Welpe, 2010). Second, as every individual is unique, it is not possible to completely control all the variables that influence their behavior. In entrepreneurship research this is especially difficult. Entrepreneurship is a well-known topic nowadays and individuals contact with notions of the field on a daily basis. Asking individuals about their entrepreneurial experiences to draw conclusions about their cognitive structures leads to difficult interpretable results, for two main reasons: first, this often employs retrospective methodologies, and second, every individual has different experiences. In this sense, to control a setting and the entrepreneurial conditions via, for example, the use of scenario or vignettes (e.g., Aguinis & Bradley, 2014) has the ability of providing uniform circumstances and increase the internal validity of empirical studies.

Hand in hand with methodological matters, are sample selection ones. We consider that to better understand how the prototype of business opportunity is developed, it needs to be observed within samples of individuals who are at a very basic stage of the entrepreneurial process and have not engaged in actual entrepreneurial activities, such as launching a company or writing a business plan. Understanding the use of prototypes by individuals with no experience on entrepreneurship is of utmost importance. Knowing on which characteristics of business opportunity potential entrepreneurs focus on and which characteristics they lack to observe, provides important clues to guide potential entrepreneurs to be alert to specific stimuli in the environment and therefore to guide them towards successful opportunity recognition (Baron, 2006). This has to do with two main reasons. First, being the prototype a basic perception tool, its development is best observed at a basic level of prior knowledge and experience. Second, to analyze the prototype in groups of individuals with an extensive background of entrepreneurial experiences does not allow the observation of the circumstances or experiences underlying its development. In this sense individuals with no experience in entrepreneurship but who have engaged in entrepreneurial thinking, such as identified opportunities, for example, can provide interesting results regarding the development of their entrepreneurial cognitive structures. Several authors claim that education and especially higher education, such as university degrees, are positive predictors of entrepreneurial activities and success (e.g., Athayde, 2009; Bae et al., 2014; Block, Hoogerheide, & Thurik, 2011; Rauch & Rijsdijk, 2013; Rauch & Rijsdijk, 2013;

Souitaris, Zerbinati, & Al-Laham, 2007; Ucbasaran, Westhead, & Wright, 2007). In this sense, university students might engage in entrepreneurial activities but most of them still have no experience in entrepreneurship.

Therefore, using this group of individuals as a proxy for potential entrepreneurs seems adequate when the development of cognitive structures regarding opportunity recognition is to be observed.

1.5 Conclusion of Chapter 1

After providing an overview of the history of entrepreneurship research in general, this chapter zoomed in a specific topic within the entrepreneurship research field: entrepreneurial cognition. We provided an overview of the most significant trends in entrepreneurial cognition research, concluding that this field borrows concepts from cognitive psychology and from the classics in entrepreneurship. We concluded also that entrepreneurial cognition focuses on the description of entrepreneurial thinking, mainly at the opportunity recognition stage and that cognitive structures, such as prototypes, are essential to understand this phenomenon. As conceptual caution should be taken every time fields of research merge, we provided an overview on the topics of prototype theory (cognitive psychology) and a systematic literature review about this topic within the field of entrepreneurship. From this literature review we draw a theoretical model which we aim to test on the following chapters of this thesis. Such task is performed considering also the methodological concerns on which we reflected in this chapter.

CHAPTER 2 - THE ROLE OF DIFFERENT OPPORTUNITIES IN THE ACTIVATION AND USE OF THE BUSINESS OPPORTUNITY PROTOTYPE (STUDY 2)

CHAPTER 2 - THE ROLE OF DIFFERENT OPPORTUNITIES IN THE ACTIVATION AND USE OF THE BUSINESS OPPORTUNITY PROTOTYPE (STUDY 2)

Summary

This study analyzes the effect of different business opportunities on the use of the business opportunity prototype by individuals without entrepreneurial experience, such as university students. Although scholars have examined the reasons why some individuals, but not others, identify business opportunities, little is known about the influence of different opportunities as stimuli on the development and use of cognitive structures responsible for the recognition of opportunities. Moreover, most studies on opportunity recognition rely either on retrospective data or on entrepreneurs' prior knowledge and experience. Thus, little is said about the activation and use of relevant cognitive structures at early stages of the entrepreneurial process and how the different context of opportunities affects the use of these cognitive structures.

Participants were presented with one of two scenarios describing two different business opportunities: an independent entrepreneurial opportunity and a business reformulation opportunity. We concluded that there are significant differences in the ways respondents identified characteristics related to *customers* and *risk* between both opportunities, but not in the characteristics related to *profit.* In general, participants were more risk-averse in the business reformulation opportunity than in the entrepreneurial opportunity. In the latter case, the participants focused more on customers.

Using an experimental approach, this study provides a deeper understanding of the activation and use of cognitive structures with different stimuli during opportunity recognition.

A previous version of this study is published as Costa, S. F., & Caetano A. (2013). Entrepreneurship and intrapreneurship in academic contexts: How students recognize business opportunities. In T. Baaken, A. Meerman, M. Neuvonen-Rauhala, T. Lähdeniemi, T. Ahonen, & T. Kliewe (eds.), Entrepreneurial Universities Conference Proceedings (pp. 33-40). Münster: Münster University of Applied Sciences.

The current version includes relevant feedback from peer reviews obtained at international conferences such as the 2014 High Tech Small Firms Conference, organized by the University of Twente, Enschede, The Netherlands. It is currently under review in an international journal.

Reference: Costa, S., Ehrenhard, M., Caetano, A., Santos, S. (submitted). The role of different opportunities in the activation and use of the business opportunity prototype. Article presented at the 2014 High Tech Small Firms conference, Enschede, The Netherlands.

2.1 Introduction

Entrepreneurial cognition is of particular interest to explain how entrepreneurs think and specifically, why some individuals, but not others, identify business opportunities, as evidenced on Chapter 1. To do so, the research stream on entrepreneurial cognition often focuses on the individual–opportunity nexus perspective (Shane & Venkataraman, 2000; Shane, 2012; York & Venkataraman, 2010). From this perspective, entrepreneurship is a process that depends on the encounter of two fundamental elements: individuals and opportunities. On the individual side of the nexus, the particular past experiences and prior knowledge that translate into cognitive competencies are responsible for the identification of stimuli in the environment, which can be recognized as opportunities. On the opportunity side of the nexus, contextual factors, such as technological, social, demographic and political changes, are the stimuli usually described as the elements of business opportunities (Baron, 2006).

The studies on entrepreneurial cognition provide important insights on entrepreneurial thinking, including how to orient an entrepreneurial mindset toward that of an expert (Krueger, 2007). Another major contribution of entrepreneurial cognition is that knowing how entrepreneurs think allows the training of such competencies with individuals who wish to develop their entrepreneurial skills, in order to foster creativity and innovation (Baron, 2004, 2006). A broad stream of literature describes how cognition can explain differences among individuals' ability to identify opportunities (e.g., Baron & Ensley, 2006; Baron & Ward, 2004; Baum et al., 2007; Forbes, 1999; Frese & Gielnik, 2014; Gielnik et al., 2014). However, little is known about the effect of different opportunities on the activation and use of cognitive structures that underlie opportunity recognition. Most studies addressing opportunity variation more often relate to performance variables at an organizational level (e.g., Dahlqvist & Wiklund, 2012; Dencker et al., 2009; Samuelsson & Davidsson, 2008) rather than to how different stimuli influence the recognition of business opportunities at an individual level. As evidenced on Chapter 1, several authors acknowledge the need of understanding the role of context and the nature of opportunities on the recognition process (e.g., Grégoire et al., 2011). Understanding the context where opportunities can be recognized and within which entrepreneurs think and act is of the utmost importance (Kessler & Frank, 2009; Spedale

& Watson, 2013; Wright & Stigliani, 2012). Moreover, most studies are based on either from retrospective data from entrepreneurs (e.g., Baron & Ensley, 2006) or from data based on entrepreneurs' past experience and prior knowledge and their influence on cognitive processes (Grégoire, Barr, et al., 2010; Grégoire & Shepherd, 2012). This hinders an explanation of the way in which cognitive structures responsible for business opportunity recognition develop from the early stages of entrepreneurial experience, which is of importance to potential entrepreneurs, both acting independently or within an organization.

To address these gaps, this study will examine how individuals with no entrepreneurial experience make use of a basic cognitive structure to recognize different business opportunities. Specifically, we analyze how the different nature and context of business opportunities affects the way individuals make use of their business opportunity prototype to recognize business opportunities.

2.1.1 Business Opportunities as Stimuli for Recognition

Theories on perception from the field of classical psychology (Anderson, 2003; Rosch et al., 1976; Rosch, 1975, 1978) lent early support to the assumption that both basic categorization features and structural characteristics contribute to perception. The idea that opportunities emerge from a pattern of seemingly unrelated events in the environment made it evident that cognitive structures are essential to recognize business opportunities (Baron, 2006). Based on human cognition research in general, and cognitive frameworks in particular, Baron (2004; 2006) developed one of the most convincing approaches to business opportunity recognition: the "connecting the dots" perspective (see Table 1.1 – Chapter 1). Baron suggested that individuals identify business opportunities by perceiving connections between apparently unrelated events or trends – e.g., changes in technology, demographics, markets or government policies – as a meaningful pattern. In order to be recognized as an opportunity, this pattern has to undergo a categorization process.

Categorization is one of the basic processes to place an experience, object or event in a group of objects that are similar in some respects (Markman & Gentner, 1993). The essential cognitive structures needed to perform this process are prototypes. Prototypical categorization is a cognitive process, which suggests that concepts are expressed through the most salient or representative features involved in an underlying structure, namely a

group of features that are indicative of a category membership (Lakoff, 1987; Rosch et al., 1976). Prototypes are abstract mental representations of the most common salient features combined in an object that represents a category. Prototypes such as 'house' or 'tree' are easy to describe, as we can identify their most common features without difficulty: door, windows, roof, and trunk, branches and leaves, respectively. Research has also shown that the same is possible with 'business opportunities' (Baron & Ensley, 2006).

As explained on Chapter 1, applying this theory to business opportunity recognition is to say that individuals compare ideas of new products or services with their prototype of *business opportunity*. If a match is possible, the individual will recognize and categorize it as a business opportunity (Baron, 2004). Baron and Ensley's (2006) conducted a study in which they identified the dimensions (i.e. the most salient features) of the business opportunity prototype. The authors also concluded that experienced entrepreneurs have richer and better defined prototypes (see Chaper 1, Study 1).

In the case of individuals with no experience, it is useful to assess their abstract representations of business opportunities, i.e., their prototypes. Studying the dimensions – that is the most salient features identified in a given object for categorization purposes – will provide important information to individuals with little to no experience in order to let them be alert to specific stimuli. This can easily be understood with the following example: If a person has never seen a car but would like to find one, how would this person know when they do see a car? Let this person be informed by an experienced other who has seen and had contact with many cars. The experienced individual would tell the inexperienced one "look for large moving objects with wheels and the sound of a motor" to help them on their way. The well-known story of the blind men and the elephant (e.g., Gartner, 2001), in which six blind men touch different parts of an elephant, is also a good example of this. Each of the blind men identified one part of the elephant but could not identify it completely. Had the blind men been instructed that the *object* elephant has legs "like pillars", ears "like hand fans" and a snout "like a pipe", they would have known they were confronted with an elephant and recognized it as such when they touched these elements. One can apply this example to business opportunities: If the main characteristics of the business opportunities more often recognized by entrepreneurs are known, in other words, if the dimensions of such cognitive structures are known,

individuals with less experience can easily be guided to recognize opportunities. At a very early stage of the entrepreneurial experience, this basic categorization process is essential.

As also argued by other scholars (e.g., Dane, 2010; Westhead, Ucbasaran, & Wright, 2005), the bigger the expertise of an individual in a given area of knowledge, the higher the stability of his/her cognitive schemas, which might not be a synonym for inflexibility but a demand for a more stimulating environment and focus on tasks outside of their domain of expertise. This makes it interesting and pertinent to analyze how the business opportunity prototype is used in different contexts and with different stimuli. Returning to our example of the car, given that not all cars are the same, how would this inexperienced person use the framework they were given (large moving object, wheels, motor sound) when seeing a racing car or a truck? Some of these features would probably be more salient in one object than in another. How do inexperienced individuals make use of the business opportunity prototype to recognize different business opportunities? Grégoire and Shepherd (2012) suggest that individuals' knowledge, experience and motivations affect the way they perceive superficial and structural similarities in technology-market combinations to identify opportunities. Their findings focus on the specific set of technology transfer context and rely on the prior experience of entrepreneurs. Moreover, through their findings, Grégoire and Shepherd (2012) point out that some business opportunities require different levels of cognitive demand, because they are more or less easy to recognize. We aim to analyze how, at a very early stage of entrepreneurial activity, individuals with no experience make use of a cognitive structure to recognize different opportunities in different contexts. Fulfilling this aim contributes in three ways to the theory of entrepreneurship and the opportunity recognition literature based on cognition. First, we deepen the understanding of the activation and use of the business opportunity prototype at early stages of experience. Second, we extend the theoretical knowledge about the business opportunity prototype and compare its use on different types of opportunities. Finally, methodologically we use a prospective approach to business opportunity recognition, which is an alternative to the retrospective approach used by Baron and Ensley (2006).

2.2 Method

To fulfill the aims of our study, we conducted an experiment in which we presented participants with an opportunity recognition experience. We used scenarios as a way to describe situations where business opportunities were implicit and could be recognized. Scenarios (or vignettes) provide the opportunity to control and have a set of uniformed information that respondents will analyze (Adams, Licht, & Sagiv, 2011; Aguinis & Bradley, 2014).

Since we were also interested in analyzing opportunity recognition with individuals who had no entrepreneurial experience, we asked university students without entrepreneurial experience to participate in this study. Several studies reflect and access the impact of higher education in entrepreneurial intentions and performance (e.g., Bae et al., 2014; Block et al., 2011; Dane, 2010; Liñán, Santos, & Fernández, 2011; Veciana, Aponte, & Urbano, 2005) and recently, Frese and Gielnik (2014) pointed to education as cognitive and social preconditions to entrepreneurial activity. University students, who are considered to be potential entrepreneurs (Block et al., 2011; Unger et al., 2011) and from whom, is the past few years, an entrepreneurial mindset has been required to adapt and cope in the current environment, characterized by uncertainty and rapid change, constitute our sample.

The general procedure consisted of asking participants to read one scenario describing a business opportunity and then having them write down in their own words what business opportunity they could recognize in the story.

In the following section, more information about the study design, participants and instruments is provided.

2.2.1 Study Design

We developed two scenarios based on two real business stories. Scenario A proposed an independent entrepreneurial business opportunity to create a low-cost airline company, based on the true story of the creation of a low-cost airline, and on the consequent proliferation of low-cost airlines in the United Kingdom (Rae, 2007). Scenario B proposed a business opportunity in the form of a business reformulation,

which described a potato farmer who was considering transforming the business into a gourmet potato chip production company. This story drew inspiration from the development of a potato chips brand in the United Kingdom (Rae, 2007). Both stories included elements of the business opportunity prototype that induces the identification of a business opportunity: The first was an independent entrepreneurial one, in the sense that the venture starts from scratch and leads to the creation of a still non-existent service; the second was a business reformulation one, since a company already existed but was seeking opportunities to renew or extend its business.

We used the business opportunity prototype presented by Baron and Ensley (2006) to manipulate different information based on the dimensions of the prototype for each scenario. Therefore, the scenarios had implicit information concerning three dimensions of the business opportunity prototype: (1) solves customers' problems, (2) generates positive net cash flow and (3) manageable risk. We chose these three dimensions for our study for two reasons: First, in Baron's and Ensley's model, they were the most significant to explain the business opportunity prototype in their factorial model; and second, these were the only dimensions, from a total of five, that did not require comparisons with other products (as is the case of the 'superior product' dimension) or knowledge of a complete market/industry (as is the case of the 'industry change' dimension), and the information presented in the scenarios could fully describe them. According to Baron and Ensley (2006), each of these dimensions (i.e., (1) solves customers' problems, (2) generates cash flow and (3) manageable risk) comprises several items. In order to introduce them in the stories, each item was operationalized in a sentence. We had, thus a 2 (scenarios A and B) X 3 (prototypical dimensions: solves customers' problems, generates positive net cash flow and manageable risk) study design, with six independent groups.

The existence of three different versions of each scenario, which manipulated information regarding the different dimensions of the prototype, had the goal of guaranteeing that all the prototypical aspects that we aimed to assess were present in the stories. Manipulation checks on these scenarios have been performed in prior empirical work (Costa, Santos, & Caetano, 2013). In addition, we verified in the present study whether the manipulation was effective by counting the expressions relating to each prototypical dimension that the participants referred to in each version. We concluded

that, on average, when a dimension of the prototype is present, more expressions referring to that dimension were mentioned in both scenarios. We also analyzed whether the total amount of expressions referring to the three dimensions was significantly different according to the condition. As expected, they were not, since all of these dimensions are part of the same construct (business opportunity prototype) ($F_{Scenario\ A}$ (2.32) = 1.46; p > 0.05; $F_{Scenario\ B}$ (2.32) = 0.89; p > 0.05). That being the case, we proceeded with the analysis of all conditions simultaneously and we looked at the differences based on the two different business opportunities (scenarios A and B, see Appendix A, Table A1).

2.2.2 Participants

We analyzed the answers of 70 university students. Most participants were female (70%), and the average age of participants was 21 years. The participants came from a variety of study fields (sociology and psychology, among others). The majority of them (70%) were undergraduates pursuing a bachelor's degree, and the remaining 30% were pursuing a master's degree.

Each individual participating in the study had already come up with, on average, about four business ideas, although none of them had ever launched a business venture. Table 2.1 shows the distribution of participants by scenario.

Table 2.1 *Distribution of participants by scenario and demographic characteristics*

	Scenario A	Scenario B
N	35	35
Gender		
Male	23%	37%
Female	77%	63%
Age		
	M= 22	M= 21
Education		
Enrolled in a bachelor's program	55%	86%
Enrolled in a master's program	45%	14%
Number of business opportunities		
"How many business opportunities have you thought about?"	6	1

2.2.3 Instruments, Procedure and Data Analysis

We used a questionnaire to collect data from participants recruited at a university. They were asked to fill in the questionnaire without interruption and without assistance

from anyone. Participants were told that their involvement was voluntary and their data confidential. Each participant was randomly assigned to read one of the two scenarios.

Before presenting the scenario, we provided some written instructions to participants: They had to read the story carefully and imagine themselves as the subject. After reading the scenario, they were given the instruction to 'Describe the business idea suggested by the previous story' in writing.

We performed a content analysis to examine the participants' written responses. The aim of this analysis was to scrutinize the expressions used by participants when describing the business opportunity. To perform this analysis, we created two types of codes: before the analysis (*a priori*, based on literature) and after the analysis (*a posteriori*, based on responses) (e.g., Krippendorff, 1980). The former referred to expressions identical to the ones used by Baron and Ensley (2006) to describe the dimensions of the business opportunity prototype (e.g., *meets customers' needs* and *accepted by customers*). The latter was based on the responses, which content was also related to the business opportunity prototype. These expressions were not exactly the same as the expressions shown by Baron and Ensley (2006), but their content fitted the construct of business opportunity prototype (e.g., *controlled risk* and *low investment required*). The authors performed the coding, and there was consensus regarding to which family code each code belonged, according to the manipulation of the dimensions of the prototype: *solves customers' problems, generates cash flow and manageable risk.* These codes allowed us to observe how individuals with no entrepreneurial experience analyzed this business opportunity. Figure 2.1 shows all codes and family codes obtained during analysis, and Table 2.2 shows some of the participants' quotations for each code.

We also controlled whether participants identified the same business opportunity in each scenario. Participants identified only the two business opportunities, according to what was manipulated in the stories.

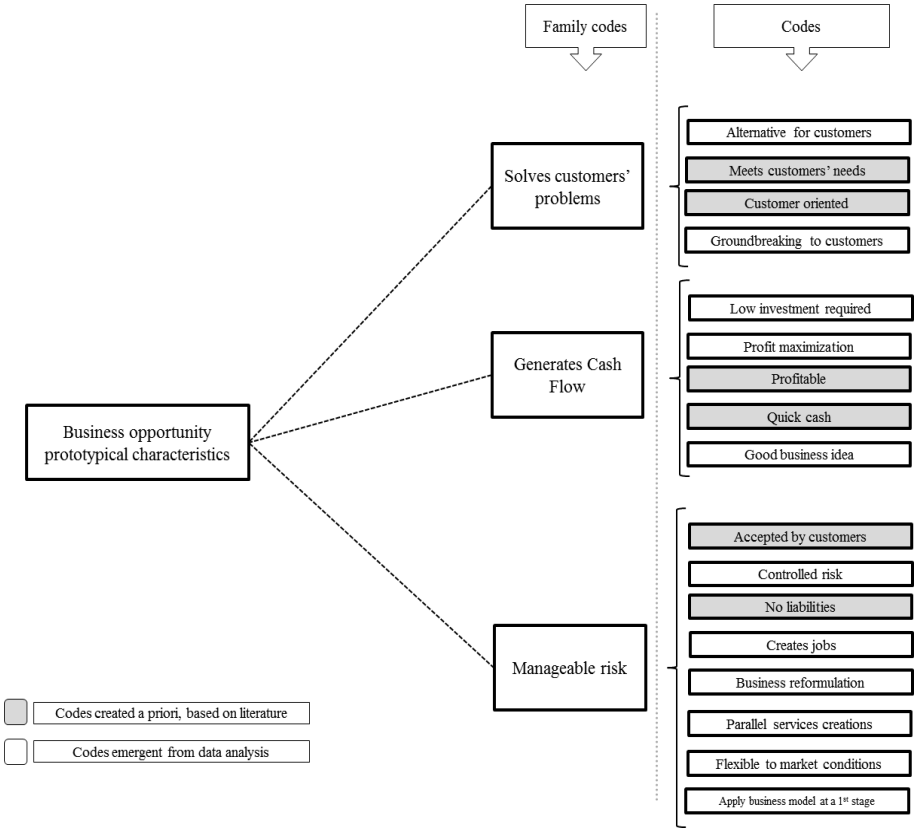

Figure 2.1 *Codes and family codes resulting from content analysis.*

Table 2.2 *Examples of participants' quotations*

Codes		Examples of citations
Family code: Solves customers' problems	Alternative for customers	"Provides an alternative in prices…"; "It's an advantage compared to the existing offer"; "Alternative for traveling"
	Meets customers' needs	"It is in accordance with passengers' needs; "It's accessible to a broader population"; "It would provide more people with the opportunity to use air conveyance"
	Customer-oriented	"It's an idea geared to a specific customer target"; "Provides a better customer service"; "Exclusively thinking about the client"
	Groundbreaking to customers	"It is innovative"; "an intelligent idea".
Family code: Generates Cash Flow	Low investment required	"Requires low investment"; "Doesn't have many financial obligations"
	Profit maximization	"High profit margins"; "aiming to maximize profit"
	Profitable	"Profitable"
	Quick cash	"obtaining profit very quickly"; "[profit] in a short time"; "It will be profitable very quickly"
	Good business idea	"good to invest"; "it is a good opportunity to business"
Family Code: Manageable Risk	Accepted by customers	"It's accepted by consumers"
	Controlled risk	"It has had good results in other contexts"; "gives guarantees of business security"
	No liabilities	"There are no barriers to start this business"; "Legally easy to do"
	Creates jobs	"Work force is necessary"; "The process depends mainly on manual work"
	Business reformulation	"There is a strategy of adaptation"; "Transform the production process"
	Parallel services creation	"I would keep both businesses running"; "I would also create a transfer service to travel between cities and airport"
	Flexible to market conditions	"Adequate to market conditions"; Fits the market"
	Apply business model at a first stage	"I would apply this model only at a first stage"; "After evaluating the success of it at a first stage, I would do it exclusively"

2.3 Results

We analyzed whether the nature of the business opportunity (entrepreneurial *versus* reformulation) has an effect on the average amount of quotes that participants used to describe the business opportunities. The family codes resulted from the sum of the absolute frequencies of the code, i.e., the number of times the participants referred to them.

Given the small size of our sample, we also performed normality and homogeneity tests regarding the variables representing business opportunity prototype dimensions (solves customers' problems – SCP; generates cash flow – GCF; manageable risk – MR) and their relation to the nature of the business opportunity. Based on this analysis, we concluded that the variables concerned had a significantly non-normal distribution, due to a frequency count method (D_{SCP} (70) = 0.308, $p < 0.05$; D_{CF} (70) = 0.228, $p < 0.05$; D_{MR} (70) = 0.293, $p < 0.05$), although the assumption of homogeneity was met (F_{SCP} (2.67) = 0.73, $p > 0.05$; F_{CF} (2.67) = 1.80; $p > 0.05$; F_{MR} (2.67) = 1.94, $p > 0.05$). Consequently, we proceeded with the analysis using a non-parametric test to analyze the effect of the nature of business opportunity on the use of the business opportunity prototype.

2.3.1 The Effect of the Nature of Business Opportunity on the Use of the Business Opportunity Prototype

We performed a Mann-Whitney U test to compare the amount of expressions between the dimensions of the business opportunity prototype by scenario. Thus, we tested whether the nature of the business opportunity (A – Independent business opportunity vs. B – Business reformulation) has an effect on the amount of expressions participants use concerning the business opportunity prototype dimensions (SCP, GCF and MR). Table 2.3 shows the average amount of times that each dimension of the business prototype was referred to by scenario, by each participant.

Table 2.3 *Mean, median, minimum and maximum of expressions by scenario*

	A – Independent business opportunity				B – Business reformulation			
Prototype Dimension	*M*	*Mdn*	*Min.*	*Max.*	*M*	*Mdn*	*Min.*	*Max.*
Solve customers' problems (SCP)	0.85	1	0	5	0.29	0	0	1
Generates cash flow (GCF)	1.00	1	0	3	0.86	1	0	3
Manageable risk (MR)	0.54	0	0	3	0.83	1	0	3

The comparative analysis shows that the amount of expressions referring to the prototype dimension GCF ($Mdn = 1$) after reading Scenario A did not differ significantly from the amount referred to by the participants who read Scenario B ($Mdn = 1$), $U = 550.0$, $z = -0.78$, $p > 0.05$. We also calculated the effect size of the nature of the business opportunity on the amount of expressions regarding the dimension GCF, $r = -0.09$, which shows a very small effect, the *r*-value being below the 0.3 criterion for a medium effect size (Field, 2009). By contrast, there are significant differences between the amounts of expressions referring to the prototype dimension SCP in scenario A ($Mdn = 1$) and scenario B ($Mdn = 0$), $U = 395.0$, $z = -2.90$, $p < 0.01$. The effect of the nature of the business opportunity on the amount of expressions regarding the dimension SCP is moderate: $r = 0.35$. Finally, there were also significant differences between the amounts of expressions referring to the prototype dimension MR in scenario A ($Mdn = 0$) and scenario B ($Mdn = 1$), $U = 449.5$, $z = -2.09$, $p < 0.05$. The effect of the nature of the business opportunity on the amount of expressions regarding the dimension MR is small: $r = 0.25$.

In summary, the type of opportunity had a significant effect on the amount of expressions referring to customers and risk but not on the amount of expressions regarding profit.

2.4 Discussion

The present study has analyzed how individuals with no entrepreneurial experience make use of a basic cognitive structure to recognize different business opportunities, in different contexts. Specifically, we analyzed how the nature of the business opportunity affects the recognition of prototypical features upon opportunity recognition.

Results showed that the nature of the business opportunity (independent entrepreneurship *versus* business reformulation) has an effect on the way participants use their business opportunity prototype, specifically concerning the dimensions of customers and risk. By contrast, the nature of business opportunity does not have a significant effect on cash flow perception.

The results show that an opportunity to create a new venture affects the way individuals recognize the elements of the opportunity related to customers' satisfaction. There is more emphasis on customers in an independent business opportunity than in a reformulation one. However, business reformulations opportunities significantly affect the way individuals recognize the elements of the opportunity related to risk. Participants tended to be more cautious when they might have something to lose, such as their existing business. This conclusion is also in line with what is evidenced in the literature. Although innovation processes, such as corporate entrepreneurship and business reformulations, are the best way to guarantee survival in the market, information on how to implement such processes as well as a risk-taking attitudes are crucial to perform such innovation and changes (Lassen, Gertsen, & Riis, 2006; Uittenbogaard, Broens, & Groen, 2005).

In the new venture creation, participants were less risk-averse. By contrast, in a business reformulation, customers are already involved, and this dimension does not play as significant a role as in an entrepreneurial one, when customers still need to be gathered. The identification of elements in the opportunities concerning cash flow generation is not significantly different in the two opportunities. Regardless of the type of opportunity, recognition of characteristics concerning profit was equally performed.

Our results refer to both the nature and context of a business opportunity and the cognitive structures of the individuals recognizing opportunities. The prototype, as a cognitive framework, is useful, since it allows discriminating between different business

opportunities, and the nature of business opportunity has an effect on the way individuals recognize the dimensions of a business opportunities from a customer's and risk point of view, but not from the point of view of generating money.

This study highlights important aspects of entrepreneurial reasoning and business opportunity recognition. First, it shows that it is possible to induce and manipulate entrepreneurial experiences in a quasi-experimental design, which not only sheds important light on the field of entrepreneurship research but can also provide useful clues for improving entrepreneurial learning and training. Having insights into how inexperienced individuals activate and use the cognitive structures for opportunity recognition can help design training programs to develop mental frameworks similar to those of expert entrepreneurs. Second, this study shows that the business opportunity prototype is useful for identifying business opportunities and successfully evaluating their main characteristics.

2.4.1 Limitations and Directions for Future Research

Some limitations to this study should be pointed out. For instance, a larger sample would produce results that are more robust. In general, the average of the characteristics pointed out by participants was low. We suggest that this is a consequence of the participants not having any previous experience in entrepreneurship and, therefore, their prototype of business opportunity was yet not well defined (Baron & Ensley, 2006). In future research, it would be interesting to compare these results with the ones of experienced entrepreneurs who are more engaged in practical activities related to entrepreneurship and who have gone through a process of legitimization in the activity (De Clercq & Voronov, 2009).

We are also aware that the business opportunity prototype perspective refers to a type of entrepreneurship focused on commercial purposes. It would be interesting in future research to evaluate which dimensions of the prototype are activated in other entrepreneurial settings, as for example in social entrepreneurship opportunities.

2.4.2 Theoretical and Practical Contributions

Despite these limitations, and given the importance of understanding entrepreneurial activity, this study makes a valid contribution by pointing the way towards promoting initiatives that can develop and improve entrepreneurial activity. Adopting a cognitive perspective is relevant to understand opportunity recognition as, according to Baron (2006), entrepreneurs or would-be entrepreneurs might consequently be trained and oriented to focus on specific relevant stimuli around them to recognize opportunities. Understanding how a first entrepreneurial experience occurs allows for the creation of follow-up activities with nascent entrepreneurs, and for training programs to be developed that can help enhance entrepreneurial activity and ensure its success. This contribution is also relevant with regard to management practices in human resources. Some authors consider that entrepreneurs and intrapreneurs are the most valuable human resources as they contribute to the creation of new ventures and to the success of their organizations (Rathna & Vijaya, 2009). Moreover, organizational and economic development is substantially dependent on entrepreneurship in existing organizations (intrapreneurship) (Antoncic & Hisrich, 2003), and an entrepreneurial culture and innovative companies are known to be effective at fostering a corporate culture that ensures committed employees and long-term success (Camelo-Ordaz, Fernandez-Alles, Ruiz-Navarro, & Sousa-Ginel, 2011; Dayan, Zacca, & Di Benedetto, 2013; Thornton, Ribeiro-Soriano, & Urbano, 2011).

Future research should focus on the application of these findings in the organizational context and produce tools that allow practitioners to recruit and select individuals with an entrepreneurial profile, or to develop their employees' competencies in that direction. It is our belief that understanding entrepreneurship from its earliest stage and within different business opportunity contexts leads to important insights not only about organizational practices but also about the general view of entrepreneurship. At a more proximal level of analysis, these results can contribute to how entrepreneurship may be viewed and taught from the early stages of a student's education, which is where universities play a fundamental role (Anderson & Jack, 2008). In this sense, and in line with the work of other authors on entrepreneurship education (e.g., Faoite et al., 2003; Fayolle et al., 2006; Jack and Anderson, 1999), these findings may contribute to enriching

the training needs diagnosis and evaluation of training initiatives related to entrepreneurship.

2.5 Conclusion of Chapter 2

Study 2 shows that the context where a business opportunity is recognized has an effect on the way individuals identify its prototypical dimensions. It is interesting to note that in entrepreneurial settings individuals are less risk-averse, i.e., identify less dimensions related to risk, than on business reformulation episodes. On the other hand, in entrepreneurial episodes, individuals focus significantly more prototypical aspects related to customers than in business reformulation ones. In both settings, prototypical dimensions regarding profit generation are equally considered. These findings are important to understand how individuals perceive opportunities from a very early stage of development of the entrepreneurial mindset.

On Chapter 1 our theoretical model suggested that the context of the opportunity is a predictor of the use and development of the business opportunity prototype. This relation had been described theoretically but not empirically tested. In this sense, this study contributes to a better understanding of the influence of context in the use of the business opportunity prototype upon recognition. Worth of note is also that we observed this process with individuals who have no practical experience in entrepreneurship and we used an experimental approach to guarantee a uniform entrepreneurial setting for all participants. Besides the context and nature of the business opportunity, the context of the individual (i.e., his or her background, country or culture, experience) can also influence the development of the cognitive structures. This relationship is tested on the following chapter (Chapter 3).

CHAPTER 3 - BUSINESS OPPORTUNITY RECOGNITION AMONG PORTUGUESE AND GERMAN STUDENTS: A SIMPLIFIED PROTOTYPE (STUDY 3)

CHAPTER 3 - BUSINESS OPPORTUNITY RECOGNITION AMONG PORTUGUESE AND GERMAN STUDENTS: A SIMPLIFIED PROTOTYPE (STUDY 3)

Summary

This chapter addresses the underline the structure of the business opportunity prototype of potential entrepreneurs at a very early stage of the entrepreneurial process. In addition, address to the effect contextual factors (country) and previous engagement in entrepreneurial thinking (experience in opportunity recognition) have on this cognitive structure.

Drawing upon the factorial model of business opportunity prototype proposed by Baron and Ensley (2006), we hypothesize that university students possess a simplified prototype of business opportunity, including attributes related to customers' satisfaction and profit generation. We tested this model in the full student sample, and we compared the fit of the model between students with and without prior-experience in opportunity recognition. To provide preliminary cross-country validation of the simplified business opportunity prototype we tested its equivalence within university students from Portugal (N= 199) and Germany (N= 128).

Confirmatory factor analyses and multigroup analyses demonstrated that the business opportunity prototype of university students is a two dimensional model integrating *solving customers' problems* and *positive net cash flow*. Additionally, results showed that the structure of this simplified prototype is invariant among university students with and without prior-experience in opportunity recognition and across the groups from both countries.

The current version of this study includes relevant feedback provided by a blind peer-review process and it has been presented the 2014 Academy of Management Meeting, Entrepreneurship Division Session, Philadelphia, Pennsylvania, U.S.A. Currently it is under review in an international journal.

Reference: Costa, S., Wach, D., Santos, S., & Caetano, A. (under review). Business opportunity recognition among Portuguese and German students: A simplified prototype. Article presented at the 2014 Academy of Management Meeting, Entrepreneurship Division Session, Philadelphia, Pennsylvania, USA.

3.1 Introduction

Previous empirical studies have focused on how entrepreneurs recognize opportunities. Some of these studies suggest that pattern recognition and the use of prototypes to recognize opportunities represent cognitive processes used by entrepreneurs (e.g., Baron & Ensley, 2006; Baron, 2006; Durand & Paolella, 2013; Palich & Bagby, 1995; Wood & Williams, 2014). While past research predominantly focuses on established entrepreneurs, this study describes the cognitive structures of potential entrepreneurs. University students, who have no entrepreneurial experience, are a good example of potential entrepreneurs. Additionally, taking university students as a sample is of high importance both for research and practice, as high education is an important human capital variable associated with prevalence to start a new business and business performance (Rauch & Rijsdijk, 2013; Unger et al., 2011). Moreover, while existing studies tend to focus mainly on entrepreneurial experience as prior venture launch or prior business owning, this study will shed light on the cognitive structure underlying opportunity recognition within potential entrepreneurs with different levels of prior experience in opportunity recognition. Finally, many studies refer to opportunity recognition in specific cultural contexts, not addressing the subject of cognitive congruence across cultures (Mitchell, Smith, Seawright, & Morse, 2000). In this sense, the current study also addresses the issue of variability *versus* stability of cognitive structures across two countries.

This study has three main goals. First, we aim to describe and test the underlying structure of a simplified business opportunity prototype for university students. Second, we will compare the simplified prototype according to different levels of experience in prior opportunity recognition among university students. Finally, we will also test the equivalency of this structure across two samples of university students from two different countries.

While we are aware of the different perspectives on opportunity identification in the literature, we aim to position this study on an individual-opportunity nexus perspective, following up on the reasoning defended along this thesis. This means that entrepreneurship occurs in the intersection between the particular characteristics of individuals and the idiosyncratic environment where they are positioned. Such intersection is often described in the literature as a result of the use of cognition by

individuals to understand and make sense of the environment surrounding them (e.g., Forbes, 1999). Specifically, the literature on cognitive processes and structures responsible for opportunity recognition relies on the fact that entrepreneurs match new information with their experience and prior knowledge to make sense out of it as opportunities (see Chapter 1). Following up on the reasoning we have been focusing on this thesis, pattern recognition and prototypes are crucial to explain opportunity identification, i.e., as a way to identify patterns of seemingly unrelated events in the environment which can be recognized as an opportunity (Baron & Ensley, 2006; Baron & Ward, 2004; Baron, 2006). To frame this study, it is important to recall two important notions associated with prototypes (see Chapter 1): 1) prototypes can be developed and learned and 2) individuals can be primed in order to activate their knowledge structures (Palich & Bagby, 1995; Rosch, 1973, 1978). This means that by studying the dimensions of prototypes used by entrepreneurs upon opportunity recognition, can provide important information on how entrepreneurs recognize opportunities. In addition, knowing these dimensions can provide important guidelines to individuals with less experience in order to develop their mindset towards an entrepreneurial one. Therefore, if one of the goals of entrepreneurial cognition is to explain and enhance entrepreneurial thinking, addressing the underlying cognitive structure of opportunity recognition with individuals who have no entrepreneurial experience is important.

Generally, empirical studies address novice entrepreneurs to explain entrepreneurial cognition at an early stage of entrepreneurial thinking. However, other groups that are very likely to engage in entrepreneurial activities, such as university students, are important to be investigated, as they are at a more premature stage of the entrepreneurial process than novice entrepreneurs (Shane, 2003; Wang & Wong, 2004). Only when we know the current state of their cognitive ability to recognize opportunities, activities that focus on the stimulation of entrepreneurial thinking can be developed. This study sheds light on how university students think and perceive entrepreneurial opportunities. Our conclusions do not only address the importance of the individual in the entrepreneurial process, but are also a starting point that can provide important clues to enhance and develop academic training programs towards successful entrepreneurial activity.

3.1.1 The Business Opportunity Prototype of University Students: A Simplified Prototype

Drawing on the work of Baron and Ensley (2006), it was possible to describe and compare the business opportunity prototype of experienced and novice entrepreneurs and conclude that the more experienced an entrepreneur is, the better defined and richer their business opportunity prototype is. In other words, experiences shape cognitive structures and entrepreneurs, having experience in entrepreneurship, have better defined cognitive structures than individuals who have no entrepreneurial experience (Baum et al., 2007). However, the linear character of the relationship between experience and opportunity recognition has been questioned. Gielnik and colleagues (2014) have demonstrated that experience has a positive effect on opportunity recognition only to a certain extent and then the effect tends to decrease. Experience by itself is a necessary but not a sufficient condition for success in opportunity recognition (e.g., (Baum et al., 2007). Unger, Rauch, Frese and Rosenbusch (2011) also stress this by demonstrating the significant relationship between human capital and entrepreneurial success. Human capital involves variables such as education, knowledge, skills and experience, among others. By pursuing a high level of education, university students may hold higher levels of general mental ability, which is positively related to successful opportunity recognition (Gielnik et al., 2014). Moreover, in recent years, entrepreneurship has been introduced at the university level as a desirable goal. For example, students are encouraged to engage in entrepreneurial activities (e.g. Neck & Greene, 2011), which points out that not only actual entrepreneurial experience (such as venture launch, business owning or self-employment) but other key aspects of the environment (e.g., access to high education and/or being in an entrepreneurial university environment) can contribute to the development of the entrepreneurial mindset of students (Gielnik et al., 2014).

To better understand the recognition of business opportunities among potential entrepreneurs, this study investigates the business opportunity prototype of university students and its underlying structure. As entrepreneurial experience increases the prototype precision and richness (Baron and Ensley 2006), the prototype of university students, who typically are not engaged in entrepreneurial activities, will be a simplified prototype. That is because university students performing opportunity recognition tasks

might not be aware of all business opportunities' characteristics as experienced entrepreneurs. We consider that initially, their business opportunity prototype might be constituted only by some of the five dimensions regarding recognition. The dimensions such as *solves customers' problems* and *positive net cash flow* are more likely to be identified by university students, because they fit the general definition of opportunity that puts emphasis on both the desirability of products or services and on economic value as key features of an entrepreneurial opportunity (Baron, 2006). These two dimensions are more intuitive and we believe they constitute a simplified prototype that it is likely to be used by university students.

The other dimensions of the prototype (i.e., *manageable risk*, *superior product* and *changes industry*) require a deeper and systematic cognitive analysis. For instance, m*anageable risk*, is a more complex concept to identify at an early stage of the entrepreneurial activity. According to Baron (2006), less experienced individuals do not focus as well as experienced entrepreneurs on the analysis of risk. Moreover, individuals that tend to identify high levels of risk in general situations may be reluctant to identify any opportunity as a good one (Baron, 2006). Although university students are aware of entrepreneurship because they are integrated in the university setting, which is prone to promote entrepreneurship awareness, they still have no practical experience. Therefore, university students may not consider risk as a key characteristic to be included in their business opportunity prototype. Finally, other dimensions of the prototype such as *superior product* and *changes industry* require a broad and vast knowledge of the market and industry that is virtually not present in the mind of individuals who have no practical experience. Considering this reasoning we draw our first hypothesis:

> *Hypothesis 1: The underlying structure of university students' mental prototype of business opportunity is a simplified one with two dimensions focusing on solving customers' problems and generating positive net cash flow.*

3.1.2 The Role of Prior Opportunity Recognition on the Simplified Prototype

According to the literature experiences shape cognition (e.g., Palich & Bagby, 1995; Politis, 2008; Ucbasaran et al., 2007; Westhead, Ucbasaran, & Wright, 2009). In the case of entrepreneurs, experience and prior knowledge are fundamental to successful opportunity recognition performance (e.g., Sommer & Haug, 2010), as experience and prior knowledge are the basis of the cognitive structures of entrepreneurs. Baron and Ensley (2006) also demonstrated on their study describing the business opportunity prototype that experienced entrepreneurs have richer and better defined prototypes than novice entrepreneurs. Gielnik and colleagues (2014) add that "even entrepreneurs with little experience can identify a high number of business opportunities when they engage in active information search" (p. 374). Following this reasoning, we consider comparing the simplified business opportunity prototype model among students who have never recognized business opportunities and the ones who have recognized opportunities important. At this point we should stress that we refer to a very early-stage type of entrepreneurial experience. We do not refer to more advanced experiences in the entrepreneurial process, such as launching a venture or participating in venture competitions. These actions are a step further in the process than opportunity recognition, which occurs at an individual level on the realm of the idea and cognition. We do refer to having recognized opportunities before as experience in entrepreneurial thinking. These experiences are not enough to be identified as actual entrepreneurial activities, but might be enough to start shaping a cognitive structure underlying business opportunity recognition. Our goal is to investigate the simplified business opportunity prototype within potential entrepreneurs with and without prior-experience in opportunity recognition. We believe that such differences will not affect the underlying structure of the prototype, although they may be associated with how students rate identify prototypical characteristics in a business opportunity. For instance, students who never recognized any business opportunity before may be prone to over or underestimate its attributes, i.e. solving customers' needs and generating profit. Moreover, experience is more responsible for shaping the richness and accuracy the prototype, rather than its structure (Baron & Ensley, 2006). Therefore, we do not expect the cognitive structure to be different between university students who have never recognized a business

opportunity and the ones who have. However, we aim to look at how prior opportunity recognition affects the ability of students to recognize each of the dimensions of the simplified prototype. Therefore, based on this reasoning we draw our hypothesis 2:

> *Hypothesis 2: The structure of the simplified model of business opportunity prototype is equivalent (invariant) for both students with and without experience in opportunity recognition.*

3.1.3 Equivalence of the Simplified Business Opportunity in German And Portuguese Subsamples

Finally, we draw attention to the issue of equivalence of the simplified business opportunity prototype across countries. Prototypes develop as situated experiences, i.e., in a given context. Therefore, we consider understanding how university students from different countries use the simplified prototype for opportunity recognition important. In order to do this we chose Portugal and Germany to test whether the country specific context has a significant effect on the underlying structure of the simplified business opportunity prototype. Entrepreneurial activity manifests differently across countries. Different nations have different start-up, success and failure rates of entrepreneurial activity (Krueger, 2007). In the case of Portugal and Germany, both countries are typified as innovation economies (Global Entrepreneurship Monitor, 2011). However, the entrepreneurial intention (EI) and the total early-stage entrepreneurial activity (TEA) varies among respondents from both countries. In general, Portugal adult population shows a higher EI (12% vs. 5%) and higher TEA (7.5% vs. 5.6%) than Germany. It is relevant to consider that these data refer to 2011, and Portugal was facing a severe economic and financial crisis. As a response to this situation, there were national policies to support self-employment and entrepreneurship, and consequently the TEA and IE showed an increase when compared to previous years. These differences, however, are only indicative of eventual contextual conditions rather than there is a structural difference in the cognitive framework of both populations, which has been demonstrated in the literature. For example, Mitchell and colleagues (2000) conducted a cross-cultural study with seven countries to evaluate the predictive ability of entrepreneurial cognition and values on venture creation. The authors concluded that entrepreneurial cognitive

structures and schemes were able to explain differences between entrepreneurs and non-entrepreneurs and also that entrepreneurial cognitive structures and scripts are consistent across cultures. In regard to the cultural background, which is of high relevancy for entrepreneurial activity (Moriano, Gorgievski, Laguna, Stephan, & Zarafshani, 2011; Stephan & Uhlaner, 2010), these two countries belong to two different regional clusters (Germanic and Latin European) that however, are included in a broader context, the European one, where general initiatives for entrepreneurship development are currently developed, suggesting that both countries are close in terms of cultural values (e.g., House, Javidan, & Dorfman, 2001; Javidan, Dorfman, Luque, & House, 2006). Therefore, eventual differences of objective entrepreneurial activity might derive more from economic and context differences, rather than from the way of perceiving opportunities or on the entrepreneurial awareness. Therefore, we consider that the cognitive structure of university students from both Portuguese and German samples is equivalent. Thus we formulate hypothesis 3:

> *Hypothesis 3: The simplified model of business opportunity prototype is equivalent (invariant) for both Portuguese and German samples of university students.*

3.2 Method

3.2.1 Participants and Procedures

Participants for this study were recruited at their universities (a Portuguese and a German one) and were asked to answer a questionnaire, which took approximately 25 minutes to complete. From an initial 342 participants, we excluded 15 cases who reported to have their own business and did not answer to a great extent of the survey. The answers of 327 university students from Portugal and Germany were analysed in this study. Table 3.1 shows the description of the sample in terms of gender, age, educational level, subject of study, country of data collection and prior experience in opportunity recognition.

Table 3.1 *Sample descriptive information*

N = 327		
Age	Mean	S.D.
	21	3.32
Gender	n	%
Female	178	54.4
Male	149	45.6
Educational level		
Undergraduate (attending a BSc Program)	275	84.0
Graduating (Master or PhD)	50	15.4
Missing	2	0.6
Study area		
Social Sciences and Humanities	179	54.7
Economics, Management and Technology	135	41.3
Other (Health, Architecture, Philosophy, among other)	8	2.4
Missing	5	1.6
Country		
Portugal	199	60.9
Germany	128	39.1
Prior experience in opportunity recognition		
Has never recognized opportunities	143	43.7
Has recognized at least one opportunity before	184	56.3

We asked participants how many business ideas they had already thought about, as a way of identifying those who had prior experience in opportunity recognition and the ones who did not (Table 3.1). Fifty-six percent of the participants reported to have recognized at least one business opportunity before. No differences were observed in regard to age (M=20.76 *vs.* 21.28, $p > 0.05$), gender (X^2=1.90, $p > 0.05$ *(df=1);* 59% female in no-prior experience *vs.* 51% in prior-experience), educational level (X^2 = 0.78 $p > 0.05$ *(df*=2*);* 84.6% undergraduate in the group without prior experience *vs.* 83.7% in the group with prior experience*)* or subject of study (46.2% in economics, management and technology*;* 49.7% in social sciences and 3.5% in other subjects in the group without prior experience *vs. 37.5%* in economics, management and technology*;* 58.7% in social sciences and 1.6% in other subjects in the group with prior experience X^2= 13.50 $p > 0.05$ *(df* =9*)*) between the participants with and without prior experience in opportunity recognition. Moreover, there were no significant differences in the number of participants with and without prior experience in business opportunity recognition in the subsamples from both countries (*54.3%* in Portugal and *59.4 %* in Germany who has prior experience in opportunity recognition *X^2=0.825, p >0.05(df=1)*). There were also no significant differences in gender distribution for Portuguese and German subsamples (*X^2=1.67, p=0.120) (df=1*); *50% women on German group vs. 57% women on Portuguese group*). It was noted that German students were significantly older than the Portuguese ones (M_{German}= 22 *vs.* $M_{Portuguese}$= 20*;* $p < 0.05$) and there were significant more students attending to graduate programs in the German group than in the Portuguese one (32% students attending to graduate programs in the German groups *vs.* 4.5% students in the Portuguese group X^2=46.42, $p < 0.05$*; (df*=2*)*). In addition, there were no significant differences on the subject of study (45.3% in economics, management and technology, 52.3% in social sciences, 0.8% in other subjects of study in the German group and 38.7% in economics, management and technology, 56.3% in social sciences and 3.5% in other subjects of study in the Portuguese group X^2=3.43*;* $p > 0.05$*;* (*df*=2)).

3.2.2 Measures and Instruments

Business opportunity recognition. In order to assess on the use of the business opportunity prototype, we used a scenario where a business opportunity could be identified. A number of studies on entrepreneurship have used scenarios to evaluate the individual decision-making process and risk perception, among other topics (Burmeister & Schade, 2007; Doff, 2008; Dutton & Jackson, 1987; Wasieleski & Weber, 2008). For instance, Grégoire and colleagues (2010) have also used scenarios to assess the cognitive mechanism of opportunity recognition by entrepreneurs. We used a scenario which was previously validated (Costa et al., 2013) and which was based on a real situation and describing a setting convenient for a business opportunity recognition based on authentic events (see Table A1, Appendix A). The scenario suggested the creation of a low-cost airline company, based on the true story of a low-cost airline (Rae, 2007). The scenario did not state explicitly which business opportunity was to be recognized, but rather provided information in a *connecting-the-dots* perspective (Baron, 2006), allowing participants to recognize the business opportunity by connecting the information presented. Moreover, each dimension of the prototype was operationalized in a sentence in the scenario, to make sure that the characteristics of the business opportunity were present. All participants read the same scenario and immediately after reading it, participants were asked if they could describe any business opportunity based on the story they has just read, and were asked to describe it briefly. This was a control question to guarantee that participants had a common understanding of the business opportunity presented in the scenario.

Business opportunity prototype. Using a questionnaire, we asked participants to complete a scale of 14 items describing three dimensions of the business opportunity prototype, according to the items suggested by Baron and Ensley (2006) that constitute the dimensions of the prototype: *solves customers' problems*, *positive net cash flow* and *manageable risk*. Although we hypothesize that the prototypical model for business opportunity recognition will be two dimensional, we included *manageable risk* as well, to test alternative three-dimensional models.

Participants should answer the question *"In your opinion, are the following items a characteristic of the business opportunity you identified?"* on a scale ranging from 1

(”not at all”) to 5 (”very much”). The prototypical dimension *solves customers' problems* was measured by 5 items, such as “customers want it” and “meets customers' needs”. The *positive net cash flow* dimension was measured by 5 items, among them being “generates lots of cash” and “generates quick cash”. Finally, the *manageable risk* dimension was measured by 4 items, two examples being “customers accept it” and “involves technology changes”.

In addition to these questions we also collected the socio-demographic data for sample description (see Table 3.1).

Both the scenario and the items for data collection were submitted to a rigorous process of translation and back translation to guarantee that the content of the story and items was the same for the Portuguese and German versions.

Statistical analysis. To obtain the structure of the prototype for business opportunity recognition we conducted confirmatory factor analyses (Arbuckle, 2005) and to analyze the equivalence of the structure according to prior experience in opportunity recognition and between the two countries, we used multigroup analyses, following the procedures considered by Byrne (2010).

3.3 Results

Following our theoretical reasoning, we wanted to test a two dimensional model of business opportunity prototype with our sample of university students. This requires the scales to have high internal consistency and acceptable fit for confirmatory factor analysis (CFA). To examine internal consistency of each business prototype dimension across all the subsamples, we use Cronbach's alpha (Table 3.2). To examine the factor structure of the business opportunity prototype, we conducted CFA. We started by defining a baseline model for the whole sample, based on our theoretical reasoning. We then conducted a CFA for each subsample (across countries – Portugal vs. Germany; and across experienced vs. non-experienced).

Table 3.2 *Means, standard deviation and reliability of sub scales*

Prototype Dimensions - Original scales	μ	S.D.	α
1.Solves Customers' Problems (5 items)	3.55	0.78	0.79
2. Positive Net Cash Flow (5 items)	3.43	0.72	0.71
3. Manageable Risk (4 items)	2.95	0.56	0.25

3.3.1 Simplified Business Opportunity Prototype: Finding a Baseline Model

We started by testing our hypothesized model of a simplified business opportunity prototype for the complete sample. We tested a model with the two factors, referring to the two dimensions of the business opportunity prototype: *solves customers' problems* and *positive net cash flow*. This model demonstrated to fit the data well for the whole sample (χ^2=67.346 (*df* =26); *CFI* =0.955; *RMSEA*=0.070). On the subscale positive net cash flow, the item *represents a short cash burn* was eliminated as its loading was below 0.40 (as indicated by Tabachnick & Fidell, 2001) and because the reliability of the scale improved when eliminated (see Table 3.4). On the following steps we tested several alternative models in order to obtain further support that the two-dimensional model was the one that best fitted the data (see Table 3.3).

We started by testing a model based on Baron and Ensley's (2006) model for the business opportunity prototype with the three dimensions that we considered: *solves customers' problems, positive net cash flow* and *manageable risk* (see Model 2, Table 3.3). This model demonstrated to unsatisfactory fit the data for the whole sample (χ^2=225.771 (*df* =74); *CFI* =0.872; *RMSEA*=0.079). Afterwards, we tested an alternative model with three factors but we eliminated three items (based on the modification indexes information - see Model 3, Table 3.3). This time, the CFI was adequate for the whole sample (above 0.90); however, the items' loadings of the manageable risk subscale were below the threshold of .40 and the reliability was very low (see Table 3.2). On a fourth model we tested a model which assumed that all items loaded directly on a first-order factor business opportunity prototype (see Model 4, Table 3.3), and it showed a very low comparative fit index for the whole sample. Finally, we tested a model based on the correlation between the dimensions: a two dimensional model including the items of manageable risk on solves customers' problems factor (see Model 5, Table 3.3), as there was significant correlation between these two dimensions (*Pearson correlation* = 0.37*;*

$p < 0.01$). However, this model also showed a comparative fit index that demonstrated not to fit the data well.

Therefore, having statistical support and theoretical reasoning demonstrating that manageable risk is not a characteristic of the business opportunity represented in the prototype of university students, we confirmed that the model that better describes the business opportunity prototype of university students is a two-factor one: *solves customers' problems* and *positive net cash flow*. This model is thus the one that better fits the data, providing full support of Hypothesis 1.

Table 3.3 *Definition of a baseline model of business opportunity prototype for university students*

Model description N= 327	χ^2	*df*	*CFI*	*RMSEA*
1. Hypothesized model with 2 factors – Solves Customers' Problems and Positive Net Cash Flow – Simplified Business Opportunity Prototype	67.346	26	0.955	0.070
2. Model with three factors based on the original by Baron & Ensley: Solves Customers' Problems. Positive Net Cash Flow and Manageable Risk (14 items)	225.771	74	0.872	0.079
3. Model with 3 factors adapted from Baron & Ensley (without the items *involves technological changes*; *has risks in production* and *represents a short cash burn*)	114.605	41	0.932	0.074
4. All items load directly on one first-order factor – *Business Opportunity Prototype*	668.417	77	0.501	0.153
5. Model with two factors: Solves Customers' Problems (SCP) and Positive Net Cash Flow – Manageable Risk items loading on SCP	226.188	76	0.873	0.078

Note. χ2 = Chi-square. df = degrees of freedom. CFI = comparative fit index. RMSEA = root mean square error of approximation.

Table 3.4 *Means, Standard deviation and Reliability of Sub Scales on the Final Baseline Model*

	Solves Customers' Problems			*Positive net cash flow*		
	M	S.D.	α	M	S.D.	α
Complete sample – University students	3.56	0.77	0.79	3.60	0.76	0.80
Sub-sample defined by level of experience on opportunity recognition						
Non-experienced	3.53	0.84	0.82	3.71	0.68	0.79
Experienced	3.58	0.72	0.76	3.51	0.80	0.82
Sub-sample defined by country						
Portugal	3.82	0.67	0.75	3.61	0.76	0.84
Germany	3.14	0.74	0.76	3.68	0.75	0.77

3.3.2 Testing the Simplified Business Opportunity Prototype Model According to Prior Experience in Opportunity Recognition

To test hypothesis 2 we looked at the equivalence of the model across the group of participants who had prior experience in opportunity recognition and the group who had no prior experience in opportunity recognition. We started by testing the simplified prototype model in the two groups of students independently. The model fitted the data well in both cases (Students with prior experience in opportunity recognition: X^2 = 69.263, (*df*= 26*), CFI*= 0.914, *RMSEA*= 0.095; Students without prior experience*:* X^2 = 28.825, (*df*= 26*), CFI*=993, *RMSEA* = 0.028).

We proceeded in analyzing potential differences on the simplified business opportunity prototype within students with prior-experience in opportunity recognition and without, by testing the configural invariance of the baseline model. The configural model fitted well to the data (X^2 = 98.070, (*df*= 52), *CFI*= 0.949, *RMSEA*= 0.052, see Table 3.5). Thus, the number of factors and the pattern of their structure are similar across the group with prior-experience and the one without prior-experience. These results provide evidence for full configural invariance, meaning that the underlying two factor structure is the same in both groups. Second, we tested and supported full metric

invariance: we compared the fit of a model where the factor loadings were constrained to be equal to the fit of a freely estimated model (See Model A, Table 3.5 and Figure 3.1). Third, we tested structural invariance; when constrained, the covariances of the factors *solving customers' problems* and *positive net cash flow* to be equal across samples, the model fit did not deteriorate significantly.

These results suggest that the configural, metric and structural models of the business opportunity prototype is equal in both groups with and without prior-experience in opportunity recognition, supporting thus, Hypothesis 2.

Table 3.5 *Goodness of fit statistics for tests of multigroup invariance for prior-experience in opportunity recognition : A summary*

Model description	$\chi 2$	*df*	$\Delta\chi$	Δdf	*CFI*	*RMSEA*
1. Configural model, no equality constraints imposed	98.070	52			0.949	0.052
2. Measurement model - Metric invariance compared to configural invariant scales						
(Model A) All factor loadings constrained equal	109.59	59	11.52 (ns)	7	0.944	0.052
3. Structural model - Scalar invariance compared to metric invariant scales						
(Model B) Factor covariance among *SCP and* PNC constrained equal	109,789	60	11.719 (ns)	8	0.945	0.051
Error variance constrained equal	117,093	69	19.023(ns)	9	0.947	0.046

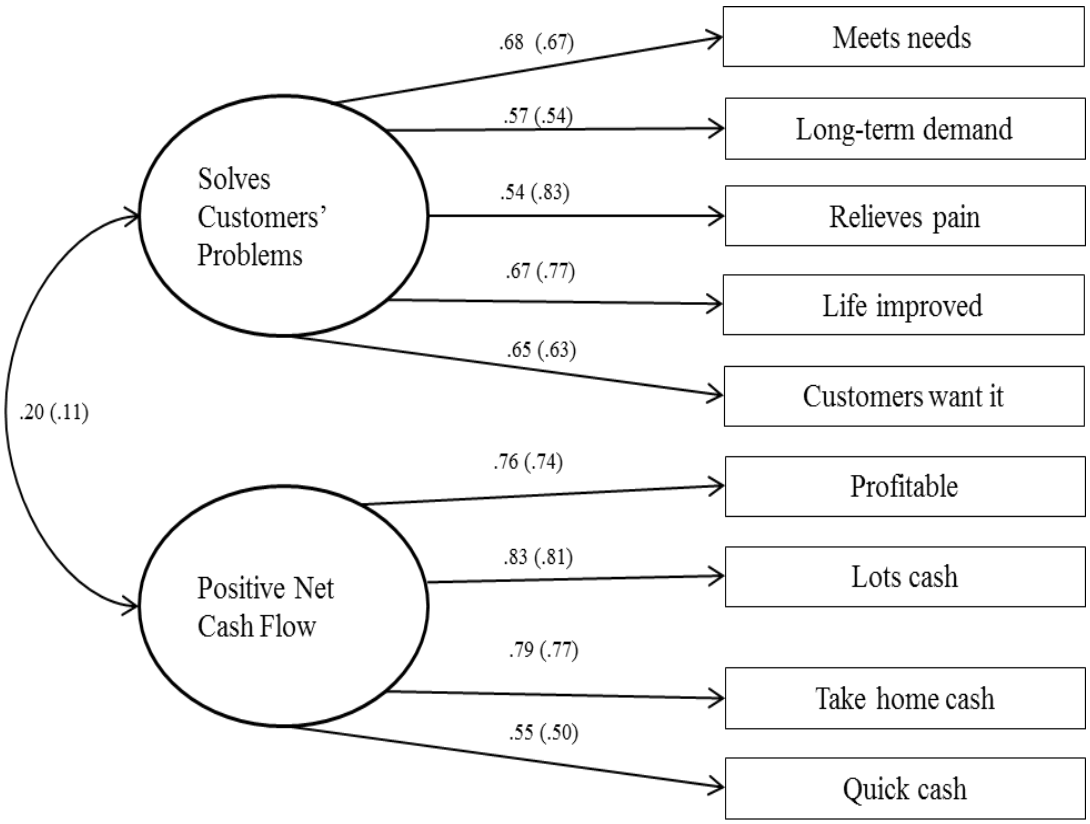

Figure 3.1 *Model of the Simplified Business Opportunity Prototype of University Students According to Prior-Experience in Opportunity Recognition.*

Note: Standardized factor loadings and correlation between the two factors are displayed. Values in brackets refer to the group without prior experience and the other values to the group with prior experience in opportunity recognition.

We investigated also if there were differences in the way students, with and without prior experience in opportunity recognition, rated the business opportunity according to the two dimensions of the prototype. To do so we conducted a multivariate analysis of variance (MANOVA) to test mean differences in the two dimensions of the simplified prototype. We used the MANOVA test because the two dimensions of the business opportunity prototype are part of the same construct. Thus, it is of interest to observe the effect of prior-experience in both dimensions simultaneously. Additionally, we were interested in observing whether there are differences in rating the business opportunity a) using the simplified prototype as a whole and b) using each dimension of the simplified business opportunity prototype.

The results indicated that participants with and without prior-experience in opportunity recognition differed significantly on rating the business opportunity according to the dimensions of the simplified business opportunity prototype ($F(2.324)= 3.45$; $p < 0.05$; *Pillai's Trace* =0.021). The univariate tests indicated that the two groups differed significantly in rating the business opportunity's *positive net cash flow* dimension, with the group without prior-experience rating it significantly higher ($M_{without\ prior\text{-}experience}= 3.71$ *vs.* $M_{with\ prior\text{-}exerience}= 3.50$). There were no significant differences on the dimension *solves customers' problems* between the two groups.

We performed also a paired sample t-test to observe if there were differences among the two two dimensions per group. On the group of individuals with prior experience in opportunity recognition, there were no significant differences on the recognition of the two dimensions (*t-test* (183) = 1.02; $p > 0.05$). On the other hand, the group without prior experience in opportunity recognition recognized significantly more potential to generate profit in the business opportunity than ability to solve customers' problems (*t-test* (142) = -2.15; $p < 0.05$).

We also conducted multivariate tests to account for eventual side effects of the subject of study of participants $F(2.634)=0.863$; $p > 0.05$; *Pillai's Trace* =0.048) and gender ($F(2.324)=0.318$; $p > 0.05$; *Pillai's Trace* =0.002*)* on the way participants characterized the business opportunity according to the two dimensions of the prototype, but only previous experience in idea recognition showed to have a significant effect.

3.3.3 Testing the Simplified Business Opportunity Prototype across Countries

We used a confirmatory factor analysis with AMOS to test the underlying structure of the business opportunity prototype for university students from Portugal and Germany separately. We tested the same models that had been tested for the whole sample now separately for both groups. The results were similar to the ones obtained to the whole sample, confirming, once again, that the model of a simplified prototype with two dimensions is the one that best fits the data also for both countries separately (see Table 3.6).

Table 3.6 *Definition of a baseline model of business opportunity prototype for university students – Groups according to country*

	χ^2		*df*		*CFI*		*RMSEA*	
Model description	*Portugal*	*Germany*	*Portugal*	*Germany*	*Portugal*	*Germany*	*Portugal*	*Germany*
1. Hypothesized model with 2 factors – Solves Customers' Problems and Positive Net Cash Flow - Simplified Business Opportunity Prototype	43.111	48.734	26	26	0.973	0.921	0.058	0.083
2. Model with three factors based on the original by Baron & Ensley: Solves Customers' Problems. Positive Net Cash Flow and Manageable Risk (14 items)	192.796	126.538	74	74	0.854	0.849	0.090	0.075
3. Model with 3 factors adapted from Baron & Ensley (without the items *involves technological changes*; *has risks in production* and *represents a short cash burn*)	109.305	77.158	51	51	0.921	0.917	0.076	0.064
4. All items load directly on one first-order factor – *Business Opportunity Prototype*	425.99	246.907	77	77	0.570	0.511	0.151	0.132
5. Model with two factors: Solves Customers' Problems (SCP) and Positive Net Cash Flow – Manageable Risk items loading on SCP	195.157	128.920	76	76	0.853	0.848	0.089	0.074

Note: χ2 = Chi-square. df = degrees of freedom. CFI = comparative fit index. RMSEA = root mean square error of approximation.

In order to test the cross- country invariance of the business opportunity prototype (hypothesis 3) in both Portuguese and German samples, we conducted a multigroup confirmatory factor analysis in both groups simultaneously. We used the accepted baseline model including the two dimensions of business opportunity prototype. The model fitted well to the data (χ^2=91.88(*df* =52); *CFI* =0.956; *RMSEA*=0.049) suggesting that the number of factors and the pattern of their structure are similar across Portuguese and German groups. These results provide evidence for full configural invariance, meaning that the underlying two factor structure is the same in both countries' samples (see Table 3.7, Model 1 and Figure 3.2).

On the next step we tested the extent to which parameters in the measurement and structural components of the model are invariant, i.e., equivalent in both groups. We tested whether the factor loadings (metric invariance) and the item intercepts (structural invariance) differed significantly across Portuguese and German groups, following the procedure considered by Byrne (2010). Table 3.7 presents the fitting indexes of the equivalence tests measurements for the simplified business opportunity prototype for both samples using a multigroup CFA.

First, we estimated the factor-loadings for the first group (sample 1) and constrained the second group (sample 2) to be equal to the parameters of the first group (see Model A, Table 3.7). We found a significant deterioration of model fit, i.e. lack of evidence for full metric invariance of the business opportunity prototype across both countries. On a second step, as recommended by Byrne (2010) we constrained only the items of the subscale *solves customers' problems (SCP)* to be equal across the two samples (see Model B, Table 3.7) and then only the items of the subscale *Positive Net Cash Flow (CF)* (see Model C, Table 3.7). Again, a significant deterioration of the model fit was evidenced for Model B, but not for Model C, suggesting full metric invariance of the subscale *positive net cash flow*. Therefore we tested then Model D, constraining only two items of the subscale *solves customers' problems* to be equal. The deterioration of fit of this model was non-significant, suggesting partial metric invariance of the subscale *solves customers' problems*. The metric invariance of model E including subscales *solves customers' problems* (Model B, partial metric invariance) and *positive net cash flow* (Model C) demonstrates non-significant deterioration of the model fit when compared with the baseline configural model.

Finally, after the measurement model has been established, we tested the structural invariance. This model specifies all factor loadings (metric invariance) and in addition two factor covariances constrained equal across Portuguese and German groups. As the model fit did not deteriorate significantly, factor covariance can be assumed to be invariant (equal) across countries.

These results revealed that the configural, metric and structural invariance of the simplified business opportunity prototype is equal in both Portuguese and German groups, when two items of the subscale *solves customers' problems* are constrained to be equal.

These results allow us to support hypothesis 3 that stated that the business opportunity prototype, i.e., mental framework for business opportunity recognition has the same configural, metric and structure model in both groups.

Table 3.7 *Goodness of fit statistics for tests of multigroup invariance: A summary*

Model description	$\chi 2$	*df*	$\Delta\chi$	Δdf	*CFI*	*RMSEA*
1. Configural model, no equality constraints imposed	91.881	52			0.956	0.049
2. Measurement model - Metric invariance compared to configural invariant scales						
(Model A) All factor loadings constrained equal	109.374	59	17.494**	7	0.945	0.051
(Model B) Factor loadings for only *SCP* constrained equal	106.502	56	14.621**	4	0.945	0.053
(Model C) Factor loadings for only *CF* constrained equal	94.720	55	2.839 (ns)	3	0.956	0.049
(Model D) Model B with factor loadings for Items 2 (*Demanded for a long time*) and 3 (*Relieves customers' pain/problems*) constrained equal.	97.480	54	5.599 (ns)	2	0.952	0.050
(Model E) Model C and Model D	100.356	57	8.475 (ns)	5	0.952	0.048
3. Structural model - Scalar invariance compared to metric invariant scales						
Model E and factor covariance constrained equal	100.356	58	8.475 (ns)	6	0.932	0.057

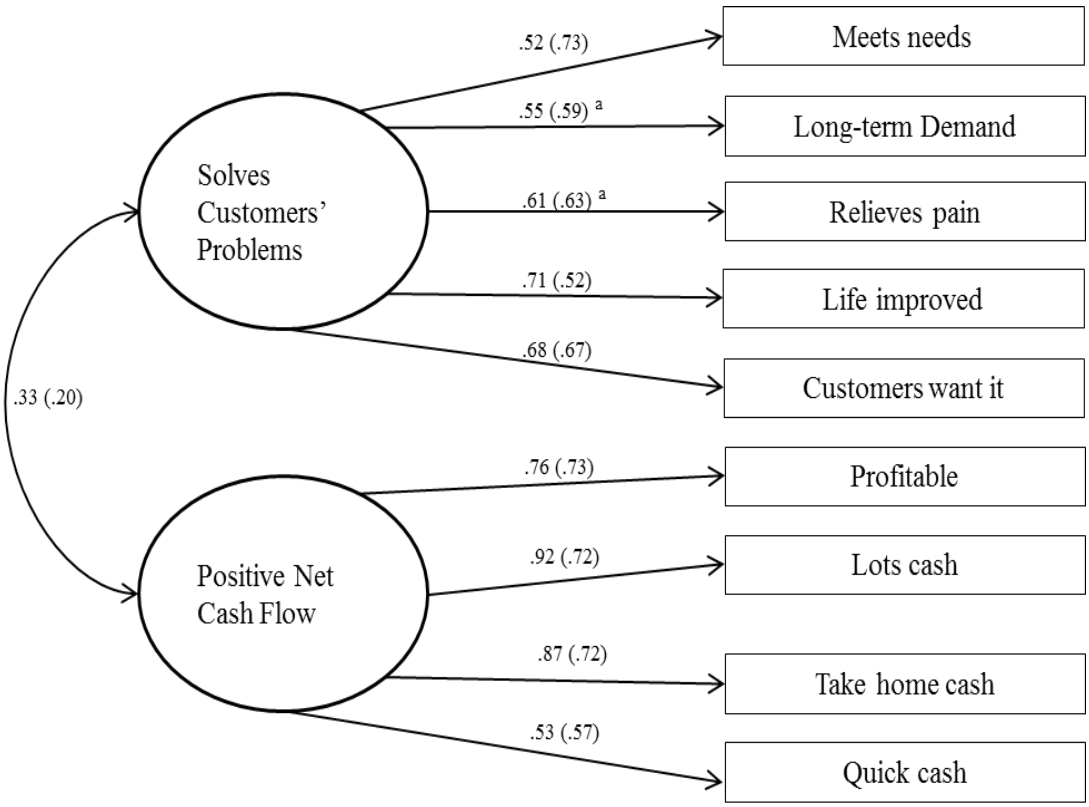

Figure 3.2 *Model of the simplified business opportunity prototype of university students according to country*

Note: Standardized factor loadings and correlation between the two factors are displayed. Values in brackets refer to the group without prior experience and the other to the group with prior experience in opportunity recognition.

[a] indicates significant differences in metric invariance across samples (see Table 7, see also section *Testing the Simplified Business Opportunity Prototype Across Countries*). Note that sample difference test refer to the non-standardized loadings as standardized values are not directly comparable across samples.

3.4 Discussion

With this study we aimed to shed light on the business opportunity prototype within university students, who are potential entrepreneurs and thus an important target group to be investigated and supported in initiating entrepreneurial activities. We proposed a simplified prototype for university students and tested this model according to different levels of prior-experience in opportunity recognition and according to the country of participants. Four main conclusions can be drawn from our results.

Firstly, we concluded that the business opportunity prototype for university students is a simplified prototype with two dimensions concerning *solving customers' problems* and *positive net cash flow*. In this sense, the underlying structure of business opportunity for university students is different from the one of entrepreneurs', described in the literature, especially concerning risk. The literature states that less experienced individuals, such as university students, do not evaluate risk as effectively as experienced entrepreneurs (e.g., Baron, 2006). The different models that we tested always evidenced that risk is a quite complex feature of the business opportunity for individuals at a very initial stage of the entrepreneurial process to evaluate and, therefore, does not fit the structure of the business opportunity prototype. These results allowed us to confirm our first hypothesis and are in accordance with the literature regarding risk

Secondly, we concluded that the underlying structure of the simplified prototype is equivalent between participants who had prior-experience in opportunity recognition and the ones who had not. Baron and Ensley identified differences in the content and richness of the prototypes between novice and experienced entrepreneurs but not in its structure. This means that experience might be accountable for focusing more or less on specific aspects of a business opportunity and accuracy using the prototype, but not for a different structure. The same is to say that the most salient features of the business opportunity can be identified, only different emphasis is put in one or another according to experience. Following this reasoning, our third conclusion is that although the structure of the simplified prototype is equivalent for participants with and without prior-experience in opportunity recognition, when we compared the rating of the presented business opportunity according to the dimensions of the simplified prototype, there were significant differences between the two groups. We could observe that it was in dimension *positive net cash flow* that these differences reside, with non-experienced students rating

the business opportunity as higher in this dimension. This means that the participants without prior-experience recognize higher economic potential in a business opportunity than participants who had prior-experience in opportunity recognition. The same is to say that participants without prior-experience in opportunity recognition consider the economic potential of a business opportunity to be more salient while there are no differences on the way the two groups access the ability of the business opportunity to *solve customer's problems*. Baron and Ensley concluded that the dimension *solves customers' problems* emerged first from the data and that it is more representative of the business opportunity. In our study, we could observe that there were no significant differences between experienced and non-experienced students in opportunity recognition regarding this dimension. However, the fact that the participants without prior-experience on opportunity recognition, identified significantly more potential in an opportunity to generate profit than the ones with prior-experience, might be explained by a reason of over confidence related to the business opportunity at a very first stage of the entrepreneurial process (Cooper et al., 1995; Koellinger, Minniti, & Schade, 2007; Liñán et al., 2011). Moreover, the fact that participants without prior experience in opportunity recognition, recognized significantly more potential to generate profit than ability to solve customers' problems, demonstrates a major focus on profit matters, overlooking other important dimensions of business opportunities.

Finally, we supported a preliminary cross country validation of the simplified business opportunity prototype. We found that the simplified prototype model is equivalent across the two different subsamples from Portugal and Germany, testing its configural, metric and scalar invariance. We also concluded that the structure suggested is the one that better represents the business opportunity prototype in both countries' sample groups. In accordance with the literature, our study suggests that cognitive structures are congruent across countries (Mitchell et al., 2000; Tung et al., 2007). This is a very important conclusion. The fact that cognitive structures are consistent across cultures, allows individuals who are interested in entrepreneurship to enrich and develop themselves in different contexts regarding business opportunity recognition abilities. We also concluded that, although contextual factors might differ across countries, the role of the individual is very important for opportunity recognition and that success is always dependent both on individual's cognitive ability and in the conditions of the environment.

Rather than cultural differences, experience and higher education are factors more likely to influence the accuracy of cognitive structures underlying opportunity recognition.

3.4.1 Limitations and Future Research

Although we draw our study upon theories that are well established in the literature of psychology and entrepreneurship, and although we made efforts to analyze a sufficiently big sample from two different countries, this study is not free of limitations. First, we tested our proposed simplified business opportunity prototype using only one scenario. Future studies could test the robustness of the simplified prototype of university students across different types of business opportunities operationalized in different scenarios. Moreover, we consider that data collection using the same scenario and items for data collection with entrepreneurs would bring important contributions to the present conclusions. In this case a frame of reference established by experienced entrepreneurs could be used to compare the answers of university students. This would be important to explain, for example, eventual answers demonstrating overconfidence or underestimation of business opportunities characteristics by inexperienced individuals when compared to the ones of entrepreneurs.

Second, the two countries chosen for comparison resulted from a convenience sample. It would be interesting to compare countries from different economies, with completely different contexts concerning entrepreneurship and analyze differences in the prototype of their populations.

Finally, we identify an avenue of research in the increasing development of experimental studies on opportunity recognition, as well as the effect of training on the development of entrepreneurial cognitive structures.

3.4.2 Theoretical and Practical Contributions

A contribution of this study regards the important relationship between opportunity and individual (Shane, 2003) in entrepreneurship. Our conclusions stress the importance of the individual in entrepreneurship activities, especially considering their cognitive ability. Rather than context, past experience in opportunity recognition as well as entrepreneurial thinking seem to be crucial factors on entrepreneurial cognition development. According to Baron (2006), the usefulness of describing and knowing the

cognitive structures underlying business opportunity recognition, is that as they are shaped and formed according to ones' experiences, they can be learned and mastered by individuals who wish to engage in the same activities. This is an important point that places a central role of the individual on the entrepreneurial process and to which our conclusions are also in accordance to.

In the last years, several initiatives have been developed at the university level in order to promote entrepreneurship awareness among students. However, these trainings and activities focus more on the business management of the process, rather than on the early stages of the entrepreneurial process, such as opportunity recognition, which is essential for the entrepreneurial process to unfold (e.g., Neck & Greene, 2011). A focus on soft entrepreneurial skills, such as entrepreneurial thinking and cognition, is essential. Therefore, the identification of the business opportunity prototype among university students is a useful starting point for the development of courses and training activities to teach participants how entrepreneurs think and act, as a way of enhancing entrepreneurial thinking among students. Although we can consider that university students are in general encouraged to become more entrepreneurial, attention should be paid to their own personal experiences in entrepreneurial thinking and to what that means about their entrepreneurial cognitive schemas. Gaining more knowledge about the differences and similarities between the cognitive structures among students and entrepreneurs will help to provide students with more tailored trainings that will enable them to develop more accurate cognitive frameworks.

This study contributes to entrepreneurial cognition literature by approaching this topic from a cross-country perspective and by putting emphasis on the role of experience on the use of cognitive frameworks. We did so by extending the understanding of entrepreneurship cognition regarding opportunity recognition among potential entrepreneurs. The main conclusion of this study is that individuals who might be potential entrepreneurs, with and without prior-experience in opportunity recognition, possess a simplified prototype of business opportunity. This structure is equivalent across different levels of experience in opportunity recognition. However, individuals without experience in opportunity recognition tend to focus more on profit matters neglecting other dimensions of the business opportunity.

Considering cognitive structures to promote entrepreneurial activities is of utmost importance, as it guides individuals not only to be “alert” but also to be alert to specific stimuli in the environment that can help them to recognize business opportunities (Baron, 2006). Universities are privileged fields for entrepreneurship education (Heinonen, 2007). Thus, efforts to enhance venture creation should be made. This study is a first step to gain better understanding on how to university students think and perceive business opportunities.

3.5 Conclusion of Chapter 3

On this study, we further explored the concept of business opportunity prototype by empirically testing its structure with university students. We tested a simplified prototype, i.e., a prototype containing two prototypical dimensions: solves customers' problems and positive net cash flow. Further exploring the predictors influencing the structure of the business opportunity prototype, we analyzed the influence of entrepreneurial thinking and context. We considered the country of respondents as a variable for context and experience in opportunity recognition as a representation of entrepreneurial thinking. The structure of the prototype revealed to be invariant across these variables. These findings are important for two main reasons: first, it is important to understand that university students perceive business opportunities through a different lens than the one described in the literature referring to entrepreneurs. Understanding this way of thinking is crucial to develop adequate training programs, for example. Second, context and past experience in recognizing opportunities does not have an effect on the overall structure of this cognitive structure. However, specific training focusing significant experiences might affect the accuracy of this cognitive structure. In fact, we could observe that experienced individuals recognize both dimensions in a business opportunity, whereas the participants without experience tend to focus mostly on profit. In addition, the internal predisposition of individuals to engage in entrepreneurial activities might have an effect on the development of this cognitive structure. On the following chapters of Part II we will further explore these relationships.

PART II – ENTREPRENEURIAL EDUCATION AND COGNITIVE TRAINING: THEORETICAL OVERVIEW AND EMPIRICAL TESTING

INTRODUCTION TO PART II

Following up on the theoretical and empirical findings of Part I, on Part II we will focus on the development and training of cognitive structures. The empirical studies of Part I (Chapters 2 and 3) provide important insights on how university students (regarded as potential entrepreneurs) perceive business opportunities. On this part we draw specific conclusions for entrepreneurial education. To do so, Part II contains two chapters, a theoretical one and an empirical one.

Chapter 4 provides an overview of the literature on the topic of entrepreneurship education. Although the literature points out universities as privileged fields for entrepreneurial education and defines higher education as a predictor for entrepreneurial activity and success (e.g., Bae et al., 2014; Block, Hoogerheide, & Thurik, 2011; Rauch & Rijsdijk, 2013; Souitaris, Zerbinati, & Al-Laham, 2007), there is still little consensus around how entrepreneurship should be taught. Therefore, on Chapter 4 we explore three main topics: firstly, we provide an overview of the different perspectives emergent in the literature, which are naturally connected to the evolution of entrepreneurship as a research field. The literature on entrepreneurial education evidences concerns about *what* and *how* entrepreneurship should be taught. However, there is little consensus about the methodologies or even conceptual basis for entrepreneurship education, which raises challenges for the practice of entrepreneurial education. Secondly, we provide an overview of these challenges. Third, the chapter focuses on the potential of entrepreneurial cognitive training as a way of answering the question "what should entrepreneurship education teach?" combined with techniques of experiential learning to answer the question of "how should entrepreneurship be taught?". The theoretical assumptions drawn on Chapter 4 are then empirically tested on Chapter 5. This study represents a contribution for the practice of entrepreneurial education. We developed a course focusing on cognitive development (Cognitive Entrepreneurial Training on Opportunity Recognition) and tested its efficacy on the development and accuracy of the business opportunity prototype. Furthermore, we explore the moderator effect of positive affect towards entrepreneurial activities. The study uses an experimental design with a pre and a post-test with an experimental group and a control group, which represents an important methodological development in the field of entrepreneurship research.

CHAPTER 4 – ENTREPRENEURSHIP EDUCATION AND THE DEVELOPMENT OF ENTREPRENEURIAL COGNITION – AN OVERVIEW

CHAPTER 4 – ENTREPRENEURSHIP EDUCATION AND THE DEVELOPMENT OF ENTREPRENEURIAL COGNITION – AN OVERVIEW

Summary

In the last decades, entrepreneurship has been on the spotlight for several reasons. This focus on entrepreneurship manifests not only in an increasing entrepreneurial activity, but also on a higher demand to understand entrepreneurs and entrepreneurship. The focus on entrepreneurship and entrepreneurs is also seen in education: the number of entrepreneurship programs and courses available at teaching institutions has been raising in the last decades. The literature on entrepreneurship education is vast and often focuses on the theoretical debate of *what* and *how* should the subject of entrepreneurship be taught (e.g., Béchard & Grégoire, 2005; Fayolle, 2013; Kuratko, 2005; Pittaway & Cope, 2007). However, very few studies focus on the empirical testing of specific approaches, as well on the long-term effects of the entrepreneurship education activities. In this chapter we provide an overview of the literature on entrepreneurship education and discuss the main research questions raised in this area of research.

4.1 Perspectives in Entrepreneurship Education

Many scholars have focused on the topic of entrepreneurship education from different perspectives. Overall, most articles reflecting on entrepreneurship education approach three main topics. First, there is a concern in emphasizing the particular characteristics of teaching entrepreneurship and that entrepreneurial education is different from teaching other subjects (e.g., Jack & Anderson, 1999; Neck & Greene, 2011). Second, there is a concern to include individual-centered approaches and learning styles in entrepreneurship education (e.g., Béchard & Grégoire, 2005); and third, scholars focus on *what* and *how* entrepreneurship should be taught, focusing on the systematization of entrepreneurship education (e.g., Béchard & Grégoire, 2005; Kuratko, 2005).

The idea that entrepreneurship can be taught derives mostly from the considerations of Peter Drucker (1985), who argued that entrepreneurship is a discipline and, as all disciplines, can be learned (Kuratko, 2005). According to the perspective of Bandura (1986), education can prepare individuals to perform specific activities, among them "enterprising". Through knowledge acquisition and transfer, individuals are able to increase their self-efficacy and achieve success in entrepreneurial activities (Anderson & Jack, 2008; Jack & Anderson, 1999). These perspectives reflect a demand during the 80's and 90's of 20th century for entrepreneurship education, due to several changes in economy, society and education (Jack & Anderson, 1999). Although entrepreneurship began to being taught as a part of management courses, the literature shows that entrepreneurship must be taught in a different way from management, which cannot be achieved using traditional pedagogical methods (Anderson & Jack, 2008; Jack & Anderson, 1999; Neck & Greene, 2011; Santos, Pimpão, Costa & Caetano, 2013). From a Schumpeterian point of view, "enterprising" is fundamentally different from "managing", as the former involves creating something inexistent and managing resources in an innovative way, whereas the later refers to coordinate and deal with an existing organization. Kuratko (2005) stressed that entrepreneurship is more than mere business creation. The author argues that although venture creation is certainly a very important part of entrepreneurial activity, it does not represent the phenomenon completely. Thus, in entrepreneurship education, other aspects of the entrepreneurial process should be emphasized, such as opportunity recognition, risk taking and bringing ideas into reality. Entrepreneurship education should focus these aspects to

comprehensively capture the main characteristics of the phenomenon (Kuratko, 2005). Therefore, the role of universities and entrepreneurship education in general, is to provide theoretical approaches to students which allow them to understand and make sense of their entrepreneurial experiences in practice. On this view, entrepreneurship is seen as a process, rather than a single moment in time, on which entrepreneurial activity is better understood in context (Cope, 2005). This dynamic view of entrepreneurship education emphasizes the interactive learning relationship existent between the entrepreneur, the business, and the wider environment. Another aspect important of notice in the entrepreneurship education literature is that we can observe a shift in the discipline as an economic mechanism, to an individual-centered approach, where the particular characteristics of the entrepreneurial experience are crucial for the development of entrepreneurial competencies.

The shift of entrepreneurship from a sub part of management disciplines towards a more individual-centered approach is also visible in the literature by an increasing amount of scholars referring to experience as a key variable to the development of entrepreneurial competencies (Kyrö, 2008). Entrepreneurship education requires unique significant experiences. In this sense, entrepreneurial experience and the knowledge acquired from entrepreneurial experience are two different variables in the process of entrepreneurship education. Knowledge becomes, thus, an outcome of entrepreneurial experience (Politis, 2005). In sum, entrepreneurship can be learned by engaging in significant experiences which are transformed into knowledge. Although an individual approach is emphasized when focusing experience as a critical aspect of entrepreneurial education, other scholars, as Higgins, Smith and Mirza (2013) defend that a social perspective is crucial to understand entrepreneurial education. A social perspective puts emphasis on the context of the experience, which can explain inter-subjective differences and exchanges in knowledge, crucial to understand entrepreneurial education and learning. For example, Cope (2005) stresses the fact that entrepreneurial learning, as a dynamic phenomenon, occurs in the complexity of each individual's experience and critical learning events.

The third point mostly emphasized in the entrepreneurship education literature refers to the *what* and *how* of entrepreneurship education, as well as to the methods of assessing the impacts of the training programs. As for *what* should be taught in

entrepreneurship education, Kuratko (2005) provides an overview of topics which are frequently related to entrepreneurs and new venture creation as a suggestion for contents to be approached in class. The topics listed by Kuratko fall into four major categories: individual level aspects of entrepreneurship (psychological aspects of entrepreneurship; entrepreneurial awareness/spirit; risks and trade-offs of entrepreneurial career); organizational level (distinguishing entrepreneurial and managerial domains; venture financing; corporate entrepreneurship; entrepreneurial strategies); societal level (women and minority entrepreneurship; economic and social contributions of entrepreneurship); and research purposes related topics (ethics and entrepreneurship; predictors of success). Although Kuratko describes the main topics of the field, agreement on whether these are the topics that should be taught in entrepreneurial education is not easily met. Moreover, there is not yet any evidence that these topics are relevant for entrepreneurial practice. Fayolle (2013) expresses concern on the fact that the field of entrepreneurship education needs a strong intellectual and conceptual ground capable of strengthen entrepreneurship programs.

As for the *how* entrepreneurship should be taught, there is an agreement on the literature that universities are privileged arenas for entrepreneurship education (Block et al., 2011; Neck & Greene, 2011) and that high education itself is a predictor of entrepreneurial activity (e.g., Athayde, 2009; Bae et al., 2014; Block, Hoogerheide, & Thurik, 2011; Souitaris, Zerbinati, & Al-Laham, 2007). Neck and Greene (2011) defended that entrepreneurship education should be viewed as a method. This method would mainly focus on entrepreneurship as a way of thinking, where students are given the opportunity to develop a portfolio of entrepreneurial competencies based on their critical experiences. Other scholars consider that entrepreneurship education should also address the development of attitudes and affective variables towards entrepreneurship, rather than only knowledge acquisition (Fayolle & Gailly, 2015; Shepherd, 2004). Although most authors refer that teaching entrepreneurship should focus on experience, hands on and contacting with examples, it is not fully established which methods are more efficient in entrepreneurship education. Fayolle (2013) refers that researchers and educators must deeply and critically reflect on their practices. Which approaches to choose to teach entrepreneurship is not consensual among entrepreneurship educators, researchers or entrepreneurs, and this is one of the main challenges in the field.

4.2 Challenges in Entrepreneurship Education

There are some concerns expressed by scholars on the topic of entrepreneurship education. Faoite, Henry, Johnston and Sijde (2003) consider that there are difficulties in categorizing entrepreneurship education and training, some ambivalence on whether entrepreneurship can actually be taught, and difficulties in assessing the existing programs. These problems derive naturally from the fact that entrepreneurship itself lacks of unanimous conceptualization. Scholars agree that there is a lack of consensus on what entrepreneurship is and, therefore, on how it should be taught and its programs evaluated. The contents of entrepreneurship education should also fit the moment of the entrepreneurial process approached as there are, for example, fundamental differences in the learning process before and after the start-up phase (Cope, 2005). Fayolle, Gailly and Lassas-Clerc (2006) consider that the evaluation of the programs should also be in accordance to these process differences. The authors consider that the impact of entrepreneurship education programs can focus on attitudes and mindset, rather than on number of business opportunities created. It is noted also by Anderson and Jack (2008) that not all individuals participating in entrepreneurship courses have the intention to launch a venture. Therefore, assessing entrepreneurship education programs in terms of ventures launched reveals a mismatch between the goals of the programs and the outcomes deriving from them. Entrepreneurship programs, at a first stage, can focus on raising entrepreneurial awareness, developing a *way of thinking* before focusing on *how to do it* (Fayolle et al., 2006).

Entrepreneurship as a way of thinking and analyzing the world represents a method to introduce entrepreneurial awareness among students, as well as an effective learning instead of mere knowledge acquisition. However, cognitive approaches to entrepreneurial education and their empirical testing are still scarce in the literature (Béchard & Grégoire, 2005). Moreover, several scholars (e.g., Corbett, 2007; Fayolle & Gailly, 2015; Neck & Greene, 2011; Shepherd, 2004) defended that entrepreneurship is best learned on the contact with examples and by effective entrepreneurial experience, which can actually modify the way of thinking of participants as well as result in a learning process. The combination of entrepreneurial cognitive training as the content of the courses (the *what* to teach/learn) and experiential learning as a method (the *how* to

teach/learn) is often presented as a viable solution for an effective entrepreneurial education, which we explore further in this chapter.

Table 4.1 displays a brief overview on several review articles on the topic of entrepreneurship education.

Table 4.1 *Overview of review articles on entrepreneurship education*

Study	Approach to Entrepreneurship Education	Main challenges identified/Ideas for future research
Harrison and Leitch, 2005	Relation between organizational learning and entrepreneurship	The authors introduce a special issue aiming to explore topics which were scarce in the literature, among them being opportunity recognition and exploitation as a learning process.
Béchard and Grégoire, 2005	Bertrand's Cotemporary Theories and Practice in Education applied to the field of entrepreneurial education	The authors conclude that the literature on the topic of entrepreneurship education evidences four main concerns: 1) related to the impact of entrepreneurial education in society and economy, as well as within the higher education institutions; 2) related to the systematization of entrepreneurship education; 3) related to the content to be taught; 4) related to individual needs in structuring teaching programs. The authors emphasize that there are not many concerns related to social-cognitive or psycho-cognitive aspects of entrepreneurial education.
Kuratko, 2005	Challenges in entrepreneurship education for the 21st century	Entrepreneurship is more than business creation. The author considers that entrepreneurship education and education institutions must embrace the fact that entrepreneurship is a way of thinking as a way to implement effective training strategies in their programs.
Pittaway and Cope, 2007	Thematic coding of entrepreneurship education	Entrepreneurship education does have an impact on student propensity and intentionality towards entrepreneurship. There is, however, little consensus on the impact of entrepreneurial education has in impact in practice, creating more effective entrepreneurs. Future research should focus on key outcome variables to evaluate entrepreneurship education.
Fayolle, 2013	The fundaments of entrepreneurship education	There is little consensus on what entrepreneurial education really is about and on which impacts the methodologies used have. There is a need to stronger intellectual and conceptual foundations of the practices adopted. Practitioners and researchers are called to reflect upon their practices on entrepreneurship education, which is not "taken for granted".

4.3 Entrepreneurial Cognitive Training

As mentioned before, for a while entrepreneurship research focused on the description of personality traits of entrepreneurs. However, this approach has received criticism, especially because it assumes that entrepreneurial traits are inherited, stable and enduring over time (Cope, 2005; Palich & Bagby, 1995). The criticism on the trait

approach came mainly from behavioral researchers such as Gartner (1988) who suggested a shift from the question "who is the entrepreneur" towards "what does the entrepreneur do?". Since then, research has shown an extensive progress in identifying the critical cognitive and behavioral aspects of entrepreneurial activity (Corbett, 2007).

Cognitive theory has been giving some important insights to answer the question "why do some individuals become entrepreneurs and other do not?" (Baron, 2006). As extensively presented on Chapter 1, according to the cognitive perspective, everything individuals do depends on mental processes. Information is categorized and analyzed within mental structures that individuals develop during their life experience. Considering cognitive frameworks to promote entrepreneurial awareness is important, as they guide individuals to be alert to specific stimuli in the environment towards opportunity recognition (Baron, 2006) and can contribute to answer the question "how do entrepreneurs think?" Moreover, as cognitive structures, such as prototypes, develop through the significant and relevant experiences of individuals, experiential learning can actually result in learning how to observe, categorize and recognize patterns of events in the environment. However, the mere contact with examples or promotion of entrepreneurial experiences is not learning by itself (Corbett, 2005). The learning process occurs in the transference and transformation of these experiences into significant knowledge. This point highlights the fact that the individual is not passive on the entrepreneurial learning process, where the mere encounter with examples will ignite entrepreneurial awareness. On the contrary, individuals are active in transforming their experiences into knowledge. Although other cognitive aspects have been identified (such as knowledge, past experience, alertness, to refer a few), the literature referring to entrepreneurial cognitive training focusing on mental frameworks is mainly associated to the stage of opportunity recognition (e.g., Corbett, 2005, 2007; Dutta & Crossan, 2005; Rae, 2003). It should also be noticed that on a special issue edited by Harrison and Leitch (2005) on entrepreneurship education, one of the gaps identified by the authors to be explored in the field was precisely opportunity recognition and exploitation as a learning process. Other scholars have approached opportunity recognition from a cognitive point of view, emphasizing the fact that this specific entrepreneurial activity has more to do with a way of thinking and critically analyzing relevant information, rather than the mere accumulation and acquisition of knowledge. Rae (2003) described opportunity centered

learning as a natural process of learning. Opportunity centered learning is motivated by natural human variables such as curiosity, desire and intentionality. Baron (2006) considers that individuals can be trained to perform better in opportunity identification, if they are trained to actively search for them using the same cognitive criteria that entrepreneurs use, rather than just being alert to opportunities.

The cognitive perspective in entrepreneurship is crucial for the further development of entrepreneurial education for four reasons. First, unlike traits theory, the cognitive perspective does not rely in inheritance principles or stability principles (Corbett, 2007). The cognitive theory is based on the principle that every individual is able to develop their cognitive frameworks through significant experiences which are transformed into knowledge. This transformation of experiences into knowledge is a learning process which is situated and contextualized in a given setting (e.g., Cope, 2005; Holcomb, Ireland, Holmes Jr, & Hitt, 2009). Second, the cognitive approach on entrepreneurship brings the field a step further on asking appropriate research questions. Gartner (1988) argued that asking "who is an entrepreneur?" does not add significant contributions to the field of research and that researchers should focus on what entrepreneurs do. Although this represented a significant advance, the cognitive perspective provides insights not only on what entrepreneurs *do* but also on *how* they perform certain activities. The cognitive perspective provides a description of the mindset and of the way of thinking of entrepreneurs, from which other current, would-be, or potential entrepreneurs can learn. In this sense, adopting a cognitive perspective in entrepreneurship education represented a step further in the field to explain and enhance entrepreneurial activity. Third, the cognitive perspective places the entrepreneur with an active role within the entrepreneurial process. The entrepreneur does not simply react to stimuli which exists objectively. According to the cognitive perspective, the entrepreneur possesses mental frameworks which he or she develops through life experiences. The entrepreneur then uses these cognitive frameworks to make sense of the environments and of the contexts they are integrated in. Every individual has their own learning style (Dutta & Crossan, 2005) and their learnings are also influenced by other personal factors such as emotion and affect (Baron, 2008; Haynie et al., 2010; Shepherd, 2004). This idea connects with the fourth and last reason: the cognitive perspective is often useful to address how opportunities are identified. Opportunity recognition is the first stage of the

entrepreneurial process (Baron & Shane, 2008) and it is critical that individuals interested in becoming entrepreneurs, or who are potential entrepreneurs, are trained on opportunity recognition even before other technical competencies (as for example, writing or building business plans) are taught (Corbett, 2007; Kuratko, 2005; Pittaway & Cope, 2007). Finding opportunities however, depends very often from finding or seeing what others cannot see. Cognitive training, by means of developing one's cognitive frameworks towards effective opportunity recognition, is of utmost importance to train potential entrepreneurs to develop an entrepreneurial mindset (Krueger, 2007).

In this overview it becomes clear that entrepreneurial education relies on the development of an entrepreneurial mindset, which can be achieved by transforming experiences into knowledge. For this reason, experiential learning has become a frequently used method on *how* to teach entrepreneurship.

4.4 Experiential Learning and Opportunity Recognition

Entrepreneurship is often taught as a sub part of the management discipline. Therefore, it focuses very often in teaching hard skills inherent to entrepreneurial management and how to run a business. These competencies are very important for potential entrepreneurs, however they refer to a later stage of the entrepreneurial process where an idea has already been identified and has begun to be exploited. Entrepreneurial education, as a way to raise awareness to entrepreneurship, has to focus also on other important aspects of the entrepreneurial process, such as creativity, ability to identify opportunities and the entrepreneurial mindset. It is not our goal to affirm here that teaching management skills to potential entrepreneurs is not appropriate. On the contrary, we consider that management competencies are crucial for entrepreneurial success (Man, Lau, & Chan, 2002; Santos, Caetano, & Curral, 2013; Santos & Caetano, 2014). However, the development of cognitive mechanisms, entrepreneurial awareness and entrepreneurial thinking are very important to complement an effective entrepreneurship program, as these skills can help in the development of an expert's mindset (Krueger, 2007). This is a pre requirement for the successful learning of other entrepreneurial skills. Jack and Anderson (1999) affirm that the role of the university in entrepreneurship programs is to enable individuals to scan their environment, to help them reflect upon their experiences

and identify their own fit in an entrepreneurial career. In addition, Honig (2004) argues that having entrepreneurship education programs relying only on management competencies, such as drawing business plans, promotes idea converging rather than creative thinking and "thinking outside the box". This type of contents are more related to stability, consistency and predictability, rather than with the uncertainty and constant change typically associated to entrepreneurial activity (Cope, 2005). Therefore, experimenting solutions for problems, learning by doing, critically reflect upon theories and engaging in real-life situations has demonstrated to have a higher impact on entrepreneurial learning, the development of perceptions and entrepreneurial intentions of students (Pittaway & Cope, 2007; Rasmussen & Sørheim, 2006).

This type of approach on education is called experiential learning and it finds its premises on the work of Kolb (Kolb & Kolb, 2005; Kolb, 1984). According to Kolb (1984), experiential learning consists in creating knowledge by transforming experience. Figure 4.1 shows a model of experiential learning adapted from Corbett (2005).

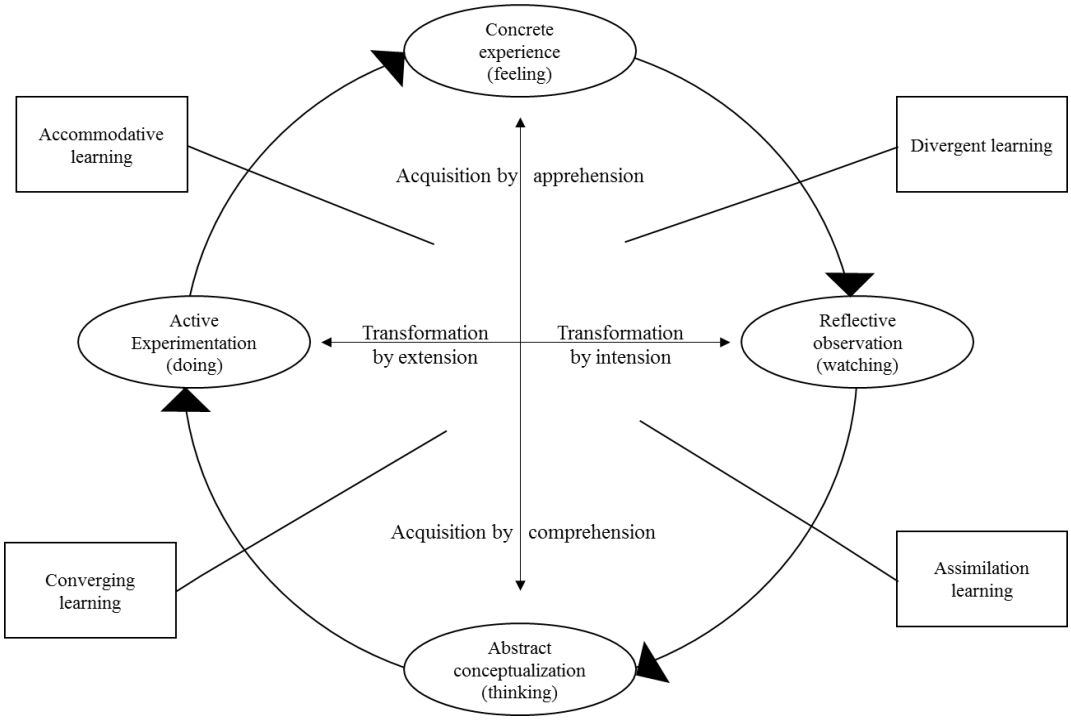

Figure 4.1 *Model of experiential learning and learning styles (adapted from Corbett, 2005, 2007)*

According to Kolb (Kolb, 1984, Corbett, 2005, 2007), there are four learning modes: experience (feeling), reflective observation (watching), abstract conceptualization (thinking) and active experimentation (doing). The variability between these processes depends on the way individuals acquire and transform information. In what acquisition of information is concerned, Kolb considers that it can occur along a spectrum ranging between two processes: acquiring information through apprehension or comprehension. The former refers to actual, concrete experiences and on the tangible qualities of this experience, while the later relies on the conceptual understanding of a situation which is, at a given moment, symbolically represented in one's mind. The information acquired can be transformed via extension or intension. Extension refers to learning by actively experimenting and testing one's ideas in the real world, while intension relies on self-reflection about one's experiences and ideas. These processes, when combined, originate four ways of creating knowledge, as shown in Figure 4.1: divergent, assimilative, convergent and accommodative. According to Corbett (2005) experiential learning is key to opportunity recognition, as all learning styles are to play a role in the process of opportunity recognition: convergent learning is important for inventorying stocks of

knowledge and experience in a given area upon preparation to recognize a business opportunity; assimilation learning plays a role when reflecting about an idea and considering its different potentialities, i.e., during the idea incubation; divergent thinking is useful to evaluate ideas at a first stage when assessing its feasibility; and accommodative learning is crucial to execute the idea in terms of planning, decision to pursue the idea and exploit it (Corbett, 2005).

Other scholars support the idea that experiential learning can have an impact on the ability of students to engage in real-life opportunity recognition (e.g., Pittaway & Cope, 2007). To our view, the combination of learning styles and the process of opportunity recognition is strongly related to the theory of opportunity recognition from a cognitive perspective. According to Baron (2006) entrepreneurs connect the dots between seemingly unrelated events to identify patterns in the environment, which are recognized as opportunities. Moreover, the exercise of pattern recognition becomes easily performed and more effective the more entrepreneurs have experience in doing so, which helps them to develop their business opportunity prototype, helping them to recognize opportunities (Baron & Ensley, 2006). In this sense, the learning processes of experiential learning has the potential to teach potential entrepreneurs how to recognize opportunities by developing their cognitive framework of opportunity.

Several studies have examined the role of opportunity identification training in entrepreneurship programs (e.g., Craig & Johnson, 2006; DeTienne & Chandler, 2004; Souitaris et al., 2007). However, the literature is still scarce on explaining how the cognitive frameworks responsible for opportunity recognition, such as prototypes, are acquired and developed. Entrepreneurship education, as a means to raise awareness and entrepreneurial attitude has the power to help individuals to develop an actual entrepreneurial mindset. In our opinion this task has to focus on experiential learning as a way of effectively develop the cognitive mechanisms responsible for opportunity recognition.

4.5 Conclusion of Chapter 4

This chapter provided an overview of the literature about the topic of entrepreneurial education. Although highly debated in the literature, this topic still does not demonstrate consensus on what should be taught and how entrepreneurship should be taught. Most scholars point out that one of the purposes of entrepreneurial education is to raise awareness towards entrepreneurship, providing important theoretical foundations allowing individuals to transform their experiences into relevant knowledge. We argue that these goals are best pursued by developing training approaches focusing on cognitive training, i.e., in developing the entrepreneurial mindset of individuals. The literature on entrepreneurial education also shows that relevant experiences are crucial to develop entrepreneurial awareness. Following this reasoning we argued that experiential learning is an adequate method to raise entrepreneurial awareness, develop cognitive structures and engage in entrepreneurial thinking. Finally, the literature also evidences that if, on the one hand, entrepreneurship courses should be theoretically uniformed and conceptual consensus must exist, on the other hand, the particular individual learning styles and predispositions towards entrepreneurship have to be considered on the programs designed. The individual has an active role on the development of his or her knowledge and therefore, affect towards the subject being learned is crucial. On the following chapter (Chapter 5) we will explore further these relationships by empirically testing the potential of cognitive training using an experiential learning approach on the cognitive development of individuals and the role that their affect towards entrepreneurship represents in this process.

CHAPTER 5 –DEVELOPING THE BUSINESS OPPORTUNITY PROTOTYPE – A TRAINING PERSPECTIVE (STUDY 4)

CHAPTER 5 –DEVELOPING THE BUSINESS OPPORTUNITY PROTOTYPE – A TRAINING PERSPECTIVE (STUDY 4)

Summary

A central goal of entrepreneurial education is to raise awareness towards entrepreneurship and develop the entrepreneurial mindset. Following the rationale of entrepreneurial education literature, we argue that training courses focusing on cognition and using an experiential learning approach can have positive effects on entrepreneurial tasks, such as opportunity recognition. Moreover, considering the role of affective variables in this learning process is relevant to better understand it.

In this chapter we introduce the Cognitive Entrepreneurial Training on Opportunity Recognition. Using an experimental design with pre and post-test and a control group, we test the efficacy of this training course with university students in two European universities. The training course was designed integrating the principles of experiential learning and had the goal of increasing the accuracy of the business opportunity prototype of attendants upon opportunity recognition. Importantly, we explored also the moderating role of entrepreneurial passion in the learning process.

Obtained results demonstrate that the training has a positive and significant effect on the accurate identification of prototypical dimensions of business opportunity. This learning process was moderated by one dimension of entrepreneurial passion. Intense positive feelings towards entrepreneurship strengthens the relationship between training and the accuracy of business opportunity recognition.

The current version of this study includes important feedback provided by peers in relevant international conferences, such as the European Association of Work and Organizational Psychology Congress (EAWOP 2013), Münster, Germany; and at the symposium In Search of the "Entrepreneurial Mindset": Insights from Neuroscience at the 2014 Academy of Management Meeting, Philadelphia, Pennsylvania, USA.

Reference: Costa, S. Wach, D., Caetano, A., & Santos, S. (under review). The Effect of Cognitive Training and Entrepreneurial Passion on the Business Opportunity Prototype.

5.1 Introduction

Entrepreneurs and opportunities are two key aspects to understand entrepreneurship (Shane & Venkataraman, 2000). On this study we investigate the relationship between entrepreneurial cognitive training, affective and emotional dimensions towards entrepreneurship and the ability to recognize business opportunities. Business opportunities are crucial to the development of entrepreneurial activities, as they are presented as the first stage of the entrepreneurial process (e.g., Baron & Shane, 2008). Cognitive theory has contributed with important insights to explain how entrepreneurs recognize opportunities, namely by using cognitive frameworks to identify and recognize patterns of opportunities (e.g., Baron & Ensley, 2006; Baron, 2006; DeTienne & Chandler, 2004; Grégoire, Shepherd, & Lambert, 2010). The cognitive perspective is insightful for the understanding of entrepreneurship because it goes beyond asking who the entrepreneurs *are* (as for example in traits approach – e.g., Rauch & Frese, 2000, 2007) or what do entrepreneurs *do* (as in the behavioral approach – e.g., Gartner, 1988), to rather focus on *how* entrepreneurs think and act (e.g., Baron, 2006; Krueger, 2007).

According to the cognitive perspective, everything individuals do is dependent on mental processes and information is categorized in mental structures that individuals develop during their unique life experiences. Considering cognitive frameworks to promote entrepreneurial awareness is important for two main reasons. First, this perspective attributes an active role to individuals in developing their cognitive structures as a way of transforming relevant experiences and knowledge into opportunities (Corbett, 2007). Second, by identifying the specific stimuli most commonly found in the environment by entrepreneurs as opportunities, on the one hand, and the way entrepreneurs recognize them, on the other hand, is important. It opens up possibilities to guide and instruct potential entrepreneurs to develop their mindset towards an experts' one, especially concerning opportunity recognition (Baron, 2006). A number of studies has examined the role of opportunity identification training entrepreneurship programs (e.g., Craig & Johnson, 2006; DeTienne & Chandler, 2004; Souitaris et al., 2007). The inclusion of both theoretical and practical activities regarding opportunity recognition training in entrepreneurial education is crucial to the develop entrepreneurial cognitive skills and to make better entrepreneurship related decisions (Fiet, 2000). However, little is known about how the cognitive frameworks responsible for opportunity recognition,

such as prototypes, are developed and acquired. As cognitive structures, such as prototypes, develop through the significant and relevant experiences of individuals, we believe that through experiential learning individuals can learn to observe, categorize and recognize patterns of events in the environment and more efficiently recognize opportunities. We do not presume that everyone possesses the personal ambition of becoming an entrepreneur. Personal feelings towards entrepreneurship, as emotional and affective variables, play a role in one's entrepreneurial development and predisposition. Thus, we suggest that entrepreneurial cognitive training and positive affective variables towards entrepreneurship, such as entrepreneurial passion, can contribute to the development of entrepreneurial cognition, especially for opportunity recognition.

In this study we test the effect of a training course, focusing on opportunity recognition, on the development of the business opportunity prototype, a cognitive framework responsible for opportunity recognition, as described in Chapter 1 (Baron & Ensley, 2006). In addition, we analyze the moderator effect of individuals' positive affects towards entrepreneurship, in this case entrepreneurial passion, on the process of learning and entrepreneurial cognitive development. By doing so this study offers two main contributions. First, we aim to demonstrate that cognitive approaches are of value to the general field of entrepreneurship education. Second, by combining the analysis of cognitive training with internal affective states, we shed light on *how* individuals learn and what the role of their personal motivations on this process is.

5.2 Developing the Business Opportunity Prototype Through Entrepreneurial Learning– A Training Approach

Opportunity recognition is fundamental for the entrepreneurial activity. Several authors argue that including opportunity recognition as a key aspect of entrepreneurial training courses is of utmost relevance, as it enhances competitive advantage and contributes to better entrepreneurial decisions (Alvarez & Busenitz, 2001; Fiet, 2000). As evidenced by DeTienne and Chandler (2004), opportunity recognition can be taught as many other entrepreneurial skills. The authors point out how important the individual perception and interpretation of the surroundings is to develop opportunity recognition skills. In addition, trainings and relevant experiences regarding opportunity recognition are essential for individuals to build knowledge and identify opportunities (Corbett, 2005;

DeTienne & Chandler, 2004). As pointed out by DeTienne and Chandler (2004), other approaches on opportunity identification, like creation, active search or fortuitous discovery, whether see opportunities as mere stimuli, or assume that the ability to identify opportunities in something inherited, reducing the process of opportunity identification to something purely casual. The perspective of opportunity recognition, however, places the main role of opportunity identification on the individual and on the way he or she builds knowledge based on significant experiences. In this sense, opportunity recognition, as a cognitive mechanism can be trained especially if using active methods such as experiential learning. Drawing up on opportunity recognition theory (Baron & Ensley, 2006; Baron, 2004, 2006) and the principles of experiential learning, we developed the Cognitive Entrepreneurial Training on Opportunity Recognition. The contents of this training course are displayed on Table 5.1.

Table 5.1 *Contents of the Cognitive Entrepreneurial Training on Opportunity Recognition*

Topic	Description of activities	Theoretical background	Relation to experiential learning
Opportunity recognition as the first stage of the entrepreneurial process	Analysis and group discussion about real entrepreneurial cases. Identification of the process phases. Identification of the process of opportunity recognition.	Baron & Shane, 2008 Shane & Venkataraman, 2000	Reflective observation Concrete experience
What is an entrepreneurial business opportunity?	Participants reflect on what makes a business opportunity an entrepreneurial one. Analysis of real cases to identify opportunities and false opportunities.	Baron, 2004, 2006	Abstract conceptualization
"Connecting the dots" to recognize a business opportunity	Participants are asked to individually list down relevant technological, social, political and economic changes in their life time. Participants agree on a common list of changes as a framework for the whole group (class). Participants are asked to connect various changes to come up with a business opportunity which is new, has potential economic value and desirable.	Baron, 2004, 2006	Concrete experience Active experimentation
Opportunity cognitive evaluation – the business opportunity prototype	The business opportunities are pitched to the whole group. The participants are asked to evaluate each other's business opportunities according to the dimensions of the business opportunity prototype[1]: solves customers' problems, generates positive net cash flow, has a manageable risk, is a superior product, changes the industry.	Baron & Ensley, 2006	Concrete experience Active experimentation Abstract conceptualization
The entrepreneurial competencies	Analysis of speeches of known entrepreneurs and discussing their competencies. Participants are asked to reflect about themselves in terms of their entrepreneurial competencies.[2]	Athayde, 2009 Santos, Caetano, & Curral, 2013 Man, Lau, & Chan, 2002	Reflective observation Abstract conceptualization

Notes (see Method section for more details):

[1]During this exercise participants are not aware that these are prototypical dimensions of the business opportunity. They are required to use them to the best of their understanding of their meaning. This is a measure to control internal validity of the experimental design.

[2] This task was not directly related to the training of opportunity recognition. It was included as a distractive task to avoid collecting data of the post-test immediately after the training.

5.2.1 Opportunity Recognition as The First Stage Of The Entrepreneurial Process

Opportunity recognition is pointed out by several scholars as the beginning of the entrepreneurial process (e.g., Baron & Shane, 2008). Without opportunity recognition, the rest of the entrepreneurial process cannot unfold. Opportunity recognition has, thus, a crucial role in entrepreneurial activity. Awareness of opportunity recognition as the beginning of the entrepreneurial process is important, as potential entrepreneurs can be oriented to develop this competence as the starting point of their entrepreneurial activities. However, to recognize business opportunities requires cognitive competencies previously developed in order to do so. Therefore, it is of crucial importance that in such training individuals are aware of the importance of opportunity recognition.

5.2.2 Definition of Entrepreneurial Business Opportunity

Opportunity is approached in this study and during the Cognitive Entrepreneurial Training as the "perceived means of generating economic value (i.e., profit) that previously has not been exploited and is not currently being exploited by others" (Baron, 2006; p 107). This definition emphasizes the newness and innovative character of a business opportunity. In addition, it refers to a service or product which has the ability to generate profit and is desired by potential customers (Baron, 2006). Although we are aware that other definitions of opportunities have been presented in the literature, this definition allows an objective identification of the main characteristics of an opportunity. Moreover, according to Baron (2006) this type of opportunities refer to truly entrepreneurial ideas in the sense that they are innovative contributing with something really new, rather than just expanding existing models.

5.2.3 "Connecting the Dots" to Recognize A Business Opportunity

The notion that opportunities emerge from a pattern of seemingly unrelated events in the environment (Baron, 2006) made it evident that cognitive structures are essential to recognize business opportunities. Based on human cognition research in general, and cognitive frameworks in particular, Baron (2004; 2006) introduced the "connecting the dots" perspective as a way to recognize patterns of opportunities. Baron suggested that individuals identify business opportunities by perceiving connections between apparently unrelated events or trends – e.g., changes in technology, demographics, markets or government policies – as a meaningful pattern which can be recognized as an opportunity.

In order to be recognized as an opportunity, this pattern has to undergo a categorization process, i.e., this pattern of seemingly unrelated events will be analyzed according to the cognitive framework of business opportunity and, if a match is possible, it will be recognized as one. The idea that opportunities arise from changes in the environment (Baron, 2006; Grégoire, Barr, et al., 2010) underlines the importance of acquiring information and knowledge in the process of opportunity recognition. To be able to recognize patterns of opportunities requires an active role and effort from the individual to be informed and actively search for information. For only by having a good overview of what surrounds them, they can critically think about these events and recognize in them an innovative, new and desirable opportunity which is not yet in use.

5.2.4 Opportunity Cognitive Evaluation – The Business Opportunity Prototype

Following up on the idea of pattern recognition as opportunities, categorization is essential to perform this task. Categorization of information is important to place an experience, object or event in a group of objects that are similar in some respects (e.g., Markman & Gentner, 2001). Prototypes are the necessary cognitive structures to perform categorization. Prototypical categorization is a cognitive process, which suggests that concepts are expressed through the most salient or representative features involved in an underlying structure, namely a group of features that are indicative of a category membership (Lakoff, 1987; Rosch et al., 1976). Prototypes are abstract mental representations of the most common salient features combined in an object that represents a category. Baron and Ensley (2006) have demonstrated that entrepreneurs possess a prototype of business opportunity, which allows them to recognize opportunities (Baron & Ensley, 2006). The process occurs by comparing ideas of new products or services with their prototype of business opportunity. If a match is possible, the entrepreneur will recognize and categorize it as a business opportunity (Baron, 2004). Baron and Ensley (2006) conducted a study in which they identified the dimensions (i.e. the most salient features) of the business opportunity prototype. The 10 dimensions constitute the business idea prototypes of entrepreneurs. The first five describe the business idea: solves customer's problems; generates positive net cash flow; manageable risk; superior product; industry change. The other five relate to the feasibility of business development: overall financial model; advice from experts; unique product; big potential market;

intuition (Baron & Ensley, 2006). The authors also concluded that the prototypes of experienced entrepreneurs are better defined and richer in content than the ones of novice entrepreneurs. This last finding stresses the importance of experience on the development of prototypes and of prior knowledge to use them (see Chapter 1).

According to Corbett (2005), opportunity recognition abilities can be enhanced by the use of experiential learning methods. In addition, since opportunity recognition is dependent on cognitive structures, having relevant experiences is necessary to develop them. In this sense, the Cognitive Entrepreneurial Training includes activities, which enhance the various learning styles of experiential learning. Following this reasoning, we hypothesize that individuals who participate in this training will be able to develop their cognitive ability to recognize business opportunities. Specifically, their business opportunity prototype will be more accurate in recognizing the most salient features of a given business opportunity. As Baron and Ensley (2006) emphasize, the more experienced entrepreneurs are, the richer and more accurate their prototype is. Therefore, in the case of university students, without entrepreneurial experience, such training might be relevant to develop the business opportunity prototype at an initial stage. However, as prototypes develop throughout individuals' life experiences, this development keeps growing after the training. With this reasoning in mind, we hypothesize the following:

Hypothesis 1a: Participants taking part in the Cognitive Entrepreneurial Training on Opportunity Recognition will evidence, after the training, a significantly more accurate business opportunity prototype than before.

Hypothesis 1b: Participants taking part in the Cognitive Entrepreneurial Training on Opportunity Recognition will evidence, after the training, a significantly more accurate business opportunity prototype than the participants in a control group.

5.3 The Importance of Affect in Cognitive Training

The way individuals feel and the moods they experience influence in a great extant several aspects of entrepreneurial cognition and behavior (Baron, 2008; Hayton &

Cholakova, 2012). For example, positive affect can enhance creativity. This, in turn, is a process where existing mental frameworks, such as prototypes, are expanded or combined resulting in the generation of new ideas previously not available (Baron, 2008). According to Baron (2008), this is how many new ideas for products and services are recognized. It is well established that motivation drives entrepreneurs to act (Robichaud, Mcgraw, & Roger, 2001; Santos et al., 2013; Shane, Locke, & Collins, 2003). Although the influence of affection on entrepreneurial cognition is recognized in the literature, there is scarce evidence of its role in the context of entrepreneurial learning. Cardon and colleagues (2009) consider that entrepreneurial passion can also influence entrepreneurial cognition. Entrepreneurial passion is defined by the authors as a consciously, intense and accessible positive feeling, which results from engaging in typical entrepreneurial activities which are central to the individual. Typical entrepreneurial activities include, for example, founding a business, developing a business or invent new solutions and opportunities (Cardon et al., 2009).

Cardon and colleagues (2009) stress that entrepreneurial passion is not a personality trait. It is an affective phenomenon that individuals experience when performing or thinking about activities typically related to entrepreneurship. Thus, passion consists of deeply, consciously accessible, positive feelings which are important for the identity of the individual. The combination of these two aspects (intense positive feelings and identity centrality) result in enduring affective experiences, which last longer than emotional episodes. To experience entrepreneurial passion means thus, on the one hand, to experience intense positive feelings while performing typically entrepreneurial tasks, which, on the other hand, are central to the entrepreneur's identity (Cardon et al., 2012).

Entrepreneurial passion, is generally an internal state. This means that entrepreneurial passion, in contrast to cognitive skills, is not possible to be trained, but it is rather an internal factor that can influence learning.

Cognitive training is expected to have a significant effect on the way potential entrepreneurs perceive the world around them and transform their experiences into knowledge, thus permitting them to better recognize opportunities. However, there are also intrinsic drives that can influence this learning process, such as entrepreneurial passion. On our study we expect that individuals who experience entrepreneurial passion

can benefit even more from attending to the training. Therefore, we hypothesize the following:

> *Hypothesis 2: Entrepreneurial Passion (Intensive Positive Feelings and Identity Centrality) will moderate the relationship between attending to the Cognitive Entrepreneurial Training on Opportunity Recognition and the accuracy of the of the business opportunity prototype.*

Figure 5.1 depicts the assumptions tested on this study.

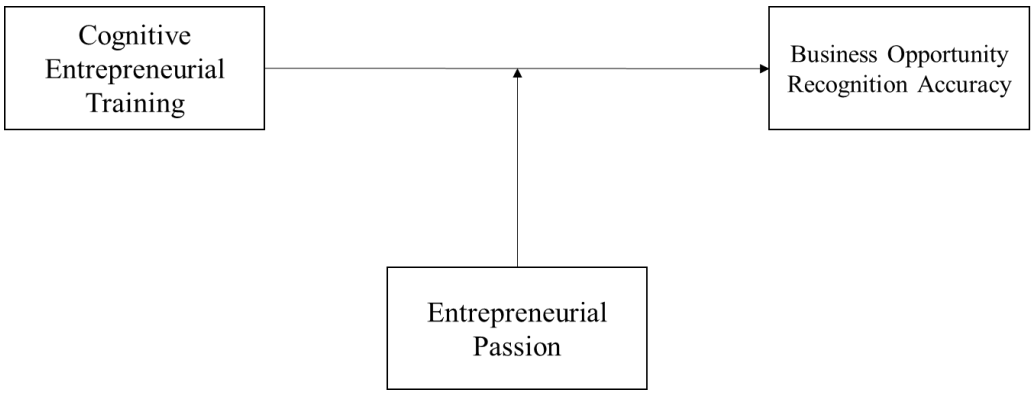

Figure 5.1 *Model in analysis in the present study.*

5.4 Methods

5.4.1 Experimental Design

We conducted an experimental design with a pre and a post-test with an experimental and a control group, as follows:

R	O_1	X	O_2
R	O_3		O_4

On this design R indicates random assignment, O refers to observations and X to the treatment. From left to right there is indication of temporal order of the observations and the variables vertical to one another are simultaneous (Shadish, Cook, & Campbell, 2002). On our design we had a total of 4 observations: O1 and O3 refer to the pre-test with the experimental and control groups, respectively; O2 and O4 refer to the post-test with the experimental and control groups, respectively.

The observations in the design were made using a questionnaire. In the case of the participants in the experimental group, the pre-test was administered before the beginning of the training and the post-test after the training. We included a distractive task in the training to avoid immediate data collection after the training (see table 5.1). The elective offered to students, who formed the experimental group, was available in two universities, one in Portugal and one in Germany. In the Portuguese university, the course was administered in four sessions of three hours during four weeks, whereas in Germany the course was administered in two sessions of six hours in two days. Another aspect important to be referred is that there was always an effort for the same instructor to teach all groups. With exception of some classes in the Portuguese university, all classes were administered by the same instructor both in Portugal and Germany and the contents and activities were exactly the same. In Portugal the course was taught in Portuguese and in Germany it was taught in English. However, the questionnaires for data collection, both on the pre-test and post-test, were in Portuguese and German, respectively. All materials of the course and questionnaires, were subjected to rigorous processes of translation and back translation. To account for possible differences caused by these discrepancies imputed to the fact that the courses were offered according to different scheduling rules at the two universities, we compared the difference between scores on the pre-test and post-test between the two samples (Portuguese and German) and found no differences ($t_{(179)}=1.80; p > 0.05$).

On the control group the pre-test and post-test were administered with three weeks interval between them, in both universities.

5.4.2 Participants

From a total of 327 university students from two universities at two different countries participating in this study, 200 participated in the Cognitive Entrepreneurial Training on Opportunity Recognition and 127 participated as a control group. Due to several reasons (e.g., mortality between pre-test and post-test; entrepreneurial experience as background and/or incorrect filling of the surveys) we were able to analyze the answers of 181 of the experimental group and 102 answers from the control group. Table 5.2 describes both groups in terms of age, gender, education, educational scientific field and country.

We performed a one-way analysis of variance (ANOVA) and Pearson chi-square analysis to verify if there were statistical differences on age, gender, educational level, educational scientific field and number of business opportunities previously identified by the two groups. As we observed differences in gender, educational scientific field and number of business opportunities previously identified, we verified if these variables had an effect on the use of the business opportunity prototype and we found no differences. Moreover, there was not a real randomization of participants into the experimental and control groups. The experimental group, i.e., participants attending to the Cognitive Entrepreneurial Training on Opportunity Recognition, selected this course from a groups of electives and chose to participate, whereas the control group were students of the same universities but who did not enroll in the training. To account for differences in the cognitive ability and motivation towards entrepreneurship of the participants in both groups we checked for differences on their business opportunity prototype and entrepreneurial passion on the pre-test and found no differences (see on Results section for more details on the analysis).

Table 5.2 *Sample Descriptive Information*

	Experimental Group		Control Group	
N =	181		102	
	Mean	S.D.	Mean	S.D.
Age	21	3.46	21	3.16
Number of business ideas previously identified	2	2.16	1	1.75
Gender	n	%	n	%
Female	90	50.3	67	65.7
Male	91	49.7	35	34.3
Educational level				
Undergraduate (attending a BSc Program)	160	88.4	81	79.4
Graduating (Master or PhD)	21	11.6	21	20.6
Educational scientific field				
Social Sciences and Humanities	43	23.8	68	66.7
Economics, Management and Technology	129	71.3	31	30.4
Other (Health, Architecture, Philosophy, among other)	5	2.8	3	2.9
Missing	4	2.1	-	-
Country				
Portugal	121	66.9	77	75.5
Germany	60	33.1	25	24.5

Note:
No differences were observed between the two groups regarding age ($F_{(1.280)}$=1.86; $p > 0.05$), level of education (*Pearson chi-square=4.66, p > 0.05, df=2*) and country of origin (*Pearson chi-square* =2.32; $p > 0.05$; *df*=1).

The groups are significantly different in terms of gender (*Pearson chi-square*=6.73; $p < 0.05$; *df*=1), educational scientific field (*Pearson chi-square=49.58; p < 0.05; df=2*), and number of business opportunities previously identified (F(1.280)=7.04; $p < 0.05$).

5.4.3 Measures

Business opportunity recognition. In order to assess the use of the business opportunity prototype, we used scenarios where business opportunities could be identified. To avoid learning effects attributable to the instrument, we used two different scenarios in the pre-test and in the post-test. For the pre-test we used a scenario which was previously validated (Costa et al., 2013) and which was based on a real situation and describing a setting convenient for a business opportunity recognition based on authentic events. The scenario suggested the creation of a low-cost airline company, based on the true story of a low-cost airline (Rae, 2007). For the post-test we used a scenario based on a real business idea presented at a venture competition (Duarte & Casimiro, 2010). This story described a situation favorable to the production and installation of piezoelectric devices in shopping centers, as a means to produce energy.

The scenarios did not state explicitly which business opportunity was to be identified in them, but rather provided information in a connecting-the-dots perspective (Baron, 2006), allowing participants to recognize the business opportunities in them by linking the information presented. All participants read the same scenarios in the pre-test and post-test, respectively. Immediately after reading it, participants were asked if they could describe any business opportunity based on the story they had just read. They were asked to describe it briefly in their own words. This was a control question to guarantee that participants had a common understanding of the business opportunities presented in the scenarios.

To operationalize the prototypical dimensions of business opportunity in the scenarios, each story contained information based on the dimensions of the business opportunity prototype as defined by Baron and Ensley (2006). Therefore, each scenario (pre-test and post-test) had sentences operationalizing three dimensions of the business opportunity prototype: (1) solves customer problems, (2) positive net cash flow and (3) manageable risk. The reasoning to choose these dimensions has to do with the fact that these three dimensions were the ones that did not require comparison with other products (as is the case with “superior product” dimension) nor the knowledge of a complete market/industry (as is the case with “change industry” dimension) and could be fully understood from the information presented in the scenarios. Therefore, the remaining

dimensions require some background on the market or even entrepreneurial experience, which is not often the case with potential entrepreneurs, such as university students.

Although the stories were different in the pre-test and in the post-test, the scenarios were design in such a way to make sure that the stories were equivalent regarding the dimensions of the prototype manipulated in them. We conducted several analysis to make sure no differences in the respondents' answers were attributed to our instrument. First, we included three questions to check if the two scenarios were equivalent in terms solving customers' problems, generating cash flow and manageable risk. We compared the answers to these items for the whole sample between the pre-test and the post-test and found no differences ($t\text{-}test_{(282)}=1.13;\ p > 0.05$). Second, to assure that the three dimensions were effectively manipulated, each story had three different versions, focusing on each dimension: solves customers' problems, generates positive net cash flow and manageable risk. This procedure aimed to assure that the dimensions were effectively manipulated, which was achieved, but since the three dimensions are part of the same construct (business opportunity prototype) we did not expect them to differ significantly, which we verified (*Pre-test:* $F_{(2.280)}=0.87;\ p > 0.05$; *post-test:* $F_{(2.80)}=0.82;\ p > 0.05$), allowing to proceed with the hypothesis testing.

Business opportunity prototype. After reading the scenario and answering the control question where participants described the business opportunity on their own words, we asked participants to characterize the business opportunity according to the dimensions of the prototype. This task was performed by completing a scale of 13 items describing the three dimensions of the business opportunity prototype. Participants were asked the question "In your opinion, are the following items a characteristic of the business opportunity you identified?" on a five point scale ranging from 1 ("not at all") to 5 ("very much"). These items were adapted from the original items indicated by Baron and Ensley (2006). The prototypical dimension solves customers' problems was measured by 5 items, such as "customers want it" and "meets customers' needs". The positive net cash flow dimension was measured by 4 items, among them being "generates lots of cash" and "generates quick cash". Finally, the manageable risk dimension was measured by 4 items, two examples being "customers accept it" and "involves technology changes".

Both the scenario and the items for data collection were submitted to a rigorous process of translation and back translation to guarantee that the content of the story and items was the same for the Portuguese and German versions.

As the prototypical dimensions of business opportunity were objectively present in the scenario, we expected that after the training, the experimental group would evidence a more accurate business opportunity. In this sense, more accurate means scoring higher on the scale referring to the dimensions of the prototype. As the scenarios were equivalent and the characteristics are objectively present, it is expected that the training enables the participants to be better capable of recognizing more prototypical dimensions of business opportunity than in the pre-test. Following this reasoning, to test hypothesis 1 we expect that participants after the training will evidence higher scores on the composed measures for solves customers' problems (SCP), generates positive net cash flow (PNC) and manageable risk (MR). We expect also that the experimental group will score significantly higher than the control group in these dimensions after the training.

Entrepreneurial Passion. To measure entrepreneurial passion we used a scale of 13 items developed by Cardon and colleagues (2012). According to the authors the construct of entrepreneurial passion is composed by two dimensions: intensive positive feelings and identity centrality. The first dimension is measured by 10 items, from which four refer to the intense positive feelings in activities concerning inventing something (e.g., "I am motivated to figure out how to make existing products/services better"), three items refer to the intense positive feelings of activities related to founding a business (e.g., "Owning my own company energizes me") and three item refer to the intense positive feeling in activities related to development (e.g., "Assembling the right people to work for my business is exciting"). The second dimension is composed by three items referring to the identity centrality in inventing related activities ("Inventing new solutions to problems is an important part of who I am"), founding a business ("Being the founder of a business is an important part of who I am") and development activities ("Nurturing and growing companies is an important part of who I am"), respectively. Participants were asked the question "Please indicate the extent to which you agree or disagree with each statement" using a 5 point scale where 1 indicated "strongly disagree" and 5 "strongly

agree". When performing tests using the measure of entrepreneurial passion we took into consideration the recommendation of the authors on always analyzing the two dimensions of passion separately, rather than a single measure of entrepreneurial passion. In this sense, our measure of entrepreneurial passion is a two dimensional one consisting of the items corresponding to Intense Positive Feelings and the ones referring to Identity Centrality.

Entrepreneurial passion was only assessed once (before the training). Also due to constraints related to the amount of data allowed to be collected in the two universities, the entrepreneurial passion items were collected only with the participants in the German university. Therefore the sample size to test Hypothesis 2 was of 85 participants.

5.4.4 Procedures

The data both for pre-test and post-test was collected using a questionnaire. For both experimental group and control group, participants were given the following explanation: "This survey is part of a study being developed by *University X* and *University Y* on the topic of entrepreneurship. The main goal is to collect opinions on the episode described in this survey.

There are no correct or wrong answers. You should answer according to your opinion. Please answer to all the questions. The answers are confidential and you will not be identified individually in this study. Your participation is very important. Thank you very much!".

After this introduction, participants were asked to read a story describing a scenario for recognizing a business opportunity. Respondents were asked to read the story carefully assuming they were the subject of the story.

Besides the questions regarding the measures in analysis, participants were asked to provide pertinent demographic information. To make sure that a match between the pre-test and post-test questionnaires was possible, we asked participants to generate a code based on the digits of their day of birth, the last two digits of their phone number and the digits of their month of birth.

After filling out the pre-test questionnaire, the participants in the experimental group began the training. All the contents and activities were presented in the same order

for all participants. After the course the post-test questionnaire was administered to participants.

5.5 Results

5.5.1 The Effect of Cognitive Entrepreneurial Training on Opportunity Recognition on the Use of the Business Opportunity Prototype Dimensions

We started by observing the correlation between the scores on the pre-test and post-test for the three dimensions of the prototype in analysis. We concluded that each pair of scores was positively and significantly correlated in the experimental group (*pre-test SCP*post-test SCP correlation* = 0.24; $p < 0.05$; *pre-test PNC*post-test PNC correlation* = 0.16; $p < 0.05$; *pre-test MR*post-test MR correlation* = 0.19; $p < 0.05$). Table 5.3 reports the mean values, standard deviation, reliability measures and correlation for the three scales measuring the dimensions of the prototype for both experimental and control groups.

Table 5.3 *Means, standard deviation and reliability of sub scales at pre-test and post-test*

	M	*S.D.*	*α*	1	2	3	4	5
Experimental Group								
1. Solves customers' problems (pre-test)	3.58	0.72	0.75					
2. Solves customers' problems (post-test)	3.79	0.71	0.77	0.24**				
3. Positive net cash flow (pre-test)	3.55	0.77	0.83	0.21**	0.10			
4. Positive net cash flow (post-test)	3.73	0.71	0.80	0.05	0.11	0.16*		
5. Manageable risk (pre-test)	3.45	0.65	0.35	0.36**	0.02	0.15*	-0.02	
6. Manageable risk (post-test)	3.40	0.68	0.41	0.27**	0.13	0.16*	-0.03	0.19*
Control Group								
1. Solves customers' problems (pre-test)	3.65	0.89	0.84					
2. Solves customers' problems (post-test)	3.44	0.74	0.83	0.55**				
3. Positive net cash flow (pre-test)	3.68	0.70	0.77	0.05	-0.03			
4. Positive net cash flow (post-test)	3.38	0.95	0.88	-0.01	0.27**	0.36**		
5. Manageable risk (pre-test)	3.62	0.61	0.25	0.42**	0.38**	-0.05	0.04	
6. Manageable risk (post-test)	3.52	0.74	0.54	0.31**	0.33**	-0.06	0.06	0.21*

Note:
*$p < 0.05$; **$p < 0.01$

As displayed on Table 5.3, the measures for manageable risk showed relatively low internal consistency. Previous work (see Chapter 3) also evidenced that the business opportunity prototype of university students is better described in a simplified model composed by two dimensions. Aware of these constraints, we have decided to not include this dimension in the analysis.

To test hypothesis 1a, stating that the participants in the experimental group will show significantly higher values on the dimensions of the prototype to be identified on the post-test than on the pre-test, we performed a paired-samples t-test to determine if the training had an effect on the average way in which participants considered the prototypical characteristics of the business opportunity. Table 5.4 shows the results for this test. We observed that on the post-test, the experimental group characterized the business opportunity significantly higher, thus more accurately, according to the general measure of the business opportunity prototype (*t-test*(180)=2.68; $p < 0.05$). An analysis

on the sub-dimensions of the prototype shows that after the training, participants recognized on average significantly more characteristics of the business opportunity related to solving customers' problems and positive net cash flow. The results support hypothesis 1a, showing that the experimental group evidenced a more accurate business opportunity prototype after the training concerning the two dimensions in analysis.

Table 5.4 *Change in the sub-dimensions of the business opportunity prototype from pre-test to post-test in the experimental group*

	Δ(T2-T1)	*t (df=180)*
Solves Customers' Problems	0.21	2.95*
Positive net cash flow	0.19	2.63*

Note:
*$p < 0.05$

To test hypothesis 1b, we used an independent samples t-test to check if the experimental group used the business opportunity prototype more accurately than the control group. Table 5.5 displays the results of this test. We concluded that on the pre-test there were no differences between the two groups in recognizing characteristics of the business opportunity related to the dimensions solves customers' problems and positive net cash flow. On the post-test the experimental group scored significantly higher and characterized the business opportunity more accurately than the control group on the dimensions solves customers' problems and positive net cash flow. These results provide full support to hypothesis 1b, showing that after the training the experimental group evidenced a more accurate business opportunity prototype than the control group.

Table 5.5 *Comparison of the business opportunity prototype's dimensions on the pre-test and post-test between experimental and control groups*

	ΔT1exp. –T1cont.	*t (df=281)*	*ΔT2exp. –T2cont.*	*t (df=281)*
Solves Customers' Problems	-0.07	-0.75	0.35	3.21*
Positive net cash flow	-0.13	-1.42	0.36	3.60**

Note:
*$p < 0.05$; **$p < 0.01$
ΔT1exp. –T1cont: difference between pre-test scores of experimental and control groups.
ΔT2exp. –T2cont: difference between post-test scores of experimental and control groups.

5.5.2 The Impact of Entrepreneurial Passion on the efficacy of the Cognitive Entrepreneurial Training on Opportunity Recognition

We started by analyzing the scores on the two dimensions of the entrepreneurial passion in the experimental and control groups. Table 5.6 shows that there are no differences between the two groups neither in the two dimensions of entrepreneurial passion, neither on its sub-dimensions. The reliability measures show an adequate fit, even though this data was collected only with a part of the total sample in this study. The fact that there are no differences between the two groups regarding entrepreneurial passion prior to the treatment, in the case of the experimental group, is important as the groups were not truly randomly assigned. It could be the case that the students enrolling in the elective would demonstrate significantly higher levels of entrepreneurial passion. That not being the case, we can conclude that the changes in the business opportunity prototype are in fact due to the training and a moderation effect of entrepreneurial passion can be tested.

Table 5.6 *Measures of entrepreneurial passion on the experimental and control groups*

	Experimental group *(N= 60)*			Control Group *(N=25)*			t-test between exp. and control groups
	M	*S.D.*	*α*	*M*	*S.D.*	*α*	$t_{(df=83)}$
Entrepreneurial Passion Dimensions							
Intensive Positive Feelings (IPF)	3.89	0.66	0.89	3.74	0.75	0.92	0.92
Identity Centrality (IC)	3.10	0.85	0.67	3.13	1.08	0.83	-0.15
Entrepreneurial Passion sub-dimensions							
IPF Inventing	4.02	0.67	0.78	3.99	0.71	0.85	1.02
IPF Founding	3.76	0.99	0.94	3.51	1.13	0.94	1.18
IPF Developing	3.86	0.72	0.74	3.64	0.87	0.89	1.18
IC Inventing	3.11	1.04	-	3.29	1.10	-	-0.69
IC Founding	2.77	1.19	-	2.70	1.19	-	0.23
IC Developing	3.42	1.04	-	3.41	1.29	-	0.30

Note:
$^{*}p < 0.05$
Reliability for IC sub-dimensions was not calculated as these measures are composed by one single item each.

To test hypothesis 2, stating that the interaction effect between the training and entrepreneurial passion are a positive predictor of a more accurate recognition of business opportunities characteristics, we used a multiple regression. To perform this analysis avoiding problems of multicollinearity, the entrepreneurial passion variables were centered. The variable representing training was recoded into a dummy variable where 1 referred to the presence of training (experimental group) and 0 to the absence of it (control group). We observed whether these variables (training and the two main dimensions of entrepreneurial passion) were positive predictors of the scores on the post-test, individually (base model), and their interaction effects (extended model). As mentioned before, we included in this analysis only two dimensions of the business opportunity prototype: solves customers' problems and positive net cash flow. Having observed the effects of training in each of the dimensions of the prototype, to test this hypothesis we recoded them in an overall measure of business opportunity prototype (α=0.80). Table 7 displays the results of this analysis.

Table 5.7 *Multiple regression results to test the interaction effect of training and entrepreneurial passion on the development of the business opportunity prototype*

	β	*t*
Base Model		
Cognitive Entrepreneurial Training on Opportunity Recognition	0.41	4.17**
Passion IPF dimension	0.24	1.68
Passion IC dimension	-0.11	-0.80
Adjusted R^2 = 0.19; $F_{(3.81)}$=7.76; p <0.001		
Extended Model		
Cognitive Entrepreneurial Training on Opportunity Recognition	0.45	3.98**
Passion IPF dimension	-0.34	-1.14
Passion IC dimension	0.36	1.37
Training * Passion IPF	0.72	2.62*
Training * Passion IC	-0.47	-1.98
Passion IPF* Passion IC	0.14	0.78
Training * Passion IPF* Passion IC	0.09	0.48
Adjusted R^2 = 0.26; $F_{(7.77)}$=5.10; p < 0.001		

Note: $^{*}p < 0.05$; $^{**}p < 0.01$

The base model shows that the Cognitive Entrepreneurial Training on Opportunity Recognition, by itself, is a positive and significant predictor of the average score of prototypical characteristics identified in the business opportunity on the post-test. The two dimensions of passion, by contrast, are not, by themselves, significant predictors of the development of the business opportunity prototype. The extended model of regression evidences a higher power of explanation on the variance of the business opportunity prototype scores after the training (*Adjusted* R^2 = 0.26; $F(7.77)=5.10$; $p < 0.001$). In addition, the training has a higher effect when interaction effects are considered in the overall model. Different levels of entrepreneurial passion, in either of its dimensions (intense positive feelings and identity centrality) per se, are not predictors of an accurate business opportunity recognition. We could observe an interaction effect between Intense Positive Feelings and Training on the recognition of business opportunity according to the prototype. To further explore this interaction effect we plotted regression results

recoding Intense Positive Feelings into two levels: low and high, ranging from one standard deviation below and above the mean, respectively, for both experimental and control group (according to the procedure recommended by Aiken and West (1991) and Dawson (2014).

We observed at the simple slopes analysis (see Figure 5.2) that when Intensive Positive Feelings are low (1 SD below the mean), there was a positive but not significant relationship between training and an accurate business opportunity recognition according to the prototype ($b = 0.06$, $t = 0.20$, $p > 0.05$). When Intensive Positive Feelings are high (1 SD above the mean), there was a positive significant relationship between the training and an accurate business opportunity recognition according to the prototype ($b = 1.22$, $t = 4.51$, $p < 0.001$).

No interaction effects between Identity Centrality and Intense Positive Feelings were observed, neither in the triple interaction between all independent variables. These results provide partial support to Hypothesis 2.

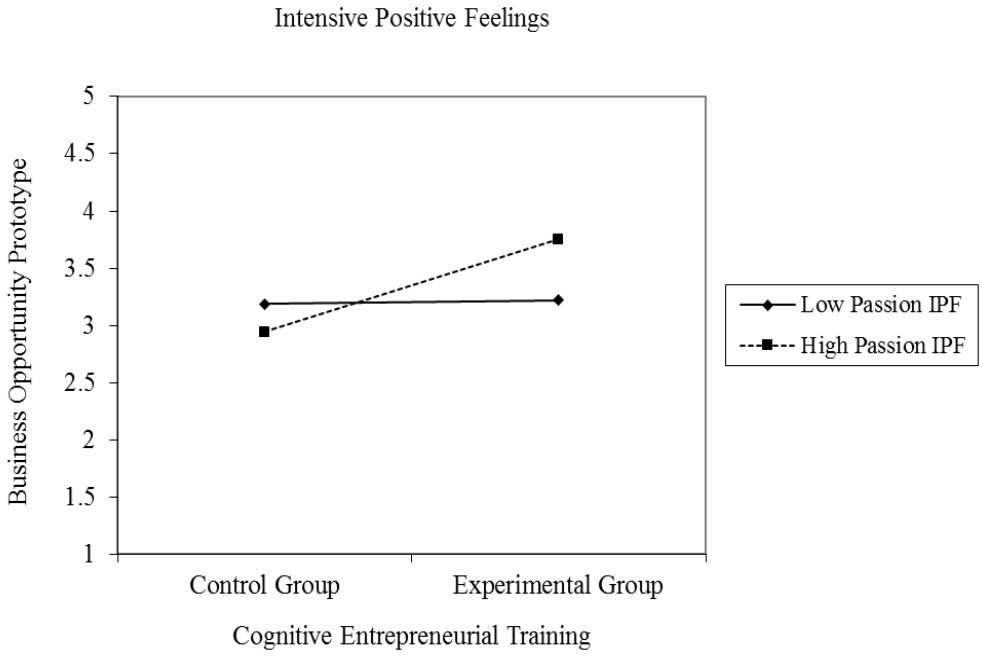

Figure 5.2 *Interaction effects between cognitive entrepreneurial training and low and high levels of entrepreneurial passion (intense positive feelings).*

5.6 Discussion

This study analyzed the efficacy of Cognitive Entrepreneurial Training on Opportunity Recognition on the development of cognitive structures responsible for opportunity recognition. We also analyzed the moderator role of entrepreneurial passion on the process of learning and developing entrepreneurial cognitive structures. We conducted an experimental design with a pre and a post-test with an experimental and a control groups.

We hypothesized that participants taking part in the Cognitive Entrepreneurial Training on Opportunity Recognition (an elective offered at two universities in Portugal and Germany and design according to the principles of experiential learning) would evidence a more accurate business opportunity prototype than before the training (Hypothesis 1a). In addition, it was expected that participants taking part in the Cognitive Entrepreneurial Training on Opportunity Recognition would evidence a more accurate business opportunity prototype after the training than the participants in the control group (Hypothesis 1b). The results provided full support to these hypotheses. Participants taking part in the course showed a more accurate business opportunity prototype after the training. In more detail, participants were able to recognize more characteristics of the business opportunity referring to the opportunity's ability to solve customers' problems and to generate profit after the training. We could also observe that there were no significant differences between the experimental group and the control group on the pre-test in identifying prototypical characteristics of the business opportunity referring to customers' and generating positive net cash flow. These results demonstrate that the Cognitive Entrepreneurial Training on Opportunity Recognition can have positive and significant effects on the accurate use and effectiveness of the business opportunity prototype of potential entrepreneurs. Since the business opportunities analyzed were the same for both groups and since there were no differences between the two groups on the pre-test, we can infer that the fact that the experimental group finds on average the business opportunity more in line with the prototype on the post-test is indeed a result of the training, especially because this difference is not observed in the control group. These results are in line with two main lines of thought in the literature. First, it provides further evidence that opportunity recognition can be learned and developed as an entrepreneurial competence (e.g., DeTienne & Chandler, 2004). Although we are aware that a prototype

is difficult to assess, as we operationalized its characteristics in a number of objective observable features, we could have a clear idea of the effect of the training in identifying those characteristics. This represents an effort to assess the business opportunity prototype and how it changes after the training. Second, the literature also states that experiential learning can have positive effects on the cognitive development of students, which our results also provide support to (Corbett, 2007; DeTienne & Chandler, 2004).

We should address the fact that we were not able to include the dimension manageable risk in the analysis, due to its low internal consistency reliability. Conceptually, manageable risk is a quite complex concept to identify at an early stage of the entrepreneurial activity. The participants in our study, university students without entrepreneurial experience, may not consider risk as a key characteristic to be included in their business opportunity prototype. According to Baron (2006), less experienced individuals do not focus as well as experienced entrepreneurs on the analysis of risk. Moreover, individuals that tend to identify high levels of risk in general situations may be reluctant to identify any opportunity as a good one (Baron, 2006). This leads us to believe that university students, as potential entrepreneurs, have a simplified opportunity prototype (Costa, Wach, Santos, & Caetano, 2014) and training can help them developing this prototype in a more accurate one, concerning customers and profit, but for risk other follow-up activities might be required, perhaps at a business opportunity evaluation stage rather than at recognition.

Our study also addressed other individual variables that are expected to play a role in the learning process of potential entrepreneurs. This relationship between cognitive features and affective and emotional aspects of individuals is hardly empirically explored in the literature. With our study we aim to shed light on this relationship, representing a first step to better understand this relationship. We hypothesized that entrepreneurial passion is a moderator of the learning process in the development of cognitive structures responsible for opportunity recognition. Our results provided partial support to this hypothesis. In the models tested, Cognitive Entrepreneurial Training on Opportunity Recognition always had a significant effect on the accuracy of the business opportunity prototype. Entrepreneurial passion, by itself, was not a predictor of the business opportunity prototype development. Remarkably, when the effect of training was investigated in combination with entrepreneurial passion, there was a significant effect of

the interaction between training and intense positive feelings towards entrepreneurship. This result showed that the training has a higher and significant effect for the individuals who experience high levels of positive feelings towards entrepreneurial activities. As pointed out by Cardon and colleagues (2009) entrepreneurial passion is not a competence that can be learned by potential entrepreneurs. However, it can be a predictor of training effectiveness for individuals who are interested in developing their entrepreneurial competencies. It is also interesting to note that identity centrality of entrepreneurial activities did not show an interaction effect with training, demonstrating a more important role of positive feelings with entrepreneurial activities rather than being important for the identity of the individual. This demonstrated how important it is to engage in long-term entrepreneurial education activities and from an early stage of education. These could be responsible for an actual development of the entrepreneurial mindset, which would also increase the centrality of entrepreneurial activities for individuals' identity.

5.6.1 Implication for Entrepreneurial Education: From Theory to Practice

The results of this study have interesting implications for theory and practice, and we list three ways in which our results can contribute specifically to entrepreneurial education.

First, this study provides empirical evidence that experiential learning methods in the classroom applied to cognitive training have positive and significant effects on the way individuals recognize business opportunities. Several scholars have stated that experiential learning is an appropriate method for entrepreneurship education, specifically because it help individuals to actually experience entrepreneurial situations (e.g., Corbett, 2005, 2007). Other scholars state that entrepreneurship education is different from teaching management theories (e.g., Anderson & Jack, 2008; Jack & Anderson, 1999; Neck & Greene, 2011) and simply teaching how to draw business plans, as an entrepreneurial competence, does not offer a wide range of tools for individuals to think in an entrepreneurial way and develop an entrepreneurial mindset, which happens mainly in a dynamic setting (Cope, 2005; Kuratko, 2005). Providing contact with examples is important, as well as to think critically about them, as way to create knowledge based on important experiences (Cope, 2005; Kuratko, 2005). Drawing up on these conceptual considerations about entrepreneurship education, we consider to offer

important empirical support to the fact that entrepreneurship is indeed more than business creation. We consider that our teaching approach emphasizes the importance of understanding the surroundings in an entrepreneurial way, as a means to develop cognitive structures responsible for opportunity recognition. We do not presume that all entrepreneurial competencies can be fully developed in the classroom setting. Nevertheless, our training provided the participants with tools to critically observe the world around them, to identify the changes in it and to reflect upon what opportunities and entrepreneurship is. All these efforts were reflected in more accurate business opportunities. Beyond empirical testing, we expect that these activities help potential entrepreneurs to observe the world around them in a more entrepreneurial way.

A second way this study can inform practice has to do with the importance of considering the expectations and motivations of the entrepreneurship training programs' attendants. As pointed out by Jack and Anderson (1999) not all individuals attending to an entrepreneurship course wish to become entrepreneurs. The expectations, motivations and feelings towards entrepreneurship of training attendants should be taken into consideration when a program is being designed (Béchard & Grégoire, 2005; Fayolle & Gailly, 2015). Although entrepreneurial passion *per se* is not sufficient to develop cognitive competencies, when combined with significant experiences and training it has a positive effect on cognitive development. As showed by our results intense positive feelings strengthens the relationship between training and its outcomes measured in terms of accuracy of business opportunity recognition. From a potential entrepreneur perspective, this is also important, as it can motivate individuals to pursue trainings that can help them to attain their motivations towards entrepreneurship.

Finally, a third point that draws from our conclusions refers to the fact that entrepreneurship education demands a common effort from educators, practitioners and researchers. We do not presume that the Cognitive Entrepreneurial Training on Opportunity Recognition, as an isolated episode in participant's lives, has the ability to transform them in actual entrepreneurs able to launch ventures immediately afterwards. We do believe, however, that Cognitive Entrepreneurial Training on Opportunity Recognition, provides them with tools to analyze their surroundings and environment with an entrepreneurial mindset. Entrepreneurship training must offer theoretical insights to individuals enabling them to make sense of their relevant experiences and transform

them into knowledge (e.g., Bae, Qian, Miao, & Fiet, 2014). This represents a challenge that every entrepreneurship actor must embrace: entrepreneurship education is a dynamic setting, where the expectations of individuals must be taken into consideration and where stimulation through up to date examples and real experiences are provided. Entrepreneurship education is best developed though untraditional pedagogical methods, but it cannot be detached from strong theoretical grounds, because that is fundamental to guide individuals in their learning process.

5.6.2 Limitations and Directions to Future Research

There are various limitations inherent to experimental designs with pre and post-test (Shadish et al., 2002), however, we made all efforts to control them and to consider possible limitations in our analysis. For example, future research should measure the sustainability of the training effects over time, several months after the training. In fact, we put effort to collect data three weeks after the training with the experimental group. However, the drop out of subjects after this period of time did not allow us to have an adequate sample size to statistically observe the impact of training over time. Our study provided evidence of the positive effect of the Cognitive Entrepreneurial Training on Opportunity Recognition. It would be interesting to compare the way participants of the training recognize the business opportunities according to the prototype with the way experienced entrepreneurs do so. Setting a frame of reference in the scores of the business opportunity prototype with entrepreneurs would provide indications on how they perceive the prototypical characteristics of a specific business opportunity and how that relates to the results of the post-test of participants in the training.

We have approached cognitive training from an individual perspective. However, an increasing number of scholars have been providing evidence that entrepreneurial activity occurs at the team level (e.g., Cooney, 2005; Harper, 2008; Santos, Costa & Caetano, 2015) and this point is worth being explored from a cognitive perspective. Future research could explore the effects of cognitive training at the team level and across different typologies of teams. Finally, we tested entrepreneurial passion as a moderator in the learning process. It is interesting to consider other possible moderators in this process, such as entrepreneurial self-efficacy, risk perception and context, as they are often referred in the literature to influence entrepreneurial awareness and success.

5.7 Conclusion of Chapter 5

With this study we provided evidence that our proposed Cognitive Entrepreneurial Training on Opportunity Recognition has a positive and significant effect on accurately identifying prototypical characteristics of business opportunities referring to customers and profit. Furthermore we provided preliminary evidence that experiencing intense positive feelings towards entrepreneurship increases the effects of training on the development of cognitive structures responsible for opportunity recognition This study aimed to address several gaps that scholars have identified in the literature on entrepreneurial education, by exploring the potential of cognitive training, by focusing on experiential learning and on the role of the predisposition of individuals towards entrepreneurship. This study represents an effort in explaining how potential entrepreneurs learn and in providing insightful information for both researchers and educators in the field.

GENERAL CONCLUSION

GENERAL CONCLUSION

Entrepreneurship is presently central for many aspects of economy, society and education. It has become clear in the literature that entrepreneurship goes beyond venture creation; it is seen nowadays as a mindset, as a way of perceiving the world. In this sense, it is of central relevance to explore how the entrepreneurial reasoning occurs since early stages of its development. For this reason this thesis focused on three main aspects of entrepreneurship: first, opportunity recognition as the point of departure for entrepreneurial thinking leading to entrepreneurial activity; second, basic perceptive cognitive structures as a fundamental resource to recognize opportunities; and third, the development, use and structure of these cognitive frameworks within individuals without experience in entrepreneurship activities but who are considered potential entrepreneurs. This thesis represents an effort to contribute to the theoretical and empirical enrichment of the field. Importantly, from the studies developed in this thesis, contributions for the practice of entrepreneurship in general and entrepreneurship education in particular, can be drawn.

Main Theoretical and Empirical Contributions

We started this manuscript by providing a theoretical overview of the entrepreneurship research landscape to place the conceptual and empirical research project underlying this thesis. We consider this task of central importance for two reasons. Firstly, entrepreneurship is currently a legitimate and well-established field of research. It is highly characterized by its multidisciplinary facets and in this sense, clear definition of concepts and theories in use must be provided. We accomplished this task by, on Chapter 1, providing an overview of the entrepreneurship research and locating this thesis within the topic of entrepreneurial cognition. Secondly, due to the fact that entrepreneurial cognition results from the merge of two research fields, caution should be taken when borrowing theories and concepts from each other's domains. For this reason we provided an overview of the central concept used from cognitive psychology (prototypes) and conducted a systematic literature review to analyze the overlap between this perspective and entrepreneurship research. Study 1 – "Connecting the Literature Dots: – A systematic literature review of the business opportunity prototype" aimed to perform a

systematization of the literature of prototypes in entrepreneurship research. From this study it was possible to conclude that prototype theory is mainly used to describe the process of opportunity recognition at early stages of entrepreneurial thinking. Theoretically, context variables, past experience in entrepreneurial thinking and cognitive training have an effect on the use, development, structure and accuracy of the business opportunity prototype. The individual is active in developing these cognitive structures. Therefore, positive affect towards entrepreneurship is likely to moderate the relationship between cognitive training and the development of the business opportunity prototype. Drawing up on this conclusions, we presented a theoretical model which was further tested on the empirical studies of this thesis. Besides contributing to the theoretical enrichment of the field, the first chapter of this thesis constitutes with a robust conceptual basis for the development of empirical studies.

The conceptual and empirical work development within this thesis contributes to a better understanding of the cognitive processes underlying opportunity recognition at very early stages of development of the entrepreneurial mindset. We were interested in understanding how the cognitive structures responsible for basic perception of opportunities develop and evolve from early stages of the entrepreneurial experience. Therefore, we focused our analysis on individuals with no entrepreneurial experience but whom are considered in the literature to be in privileged setting for the development of entrepreneurial activities and whom are considered potential entrepreneurs: universities students. The empirical studies developed provide important theoretical contributions about how potential entrepreneurs (university students) perceive business opportunities. Firstly, we could provide a better understanding of how individuals perceive opportunities and how the context where the opportunity is identified has an effect on the recognition of its prototypical dimensions. Study 2 – "The role of different opportunities in the activation and use of the business opportunity prototype" analyzed the effect of different business opportunities on the use of the prototypical dimensions of the business opportunity prototype on opportunity recognition. It was possible to conclude that individuals without entrepreneurial experience engaging in opportunity recognition at an early stage of their entrepreneurial mindset demonstrate differences in identifying prototypical characteristics of business opportunities when recognizing them in different contexts. Individuals recognizing opportunities in entrepreneurial contexts are less risk

averse than individuals recognizing opportunities in business reformulation settings. In entrepreneurial setting individuals tend to identify significantly more prototypical characteristics related to solving customers' problems. Secondly, we provided evidence that the cognitive structure responsible for opportunity recognition of individuals at a very early stage of entrepreneurial thinking, is a simplified one. Study 3 – "Business opportunity recognition among Portuguese and German students: A simplified prototype" focused on explaining and describing the underlying structure of the business opportunity prototype of university students. We concluded that the business opportunity prototype of university students is best described by a simplified model consisting of two dimensions: solves customers' problems and generating positive net cash flow. This structure is invariant across participants with or without prior experience in opportunity recognition and across individuals from Portugal and German universities. The simplified business opportunity prototype is, thus, invariant across different levels of prior engagement in opportunity recognition and across groups from two different countries. In fact, participants without prior experience in opportunity recognition identified significantly more prototypical characteristics related to profit than the experienced ones, and then prototypical dimensions referring to customers. This evidences a focus on profit neglecting other important characteristics of business opportunities. Individuals with prior experience in opportunity recognition tended to recognize both prototypical dimensions equally, demonstrating more accuracy in their prototype.

On Part II of this work we put emphasis on reflecting upon the main approaches and challenges within the topic of entrepreneurship education. After doing that we focused on the testing of a specific training program aiming the development of the business opportunity prototype for opportunity recognition. Study 4 – "Developing the business opportunity prototype – A training perspective" aimed to test the effect of a training approach based on experiential learning and cognitive development (the Cognitive Entrepreneurial Training on Opportunity Recognition) on the use and accuracy of the cognitive structures responsible for opportunity recognition. Furthermore, the moderator role of entrepreneurial passion on this learning process was also tested. Cognitive Entrepreneurial Training on Opportunity Recognition has shown to have a significant effect on the development and accurate use of the business opportunity

prototype. This effect is more significant for individuals who demonstrate high levels of positive intensive feelings and are engaged in entrepreneurial cognitive training.

These main findings constitute important theoretical contributions to understand the development of the entrepreneurial mindset. We argue that since the entrepreneurial process begins with opportunity recognition, our conclusions contribute to the better understanding of how entrepreneurial thinking unveils from its start. Overall we could provide important insights on how university students, often considered potential entrepreneurs perceive opportunities from a cognitive perspective.

Methodologically, this thesis represents an effort to use procedures that can enrich the field from an empirical perspective. We used experimental designs and tools such as scenarios in order to control as much as possible the internal and external validity of our conclusions. We consider this a positive point of the research developed in this thesis. Finally, we consider to contribute in a great extent to the understanding of entrepreneurial thinking within individuals at early stages of the entrepreneurial process. However, experimental studies comparing these individuals with experienced entrepreneurs would contribute to the further understanding and comparison of the cognitive processes underlying opportunity recognition. Nevertheless, by employing experimental designs and avoiding known biases, such as retrospective thinking, we consider to contribute to the understanding of these processes at early stages of the entrepreneurial activity.

Main Practical Contributions

We acknowledge that bridging entrepreneurship research and practice is one of the core requirements of this research field. There was an effort throughout this research project to, on the one hand, have its studies informed by practice and by the main questions in entrepreneurship field of research and, on the other hand, provide useful and relevant outcomes for practice. We consider to provide insightful conclusions for the general practice of entrepreneurship but specifically for the actors involved in entrepreneurship education. By adopting a cognitive perspective in this work we acknowledge that the individual has an active role in developing his/her entrepreneurial competencies. We strongly believe that entrepreneurial education can benefit from considering this perspective. In this sense we provided several conclusions that

practitioners in this area can consider when designing training programs aiming to raise entrepreneurial awareness within potential entrepreneurs. The theoretical model drawn upon the conclusions from the systematic literature review on this chapter speak mainly to research purposes. The theoretical propositions presented at this study were empirically tested on the following studies of the thesis. We consider relevant to have provided a theoretical overview on the topic of prototypes as a first step to comprehend these cognitive mechanisms and properly adequate our empirical testing based on the literature. This first model allowed us to successfully test our premises in the empirical studies and afterwards draw important practical contributions. On Study 2, understanding how prototypical dimensions of business opportunities are recognized in different settings can inform a) organizations interested in promoting entrepreneurial activities b) organizations interested in promoting entrepreneurial competencies development and c) entrepreneurial education in designing training programs towards cognitive development using this information as a starting point or a frame of reference. Study 3 described and tested the simplified prototype among university students. These findings are important when designing training programs for potential entrepreneurs for three reasons: a) training programs aiming to promote entrepreneurial awareness within university students should account for the fact that their prototype of business opportunity is simplified and some notions of risk should be included in these programs; b) these training programs should account for the fact that the students without experience tend to focus significantly more on profit and contents regarding other important characteristics of business opportunities should be stressed; c) the fact that this cognitive structure seems to be invariant allows the development of uniformed training programs regarding the further development of the business opportunity prototype. This last point was tested on Study 4, which also provided important ideas for the development and implementation of training courses regarding cognitive development. The conclusions of Study 4 provide important considerations for the development of training programs in entrepreneurship, regarding cognitive training: a) it is possible to train individuals to more accurately recognize prototypical dimensions of business opportunities; b) this is best done when focusing on experiential learning methods, i.e., when individuals face significant experiences and are provided with the adequate theoretical basis to transform them into knowledge; c) the role of affect towards entrepreneurial activities moderates this relationship and the

predisposition of participants in training programs towards entrepreneurship should be taken into account.

Recommendations for Future Research

The contributions made by the research here presented, although pertinent, focus on a very particular aspect of entrepreneurial activity (opportunity recognition) and of individual cognition (prototypes). We have drawn important conclusions on the influence of context, entrepreneurial thinking experience and cognitive training on the development, use and accuracy of the business opportunity prototype at the individual level. However, an increasing number of scholars argues that entrepreneurship occurs significantly at the team level (e.g., Harper, 2008; Leary & DeVaughn, 2009). It would be very interesting to explore our theoretical model at the team level to further understand the team level cognitive processes underlying opportunity recognition. Moreover, our studies focus mainly on business opportunities from a commercial point of view. Naturally, our reasoning derives from the literature which points out that entrepreneurial business opportunities are perceived as desirable, are new and have a potential economic value (Baron, 2006). However, other opportunities have a relevant place on entrepreneurship research, such as the ones focusing on social change and social entrepreneurship in general (e.g., Trivedi & Stokols, 2011; Zahra, Newey, & Li, 2013). We perceive great potential in further exploring the cognitive mechanisms underlying the different purposes of entrepreneurial activity (commercial versus social).

It is important to keep exploring the contributions of different research fields to explain the entrepreneurial phenomenon. On the present research work we have focused on the contributions from cognitive psychology, although we are aware that entrepreneurship is a broader phenomenon best understood from a holistic perspective. Our contribution is thus modest but we have tried to fully understand the specific topic explored in this thesis. We consider crucial that entrepreneurship research borrowing theories and concepts from other research fields is conceptually and theoretically well informed. Finally, a note for the importance of bridging research and practice. The research project presented here represents an effort to contribute to the theoretical enrichment of the field, but also an attempt to draw conclusions which can be used in practice. Although our practical contributions are more applicable for the specific activity

of entrepreneurship education, we have tried to have our research questions informed by the challenges described in the literature. We consider that effort to have research questions informed by practice is relevant for the creation of pertinent research as well as for the production of insights which can inform practice and entrepreneurial actors in general in their activities.

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APPENDICES

APPENDIX A. SCENARIOS USED IN THE EMPIRICAL STUDIES OF THIS THESIS (TRANSLATED)

Table A1 *Beginning of scenarios describing business opportunities*

Favorable situation to the recognition of a business opportunity to create a low-cost airline company:
English translation
During your most recent business trip to the United States of America, you traveled on InCountry Airlines, an airline company that operates domestic flights. The business model of this airline is based on a low-cost method, using cost reductions and fewer transactions and saving on services provided onboard. InCountry Airlines performs an optimization of its workforce onshore and onboard, subcontracts all staff involved and uses secondary airports. (…)
Portuguese version
Numa das suas últimas viagens de negócios aos Estados Unidos da América teve contacto com a InCountry Airlines, uma companhia aérea que realiza viagens nacionais. O modelo de negócio desta companhia aérea assenta numa metodologia low-cost, recorrendo a uma diminuição dos custos de transacções e dos serviços prestados a bordo. A InCountry Airlines realiza uma maximização da utilização do staff quer em terra quer a bordo, subcontrata todo o pessoal envolvido e utiliza aeroportos secundários. (…)
German version
Auf Ihrer letzten Geschäftsreise in den USA sind Sie mit InCountry Airlines geflogen, einer Fluggesellschaft die inländische Flüge anbietet. Das Geschäftsmodell dieser Airline basiert auf einem Niedrigkostenansatz, der Kostenreduzierung, weniger Arbeitsvorgänge und Einsparmaßnahmen bezüglich des Services an Bord nutzt. INCountry Airlines betreibt eine Maximierung des Einsatzes des Personals an Land und an Board; das gesamte Personal wird in Form von Unteraufträgen (Leiharbeit) beschäftigt und sie nutzt Sekundärflughäfen.(…)
This scenario was used in Studies 2, 3 and 4 of this thesis. It has been previously validated (see Costa et al., 2013).

Favorable situation to the recognition of a business opportunity on reformulating the business into a gourmet potato chip production company:

English translation

You have been working for some time now for your family's farm business. However, recently you were put in charge of the potato production section. When you were selling last year's harvest to hypermarkets, you were continually forced to lower the per-ton price so they could maximize their profits. Quickly you realized that if the farm merely continued producing potatoes it would go out of business very soon.

Along with these events, you became acquainted with a new area of products that are proving to be quite successful in the international marketplace: gourmet products. (…)

Portuguese version

Apesar de já trabalhar há alguns anos na quinta de uns familiares ficou, há relativamente pouco tempo, encarregue de toda a administração e produção de batata da mesma. Ao vender a colheita desse ano a várias cadeias de hipermercados, depara-se com o facto de estes forçarem constantemente os produtores a baixar o preço da tonelada para aumentarem a sua margem de lucro. Contactando com esta realidade depressa compreende que se a quinta se continuar a dedicar exclusivamente à produção de batata terá os dias contados.

Paralelamente a esta situação, toma conhecimento de um novo tipo de produtos que começam a ter bastante êxito no mercado internacional: os produtos gourmet. (…)

This scenario was used in Study 2 as an operationalization of an opportunity in a business reformulation context. It has been previously validated (see Costa et al., 2013).

Favorable situation to the recognition of a business opportunity for the production and installation of piezoelectric devices in shopping centers, as a means to produce energy:

English translation

You are in charge of the electric maintenance of a shopping centre group. In your last visit to one of them you faced the typical crowded scenario in these places. You started talking to the shopping centre manager about this and he tells you that although there are lots of people, they buy less and less. Expenses with electric energy are bigger every month and the profit margin to pay them is smaller. Using your knowledge about electricity, quickly you understand that the energy produced by people walking around

the shopping centre could be transformed in electric energy. You imagine then a device covering the entire shopping centre floor. (…)

Portuguese version

É o responsável pela manutenção da rede eléctrica de um grupo de centros comerciais. Na sua última visita a um deles deparou-se com a situação típica de grande afluência de pessoas. Conversando com o administrador do centro comercial comenta com ele esta situação e ele responde-lhe que embora a afluência de pessoas seja importante para o negócio, estas consomem cada vez menos. Mensalmente as despesas da electricidade são muito altas e a margem para as pagar cada vez mais pequena. Utilizando os seus conhecimentos sobre electricidade rapidamente percebe que a energia libertada pelo andar das pessoas poderia ser convertida em energia eléctrica, através de dispositivos que cubram todo o chão do centro comercial. (…)

German version

Sie sind verantwortlich für die Elektrizität einer Gruppe von Einkaufszentren. Bei Ihrem letzten Besuch in einem der Einkaufszentren begegnen Sie dem üblichen Andrang von Menschen, der typisch für solche Orte ist. Im Gespräch mit dem Manager dieses Einkaufzentrums erfahren Sie, dass – obwohl es viele Besucher gibt – immer weniger gekauft wird. Die Stromkosten steigen jeden Monat an und die Gewinn-Marge, um sie zu bezahlen, wird immer kleiner. Mit Ihrem Fachwissen über Elektrizität erkennen Sie schnell, dass die durch das Gehen der Menschen im Einkaufszentrum freigesetzte Energie, in elektrische Energie umgewandelt werden könnte. Sie stellen sich hierfür eine Vorrichtung vor, die den gesamten Boden eines Einkaufszentrums bedeckt. (…)

This scenario was used on Study 4. Measures of validation were calculated within the study (see Chpater 5, method section).

Note: After this common introduction to the stories, a manipulation for each condition was made with specific sentences. Each scenarios had three versions focusing on Solves Customers' Problems, Generates Cash Flow and Manageable Risk.

APPENDIX B. SAMPLE OF INSTRUMENT FOR DATA COLLECTION IN STUDY 2

QUESTIONÁRIO

O presente questionário enquadra-se numa investigação que a ser desenvolvida O principal objectivo é recolher as suas opiniões acerca de um conjunto de situações que lhe apresentaremos de seguida.

Não existem respostas certas ou erradas; pretende-se apenas que responda de acordo com o que considera mais adequado.

Todas as respostas são confidenciais e não se pretende fazer nenhuma identificação pessoal.

Por favor, responda a todas as questões.

A sua participação neste estudo é muito importante! Muito obrigado pela sua colaboração!

A pequena história que lerá de seguida descreve uma situação hipotética de negócio. Por favor, imagine que é o sujeito da história. Leia atentamente a história 1.

Numa das suas últimas viagens de negócios aos Estados Unidos da América teve contacto com a *InCountry Airlines*, uma companhia aérea que realiza viagens nacionais. O modelo de negócio desta companhia aérea assenta numa metodologia *low-cost*, recorrendo a uma diminuição dos custos de transacções e dos serviços prestados a bordo. A *InCountry Airlines* realiza uma maximização da utilização do *staff* quer em terra quer a bordo, subcontrata todo o pessoal envolvido e utiliza aeroportos secundários. Tudo isto permite a prática de preços mais baixos relativamente às restantes companhias e ter rapidamente uma margem de lucro bastante grande, sendo nalguns casos superior às de outras companhias aéreas.

Embora a constituição de um negócio deste tipo implique um investimento baixo, no seu país não existe nenhuma companhia aérea a operar nestes moldes. Todo o modelo de negócio está orientado para minimizar os custos de forma a maximizar os lucros.

1.1 Descreva a ideia de negócio que a história anterior lhe sugere.

Por favor, responda agora a algumas questões sobre si. Estas perguntas têm como objectivo a caracterização global da amostra. Preencha os espaços em branco e seleccione a sua resposta com uma cruz (x).

1. Sexo……❑1 Masculino ❑2 Feminino

2. Idade _____ anos

3. Formação Académica	Bolonha	❑1 Secundário (12º ano)	❑3 Mestrado Pré-Bolonha	❑5 Mestrado Pós-Bolonha	
		❑2 Licenciatura (frequência)	❑4 Licenciatura	❑6 Doutoramento	

4.1 Estabelecimento de ensino_____ 4.2 Curso_____

5. Situação profissional actual	❑1 Empresário / Patrão	❑3 Trabalhador por conta de outrem	❑5 Trabalhador por contra própria	
	❑2 Desempregado	❑4 Estudante	❑6Outra	

6. Estado Civil: ❑1 Solteiro ❑2 Casado ❑3 Divorciado ❑4 União de Facto ❑5 Viúvo

7. No meu telemóvel tenho aproximadamente o seguinte número de contactos:

❑1 até 249 ❑2 250-499 ❑3 500-699 ❑4 700-999 ❑5 1000 ou mais

8. No meu computador, entre contactos de email, Messenger, Hi5, ou Skype, tenho aproximadamente o seguinte número de contactos

❑1 até 249 ❑2 250-499 ❑3 500-699 ❑4 700-999 ❑5 1000 ou mais

9. Quantas oportunidades de negócio concretizáveis já lhe ocorreram? _____

Muito Obrigado pela sua participação!

APPENDIX C. SAMPLE OF INSTRUMENTS FOR DATA COLLECTION IN STUDY 3 (PORTUGUESE AND GERMAN VERSIONS)

QUESTIONÁRIO

O presente questionário enquadra-se numa investigação que está a ser desenvolvida no âmbito do Doutoramento em Gestão e Desenvolvimento de Recursos Humanos. O principal objectivo é recolher as suas opiniões acerca de um conjunto de situações que lhe apresentaremos de seguida.

Não existem respostas certas ou erradas; pretende-se apenas que responda de acordo com o que considera mais adequado.

Todas as respostas são confidenciais e não se pretende fazer nenhuma identificação pessoal.

Por favor, responda a todas as questões.

A sua participação neste estudo é muito importante! Muito obrigado pela sua colaboração!

A pequena história que lerá de seguida descreve uma situação hipotética de negócio. Por favor, imagine que é o sujeito da história. Leia atentamente a história 1.

Numa das suas últimas viagens de negócios aos Estados Unidos da América teve contacto com a *InCountry Airlines*, uma companhia aérea que realiza viagens nacionais. O modelo de negócio desta companhia aérea assenta numa metodologia *low-cost*, recorrendo a uma diminuição dos custos de transacções e dos serviços prestados a bordo. A *InCountry Airlines* realiza uma maximização da utilização do staff quer em terra quer a bordo, subcontrata todo o pessoal envolvido e utiliza aeroportos secundários.

No país onde vive, este tipo de companhias aéreas não existe. Contudo, as viagens nacionais de longa distância, que são cada vez mais frequentes, têm que ser, muitas vezes, realizadas recorrendo ao transporte aéreo, com preços excessivamente altos. As alternativas tradicionais mostram-se cada vez menos viáveis: o transporte rodoviário é cada vez mais difícil, devido ao volume de tráfego acentuado nas estradas, à insegurança e, à semelhança do transporte ferroviário, é dispendioso e moroso. Já a deslocação aérea é, comprovadamente, mais segura e mais rápida. Neste sentido, a existência de uma companhia aérea que funcione nos mesmos moldes na *InCountry Airlines* poderia resolver estes problemas e apresentar-se com uma boa alternativa para as deslocações nacionais.

1.1Descreva a ideia de negócio que a história anterior lhe sugere.

1.2 Até que ponto os seguintes factores caracterizam a ideia de negócio que descreveu? Responda utilizando a seguinte escala: **1= Nada; 5= Muito.**	Nada				Muito	
A situação descrita…	**1**	**2**	**3**	**4**	**5**	**NS**
1. Resolve os problemas de potenciais clientes						
2. Gera lucro						
3. Tem um risco gerível						
4. Vai de encontro às necessidades de potenciais clientes do meu negócio						
5. Consegue responder a necessidades a longo prazo						
6. Permite aliviar dor/problemas dos meus potenciais clientes						
7. Permite melhorar a vida das pessoas em geral						
8. É solicitada pelos meus potenciais clientes						
9. É lucrativa						
10. Dá origem a muito dinheiro						
11. Permite-me ganhar muito dinheiro						
12. Permite um lucro rápido						
13. Requer um investimento baixo						
14. É aceitável por parte dos meus potenciais clientes						
15. Requer mudanças tecnológicas						
16. Requer responsabilidades legais						
17. Tem riscos na produção						

Por favor, responda agora a algumas questões sobre si. Estas perguntas têm como objectivo a caracterização global da amostra. Preencha os espaços em branco e seleccione a sua resposta com uma cruz (x).

1. Sexo……❑1 Masculino ❑2 Feminino

2. Idade _____ anos

3. Formação Académica ❑1 Secundário (12º ano) ❑3 Mestrado Pré-Bolonha ❑5 Mestrado Pós-Bolonha

❑2 Licenciatura (frequência) ❑4 Licenciatura ❑6 Doutoramento

4.1 Estabelecimento de ensino _____ 4.2 Curso_____

5. Situação profissional actual ❑1 Empresário / Patrão:
Descreva sucintamente o seu negócio:

_____

_____

_____

_____

❑3 Trabalhador por conta de outrem ❑5 Trabalhador por contra própria

❑2 Desempregado ❑4 Estudante ❑6Outra

6. Estado Civil: ❑1 Solteiro ❑2 Casado ❑3 Divorciado ❑4 União de Facto ❑5 Viúvo

7. No meu telemóvel tenho aproximadamente o seguinte número de contactos:

❑1 até 249 ❑2 250-499 ❑3 500-699 ❑4 700-999 ❑5 1000 ou mais

8. No meu computador, entre contactos de email, Messenger, Facebook, ou Skype, tenho aproximadamente o seguinte número de contactos

❑1 até 249 ❑2 250-499 ❑3 500-699 ❑4 700-999 ❑5 1000 ou mais

9. Quantas oportunidades de negócio concretizáveis já lhe ocorreram?_____

10. De forma a criar um código apenas para localização de questionários em base de dados, por favor indique: os dois últimos dígitos do seu numero de telefone____, o dia do seu nascimento_____ e o mês ____ .

11.De forma a podermos divulgar os resultados deste estudo, indique por favor o seu e-mail: _____

Muito Obrigado pela sua participação!

TECHNISCHE UNIVERSITÄT DRESDEN

ISCTE IUL Instituto Universitário de Lisboa Lisbon University Institute

UMFRAGE

Diese Umfrage ist Teil einer Studie, die von der TU Dresden und dem Instituto Universitario de Lisboa (ISCTE-IUL, Portugal) zum Thema Unternehmertum entwickelt wurde. Das Hauptziel ist es, Meinungen über die in dieser Studie beschriebenen Situationen zu sammeln. Es gibt keine richtigen oder falschen Antworten. Sie sollten entsprechend Ihrer Meinung beantworten. Bitte beantworten Sie alle Fragen. Die Antworten sind vertraulich und sind nicht auf Ihre Person zurückführbar. Ihre Teilnahme ist uns sehr wichtig.

Vielen herzlichen Dank!

1. Die folgende Geschichte beschreibt eine hypothetische Geschäftsmöglichkeit. Stellen Sie sich vor, dass Sie die Person aus der Geschichte sind. Bitte lesen Sie den Text sorgfältig.

Auf Ihrer letzten Geschäftsreise in den USA sind Sie mit InCountry Airlines geflogen, einer Fluggesellschaft die inländische Flüge anbietet. Das Geschäftsmodell dieser Airline basiert auf einem Niedrigkostenansatz, der Kostenreduzierung, weniger Arbeitsvorgänge und Einsparmaßnahmen bezüglich des Services an Bord nutzt. INCountry Airlines betreibt eine Maximierung des Einsatzes des Personals an Land und an Board; das gesamte Personal wird in Form von Unteraufträgen (Leiharbeit) beschäftigt und sie nutzt Sekundärflughäfen. In Ihrem Land gibt es keine derartige Airline. Nationale Langstreckenreisen, die immer häufiger werden, müssen oft per Lufttransport bewältigt werden, bei überhöhten Preisen. Das bisher übliche Reisen mit dem Auto wird durch ein hohes Verkehrsaufkommen und Sicherheitsbedenken immer problematischer und ist nicht zuletzt wie auch das Reisen im Zug sowohl teuer und zeitaufwendig. Fliegen ist bekanntermaßen sicherer und schneller. Deshalb könnte die Existenz einer solchen Airline wie InCountry Airlines die Lösung für diese Probleme sein und eine annehmbare Alternative zu den momentanen Gepflogenheiten des Reisens im Inland darstellen.

2. Beschreiben Sie die Geschäftsidee die in dieser Geschichte vorgestellt wurde.

3. Inwiefern sind folgende Aussagen zur beschriebenen Geschäftsidee zutreffend?
Verwenden Sie die folgende Skala:
1 = überhaupt nicht, 5 = sehr stark.
Falls eine Aussage nicht zutrifft, kreuzen Sie bitte NZ an.

Die beschriebene Geschäftsidee ...	überhaupt nicht 1	2	3	4	sehr stark 5	NZ
1. Löst die Probleme der Kunden						
2. Führt zu einem positiven Netto-Cash-flow*[1]						
3. Bringt handhabbares Risiko mit sich						
4. Erfüllt die Bedürfnisse der Kunden						
5. Wird von den Kunden langfristig gefordert						
6. Mindert die Leiden / Probleme der Kunden						
7. Verbessert das Leben						
8. Ist von den Kunden gewollt						
9. Ist profitabel						
10. Generiert viel Geld						
11. Kann viel Geld bringen						
12. Bringt schnell Gewinn						
13. Erfordert geringe Investitionen						
14. Wird von Kunden akzeptiert						
15. Benötigt wenige technologische Veränderungen						
16. Bringt geringe rechtliche Verantwortung mit sich						
17. Es bestehen Risiken bei der Herstellung						

4. Bitte beantworten Sie ein paar Fragen über sich. Diese Fragen dienen der Beschreibung unserer Stichprobe. Markieren Sie das entsprechende Kästchen mit einem X.

Geschlecht ❑1 Mann ❑2 Frau

Alter _____

Ausbildungsgrad ❑1 Bachelor (angestrebt) ❑3 Diplom/Master (angestrebt)

❑2 Bachelor (abgeschlossen, Bsc) ❑4 PhD

Universität _____ Fachrichtung _____

Berufliche Stellung ❑1 Ich habe mein eigenes Geschäft:

Bitte beschreiben Sie kurz Ihre Geschäftstätigkeit:

_____
_____
_____
_____

❑2 arbeitstätig ❑3 erwerbslos ❑4 Student

Familienstand: ❑1 ledig ❑2 verheiratet ❑3 geschieden ❑5 verwitwet

Auf meinem Handy habe ich ungefähr folgende Anzahl an Kontakten: ❑1 bis zu 249 ❑4 700-999 ❑2 250-499 ❑5 1000 oder mehr ❑3 500-699

Auf meinem Computer (E-Mail, MSN, Skype, Facebook, etc.) habe ich ungefähr folgende Anzahl an Kontakten: ❑1 bis zu 249 ❑4 700-999 ❑2 250-499 ❑5 1000 oder mehr ❑3 500-699

An wie viele machbare/realistische Geschäftsmöglichkeiten haben Sie bereits nachgedacht? _____

Für Zwecke der Datenanalyse geben Sie bitte folgenden Zahlencode an: Tag Ihrer Geburt _____ , die letzten beiden Ziffern Ihrer Telefonnummer _____ und Ihren Geburtsmonat _____ .

(Beispiel: Geburtstag: 04.12.1988, Telefonnummer 0177 1234567. Daraus folgt der Code: 04 67 12)

Ihre Email-Adresse: _____

APPENDIX D. SAMPLE OF INSTRUMENTS FOR DATA COLLECTION IN STUDY 4 (PORTUGUESE AND GERMAN VERSIONS)

ISCTE IUL
Instituto Universitário de Lisboa
Lisbon University Institute

QUESTIONÁRIO

O presente questionário enquadra-se numa investigação que está a ser desenvolvida no âmbito do Doutoramento em Gestão e Desenvolvimento de Recursos Humanos. O principal objectivo é recolher as suas opiniões acerca de um conjunto de situações que lhe apresentaremos de seguida.

Não existem respostas certas ou erradas; pretende-se apenas que responda de acordo com o que considera mais adequado.

Todas as respostas são confidenciais e não se pretende fazer nenhuma identificação pessoal.

Por favor, responda a todas as questões.

A sua participação neste estudo é muito importante! Muito obrigado pela sua colaboração!

A pequena história que lerá de seguida descreve uma situação hipotética de negócio. Por favor, imagine que é o sujeito da história.
Leia atentamente a história 1.

É o responsável pela manutenção da rede eléctrica de um grupo de centros comerciais. Na sua última visita a um deles deparou-se com a situação típica de grande afluência de pessoas. Conversando com o administrador do centro comercial comenta com ele esta situação e ele responde-lhe que embora a afluência de pessoas seja importante para o negócio, as pessoas consomem cada vez menos. Mensalmente as despesas da electricidade são muito altas e a margem para as pagar cada vez mais pequena. Utilizando os seus conhecimentos sobre electricidade rapidamente percebe que a energia libertada pelo andar das pessoas poderia ser convertida em energia eléctrica. Ao desenvolver a ideia imagina um dispositivo que poderia cobrir todo o chão do centro comercial e rentabilizar as visitas das pessoas mesmo que não consumam, resolvendo o problema da empresa. O mesmo conceito poderia ser aplicado a outras empresas-clientes e resolver os seus problemas de dependência energética. Assim, a longo prazo o centro comercial deixaria de depender de fornecimento externo, diminuindo a sua dependência e com recurso a uma fonte de energia renovável, contribuindo para a política de responsabilidade social a que o centro comercial está associado.

1.2 Descreva a ideia de negócio que a história anterior lhe sugere.

1.2 Até que ponto os seguintes factores caracterizam a ideia de negócio que descreveu? Responda utilizando a seguinte escala: **1= Nada; 5= Muito.**	Nada				Muito	
A situação descrita…	**1**	**2**	**3**	**4**	**5**	**NS**
1. Resolve os problemas de potenciais clientes						
2. Gera lucro						
3. Tem um risco gerível						
4. Vai de encontro às necessidades de potenciais clientes do meu negócio						
5. Consegue responder a necessidades a longo prazo						
6. Permite aliviar dor/problemas dos meus potenciais clientes						
7. Permite melhorar a vida das pessoas em geral						
8. É solicitada pelos meus potenciais clientes						
9. É lucrativa						
10. Dá origem a muito dinheiro						
11. Permite-me ganhar muito dinheiro						
12. Permite um lucro rápido						
13. Requer um investimento baixo						
14. É aceitável por parte dos meus potenciais clientes						
15. Requer mudanças tecnológicas						
16. Requer responsabilidades legais						
17. Tem riscos na produção						

Por favor, responda agora a algumas questões sobre si. Estas perguntas têm como objectivo a caracterização global da amostra. Preencha os espaços em branco e seleccione a sua resposta com uma cruz (x).

1. Sexo……❑1 Masculino ❑2 Feminino

2. Idade _____ anos

3. Formação Académica ❑1 Secundário (12º ano) ❑3 Mestrado Pré-Bolonha ❑5 Mestrado Pós-Bolonha
❑2 Licenciatura (frequência) ❑4 Licenciatura ❑6 Doutoramento

4.1 Estabelecimento de ensino _____ 4.2 Curso_____

5. Situação profissional actual ❑1 Empresário / Patrão:
Descreva sucintamente o seu negócio/ideia de negócio:
_____
_____
_____
_____
❑3 Trabalhador por conta de outrem ❑5 Trabalhador por contra própria
❑2 Desempregado ❑4 Estudante ❑6Outra

6. Estado Civil: ❑1 Solteiro ❑2 Casado ❑3 Divorciado ❑4 União de Facto ❑5 Viúvo

7. No meu telemóvel tenho aproximadamente o seguinte número de contactos:

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9. Quantas oportunidades de negócio concretizáveis já lhe ocorreram?_____

10. De forma a criar um código apenas para localização de questionários em base de dados, por favor indique: os dois últimos dígitos do seu numero de telefone____, o dia do seu nascimento_____ e o mês ____ .

11.De forma a podermos divulgar os resultados deste estudo, indique por favor o seu e-mail: _____

Muito Obrigado pela sua participação!

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Vielen herzlichen Dank!

3. Die folgende Geschichte beschreibt eine hypothetische Geschäftsmöglichkeit. Stellen Sie sich vor, dass Sie die Person aus der Geschichte sind. Bitte lesen Sie den Text sorgfältig.

Sie sind verantwortlich für die Elektrizität einer Gruppe von Einkaufszentren. Bei Ihrem letzten Besuch in einem der Einkaufszentren begegnen Sie dem üblichen Andrang von Menschen, der typisch für solche Orte ist. Im Gespräch mit dem Manager dieses Einkaufzentrums erfahren Sie, dass – obwohl es viele Besucher gibt – immer weniger gekauft wird. Die Stromkosten steigen jeden Monat an und die Gewinn-Marge, um sie zu bezahlen, wird immer kleiner. Mit Ihrem Fachwissen über Elektrizität erkennen Sie schnell, dass die durch das Gehen der Menschen im Einkaufszentrum freigesetzte Energie, in elektrische Energie umgewandelt werden könnte. Sie stellen sich hierfür eine Vorrichtung vor, die den gesamten Boden eines Einkaufszentrums bedeckt und den Besuch der Menschen rentabel machen würde, selbst wenn diese kein Geld ausgeben. Dies würde das Problem des Unternehmens lösen. Die gleiche Idee könnte an weitere Einkaufszentren der Gruppe verkauft werden, damit diese ihre Probleme der Energie-Abhängigkeit lösen können. Langfristig gesehen wären die Einkaufszentren nicht mehr auf eine externe Stromversorgung angewiesen, was ihre Abhängigkeit verringern würde. Mit der Verwendung dieser erneuerbaren Energiequelle, würde eine soziale Verantwortung demonstriert werden, mit der die Einkaufszentren assoziiert würden..

4. Beschreiben Sie die Geschäftsidee die in dieser Geschichte vorgestellt wurde.

3. Inwiefern sind folgende Aussagen zur beschriebenen Geschäftsidee zutreffend?
Verwenden Sie die folgende Skala:
1 = überhaupt nicht, 5 = sehr stark.
Falls eine Aussage nicht zutrifft, kreuzen Sie bitte NZ an.

Die beschriebene Geschäftsidee ...	überhaupt nicht 1	2	3	4	sehr stark 5	NZ
1. Löst die Probleme der Kunden						
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15. Benötigt wenige technologische Veränderungen						
16. Bringt geringe rechtliche Verantwortung mit sich						
17. Es bestehen Risiken bei der Herstellung						

5. Stellen Sie sich vor, Sie sind ein Unternehmer. Geben Sie bitte an inwieweit Sie folgenden Aussagen zustimmen:

Verwenden Sie dafür folgende Skala:
1 = stimme überhaupt nicht zu, 5 = stimme völlig zu.
Falls diese Aussage auf Sie nicht zutrifft, kreuzen Sie bitte NZ an

	Stimme überhaupt				Sehr wichtig	
	1	**2**	**3**	**4**	**5**	**NZ**
1. Es ist spannend, neue Wege herauszufinden, wie man unerfüllte Bedürfnisse des Marktes erfüllen und, vermarkten könnte.						
2. Es macht mir Spaß nach neuen Ideen für Produkte / Dienstleistungen zu suchen.						
3. Ich bin motiviert, um herauszufinden, wie man bestehende Produkte / Dienstleistungen verbessern kann.						
4. Die Suche nach neuen Gelegenheiten in der Umgebung begeistert mich.						
5. Das Erfinden neuer Lösungen für Probleme ist eine besondere Eigenschaft von mir.						
6. Die Gründung eines neuen Unternehmens reizt mich.						
7. Der Gedanke eine eigene Firma zu besitzen spornt mich an.						
8. Es reizt mich eine neue Firma aufzuziehen und erfolgreich zu machen.						
9. Die Unternehmensgründung stellt einen wichtigen Teil meiner Persönlichkeit dar.						
10. Ich mag es die richtigen Leute zu finden, die mein Produkt / Dienstleistung vermarkten.						
11. Die richtigen Leute der Arbeit in meinem Unternehmen zuzuteilen ist aufregend.						
12. Meine Mitarbeiter und mich dazu zu bringen unser Unternehmen zu verbessern motiviert mich.						
13. Sich um die Pflege und das Wachstum von Unternehmen zu kümmern macht meine Persönlichkeit zu großen Teilen aus.						

6. Bitte beantworten Sie ein paar Fragen über sich. Diese Fragen dienen der Beschreibung unserer Stichprobe. Markieren Sie das entsprechende Kästchen mit einem X.

Geschlecht ❑1 Mann ❑2 Frau

Alter _____

Ausbildungsgrad ❑1 Bachelor (angestrebt) ❑3 Diplom/Master (angestrebt)

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_____
_____
_____

❑2 arbeitstätig ❑3 erwerbslos ❑4 Student

Familienstand: ❑1 ledig ❑2 verheiratet ❑3 geschieden ❑5 verwitwet

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(Beispiel: Geburtstag: 04.12.1988, Telefonnummer 0177 1234567. Daraus folgt der Code: 04 67 12)

Ihre Email-Adresse: _____