

**Impact Parameters in an Entrepreneurial Career
Determination Model from Cognition and Social
Network Perspectives**

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Abstract

The background to this study relates to the policy of the Chinese government to encourage university graduates to become entrepreneurs as a means of addressing unemployment in China. Far less than the expected number of university graduates however engage in an entrepreneurial career which leads one to question the effectiveness of this policy initiative. A number of critical issues arise. First, although the government's policy incentives may have a positive impact on the take-up of entrepreneurial careers, there is insufficient research to justify the kind of support currently being implemented by the Chinese government. Second, while some studies have shown that one's social network is a significant attribute in the decision to become an entrepreneur, the empirical evidence is mixed. Other studies have shown that entrepreneurial cognition is a crucial antecedent to whether people choose to become entrepreneurs. Few studies however have examined the relationship between one's social network and cognition, and their relationship to how entrepreneurial intentions are formed.

In addressing these gaps, the thesis investigates how the characteristics of an individual's social network affect the formation of his or her entrepreneurial intentions directly and via entrepreneurial cognition. The findings of this study contribute to the literature in three respects. The first contribution comes from the argument that one's social network properties and in particular, one's entrepreneurial social network, directly influence cognition during the formation of entrepreneurial intentions. The second contribution reveals alternative measures and hence explanations of entrepreneurship in relation to one's social capital, one's social network characteristics and other factors. The third contribution rests on the analytical approach, which uses the technics of structural equation modeling (SEM) to reveal the relationship between critical realism and conceptions. As the analysis show, SEM is an appropriate and effective approach to the confirmatory analysis. Essentially, it enables integrating knowledge and by drawing together parameter variables and latent variables, it offers concurrent understanding of the critical insight of the focal problem of why some people choose to be entrepreneurs.

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Declaration and Statement

I declare that I have not, whilst being registered for the PhD program in Manchester Metropolitan University, been a registered candidate for another award of a university.

The material in the dissertation has not been used in any other submissions for an academic award.

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CHAPTER 1 INTRODUCTION

Each year, there are several million university graduates entering the job market in China as fresh blood adding value to the growing economy (Zhou and Lin, 2009). Yet the absorption of this constant flow of graduates remains a substantial challenge for policy makers. Although the government in China makes policies to encourage university graduates to start up their own business as a means of improving graduate employment prospects, the effects of the policy are not so satisfying. Given the improved policy, it however produces far less employment than expected and the entrepreneurial failure rate is very high. Social science can provide intellectual underpinnings. Under the guidance of the theory that can explain the social events, policy makers may design intervention mechanisms informed by theory to bring about the anticipated effects (Little, 1991). Entrepreneurial intention (hereafter referred to as EI) is a necessary condition of becoming an entrepreneur. All new business start-ups by individuals begin with EI, which also acts as a proxy for entrepreneurial activity (Krueger et al., 2000; Thompson, 2009).

Therefore, it will be worthwhile to investigate the question “*Why do some university students develop entrepreneurial intentions while others do not?*” Addressing this question not only concerns choices and preferences, it has a direct effect on impact parameters and therefore further research is required to identify the determinants of entrepreneurship as a career. Thus, to explore the insight drives this study to identify a career choice model in relation to the research issue. Findings of this study will significantly contribute to current theory advancement towards our understanding of entrepreneurship. In turn, this will influence government policy choice and future economic growth in China. The answer to this question will have implications for government support and the encouragement of entrepreneurship among university graduates in terms of widening employment

opportunities and in enhancing the capacity of productive talent in China, with consequences for non-inflationary economic growth.

Scholars from multiple theoretical perspectives (e.g., Shane and Venkataraman, 2000; Gregoire et al. 2006) have addressed the above question. Prior literatures include trait theory, entrepreneurial opportunity economics, cognition theory, and social capital theory. Though we can trace several different perspectives in the literatures, prior research has not satisfactorily addressed the question of why some people choose entrepreneurship as a career. The emerging body of literature shows a trend in combining several theoretical perspectives in order to provide a more holistic or integrated analysis when addressing this question (De Carolis and Saporito, 2006; Liñán and Santos, 2007; De Carolis et al., 2009). Building on the emergent literature, the immediate research in this thesis follows the various schools of thought in the different research streams in order to explore further the question and provide insights, which will be developed in the research. As such, the thesis integrates social capital theory and the theory of entrepreneurial cognition, and importantly, it accounts for the antecedents of entrepreneurial intentions among individuals. To clarify, the immediate research in this thesis applies social capital theory to the entrepreneurial context and it argues that entrepreneurship related social capital, rather than general social capital is more powerful in explaining the phenomenon in the entrepreneurship domain. Entrepreneurial related behavior and the creation of social capital can be examined using exploratory measures in relation to an individual's social network and network characteristics. Thus, the research proposes the following objectives.

1.1 The Aims and Objectives

The overall aim of the thesis is to establish a theoretical framework, which may be distinguished from previous research. It uses the proposed framework to explore and subsequently offers explanations to the central question that why some people and not

others develop entrepreneurial intentions (EI). In order to augment the insight and to show the parameter determinants, the thesis sets up the objectives, as follows:

1. Examine the evolution of different theoretical perspectives in explaining the effects of personal traits, entrepreneurial opportunities, cognitions, and social capital and their impact on research into entrepreneurial career choice;
2. Establish a theoretical framework that draws on theory from both social network and individual cognition perspectives for investigating why people engage with EI;
3. Develop the test model through which to identify and hence empirically confirm the proposed parameter variables within the framework of entrepreneurial career determination;
4. Identify significant relationships through examining both direct and indirect effects of the predicted variables derived from multiple assumptions towards the central research question ;
5. Examine mediation effects of the cognitive properties on the relationship between one's social network characteristics and the emerging intention of being an entrepreneur.

1.2 Contributions to the Literature

The major contribution of this thesis is theory advancement that specifically relates to the argument that one's social networks directly influence how one's cognition shapes the formation of EI. The contribution is expected to meet the process argument raised by the objectives 2, 4, and 5. As the proposed framework will show, the contribution to knowledge is developed from an in-depth study of the relevant literatures in order to explicate certain gaps in prior studies.

Although the relationship between social capital and the entrepreneurial process has been tested before (Davidsson and Honig, 2003; De Carolis et al., 2009; De Carolis and Saporito, 2006; Greve and Salaff, 2003; Krueger, 1993; Liñán and Santos, 2007; Ozgen and Baron, 2007; Scherer et al., 1989; Sequeira et al., 2007; Van Auken et al., 2006), prior studies have considered only the direct relation between social capital variables and EI, resulting in either finding weak correlations or statistically insignificant (though logically sound) relationships, outcomes that might be caused by ignoring mediating effects of such variables as cognitive bias, which is widely used to explain entrepreneurship (Hayward et al., 2006; Camerer and Lovo, 1999; Koellinger et al., 2007; Trevelyan, 2008; Baron, 1998; Busenitz and Barney, 1997; De Carolis and Saporito, 2006; Simon et al., 2000; De Carolis et al., 2009).

This thesis intends to argue that prior studies have neglected the relationship between cognitive bias and EI. It may be an incorrect interpretation that prior research perceives entrepreneurial formation and other early entrepreneurial activities as one smooth stage. Given that cognitive bias may have a different role at different stages, it is likely to have a differential impact on career choice. Prior research has provided different solutions with regard to the elimination and diffusion of cognitive bias in the process of an individual's entrepreneurial choice (Davidsson and Honig, 2003; Ozgen and Baron, 2007; De Carolis et al., 2009). Although prior literature has revealed the link between social networks and cognitive bias, the link and its consequent effects need to be further researched. Yet as the extant literature shows, prior research has made few inroads in advancing this line of research. To fill the gap, this research seeks to understand the relationship between social network and cognitive bias and entrepreneurial intentions. The distinctiveness of this thesis is to be found in the model, which seeks to explain entrepreneurial intentions through examining not only the influence of early entrepreneurial activities of individuals but also the effects of cognitive bias. In so doing, this study draws attention to an unresolved issue in the current debate. As the proposed theoretical framework shows, there is a set of properties that associate an individual's disposition to become an entrepreneur, including an individual's social network experience, cognition, as well as other parameters, that have not been systemically examined, at least not through a large quantitative data set and rigorous empirical analysis.

The second contribution to knowledge comes from developing an alternative way of measuring one's social capital in the context of entrepreneurship, achieved by addressing objective three. When using social capital as an independent variable, three dimensions are often cited (Nahapiet and Ghoshal, 1998; Tsuzuki, 2005; Lee, 2009), with both indirect and direct entrepreneurial experiences, crucial to EI, being excluded from consideration. This thesis, by infusing vicarious entrepreneurial experiences into the constructs of social capital in the field of entrepreneurship, introduces a crucial characteristic into one's social network. Comparatively, the three dimensions of social capital (structural, relational, and cognitive) used in prior studies are directly transferred from other domains and do not necessarily accord to the entrepreneurial context. As such, this thesis contributes to a way of measuring the three dimensions from the perspective of vicarious entrepreneurial experiences present in an individual's social network.

The third contribution is related to the use of analytical tools from the extant literature in the philosophy of knowledge to address the question of why some people but not others choose to be entrepreneurs. This contribution is to be made when the first objective is met. Although the extant literature in the philosophy of knowledge attempts to address the question why some people but not others choose to be entrepreneurs, the attributes have as yet not been significantly advanced, or at the least, development has been slow in producing fresh insights. Many factors are used to explain one's entrepreneurial career choice, including trait theory (Rauch and Frese, 2007), information distribution (Kirzner, 1997; Shane, 2000; Shane and Venkataraman, 2000), cognitive mechanism (Baron, 2004a, b; Mitchell et al., 2007), social capital (Casson and Giusta, 2007; Davidsson and Honig, 2003; De Carolis et al., 2009; Liñán and Santos, 2007) and other factors. The entrepreneurship domain now has at least a 30 year history and has experienced at least four conceptual convergences (Shane and Venkataraman, 2000; Gregoire et al., 2006). From the results of this thesis, the time is now ripe to critically reflect on theory development within entrepreneurship. The results provide a more holistic picture of the nature of knowledge in the entrepreneurship field. In particular, the results are reached by applying the tools from the philosophy of knowledge, for example, the analytical

framework of the progress of science by Popper (1972) and Lakatos (1978), and this thesis is among the earliest attempts to apply this analytical framework in the entrepreneurship domain.

1.3 The Structure of the Thesis

Chapter 1 introduces the research background, objectives, and especially the research problem. In what follows the chapter also highlights the contributions made. Furthermore, the methodological approaches are also introduced, and finally the structure of this thesis. Chapter 2 critically analyzes how theories have evolved to the present stage in the entrepreneurship domain using Lakatos' (1970, 1978) theory of scientific research program as the evaluation tool. The hard cores claim in the entrepreneurship domain is that entrepreneurs and non-entrepreneurs are different and the protecting belts for it are differences in specific aspects, such as traits, demographic features, information distribution, cognitive properties, and social capital. This research argues that social capital theory and cognition theory can be combined to form an integrative framework to explain why some people but not others choose to be entrepreneurs.

Chapter 3 firstly analyzes the concepts discussed in prior entrepreneurial frameworks and models used to explain why some people but not others choose to be entrepreneurs, and then by a synthesis process the chapter categorizes these concepts into two groups: individual factors and environmental factors. By adding entrepreneurial intentions as the third point, this research proposes a triangle entrepreneurial intentions (EI) model which stresses the direct effect that individual and environmental factors have on EI as well as the indirect effect of environmental factors on EI through the mediation of individual factors. The EI model specially designed for the research makes the claim, supported by argument and empirical evidence, that the characteristics of an individual's social network would directly influence EI, that cognitive bias would directly affect EI, and that the characteristics of an individual's social network would indirectly impact on EI through the mediation of cognitive bias. An individual would learn from the entrepreneurial

experiences presented in his or her network, but this learning could affect cognitive bias and therefore, it could influence the formation of entrepreneurial intentions. Based on the proposed model, the chapter presents a series of hypotheses.

Chapter 4 explains the methodological issues of this thesis. This research leans toward critical realism in terms of ontological and epistemological assumptions and assumes that mechanisms generating EI has an external existence, situated in the “real” domain, but to gain knowledge about them is a social practice. Given the nature of the research, this thesis adopts both inductive and deductive studies. The research strategy is to gain knowledge about EI mechanisms. The knowledge produced is thus tentative but not relative. This research designs measurement instruments with reference to prior studies and the model specially designed for the present research. Although it is always difficult to move from general to domain specific measures of social capital, this thesis tentatively suggests that structural, relational, and cognitive dimensions of social capital could be measured by network support, intensity of prior interaction with entrepreneurs in one’s social network, and positive perceptions of entrepreneurial experiences in one’s social network respectively and hence, affect the formation of cognitive biases and entrepreneurial intentions. The measurement instruments are then used in the questionnaire to collect primary cross-sectional quantitative data using survey method. A four-stage random sampling method is designed to reach about 1200 graduates in Wuhan University, China and 625 valid questionnaires are collected. Structural Equation Modeling methods are compatible with the methodological stance of this research. Exploratory and confirmatory factor analysis is used in the pilot study to test the reliability and validity of measurement scales designed. The fit indices are analyzed for both the measurement and structural model based on the data collected from the formal survey.

According to the test results presented in Chapter 5, the scale used to measure the three major conceptions, including entrepreneurial intentions, cognitive bias, and the characteristics of one’s network, are reliable and valid. The goodness of fit of the measurement model is acceptable. After the relationships between the three social network characteristics variables are freed for estimation, the revised structural model improved goodness of fit. The research results show that the three social network characteristics variable can directly impact on EI. But illusion of control can fully mediate the relationship

between positive perceptions of entrepreneurial experience in one's social network and EI, and between network support and EI. Illusion of control partly mediates the relationship between intensity of prior interactions with entrepreneurs in one's social network and EI.

Chapter 6 discusses the findings. The results from the measurement model support the claim that cognitive biases, including overconfidence and illusion of control, are significantly related to the formation of EI. However, the hypothesized causal direction that overconfidence leads to the formation of EI is not supported by the data. The findings, in fact, show that firstly, these results suggest that overconfidence is a consequence of the EI formation process rather than its cause. Secondly, these results are achieved because illusion of control absorbs most the effects that cognitive bias constructs has on EI formation. Thirdly, the simultaneous measurement of multi-item constructs and the correlations among these constructs has highlighted the overall effects, though some paths may be statistically insignificant. Finally, guanxi (relationship) plays an important role in EI formation but it is not included in the model and does not have an effect on one's judgment of his/her entrepreneurial capabilities. University graduates in China think that guanxi (or relationship) plays a very important role in career choice. Guanxi can change one's perception on his/her control over the success of the new venture.

The results in the measurement model show that any of the three variables, including intensity of prior interactions with entrepreneurs in one's social network, positive perceptions of entrepreneurial experiences in one's social network, and network support are significantly and positively related to overconfidence and illusion of control. However, the relationship between the intensity of the prior interactions with entrepreneurs and overconfidence become insignificant in the structural model. Successful entrepreneurs often get less confident and the interactions with them make an individual less confident about his/her entrepreneurial abilities. But the intensity of the prior interactions may exert an influence on overconfidence and illusion of control via the effects that it has on positive perceptions of entrepreneurial experiences and network support. Furthermore, any of the three individual's social network characteristics can influence the formation process of entrepreneurial intentions and these three characteristic can combine in some way to exert an influence on the entrepreneurial career choice. The effects of social network characteristics on the formation of EI can be direct or indirect. IC (illusion of control)

partially mediates the relationship between intensity of prior interactions and EI and fully mediates the relationship between network support and EI and the relationship between positive perceptions of entrepreneurial experiences and EI. Not all cognitive biases may mediate the relationship between social network properties and the formation of EI. Among those cognitive biases that play mediating roles, some relationships between social capital and EI are fully mediated, and others are partially mediated and can be distinguished by statistical tests.

Based on the findings of this research, Chapter 7 offers seven suggestions to policy choice concerning the encouragement of entrepreneurship among university graduates. First, it suggests that before making decisions, policy makers should be informed with theories that can explain the formation of entrepreneurial intentions. Second, it suggests that the characteristics of a graduate's social network should be tested to ensure that policies can target the correct group of people. Third, it suggests that entrepreneurship encouragement policies should include measures that target at the early entrepreneurship gestation stage especially the entrepreneurial intention formation stage. Fourth, it suggests that entrepreneurship training programs should create opportunities to encourage graduates to interact with entrepreneurs. Fifth, it suggests that entrepreneurship training courses should tolerate cognitive bias that students have toward entrepreneurial activities. Sixth, it suggests that entrepreneurship training programs should facilitate graduates to participate in ongoing entrepreneurial activities. Seventh, it suggests that entrepreneurship training program should help students to establish positive perceptions of entrepreneurial experiences. Chapter 7 also points out three areas that might constitute a significant research agenda for the near future. First, it suggests that future studies could investigate whether a person may choose to be an entrepreneur is actually a random event. Second, it suggests that future work could critically review studies that use qualitative methods to understand the differences between entrepreneurs and non-entrepreneur. Thirdly, it suggests that future research could design better entrepreneurship domain specific question items congruent with general social capital theory.

CHAPTER 2 WHY DO SOME PEOPLE CHOOSE TO BE ENTREPRENEURS

Why do some people choose to be entrepreneurs but not others? This is a fundamentally challenging question for research in the entrepreneurship domain. Researchers in this field have experienced many breakthroughs and setbacks whilst attempting to provide an explanation (Shane and Venkataraman, 2000; Gregoire et al., 2006). Based on both successful and unsuccessful attempts, many tentative assumptions have been established. Early efforts focused on the search for differences between entrepreneurs and non-entrepreneurs with regard to personality (Shane and Venkataraman, 2000; Gregoire et al., 2006). Differences in personal traits would seem a sound logic by common sense, but they are not supported and verified by subsequent empirical research. Scholars then try to approach the differences from other aspects, e.g. demographic factors (Reynolds, 1997). Though most of the empirical results support this class of assumptions, demographic factors can explain only a very small portion of variance (Reynolds, 1997). Because the ‘variances’ in search are not empirically supported, some researchers have shifted to the study of relationships between certain factors and entrepreneurship. For instance, how information distribution (Shane, 2003; Alvarez et al., 2010), entrepreneurial opportunities (Hayek, 1945; Kirzner, 1973; Shane and Venkataraman, 2000), cognitive biases (Simon, 1972; Baron, 1998; Gigerenzer, 2005; Mitchell et al., 2007), and social capital (Coleman, 1988; Burt, 1992; Van Auken et al., 2006; Lee, 2009) affect people’s decision to create new ventures. These studies attempt to identify all the sufficient and necessary conditions that may lead to entrepreneurship, the complex phenomenon. As such, there has been a shift from using variance analysis to relationship analysis in search for explanations towards this fundamental question: *Why do some people but not others choose to be entrepreneurs from the beginning of this new millennium?* This gap opens opportunities for further research to advance theory.

This chapter hence provides seven sections of in-depth reviews of the contemporary literatures in immediate, as well as, the related fields. The reviews regard entrepreneurship domain as a field of social science and using Lakatos’ (1970, 1978) theory of scientific

research program as a basis. Hence, this chapter provides a rational account of the progress of entrepreneurship theory. The critical point by following Lakatos' (1970, 1978) is that in a scientific research program, it is common for a theory to be disproved by empirical evidence but not subsequently rejected. While Lakatos' (1970, 1978) theory serves the entrepreneurship domain, there are also suggestions (e.g., Kuhn, 1996; Shane and Venkataraman, 2000) by which researchers should disregard certain topics in the field in the entrepreneurship domain because studies in their approaches and conceptions have remained as largely constant, instead of scientific theory revolution. Indeed, there is a research gap that lies in prior studies, which have less invent new concepts and less examine relationships and compatibilities of prior theories with new phenomena, such as the new events of entrepreneurs with changing social perceptions and social-economic conditions (Shane and Venkataraman, 2000; Sarason et al., 2010). Overall, this chapter argues that there is an unguent need for research in this field that can demonstrate theory advancement, scientific theory revolution, and can broaden and heighten paradigmatic dimensions.

Using Lakatos' (1978) theory of a scientific research program as an analytical tool, the first section of this chapter raises the argument that the hard core assumption of entrepreneurship research cannot be challenged, that is, entrepreneurs and non-entrepreneurs differ. The hard core is termed by this thesis as the "*difference assumption*", and the protecting belts for this hard core are the differences in specific attributes of the entrepreneur. To highlight this point, section two uses trait theory as an example to illustrate that though the theory is inconsistent with the results of some empirical research (e.g. Brockhaus, 1980; Begley and Boyd, 1987), the idea that traits can be used to predict who may choose to be entrepreneurs has not been refuted by prior studies. These tools from philosophy of knowledge are then used to evaluate the influence factors including demographic features, entrepreneurial opportunity, cognitive mechanisms, and social capital, all of which are used to explain entrepreneurial phenomenon. Each of these influence factors are analyzed in a distinct section: from Section 3 on demographic factors to Section 6 on social capital. These critiques are based on a set of critical reviews of these influence factors, and so, section 7 advances a framework that is used to explain why some people but not others choose to be entrepreneurs.

2.1 Differences between Entrepreneurs and Non-entrepreneurs: Hard Core and Protecting Belts

The literature review starts from Popper's (1934) falsificationism. Popper (1934, 1972) has held that scientists must commit in advance as to what results would falsify a theory and they must stick with that decision. Yet, by a review of the histories of science, Lakatos (1970) revealed that science is characterized by relatively unfalsifiable research programmes. That is, research should reject prior decisions (of findings), based on rational grounds. Lakatos (1970) found that historically all theories have been 'born falsified' into an 'ocean of anomalies'. As such, what characterizes science and how can science make progress is scientists can rationally work on a theory already 'falsified', so that scientists can change their mind about the conditions that would falsify a theory (Lakatos 1970, 1978; Lakatos, 1978; Chalmers, 1999; Dienes, 2008). A scientific theory can become a hard core of a research programme, treated as immune to falsification (Dienes, 2008). The hardcore are the pillar assumptions of a science program and scientists are forbidden from challenging the hardcore (Lakatos, 1978; Chalmers, 1999; Dienes, 2008). Based on the hard core, scientists invent specific theories that form a protective belt around the core, and direct disproving conclusions to them – they get adjusted, re-adjusted or replaced to defend the hardened core (Dienes, 2008). If an adjustment predicts some hitherto unexpected fact, the change is theoretically progressive, otherwise the adjustment is degenerating (Lakatos, 1970). With the help of the notion of research programme, we can find the continuity and unity of theories over time in a scientific research area. So, contrary to Popper (1934), Lakatos (1970) argued that it is rational to work in a research programme that is already rejected by prior empirical data and scientists don't have to stick with the decisions to reject the theory if it is arguable. It is only when a progressive programme explains the failures of a degenerating one that the degenerating one is treated as disproved (Dienes, 2008). The history of entrepreneurship research domain seems to support Lakatos' (1970) account of science advancement more than Popper's (1934).

Scholars in the entrepreneurship domain have long been committed to the assumption that some characteristics unique to entrepreneurs have driven them to engage in entrepreneurial activities (Gregoire et al., 2006). Even though the assumption met great empirical

challenges, scholars have been resistant to give up. The assumption that entrepreneurs and non-entrepreneurs differ is one of the hard cores of the entrepreneurship domain. This hard core (difference assumption) is rich enough to generate a protecting belt of auxiliary hypothesis around it. When the empirical results challenge the difference assumption, scholars in the field will direct the disproving conclusions to these auxiliary hypotheses. For example, when empirical evidence rejects the theories that entrepreneurs and non-entrepreneurs are different with regard to a combination of traits, scholars in this field do not give up on the difference assumption. Instead, they adjust the auxiliary hypotheses (trait theories) to defend the hard core by proposing that entrepreneurs and non-entrepreneurs differ in cognitive properties (Baron, 1998; Mitchell et al., 2004; Mitchell et al., 2007).

2.1.1 Hard Core: the Difference Assumption

In their widely cited work, “The Promise of Entrepreneurship as a field of Study”, Shane and Venkataraman (2000, pp: 218) argues that a fundamental research question for entrepreneurship should be: “*why, when, and how some people and not others discover and exploit these opportunities?*” Baron (1998, pp: 275) regards the following questions as the basic questions for entrepreneurship: “*why do some people, but not others, recognize or create new opportunities? Why do some, but not others, try to convert their ideas and dreams into business ventures?*” Irrespective of the answers, these questions imply a hidden assumption that entrepreneurs and non-entrepreneurs are systematically different. On the contrary, some theorist might argue that it is luck (Reynolds, 2005; Cha and Bae, 2010), environment, culture, or institutional factors (Ebner, 2006; Kshetri, 2007; Aidis et al., 2008; Bowen and De Clercq, 2008; Wu and Huang, 2008; Griffiths et al., 2009; High, 2009; Nguyen et al., 2009; Mair and Marti, 2009; Bruton et al., 2009; Smallbone et al., 2010; Liñán et al., 2011) that determine who will be entrepreneurs, while individual differences are of no significant influence at all.

These studies either use macro level differences to replace micro level ones or to argue that whether someone will be an entrepreneur is totally a random event. Macro level

differences may be useful in explaining why different people or groups are classified according to these macro factors, e.g. the percentages of people in the U.K and people in China who choose to be entrepreneurs are different (different national entrepreneurship rate) (Kelley et al., 2011), but macro level factors cannot solve the problem of why some people but not others within the same group choose an entrepreneurial career, since within the group, macro level differences do not exist. As such, this line of logic is totally different from the difference assumption. Scholars in the entrepreneurship field have an explicit or implicit difference assumption, making it one of the pillar assumptions of the field, according to Lakatos's (1970, 1978) theory of research program, this difference assumption would be regarded as one of the hard cores for the entrepreneurship domain.

In the theory system of any science discipline, some basic principles or rules may lay the foundation for the domain and define the essence of that theory system (Chalmers, 1999). For example, the principle that the planet earth is the center of the universe lays the foundation for Aristotle's astronomy which could be used to successfully predict the tracks of planet movements under certain conditions (Chalmers, 1999). These basic principles are referred to as "*hard cores*" of a scientific research program by such theorist in the domain of philosophy of knowledge. Lakatos (1970, 1978) defined it as some common idea that is shared by different theories developed overtime in a certain research field. Outside the hard core are protecting belts or auxiliary hypotheses that can shield the theoretical core from falsification (Popper, 1934, 1972; Lakatos, 1970, 1978). If theories proposed are inconsistent with the observations, scientist can make amendments to these protecting belts, rather than refute the hard core, so as to improve the explanatory power of the theory (Chalmers, 1999). One of such hard core for entrepreneurship domain is that entrepreneurs and non-entrepreneurs are different, which this research terms as the "difference assumption".

2.1.2 Protecting Belts: Differences in Various Specific Aspects

Although the "differences assumption" forms one of the pillar predictions in the mainstream entrepreneurship research (Shane and Venkataraman, 2000; Gregoire et al.,

2006), scholars quite often do not use this hard core directly to predict entrepreneurial career choice. Instead they use a series of auxiliary hypotheses, which have been set on various aspects of which entrepreneurs and non-entrepreneurs are viewed as different, including at least the following: personality (trait) (Stewart and Roth, 2007; Zhao et al., 2010); demographic factor (Reynolds, 1997); cognitive properties (Simon, 1972; Baron, 1998; Gigerenzer, 2005; Mitchell et al., 2007); information distribution (Hayek, 1945; Kirzner, 1973; Shane and Venkataraman, 2000); and social capital (Coleman, 1988; Burt, 1992; Van Auken et al., 2006; Lee, 2009). These specific aspects can be used directly to predict which group of people may choose to be entrepreneurs, and they form protecting belts for the entrepreneurship research program. Some of the auxiliary hypotheses are not corroborated by observations or not supported by the results of subsequent empirical studies (e.g., Mancuso, 1975; Brockhaus, 1980). Yet, mainstream scholars in the entrepreneurship field rarely abandon the difference assumption, (i.e. the hard core), instead, they continue to explore differences using new aspects and proposing new theory, through which they believe that they can improve the consistency between the theory and observations (see Gregoire et al., 2006).

The assumption that entrepreneurs and non-entrepreneurs are different in certain trait aspects has been corroborated by some studies but refuted by others (Stewart and Roth, 2007; Zhao et al., 2010). According to Popper's (1934, 1972) falsification theory (Chalmers, 1999), once a theory is found to be in contradiction with the observations, it should be rejected, making place for better theories to be constructed to explain the phenomenon. The skepticism toward the explanatory power of personality difference (Mancuso, 1975; Brockhaus, 1980) drives scholars to explore differences in other aspects, e.g. entrepreneurs are more alert to entrepreneurial opportunities than non-entrepreneurs (Kirzner, 1997), entrepreneurs and non-entrepreneurs have different prior knowledge (Shane, 2000), they have different ways of thinking (Baron, 1998), they have different family background (Reynolds, 1997), or they have different social capital portfolios (Liñán and Santos, 2007). Scholars then design empirical studies to test the assumptions in these specific aspects, most of which have been corroborated, resulting in a largely strengthened core assumption that entrepreneurs and non-entrepreneurs differ.

Initially, scholars explored the differences between entrepreneurs and non-entrepreneurs

from a single aspect. For example, holding other factors constant, researchers have explored differences in a “*way of thinking*” (Mitchell et al., 2007, pp. 1) between two groups of people. More recently, a combined theoretical perspective has become popular, for example Ozgen and Baron (2007) and De Carolis et al. (2009) propose that social capital can affect the entrepreneurial process and opportunity identification by way of cognitive properties. The integrated perspective may take the compound effects of different groups of factors into consideration. Entrepreneurship is a complex phenomenon that cannot be explained by a single group of factors. A falling leaf, if not affected by the wind, will fall to the ground in a rectilinear motion with constant acceleration, similar to a stone falling to the ground, as can be explained by Newton’s theory of gravity (Chalmers, 1999). However, you cannot assume that other influences do not exist. The falling leaf cannot escape the influence of the wind, and only by combining more factors and considering their compound effects can the trace of falling be better understood (Chalmers, 1999). As such, the following sections will examine typical aspects that scholars propose in explaining why entrepreneurs and non-entrepreneurs are different, beginning with differences in personality.

2.2 Personality Difference and Entrepreneurial Career Choice

Traits can be defined as habitual patterns of behavior, thought, and emotion and they are relatively stable over time, and differ across individuals (Kassin, 2003). Trait theory in entrepreneurship domain assumes that the possession of certain specific traits make potential entrepreneurs capable of generating new ideas and creating new ventures, thus making them choose an entrepreneurial career. Trait theory is the first major theory that researchers have proposed to explain why some people but not others choose to become entrepreneurs. Scholars examined the role that such major traits as risk propensity (Cromie, 2000; Thomas and Mueller, 2000), need for achievement (McClelland, 1965, 1987), locus of control (Brockhaus, 1975), ambiguity tolerance (Dollinger, 1983) played in an individual’s career decision process. However, the opponents have challenged trait theory by proposing that those who do not choose to be entrepreneurs have similar traits as those who choose (Mancuso, 1975; Brockhaus, 1980).

As such, not until recently, trait theory has been regarded as invalid in explaining who may choose to be entrepreneurs (Stewart and Roth, 2007; Zhao et al., 2010). That is because the results of the empirical research are equivocal (Zhao et al., 2010). But trait theories have played an important role as it was the first major research topic that helped shape and legitimate the entrepreneurship research domain (Shane and Venkataraman, 2000; Gregoire et al., 2006). The major research direction of a research field can be figured out by an examination of concepts in which scholars share common interests. Gregoire et al. (2006) content-analyzed the networks of co-citation emerging from the 20,184 references listed in the 960 full-length articles published in the *Frontiers of Entrepreneurship Research* series between 1981 and 2004 and found that studies in the entrepreneurship domain during 1980s centered on exploration and discovery of special traits for entrepreneurs. Research in the personal traits form the first conceptual convergence ever seen in the entrepreneurship domain. This section selects some trait theories that are often used by scholars in the field to differentiate entrepreneurs from those who are not and critically reviews the contradicting results of empirical studies, in the hope of tracking theory development in this field. The traits to be examined includes: risk propensity, need for achievement, locus of control, and tolerance of ambiguity. This is not a complete list of different traits characteristics proposed, but they are typical, problems with them are very often with other trait characteristics that will not necessarily be discussed here.

2.2.1 Differences in Risk Propensity

Risk propensity refers to whether a person tends to take them or avoid them when one finds he or she might be exposed to risk. Entrepreneurs are believed to bear risks in the following aspects: money losses, career opportunities, family relationships, and psychological well-being (Brockhaus, 1980; Erdem, 2001). Since entrepreneurship occurs in uncertain environments, entrepreneurs may incur losses if the ventures created by them fail. It is supposed that entrepreneurs are aware of these possible losses before the start-up activities, so we can safely draw the conclusion that they are not risk-averse (Cromie, 2000). Therefore, entrepreneurs are assumed to have higher propensity for risk-taking than

other groups of people (Cromie, 2000; Thomas and Mueller, 2000).

Risk propensity has been regarded as intimately related to entrepreneurs and entrepreneurship from very early research. The French economist R. Cantillon was among the first scholars that attempted to define entrepreneurship (Carland et al., 1988; Carland et al., 1984) and he regarded risk-taking as a defining characteristic for entrepreneurs (Kilby, 1971). Cantillon argued that the risk-taking property differentiates paid employees from entrepreneurs. Mill (1948) was the first person to my knowledge to introduce the word “*entrepreneur*” to the general public (Schumpeter, 1934), and Mill believe that the biggest difference between managers and entrepreneurs is the risk taking propensity.

Why risk taking is related to entrepreneurial career choice can be explained as follows. Before deciding on an entrepreneurial career, potential entrepreneurs are aware that they have the ultimate responsibility for the survival and success of the ventures to be created. And they understand that the role of an entrepreneur requires them to take on the responsibility of the decisions in the business creating process, which entails taking the consequences for the risks that comes with the particular situation. As such, part of the job of an entrepreneur and the nature of entrepreneurship are taking risks. After the assumptions about the link between risk propensity and entrepreneurial career choice are posed, according to scientific methods, the next step should be to use data to test the theories. However, the hypotheses that entrepreneurs have higher risk-taking propensity were corroborated by some studies yet rejected by others.

For example, Brockhaus (1980) conducted an empirical research, the results of which show that entrepreneurs are not significantly different from managers and the general public with regard to the risk taking propensity. If we examine carefully the methods used by Brockhaus (1980) and similar studies at that period, we can find that they employed only entrepreneur groups as samples without a non-entrepreneur group for comparison. This might lead to the conclusion that entrepreneurs are actually risk-taking, but non-entrepreneurs (e.g. managers) can equally become risk-takers. This conclusion can be easily understood: the nature of entrepreneurship requires that entrepreneurs are risk-taking, but it does not mean that risk-taking inevitably leads a person to choose to become an entrepreneur. Risk-taking persons may choose other careers such as becoming a politician.

In other words, risk propensity cannot be used as an attribute to identify potential entrepreneurs from the general public because entrepreneurs and non-entrepreneurs can be risk-takers, thus risk propensity cannot be used as a defining characteristic for entrepreneurs.

In addition, these studies very often choose the successful entrepreneurs as samples, excluding those who failed, thus the research results at best can be generalized to a fraction of entrepreneurs, those who are successful. For example, the results of the empirical research of Mancuso (1975) also suggest that successful entrepreneurs are moderate risk takers. As it is difficult to do research among not so successful or failed entrepreneurs, the risk propensity of these groups of entrepreneurs is unknown.

2.2.2 Differences in Need for Achievement

Research into need for achievement follows a similar pattern. Murray (1938, p. 164) first defines need for achievement by a range of actions including: "*intense, prolonged and repeated efforts to accomplish something difficult*", "*to work with singleness of purpose towards a high and distant goal*", and "*to have the determination to win*". Need of achievement is related to an individual's enduring and consistent concern with the difficulty of the task people choose to undertake. This need comprises both intrinsic motivation (internal drive for action) and external motivation (the pressure caused by the expectations of people around). McClelland (1961) subsequently popularized the concept of need for achievement and introduced it to the entrepreneurship research domain. In a longitudinal analysis of the need for achievement scores of college freshmen, McClelland (1965) concluded that a high need for achievement is a predictor of entrepreneurship. McClelland's (1965) findings comply with his definition of need for achievement: those freshmen with high achievement needs may think that entrepreneurial activities are moderately difficult tasks and feel that although they are challenging, they are within reach. Choosing to be an entrepreneur involves a moderate chance of success or a maximum opportunity of personal achievement satisfaction without the undue risk of failure.

The link between need for achievement and entrepreneurial career choice has inspired scholars in the entrepreneurship domain and need for achievement is widely used as a personal trait to differentiate entrepreneurs and non-entrepreneurs (Collins et al., 2004). However, need for achievement cannot serve as an absolute criterion that we can generally use to decide the probability that an individual may choose entrepreneurial career (Cromie and Johns, 1983). Different culture backgrounds require different threshold levels of need for achievement to motivate an individual to choose to be entrepreneurs. Carraher et al. (2010) support that need of achievement can influence the decision one makes to engage in entrepreneurial activity by a research into the entrepreneurial need for achievement in China, Latvia, and the USA. The results from this comparative study indicates that although need for achievement is important for entrepreneurs across these three very diverse cultures, the variables related to Need for Achievement vary between the countries. In addition, Wu et al. (2007) find that business goals can moderate the relationship between need for achievement and persistent behavior among entrepreneurs.

Some empirical research has corroborated the theory linking levels of need for achievement and the decision to choose an entrepreneurial career. For example, McClelland (1965, 1987) conducted a longitudinal empirical research and verified this theory. However, the results of many other empirical studies enabled the arguments against this hypothesized unique characteristics for entrepreneurs (Johnson, 1990). As such, from the 1980s scholars began to challenge whether this factor could be a definitive feature of entrepreneurs. However, some scholars made a defense by blaming the methods used. Sexton and Bowman (1986) argue that if effective measurement instruments and appropriate research design can be used, a combination of personal traits can be found to be unique for the entrepreneurs. And the results of a meta-analysis conducted by Collins et al. (2004) suggest that need for achievement is significantly related to entrepreneurial career choice.

2.2.3 Differences in Locus of Control

Locus of control refers to the extent to which individuals believe that they can control

events that affect them (Rotter, 1966). Those who tend to think that they can control events that affect them are classified as having internal locus of control. Those who tend to attribute control to external forces are said to have external locus of control (Spector, 1992; Nwachukwu, 1995; Carver, 1997). Gilad (1982) argues that locus of control can affect an individual's perceptual alertness thus resulting in the identification of the entrepreneurial opportunities from the environment. The relationship between locus of control and opportunity identification was endorsed by Burch (1986) and Bygrave (1993) who argue that locus of control may change the information distribution since people with internal locus of control tend to search proactively for information that they need for the recognition of entrepreneurial opportunities. According to Shane and Venkataraman (2000), the identification of entrepreneurial opportunities very often leads an individual to engage in entrepreneurial activities and new venture creation process. This line of logic has inspired scholars in entrepreneurship domain to use locus of control as a tool to predict who has the potential to become an entrepreneur.

Indeed, the role of locus of control in differentiating entrepreneurs and non-entrepreneurs is empirically corroborated by some studies and challenged by other studies. Brockhaus (1975) suggest that people with internal locus of control are more likely to take an entrepreneurial career. A longitudinal research conducted by Andrisan and Nestel (1976) found that successful entrepreneurs have internal locus of control. According to Perry (1990) and Kaufmann and Welsh (1995), internal locus of control is an important psychological trait that can be used to predict whether an individual will choose to be entrepreneurs. Rahim (1996) applied multivariate analysis of variance method to the data collected from a questionnaire survey with random samples of managers and entrepreneurs and the results show that the two groups of people differ significantly on locus of control. Furthermore, research suggests that locus of control cannot only be used to differentiate senior managers and entrepreneurs from the general public, but it can also be used to distinguish between successful and unsuccessful entrepreneurs (Brockhaus, 1975; Cromie and Johns, 1983; Gilad, 1982). In addition, Lee and Tsang (2001) and Sebora et al. (2009) found that locus of control of the entrepreneurs can even contribute to the growth and success of the ventures newly created.

However, according to Cromie (2000), the results of some studies do not support that

entrepreneurs and managers differ significantly on locus of control. Cromie (2000, pp19) cited Koh's (1996) research results which suggest "*no difference between the scores of entrepreneurial and non-entrepreneurial MBAs*". The research of Chen et al. (1998) also challenged that locus of control is less effective than other factors in distinguishing between entrepreneurs and managers. Chen et al. (1998) argue that, comparing with self-efficacy, locus of control measures both behavior and outcome control but self-efficacy emphasizes behavioral control, and locus of control is a generalized construct covering a variety of situations, whereas self-efficacy is task specific. Therefore, an individual may have a high score of internal locus of control in general but have a low self-efficacy in performing entrepreneurial related activities. As such, locus of control is not as effective as such variables as self-efficacy in judging who has the potential to become an entrepreneur. In addition, from the point view of research methods, Boone and Brabander (1997) suggest that the relationship between locus of control and entrepreneurship cannot be identified clearly because of two methodological problems: a fallacy of the wrong level and common method variance. The arguments lead to further explorations of the differences in ambiguity tolerance between entrepreneurs and non-entrepreneurs.

2.2.4 Differences in Perceptions in Ambiguity Tolerance

Norton (1975, pp: 607) defined ambiguity tolerance as "*the ability to deal effectively, i.e., without experiencing psychological discomfort or threat, with situations or information that are vague, incomplete, unstructured, uncertain or unclear*". Dollinger (1983) regarded entrepreneurs as the kind of people that deal with ambiguity and uncertainty because they usually find themselves within a turbulent and complex environment. Entrepreneurs often find themselves in highly volatile environments full of contradictory and unexpected evidence of things and events (Dollinger, 1983). If an individual is intolerant of ambiguity, then the individual prefers to react to a situation when all adequate information is available. Otherwise, the ambiguity of the situation may bring them anxiety and cause them to feel undesirable. Therefore, a person who is intolerant of ambiguity is less likely to become an entrepreneur. On the contrary, individuals who are more tolerant of ambiguity may view

uncertainty as a challenge and the element of ambiguity as an exciting stimulus rather than a threat. As such, these individuals are willing to make bold decisions before the necessary information is available. Entrepreneurs are exactly this type of individual. Therefore, researchers believe that tolerance of ambiguity can be used to differentiate entrepreneurs from the general public (Norton, 1975; Dollinger, 1983).

The empirical results to test whether entrepreneurs differ from non-entrepreneurs are again contradictory. Using ten successful entrepreneurs as research samples, Hornaday (1971) found that they rate themselves very low in the aspects of ambiguity tolerance. On the contrary, Shapero (1978) viewed entrepreneurs as those who are not frightened by ambiguity and who accept the idea that the world is in chaos. In addition, De Pillis and Reardon (2007) used samples from Ireland and the United States and found that whether ambiguity tolerance can affect an undergraduate's decision to become entrepreneurs depends on which culture he or she is in. Furthermore, Wagener et al. (2010) used data collected from 194 business owners and found that ambiguity tolerance is not a typical personal characteristic universally present across all entrepreneurs and only a small portion of entrepreneurs has this entrepreneurial characteristic.

2.2.5 A Critical Analysis of Trait Theory

From a careful examination of the question “why do some people but not others choose to be entrepreneurs”, it would seem that the question can be divided into two. The first part is about why a particular group of people choose to be entrepreneurs, which seeks to find the difference between entrepreneurs and non-entrepreneurs. This part would be better solved using variance analysis (Hair et al., 2010). The second part is about why one chooses the entrepreneurial career, which is a question that explores the factors that can affect entrepreneurial career choice by certain cause and effect mechanisms. This part would be better solved using relationship analysis (Hair et al., 2010).

2.2.5.1 Variance Analysis and its Problems

Early studies attempted to compare entrepreneurs with non-entrepreneurs to infer the traits that are specific to entrepreneurs (Shane and Venkataraman, 2000; Gregoire et al., 2006; Stewart and Roth, 2007; Zhao et al., 2010). The combination of these specific traits would be used to predict who are more likely to become entrepreneurs. As examples in section 2.2 suggest: after a certain trait theory had been posed, it then experienced verification by some empirical studies as well as refutation by others. According to Lakatos (1978), even if a theory is refuted by the data, the theory should not be abandoned. Instead, researchers should make adjustment to the theory by adding auxiliary hypotheses so as to explain the disconformity between the theory and the data. If the predictive power of the adjusted theory is improved, then the knowledge in the field actually makes progress. Have scholars in this field given up on trait theory? And what auxiliary hypotheses do they make to protect the hard core: *the difference assumption*.

The voice that entrepreneurship research focus should shift from trait theory to other topics has been very strong from the end of the 1980s when interest in traits appeared to die down (Gregoire et al., 2006). Gartner (1985) strongly doubted trait theory by arguing that trait theory has a hidden assumption that all entrepreneurs are the same and the ventures created by them are the same too. In addition, the differences between one entrepreneur and another can be larger than the difference between an entrepreneur and a non-entrepreneur (Gartner, 1985). Perry (1990) also made suggestions that scholars avoid trait theories in the entrepreneurship domain.

However, some scholars believe that trait theory may help identify those people who are more likely to recognize entrepreneurial opportunities (Baum et al., 2000; Collins et al., 2004; Stewart and Roth, 2007). They admit the crisis of research about entrepreneurial traits, but they think that more questions are left unanswered about how traits affect entrepreneurial behaviors (Shane and Venkataraman, 2000). Though there have been many studies that focus on the types of venture, the industrial environment, the entrepreneurial opportunity, and so on, if we don't understand the trait and motivation of the people involved, entrepreneurship research will be incomplete since entrepreneurship is an individual-opportunity nexus (Shane and Venkataraman, 2000).

New evidence further supported trait theory. During the turn of the new millennium, some empirical research did find that trait and motivational factors are significantly related to the entrepreneurial process (Baum et al., 2000; Stewart and Roth, 2001). The results of meta-analysis also show that personality studies are a valuable direction for entrepreneurship research (Collins et al., 2004; Stewart and Roth, 2007).

Though variance analysis in trait theory is verified by new evidences, this method is still not without problems in explaining who are more likely to be entrepreneurs. Statistically, variance analysis is based on the inductive inference which is flawed in the aspects of generalizing regularities observed between events of interest to conclusive knowledge because a theorist cannot exhaust all cases (Chalmers, 1999).

In addition, no matter whether a trait can be assumed to differentiate entrepreneurs from non-entrepreneurs is verified or rejected, the conclusion cannot be drawn concerning whether this trait causes the generation of entrepreneurial intentions. In the complex settings of social phenomenon, causal reasoning might lead to higher explanatory power. Three ideas that arise from the central of causal reasoning are: *“the idea of a causal mechanism connecting cause and effect, the idea of a correlation between two or more variables, and the idea that one event is a necessary or sufficient condition for the other”* (Little, 1991, pp: 14). Some variance analysis in the entrepreneurial intentions field focus only on the correlation between certain traits and entrepreneurial intentions, others propose theories that link certain traits with entrepreneurial intentions, but variance analysis often does not obey all the three central ideas of causal reasoning. Relationship analysis might be able to perform better in the search for an explanation of entrepreneurial intentions.

2.2.5.2 Toward Relationship Analysis

Although the variance part of the question might be abandoned because of refutation, the research on the relationship part on the other hand has been gaining ground in the analysis. If a trait cannot be used to differentiate entrepreneurs from non-entrepreneurs, this result only suggests that these two groups of people have no significant difference with regard to this trait, but this trait cannot be ruled out as one in a bundle of influencing factors that

may lead to entrepreneurial career choice. Possibilities exist that this particular trait may act together with a group of factors to drive one to choose to be managers, but the same particular trait may act together with another group of factors to lead one to choose to be entrepreneurs. In both situations, this particular trait is a prerequisite. However, by variance analysis, in this case, entrepreneurs and non-entrepreneurs can be found to have no difference in this particular trait. As such, it is worthwhile to study the causal factors that lead to entrepreneurial career choice.

A causes **B** if and only if **A** is a necessary condition for the occurrence of **B**, and **A** belongs to a set of conditions **C** that are jointly sufficient to give rise to **B** (Little, 1991). A specific trait can be the necessary condition for the formulation of an individual's entrepreneurial intentions, and it can be one of a set of conditions **C** that are jointly sufficient to give rise to the formulation of the individual's entrepreneurial intentions. However, this same specific trait can also be the necessary condition for an individual to choose to be managers, and it can be in the set of conditions **D** that are jointly sufficient to give rise to this career choice. **C** and **D** obviously share some common factors, and this specific trait is one of them. As such, though this specific trait cannot be used to differentiate entrepreneurs from non-entrepreneurs, it is worthwhile to study it because when linked to other conditions, it may cause an individual to have entrepreneurial intentions.

Personal trait is just one of the many classes of factors that can influence the formulation of entrepreneurial intentions, if scholars limit their interest by just focusing on this area, the research may end up in a blind alley. The presence of oxygen and the presence of dry paper and the presence of a spark together can cause combustion (Little, 1991). Examining only the properties of oxygen cannot explain the combustion. If we compare entrepreneurship to combustion, then restricting the study to personal traits only cannot explain who wish to choose to be entrepreneurs. As such, the task for the scholars in the area is to find other factors that may form a complete set of sufficient conditions that cause an individual to formulate entrepreneurial intentions. It is exactly by following this direction that the entrepreneurship domain become prosperous again, i.e. cognition, information distribution, entrepreneurial opportunities (Hayek, 1945; Kirzner, 1973; Shane and Venkataraman, 2000) can be used to explain entrepreneurship.

2.3 Demographic Factors and Entrepreneurial Career Choice

Scholars have also attempted to differentiate entrepreneurs from non-entrepreneurs using demographic factors (Reynold, 1997). To avoid distracting the attention from the major topic this section only introduces a typical but influential piece of research in the field. A Panel Study of Entrepreneurial Dynamics (PSED) was conducted in the United States using random sampling methods to collect longitudinal data about entrepreneurship from conceptualization to activities in the entrepreneurial process (Reynolds and Curtin, 2007). A series of demographic information of entrepreneurs were collected. Reynolds (1997) examined the data from 150, 275 samples collected by PSED 1968- 1987 in an attempt to find how entrepreneurs and non-entrepreneurs are different in terms of age, gender, ethnic identity, education, household income, dwelling ownership, labor force participation, marital status, age of children in the household, and so on. Using these demographic variables as independent variable, Reynolds (1997) advanced a linear model in order to predict who may choose to be entrepreneurs. The results show that these factors are not significantly related to entrepreneurial career choice. However, the model with age, the square of age, and education as independent variables are significant but it can only explain 0.268% total variance. In other words, over 99.7% of the reason why some people choose to be entrepreneurs cannot be explained by differences in demographic factors, which indicates that demographic factors can be neglected without losing much explanatory power.

According to Popper (1972), theories that are inconsistent with data from observations or experiments should be replaced by further conjectures and therefore science advances through a process of trial and error through conjecture and refutation and only those theories that are the fittest survive. Since trait theory was seriously challenged by empirical results and demographical factors play a minor role, scholars began to find other factors that are unique to entrepreneurship without giving up the hard core difference assumption. This time, however, it is not a simple improvement of trait theory or demographic variables, but conjectures in many new directions among which entrepreneurial opportunity (Hayek, 1945; Kirzner, 1973; Shane and Venkataraman, 2000), cognitive mechanism (Simon, 1972; Baron, 1998; Gigerenzer, 2005; Mitchell et al., 2007), and social capital (Coleman, 1988;

Burt, 1992; Van Auken et al., 2006; Lee, 2009) have been the most successful. And the following sections will examine some of these new directions.

2.4 Entrepreneurial Opportunity and Entrepreneurial Career Choice

While trait theory encounters problems when it is used to predict who will choose an entrepreneurial career (Shane and Venkataraman, 2000; Gregoire et al., 2006), scholars have shifted the focus from the individual to the entrepreneurial opportunity, the domain defining concepts for entrepreneurship research (Shane and Ventataraman, 2000). Individuals may have different bundles of information, knowledge, resources, and capabilities. These individual differences may be the reason why some people but not others can identify an opportunity that exists out there. Austrian economics and the resource based view (RBV) of strategic management contribute to the field by introducing the role of the heterogeneity of information and resources in the process of opportunity discovery.

2.4.1 From Individual Trait to Information Distribution and to Resource Heterogeneity

The progress of science begins with a research question that would be solved by a bold conjecture that is criticized and finally rejected in a process from which new questions emerge (Chalmers, 1999). This also occurred in the entrepreneurship research domain. While the focus on the individual in the 1980s advanced into a blind alley, scholars found that entrepreneurial opportunity is also one of the necessary conditions without which there will be no entrepreneurship (Shane and Venkataraman, 2000). And entrepreneurs are those people who discover and exploit entrepreneurial opportunities. Entrepreneurship thus can be defined as the discovery, evaluation, and exploitation of entrepreneurial opportunities which might introduce new product (service), or new way of organizing, or new market, or new producing method, or the new raw material (Schumpeter, 1934; Shane and Venkataraman, 2000).

The question of why some people choose to be entrepreneurs but not others suggests an individual focus. If we may formulate the question in a way that is related to how one discovers entrepreneurial opportunities, compared with another, then, the argument instead rests on entrepreneurial opportunities. If the issue has little to do with intention but opportunity, new questions follow: what is the origin of entrepreneurial opportunities and how are these opportunities generated? Are they the creation of entrepreneurs or do they exist already, out there waiting for entrepreneurs to discover them? These questions have shifted the research focus from opportunities themselves to the processes that form and exploit them. Two major theories are developed to explain the opportunity formation process: discovery theory and creation theory (Alvarez et al., 2010). Compared with scholars who argue that entrepreneurial opportunities are created by the minds of entrepreneurs or constructed by the interaction between entrepreneurs and the environment (Sarason and Dillard, 2006; Alvensson and Deetz, 2007; Sarason et al., 2010), this research stream takes a realist philosophical stance by thinking that opportunities exist out there in the environment waiting for people who can discover them.

If we assume that entrepreneurial opportunities are real and exist independently of the perceptions and actions of potential entrepreneurs (Kirzner, 1973), then what determines who can discover the opportunities? Scholars following the Austrian economics tradition argues that it is the asymmetry in the distribution of information and knowledge idiosyncrasy that determines who can discover the opportunities (Kirzner, 1973). Since no market participant can have complete information, profitable opportunities always exist in the market. And these opportunities cannot be discovered by ‘economic man’ that uses mathematical maximization principles based on the full rational model because not all the information needed for the calculation is available (Kirzner, 1973). Taking advantage of the knowledge that are known only to themselves, alert and bold entrepreneurs then use their imaginations to discover the hitherto unnoticed opportunities which are also a surprise to them (Kirzner, 1973).

Scholars from the strategy field who hold a resources based view (RBV) argue that it is the individuals’ bundles of heterogeneous resources that determines who can discover the opportunities (Penrose, 1959; Barney, 1991). Although Austrian economics and RBV stem

from different research traditions, both of them assume that entrepreneurs and non-entrepreneurs differ in certain aspects. The assumed differences between entrepreneurs and non-entrepreneurs once again become an important component of research in the discovery process (Shane, 2003; Shane and Eckhardt, 2003). As such, the theory advancement in the entrepreneurship domain has successfully defended the hard core *difference assumption* and developed auxiliary hypotheses on individual differences other than traits. Information and knowledge are regarded by some RBV scholars as a type of resource (Alvarez et al., 2010). In this sense, RBV and Austrian economics research traditions seem to make overlapping explanation about who can discover the opportunities regarding the role of the distribution of information and knowledge.

2.4.1.1 Information Asymmetry

Scholars have reached the remarkable consensus that an opportunity exists when competitive imperfections exist in product or factor markets (Alvarez et al., 2010). Austrian economics take a realist view that an opportunity is an objective social fact (Shane and Venkataraman, 2000; Shane, 2003; Alvarez et al., 2010). Pieces of information or knowledge serve as the ingredients, which are integrated to form the whole of an entrepreneurial opportunity. Identifying an opportunity is like putting together the pieces of a jigsaw puzzle. Once many of the pieces are in place, perhaps as a result of previous actions, the entrepreneur is more likely to see the pieces that are required to complete the puzzle, or complete the identity of the opportunity. But do we have the same probability of identifying an opportunity? The answer might be no if we assume that economy is often in a state of disequilibrium where information is distributed asymmetrically and actors are susceptible to incorrect beliefs and judgments. According to Hayek (1945), everyone in the society has idiosyncratic knowledge and no two people have exactly the same knowledge combination. However, for most activities, specialized knowledge is more significant than general knowledge (Hayek, 1945). As such, the extent to which any entrepreneurial opportunity can be discovered is not the same for all people for all points in time. At any given time, only some people can identify a specific entrepreneurial opportunity (Kirzner, 1973). Information has placed some people at a more advantageous position to spot the entrepreneurial opportunity. But what kind of information is most important, the possession of which may lead to opportunity discovery?

As information is distributed randomly among people, some people are luckier to own some significant piece of information that other people do not happen to have and that may lead to opportunity identification (Nelson and Winter, 1982; Denrell et. al, 2003). Apart from this randomness of information distribution, Shane and Venkataraman (2000) argue that two factors can affect why some people but not others discover a certain opportunity: the possession of prior knowledge that is requisite for the recognition of the opportunity, and the cognitive properties that are necessary in the evaluation of the opportunity. The argument by Shane and Venkataraman (2000) is in line with Denrell et al. (2003), who argue from the perspective of the resource based view (RBV), discussed in the next section. If we adapt the argument by Denrell et al. (2003) from the perspective of information and knowledge, we can say that people acquire knowledge throughout their lives and serendipitously, some of this knowledge fits with the knowledge required to identify an opportunity.

An individual's knowledge reserve forms an information corridor that leads to the opportunity recognition. This information reserve, sparked by the new piece of information, drives the individual to form a conjecture of an entrepreneurial opportunity (Kaish and Gilad, 1991). In other words, this last piece of information can lead to opportunity identification only when the individual has the right information reserve. However, if this last piece of information is known by another person with a different knowledge reservoir, it cannot be the last piece of information that gives rise to the opportunity. This same piece of information might be meaningless or has no use to this other person.

Three groups of prior knowledge are found to be the most significant for entrepreneurial opportunity identification, including: people's prior knowledge about markets, how to serve the markets, and the customers' problem (Shane, 2000). The research verified the theory that these three groups of prior knowledge will influence people's discovery of which markets to enter to exploit a new technology, how to use a new technology to serve a market, and the products and services to exploit a new technology.

2.4.1.2 Resource and Capability Heterogeneity

Although Austrian economics and RBV scholars agree that information differences play an important role in identifying the opportunity, the former emphasizes the role of information itself in the opportunity formation process, while the latter focus the attention on the advantageous position that an individual enjoyed in the opportunity identifying process. According to Denrell et al., (2003), the crucial missing elements in explaining the opportunity formation process is the idiosyncratic position of an individual enabled by the superior information, resources, and capabilities that the individual have access to. This advantageous position gives the individual a distinctive view. The more unique the view, the more likely that such a view can encompass an opportunity that has gone unnoticed by others. Denrell et al., (2003) thus argue that the discovery of an opportunity is often a matter of luck combined with alertness and flexibility.

From resource based view (RBV), performance differences between organizations are accounted for by asymmetric resource endowments with differential productivities (Barney and Arikan, 2001; Porter, 1996). This argument suggests that competitive advantage is more likely to be determined by resources managed by the firm rather than industry and market factors. Performance differences are more likely to be sustained if resources have the following attributes: valuable, unique (rare), costly to imitate (inimitable) and costly to substitute (non-substitutable) – the VRIN attributes (Barney, 1991; Levinthal, 1997). In this respect, to implement a unique product market strategy a firm needs to have access to and control of unique resources that have the VRIN attributes.

An individual, like a firm, can be regarded as having an idiosyncratic bundle of heterogeneous resources (Penrose, 1959; Barney, 1991), but the full set of resource attributes is not self-evident and is not known a-priori, and the recognition of these attributes may bring sustainable competitive advantage, so these attributes must be discovered (Denrell et al., 2003). But if the revenue generated from the understanding of the attributes of the resources cannot be protected from imitation of other people, the advantage gained may erode very quickly. So Foss and Foss (2008) prove that the property rights to these resources attributes provide incentives for an individual to engage in the

opportunity discovery process. As such, resource and capability heterogeneity together with other institutional factor play an important role in deciding who can discover the opportunity.

To be able to discover opportunities also depends on capabilities while capabilities heterogeneity may related to individual experience. Experience is built through different activities, which according to strategy literature also explain the capabilities hierarchies. The hierarchies capture the conceptions of zero-order capabilities – an ability to perform the basic activities of the business, ‘how to earn a living now’ capability (Helfat and Peteraf, 2009; Teece, 2007), first-order capabilities – abilities to change the activities of the business; to integrate, renew, build, and reconfigure activities; to change the product, the production processes, the customer base (or markets served); and ‘what is needed to earn a living in the future’ -dynamic capabilities; second-order capabilities – cognitive, the capabilities to conceive, perceive and recognise what and when to change; abilities associated with entrepreneurial activities- ‘entrepreneurial alertness’, ‘insight’, ‘foresight’, and ‘vision’, and so on.- dynamic capabilities (e.g., Helfat and Peteraf, 2003; Winter, 2003; Teece, 2007).

The strategy literature further argues that capabilities have to order change and events in a changing environments (Teece, 2007; Winter, 2003); to involve adaptation and they build, integrate, or reconfigure other resources and capabilities (Helfat and Peteraf, 2003). Capabilities entail individuals’ creativity (Winter, 2003) and most importantly, rely much less on existing experience but much more on rapidly creating situation-specific new knowledge.

2.4.2 Problems with the Theory of Entrepreneurial Opportunity

Entrepreneurial opportunity is one of the fundamental concepts that define the research boundaries of the entrepreneurship domain. Scholars developed competing views on the philosophical nature of opportunities themselves and the process that form and exploit them. Opportunities can be regarded as either objective social facts (Shane and Venkataraman, 2000) or path dependent social constructions (Aldrich and Kenworthy

1999). The opportunity formation process can be regarded as one of either discovery (Shane and Venkataraman, 2000) or creation (Aldrich and Kenworthy 1999). The present research believes that opportunities are real. However, even though all pieces of information that form an opportunity are presented before an individual, he/she may fail to identify the opportunity if appropriate patterns of recognition are not present.

2.4.2.1 Individual Differences

Recently, scholars have recognized two systematically different views on the opportunity formation process: “*the first suggests that opportunities are formed by exogenous shocks to preexisting markets or industries that entrepreneurs then discover; the second suggests that they are formed endogenously by the entrepreneurs who created them*” (Alvarez et al., 2010, pp: 3). Although these two views agree on the definition of the term opportunity, they differ from their epistemological roots. The first view regards opportunities as objective social facts that can be known (Shane and Venkataraman, 2000). The second view regards opportunities as social constructions that do not exist independently of those perceptions and human action (Aldrich and Kenworthy 1999). The differences in the understanding of the philosophical nature of opportunities between different scholars influence how the opportunity formation process is theorized. If opportunities are real and independent of the perceptions of the potential entrepreneur, then the opportunity formation process is a discovery process. If opportunities are endogenously and socially constructed by entrepreneurs themselves, then the opportunity formation process is a creation process that is path dependent. Alvarez and Barney (2007) term these two theories to explain opportunity formation process as discovery theory and creation theory.

Discovery theory must assume *ex ante* differences between entrepreneurs and non-entrepreneurs, for example, heterogeneous distribution of information, entrepreneurial awareness, and resources and capabilities (Alvarez and Barney, 2007). Otherwise, the theory cannot explain why some people but not others discover the opportunities. Individual differences are regarded as the causes for opportunity identification in the discovery process. But creation theory does not have to assume that individual differences determine who recognize the opportunities. On the contrary, creation theory argues that “*for created opportunities, the path-dependent enactment process may generate ex post*

differences between those who have gone through this process and those that have not” (Alvarez et al., 2010, pp: 10). As such, Hayward et al. (2006) points out that ex post systematic differences between entrepreneurs may be the result rather than the cause of the process of the opportunity formation.

The present research follows the discovery theory. It is very important to explicitly express this stance because the choice sets the philosophical foundations for the present research. As argued by Alvarez and Barney (2007), scholars who agree that discovered opportunities are independent and objective reality are more likely to lean towards a critical realist epistemology in the research on the process of forming discovered opportunities. But further evaluation of the ontological and epistemological assumptions for the entrepreneurship domain and the justification of the stance that the present research takes will be presented in Chapter Four. This analysis of philosophical assumptions provides guidance for consideration of the lower level methodological issues for the present research.

2.4.2.2 Entrepreneurial Opportunities do not Automatically Emerge without Appropriate Cognitive Processes

It is not convincing to argue that one’s earlier knowledge can influence his later discovery of the entrepreneurial opportunities once we take into consideration how cognition functions. Although all the pieces of information that comprise an entrepreneurial opportunity might be present to an individual, they will not be combined automatically, resulting in the emergence of entrepreneurial opportunities in the mind of the individual (Baron, 2006; Baron and Ensley, 2006). The theory of prior knowledge has a hidden assumption that each individual shares the same schema, or what Baron termed as pattern recognition in the context of entrepreneurship research (Baron, 2006; Baron and Ensley, 2006).

The reality is that different people have different patterns of recognition (Baron and Ensley, 2006). For example, if we show the wheel, the rear mirror, and the gear to people familiar with cars, they will have no difficulty in connecting the three in the mind and make a conjecture that they are parts of a car. But imagine if we show these three things to people

who have never seen a car, to prompt these three objects will not make them think of a car. The same thing may happen in opportunity identification. If the individual does not know what entrepreneurship is and has no such experiences at all, then according to cognition theories (Baron and Ensley, 2006), this individual cannot make sense out of the connection between these pieces of information so as to identify the entrepreneurial opportunity. In addition, the degree of familiarity with entrepreneurship may influence how much information is needed in successfully recognizing an opportunity. Experienced entrepreneurs may need less information input to identify an opportunity.

In summary, as a minimum, prior knowledge should be combined with cognition to form a sufficient condition for the choice of an entrepreneurial career. In addition, cognition not only influences who can identify an opportunity, but also the perceived desirability and feasibility of the decision to create a new venture (Krueger, et al. 2000). So, the next section deals with the role of cognitive mechanisms in an individual's entrepreneurial career choice.

2.5 Cognitive Mechanisms and Entrepreneurial Career Choice

Entrepreneurial cognition theories emphasize the think-doing link and can be used to explain many phenomena in the entrepreneurial process (Mitchell et al., 2004; Mitchell et al., 2007). For example, Baron and Ensley (2006) argue that entrepreneurial opportunity identification is actually a cognitive process of pattern recognition through which individuals identify meaningful patterns in complex arrays of events or trends. The accumulation of prior experiences forms in the minds of individuals cognitive frameworks that then connect seemingly independent events to reveal meaningful patterns (Baron and Ensley, 2006). There are cognitive frameworks for entrepreneurial opportunity in the minds of entrepreneurs. For example, an entrepreneurial opportunity should be able to meet the demands of the potential customers, to bring profits, and have controllable risks (Baron and Ensley, 2006).

If events under consideration conform to this cognitive framework for entrepreneurial opportunity, then potential entrepreneurs may make attempts to connect these events to develop a service or product that may meet the need of the potential customer. It is implied that this cognitive framework comes from an individual's prior experiences. The richness of the prior entrepreneurial experiences may influence the extent to which the framework is clearly defined, rich in content, and concerned with factors or conditions related to actually starting and running a new venture (Baron, 2006). Apart from pattern recognition, many other kinds of cognitive mechanisms might be at play when an individual is making decisions concerning whether to create a new venture, including counterfactual thinking, affect infusion, attributional style, the planning fallacy, self-justification (Baron, 1998), to name just a few.

Problems with cognitive mechanisms and the structures of the information in the environment form two sets of bounds to rationality. As Gigerenzer and Gaissmaier, (2011, pp, 453) flesh out by drawing on Simon's (1990, pp, 7) scissors analogy: "*Human rational behavior (and the rational behavior of all physical symbol systems) is shaped by a scissors whose two blades are the structure of the task environment and the computational capabilities of the actor*". Bounded by both the internal (cognitive capability) and external (information structure in the environment) constraints, Simon (1990) argues for a notion of bounded rationality in which processes are optimized subject to a set of constraints. Bounded rationality becomes constrained optimization. However, researchers often found that by using heuristics people can make better decisions than using more "*rational*" methods (Gigerenzer and Gaissmaier, 2011). Some cognitive biases or errors are even considered as indispensable and functional (Gigerenzer, 2005).

2.5.1 Bounded Rationality, Heuristics, and Cognitive Biases

Bounded rationally (Simon, 1957, 1972, 1987) is one of the crowning achievements of the human intellect, driving research and human activity, and especially decision choice in organizations. Simon (1972, pp: 162) argues that bounded rationality by "*incorporating*

constraints on the information-processing capacities of the actor” can reduce human error in decision-making. The fundamental feature of Simon’s (1957, 1972) thinking of bounded rationality is organizational hierarchies, wherein organizational procedures are established to guide managerial actions and higher-level decisions can constrain lower-level decisions and organizational choice then resembles rule-following behavior. While the theory of bounded rationality continues to lead the debate, subsequent research has proposed a set of related ideas for organizational decision choice.

Research in threat-rigidity theory has argued that due to human inefficacious cognition one can respond to identical situations differently (e.g., Chattopadhyay et al., 2001). Neurological theory (e.g., Schwartz, et al., 2005) indicates that one can also interpret the same environment in different ways. In a highly uncertain and complex environment, people can lose their ability to make sense of situations. Sense making theory argues that human activity also is diffused by autonomic, neuropsychological systems. Actions may not be always a produce rational behavior but irrational responses and emotive behavior (Camerer and Weber, 1992; Zajonic, 1980).

Heuristics can be biased and agents have to overcome the ‘black box’ of mental constraints in choice to be made in complex environments (Levinthal, 1997; Zajac and Bazerman, 1991). From an epistemological perspective (Camerer and Weber, 1992), experience is also inherently problematic, and in time is challenged by the issue of what can be known about the nature of the problem. Bingham and Eisenhardt (2011) argue, agents gain insights from the outcomes of prior actions and by reflection of effective learning, and that according to Argot et al. (1990), is not simply by accumulating experiences, rather, existing knowledge sources need to be revisited, reinterpreted (Garud and Nayyar 1994), retrieved (Ansari, et al., 2010), and importantly, contextually applied. As Ostrom (2010) and Simon (1957) further indicate, that involves ‘trial and error’ learning.

Individuals often face dynamic and complex environments when they are confronted with entrepreneurial career decisions. It is very often that they have incomplete information or information that is incapable of being made complete. To cope with making judgment under uncertain environments, at certain times, they rely on heuristics which reduce the

complex tasks of assessing probabilities and predicting values to simpler judgmental operations (Kahneman et al., 1982). However, heuristics could lead to enumerate cognitive biases (Tversky and Kahneman, 1974). As such, researchers have increasingly employed cognitive theory to explain why some people but not others choose to become entrepreneurs (Baron, 1998; Mitchell et al., 2004; Mitchell et al., 2007). But cognitive theories can be challenged as they seem to be trait theory in disguise. For example, risk perception is regarded by some researchers as a cognitive property, but as discussed earlier, risk propensity has also been treated as a personal trait. As such, this section first points out the difference between personal trait and cognitive properties so as to explain why scholars in the entrepreneurship domain shift the attention from trait theory to cognitive theory. And then the section analyzes the positive role of cognitive biases in entrepreneurship related decisions with reference to Simon's (1972, 1990) notion of bounded rationality and Gigerenzer's (2005) conceptions of heuristics and cognitive biases or errors (Goldstein and Gigerenzer, 2002).

Some may challenge that cognitive theory is just trait theory in disguise because it seems that what can be explained by cognitive theory can be also explained by trait theory. For example, risk perception is regarded as a cognitive property (De Carolis et al., 2009), while as discussed earlier, it is also regarded as an aspect of personal traits. The same thing is also true for optimistic orientation which Trevelyan (2008) regards as a trait while Hayward et al. (2006) viewed it as a cognitive characteristic. Whether these characteristics are cognitive properties or personal traits depend on a scholar's definition. If the scholar views these characteristics as static in that they stay the same under all conditions, then they are traits. If scholars regard these characteristics as changing with the environment, then they are cognitive properties (Baron, 1998; Mitchell et al., 2004; Mitchell et al., 2007). For example, from a cognition theory perspective, over confidence is regarded as a cognitive property, as it is argued that people may have overconfidence in areas they are familiar with and may lack confidence when they are placed under environments new to them (Hayward et al., 2006).

Cognition theories take a dynamic perspective in that they focus on the interaction between environments and person, which should largely improve the explanatory power compared with sole use of personal trait theory which takes a static perspective, resulting in a loss of

power in explaining phenomenon that occurs in highly dynamic and complex environments. But according to Simon (1991), it is exactly the external environment and internal cognition capability that limit a person to be fully rational and to rely solely on logic. The two sets of bounds invite heuristics and cognitive errors to join in the decision making process so as to help decision maker to cope with decision making under uncertainty.

March (1994) described the consequential process of rational decision making. A rational decision maker should first define clearly the problem to be solved. The alternative actions to be taken to solve the problem should be determined by the anticipation of future effects that these actions bring (March, 1994). So, decision makers then generate a list of alternatives and ensure each of them can reach the anticipated future effects. In the next step, the decision makers should identify the criteria for evaluation according to their preferences. Guided by the evaluation criteria, the decision maker then calculate the expected utilities or the outcomes of different alternatives. In the final step, the decision maker chooses the alternative that has the maximum utility. According to the above description, rational decision making model (March, 1994) has at least following inherent assumptions: the problem can be clearly defined without any ambiguity, all viable alternatives can be identified, decision maker's preferences can be ranked and weighted and stay constant over time. Complete information is required if these assumptions are true.

Rational decision making process seem to be very beautiful, but it is not realistic that potential entrepreneurs adopt the rational choice model in the decision of whether to choose to create their new ventures because of the impossibility for the potential entrepreneurs to collect complete information and follow the rational decision process. However, individuals have to make decisions despite incomplete information and often inadequate ability in processing the information available. They form beliefs concerning the likelihood of uncertain events based on incomplete information and inadequate ability. These beliefs then form the bases for entrepreneurial career choice decisions that rely on *“a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operation”* (Kahneman and Tversky, 1974, pp: 185). Potential entrepreneurs, not unlike all human decision makers, are

boundedly rational (Simon 1957; March 1994; Knudsen and Levinthal, 2007; Hogarth and Karelaia, 2012) in the sense that they cannot account for the perfect nature of business opportunities situated in the dynamic and complex environments. The logic emphasizes the aspect that human cognition fails inevitably at times. We do not have perfect cognitive capabilities.

If we use economic rationality as the standard of comparison, then anything that deviates from this is suboptimal or regarded as flawed. Cognitive biases are regarded as failures of human judgment that arise when one deviates from the reasoning of the logic (or logical definition of errors) (Gigerenzer, 2005). This however is an inappropriate standard for human decision making, because human intelligence reaches far beyond narrow logical norms. Cognitive biases are a necessary part, or by-product of an intelligent system, and these errors are indispensable and are indeed functional, which Gigerenzer (2005, pp: 196) terms as “*good errors*”: “*every intelligent system has to make errors. Making no error would destroy the intelligence of the system*”. Cognitive biases are the consequence of the adaptation of mental heuristics to the structure of the environment (Kahneman and Tversky, 1974). By a further exploration of the role of heuristics, Gigerenzer (2005, 2011) has expanded the conception of bounded rationality by offering a new interpretation of it.

The classical notion of bounded rationality implies the external environment and internal cognitive capability constraints keep us from being truly optimal or fully rational in the sense of the ‘rational economic model’. However, it is worth considering the relationship between internal and external bounds. Fitting these two sets of bounds together, people can make good decisions by using mental mechanisms whose internal structure exploit the external information structures available in the environment. Todd and Gigerenzer (2003) referred to this fit between the internal cognitive structure and the external information structure as the defining characteristics of ecological rationality --- a perspective of bounded rationality, indicating a new way to conceive of rationality: as a fit between the structures of the mind and the environment.

Under the classical notion of bounded rationality, internal cognition capability and external environment are examined separately. But if we look at only one of the two sets of bounds, for example, cognition, we cannot understand why and when cognition succeeds or fails.

Ecological rationality takes the fit between external environments and internal cognitions into consideration. As Gigerenzer et al. (1999, pp. 13) put it: “*a heuristic is ecologically rational to the degree that it is adapted to the structure of the environment*”. In addition, Todd et al. (2011) suggest that such environment structures as uncertainty, redundancy (the correlation between cues), sample size (number of observations relative to number of cues), and variability (the distribution of the cue weights) may influence whether a given heuristic can succeed. However, the traditional explanation is that the external environments are so complex and our internal cognitions are so limited that one has to rely on heuristics because the costs of effort are higher than the gain in accuracy. And in this sense heuristics are considered as a source of judgmental errors.

However, the definition of heuristics proposed by Gigerenzer and Gaissmaier (2011) forcefully denied these accusations: a heuristic is “*a strategy that ignores part of the information, with the goal of making decisions more quickly, frugally, and/or accurately than more complex methods.*” This definition is against the classical explanation that people save effort with heuristics, but at the cost of accuracy (Payne et al. 1993; Shah and Oppenheimer 2008). The definition argues that heuristics do not tradeoff beneficially some loss in accuracy for faster and more frugal cognition. In addition, this definition has gone beyond the widespread fiction that basing decision making on more information and computation will always lead to more accurate inferences (Todd and Gigerenzer, 2003). On the contrary, heuristics enjoys the effect of ‘less-is-more’ (Gigerenzer and Gaissmaier, 2011).

There are many types of heuristics. Kahneman et al. (1982) have discussed several heuristics including: representativeness, causality and attribution, availability, covariation and control, overconfidence, multistage evaluation, corrective procedures, risk perception, and post script. While Kahneman et al. (1982) emphasize how heuristics cause biases, Gigerenzer et al. (1999) focus more on the beneficial effects that heuristics could have on the decision making process. Gigerenzer et al. (1999) also proposed three building blocks common to various heuristics: search rules, which specify in what direction the search extends in the search space, stopping rules, which specify when the search is stopped, and decision rules which specify how the final decision is reached. However, heuristics and cognitive biases are at some times regarded as being able to bring benefits to the

entrepreneurial process, but at another time, they may be regarded as hazardous. For example, entrepreneurial alertness is a type of heuristic thinking and can be very beneficial to opportunity identification. But the escalation of commitment (Baron, 1998), also a type of heuristic thinking, may bring errors in the decision process because the individual may be clear that the entrepreneurial activity will fail but continues to make commitments because of previous commitments. Or erroneously, they may believe they have the cognitive proficiency to bring about a good outcome, which is related to the over-confidence bias.

Uncertain and complex environment very often, if not always, lead potential entrepreneurs to follow heuristic decision making principles which lead to certain cognitive errors or biases, such as, overconfidence and illusion of control. Cognitive theories are often used to explain the success and failure of a newly created venture which is a result of the potential entrepreneurs' decision to exploit the entrepreneurial opportunities. However, cognitive theorists attribute the success to the elimination of the negative impact of cognitive biases (Baron and Ward, 2004; Baron, 2004a). In this case, cognitive biases are viewed as errors that entrepreneurs make when the rational model is used as the standard. On other occasions, cognitive biases are said to be the forces that drive individuals to open new ventures.

As such, it seems that an individual's cognitive ability will enjoy an improvement in terms of eliminating cognitive bias as the individual proceeds from having entrepreneurial intentions, identifying and exploiting opportunities, and getting success. This assumed improvement in cognitive abilities is not convincing since the assumption does not take the environment into consideration. Once the individual begins to operate the new born firm, compared with the stage in which they decide whether to create new ventures, they can get more and more information that is needed for decision making. If they do not process this information rationally, they may be more likely to fail. This new information was not available before they decided to set up the firm. So the environments for the entrepreneurs before and after the decision to create the venture are different. After the venture is created, it is the business rules that decide which firm will fail, but before the ventures are created, this business information are not as sufficient, rational thinking are less probable, potential entrepreneurs have to resort to heuristics and cognitive biases. It would seem that logic and

heuristics can complement each other in various entrepreneurial stages. Heuristics in this sense are also rational in that it adapts to the structure of the environment.

Apart from the environmental factors, emotional factors may also drive the potential entrepreneurs to commit cognitive errors. For example, affect can also lead to wrong decisions with regard to entrepreneurial activities. Baron (2008) finds that affect can make an individual lean toward some certain activities or decisions under environment with high uncertainty and low predictability. While in more certain and predictable environments, the individual may not act the same way. For example, strong affect may push the individual to accept premature opportunity and to exploit it without thinking through its feasibility (Baron, 2008). Affect may falsely lead the individual to think the opportunities they like are good ones, resulting in the termination of searching for more appropriate opportunities, or ones that are more proper to the individual. Positive affect may cause many kinds of cognitive biases. Positive affect may strongly influence memory so that individuals can bring to their minds only the information that conforms to it, resulting in possible serious mistakes in decisions since only part of the information is used in the decision process.

2.5.2 The Role of Cognitive Mechanism and the Development of Entrepreneurial Intentions

Individuals' differences with regard to cognitive properties are another protecting belt for the hard core difference assumption in the entrepreneurship research domain. The differences in certain traits which were refuted by empirical evidence, after some amendment, are used again to predict who might choose to be entrepreneurs. This is a common approach of scientists when the theories they propose are refuted by empirical evidence. They make amendment by introducing ad hoc hypotheses which are defined by Popper (1972) as "*one that is introduced to immunize a theory from some (or all) refutation but which cannot be tested independently*". For example, risk taking propensity, as discussed in section 2.2, was regarded as a static variable in the trait theory in that the theory assumes that an individual demonstrate the same level of risk taking propensity at all occasions. But, if we reject the static nature of this trait and assume that risk taking

propensity is a dynamic variable, i.e. an individual's level of risk taking propensity is contingent on the environment the individual find herself in (Brockhaus, 1980; Simon et al., 2000). An individual may be willing to take a high risk in areas that they are familiar with and may be highly risk averse under unfamiliar environments.

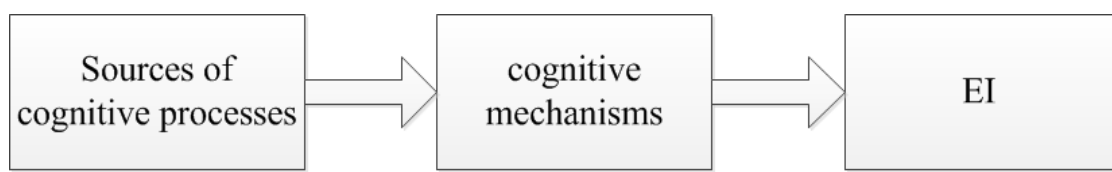
By this amendment, the risk of propensity can confront most of the challenges from the prior empirical evidences which did not measure the risk taking propensity of the subjects in the entrepreneurial context. To say this hypothesis is ad hoc is that researcher in this field failed to test whether an individual demonstrate different risk propensity in different contexts, it was only a theoretical proposition. Many other traits also experienced such amendment from static to dynamic, for example, optimistic tendency (Hmieleski and Baron, 2009; Koellinger et al., 2007; Trevelyan, 2008), these amendments save and may improve the explanatory power of the theory, but at the same time, they bring the research to a new area, since dynamic traits are considered as cognitive properties situated in a new research field.

However, with regard to research methods, researchers seldom choose to conduct variance analysis to see whether entrepreneurs and non-entrepreneurs are different in cognitive properties. Instead, they pay direct attention to relationship analysis, i.e. seeking to discover and verify various kinds of cognitive properties that may cause entrepreneurial intentions or other phenomenon in the entrepreneurship research domain. If an individual decides to choose an entrepreneurial career, the individual must have experienced a cognitive process that is guided by certain ways of thinking, for example, guided by overconfidence or optimism in processing the information the actor may choose to start up (Hayward et al., 2006; Koellinger et al., 2007; Simon et al., 2000; Trevelyan, 2008), also the entrepreneur may think that if they do not start, they may lose the best opportunity in their life when actually the opportunity is not so significant, so the actor makes a decision to start-up. The above example also provides evidence that are supported by numerous empirical studies that look into various cognitive mechanisms that lead to the formation of entrepreneurial intentions among research subjects (Camerer and Lovallo, 1999; Hayward et al., 2006; Koellinger et al., 2007; Simon et al., 2000; Trevelyan, 2008).

Cognition generates entrepreneurial intentions. Scholars by examining the characteristics

and causal forces of a variety of cognitive properties, find that certain types of cognitive properties can generate entrepreneurial intentions. But these results can only form part of the focal causal mechanism (Simon, 1972; Baron, 1998; Gigerenzer, 2005; Mitchell et al., 2007). The remaining question is: why do individuals use certain types of cognitive mechanisms instead of others when they are contemplating whether to start up their own ventures? A more holistic picture may emerge by searching for the answers to this question.

One side of the causal mechanism that generates entrepreneurial intention is the link between novel ways of thinking and EI. But what are the sources of these ways of thinking? The answers suggest clues to the other side of the causal link. These two links make one complete causal mechanism that generates entrepreneurial intentions, which is illustrated as follows:



Such prediction is not appropriate without considering the source for cognitive mechanisms. Mitchell et al. (2007) indicates that the core of entrepreneurial cognition theories focus on how the interaction between entrepreneurial environments and cognitive properties affect individual attitudes, intentions, and the behaviors of entrepreneurs. This is a social-cognitive perspective from that we should take contexts into consideration in the study of an individual's cognition and motivation. It is suggested that even the same person will have a different way of thinking when placed in different environments. People will often change their way of thinking with a change in the environment.

As discussed earlier, entrepreneurial opportunities do not emerge automatically from pieces of information, cognition theories complete the logic chain from information to entrepreneurial opportunity at the micro level by linking doing with thinking. However, this link can be expanded to include a more comprehensive causal link by asking why the individual has developed such a way of thinking. Entrepreneurial cognition theories

assume that contextual factors play an important role. Social and culture factors are among those contextual factors that may influence an individual's cognitive properties (Todd and Gigerenzer, 2003). The next section will discuss the effect that social capital may have on an individual's career decision.

2.6 Social Capital and Entrepreneurial Career Choice

Entrepreneurship is a social process in which social capital of an individual may render competition in the market arena imperfect (Burt, 1992). Whether we may choose an entrepreneurial career depends more on whom we know than on what we know (Burt, 1992). Both dense and sparse social networks contribute to entrepreneurial activities (Coleman, 1990). Social capital can be best approached from three dimensions: structural, relational, and cognitive (Putnam, 1993; Lee, 2009). Social capital theory is a protecting belt for the hard core difference assumption in the entrepreneurship domain. And the social network is one of the necessary conditions for a person to choose the entrepreneurship career.

2.6.1 Social Structure, Competition, Social Capital, and Entrepreneurship

Each individual in the society has his unique information portfolio that makes a certain entrepreneurial opportunity visible to only a few people, i.e. there is an information corridor that leads to the discovery of the entrepreneurial opportunities (Shane and Venkataraman, 2000). As discussed in section 2.3, it is because of the information asymmetry that some people are placed at a more advantageous position. But why do certain people enjoy this information advantage? This is partly determined by the social structure of the market: "*players trusting certain others, obligated to support certain others, dependent on exchange with certain others*" (Burt, 1992). Whether you can discover an entrepreneurial opportunity or whether you have the intent to start a new venture or even whether you may succeed is determined less by what you know than by whom you know. In this way, social structure makes competition imperfect in the market

place.

The relationships with these certain other players form the social capital for this network of people (Coleman, 1988, Putnam, 1993, Burt, 1992). An individual may gain an advantageous place in the market depending on his network structure and its member's position in the social structure of the market. Each individual is socially situated. Certain contacts in his network may refer his name at the right time in the right place resulting in the individual's early access to the opportunities. In this sense, social capital is a contextual complement for human and financial capital. Of those who are equally qualified in terms of human and financial capital, only those who are better connected get the most rewarding opportunities (Burt, 1992; Batjargal, 2007; Goyal and Vega-Redondo, 2007).

The proliferation of social capital literature in recent years proposed many distinct notions, including: trusts, norms, community, and networks (Quibria, 2003). For example, Coleman (1988) argues that social capital is the function of the social structure that produces advantages. Based on Coleman's attribution, Putnam (1993, pp: 167) defines social capital as: *“features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated action”*. The above discussion brings about the section below that will compare and contrast two notions of social capital. The two aspects include social capital as an individual asset that is generated from access to networks and social connections (Burt, 1992); and social capital as a shared asset that resides in a homogeneous collective entity (Coleman, 1988). Further it reviews norms and shared values (Putnam, 2000). These aspects of social capital are very often connected in the entrepreneurship literature.

As described in section 2.3, an entrepreneurial opportunity can be viewed as made up of separate pieces of information. An individual has his unique stock of information, but does not have the last few pieces that make the opportunity recognition complete. Once these last pieces of information are presented to him, with the help of certain cognitive process, the entrepreneurial opportunity can be identified. This line of logic takes economic and psychological perspectives, thus separating information from the people who own it. A social perspective may help improve the explanatory power. As we know, information is saved in the minds of people, which flow to the minds of others by communication, or

some social activities. To communicate with people already connected usually cannot provide the last piece of information required to recognize the entrepreneurial opportunity. As such, Burt (1992) argues that the essence of entrepreneurship is to bring together separate pieces, which he regards as the holes in the social structure of the market, which he terms as structural holes. The theory of structural holes proposed by Burt (1992) is deeply rooted in the contributions made in the field of sociology in the 1970s, most notably on knowledge about the “*strength of weak ties, betweenness centrality, the benefits of exclusive exchange partners, and the autonomy created by complex networks*” (Staw et al., 2000, pp: 353).

Burt’s (1992) argument is that there are strong and weak ties in an individual social network and the weak ties that area key element of social structure that facilitates information flow that integrates otherwise disconnected social clusters into a broader society. This argument was ignored by researchers who adhere to coherent and dense networks. Coleman (1990) argues that coherent and dense networks enable players to achieve their goals effectively because of cooperative behavior of members, high trust embedded in relationships and informal social mechanisms which prevent opportunistic behaviors (Batjargal, 2007). Guillén et al. (2002, pp: 181) cites Burt’s (1992) work and says that if an individual has a network spanning structure holes, the individual may enjoy: “*creativity and learning, adaptive implementation, more positive evaluations, more successful teams, early promotion, and higher compensation*”. According to this line of thinking, whether an individual can develop entrepreneurial opportunities depends on the richness of the structural holes around his contacts and none attached to himself. Burt (2007) distinguishes between brokerage among direct contacts and that among indirect contacts and has shown that indirect (secondhand) brokerage has little or no value in a variety of circumstances. However, whether a contact is direct or indirect is not static and absolute, through appropriate communications, previously indirect contacts can be changed into direct contacts (Burt, 2007). By reconciling two perspectives, it would seem that what an individual should do is associated with bridging across structural holes and how to do it is critically related to network density and cohesiveness. Brokerage provides strategic direction for an individual’s career choice while network density and cohesiveness ensure that the direction chosen can be fulfilled.

Apart from Burt's (1992) structural holes theory, there are competing theories used to explain the relationship between social capital and entrepreneurship (Gargiulo and Benassi, 2000), among which the Coleman (1988) network is a significant one. It would seem that Burt (1992) stresses the structural dimensions of social capital, but Coleman emphasizes the relational side of social capital. Burt's (1992) analysis is centered on the individual, while Coleman (1988) argues that social capital is a kind of public good available to everyone within a social network. The key aspect for analysis in Burt's (1992) structural holes theory is information benefits provided by brokerage, including information access, timing and referrals. "Structural holes" theory is easily assimilated within economic theories that study the relationship between information and entrepreneurship. It also makes this theory more empirically testable. Coleman's (1988) dense and cohesive network theory is more of a sociological perspective and the key aspects for analysis are: obligations and expectations, information-flow capability of the social structure, and norms accompanied by sanctions. Coleman's (1988) theory has an underlying assumption that people are "socialized actors that behave according to social norms, rules, and obligations". Whether to take a certain action is shaped and conditioned by the social environment.

After the disputations on whether dense or sparse networks form social capital are settled, the literature in social capital field is still burgeoning. Lee (2009) used systematic literature review templates and provided an up-to-date synthesis of social capital literature. Lee (2009) finds that social capital studies are concentrated into three core dimensions: structural, relational and cognitive. The section below analyzes the relationship between social capital and entrepreneurial intentions from these three dimensions.

2.6.2 Determinants in Entrepreneurial Career Choice: Structure, Relational, and Cognition

Social capital is a multi-faceted and multi-dimensional phenomenon (Lee, 2009). Social capital may bring benefits to individuals, organizations, regions, and nations, and correspondingly, scholars use the theory at macro, meso, and micro levels. This research uses the micro level analysis about social capital, which is defined as the social network

and the norms and values that are generated by the network (Putnam, 2000). This definition emphasizes two aspects: network and intangible things that are derived from the network. Social network can be capital because the network can transfer among its members information and resources that may not otherwise be available to some of the members of the network. It is this information and resources that make it possible for the member to achieve particular goals. This aspect of social capital in terms of social network is relatively more objective and can be measured by the number of social ties and the strength of the contact, i.e. the structure of the network. The other aspect of this definition is the shared norms and values of the members of a social network.

It would be a better way to approach these different aspects of social capital if we follow Nahapiet and Ghoshal's (1998) three-dimensional model of social capital, including structural, cognitive, and relational dimensions. The structural dimension focuses on the diversity and the structure of the network, e.g. dense or sparse network structure. Relational dimension involves the trust, reciprocity and norms shared among members of the social network. The shared norms determine what behaviors are appropriate and acceptable. The structural and relational dimensions interplay through the exchange of knowledge and resources, accumulating and developing intangible intellectual capital for the members of the network. If members wish to develop these sustainable relationships, they should promote mutual understanding among members through meaningful communication (Nahapiet and Ghoshal, 1998). Mutual understanding may unite the group and provide psychological support for the group, and this is the cognitive dimension of social capital.

Viewed from the structural dimension, social capital can be further divided into strong ties and weak ties according to the closeness of contact, or bonding and bridging social capital. The strong ties include the individual's family and close friends. The contacts between strong ties are rather frequent and full of affect. On the contrary, the contacts between weak ties are less frequent and purposeful. As discussed earlier in the last section, strong ties stress the network's density nature in which trust, norms, and sanctions play key roles. Weak ties emphasize the structural holes (Burt, 1992) which might offer new opportunities and new values. Social network is the combination of the relationships that connect people. The social ties in an individual's social network can be viewed as a kind of resource which

may provide important emotional and actual support, disseminate information, and raise one's alertness to entrepreneurial opportunities.

If entrepreneurship is viewed as a social process, then the contacts in the network provide essential elements. Individuals gradually form their own values and attitudes at early stages of their lives through the communication with strong ties around them. The knowledge, skills, and experiences related to entrepreneurship in an individual's social network may provide the potential entrepreneur with information and other resources needed for entrepreneurship. It is widely believed that entrepreneurs are affected by their family background and childhood experience when they made decisions to open new ventures (Judy et al., 2005; Anderson et al., 20; Baughn et al., 2006; Carr and Sequeira, 2007; Chang et al., 2009; Greve and Salaff, 2003; Matthews and Moser, 1996; Rodriguez et al., 2009; Steier, 2009; Xie and Amine, 2009), i.e. by the influences of role models, e.g. parent entrepreneurs. Weak ties also play a role when the individual is facing a career choice, as was described by Burt (1992, pp: 36): *"If all you know is entrepreneurial relationships, the motivation question is a nonissue. Being willing and able to act entrepreneurially is how you understand social life"*.

Research suggests that the parents of entrepreneurs are more likely to be entrepreneurs (Scherer et al., 1989). Carr and Sequeira (2007) found that family background can influence an individual's entrepreneurial career choice. Why so? Theorist hypothesized the role model theory to explain this phenomenon. Firstly, role models set examples for an individual to follow suit (Scherer et al., 1989). Secondly, with a parent as an entrepreneur, an individual may develop positive perception and evaluation of entrepreneurship because some entrepreneurs may include their children in some entrepreneurial process so that they may know and understand more about entrepreneurship (Scherer et al., 1989; Van Auken et al., 2006). Thirdly, the role model process may improve an individual's entrepreneurship related abilities, values, and norms. Studies show that some individuals were placed in a certain position in their family business when they were very young (Van Auken et al., 2006; Judy et al., 2005). Some of these individuals are expected by their parents to also take the entrepreneurial career.

It is not enough to study the structural differences among the social networks of different

individuals through the differentiation of strong or weak ties, bridging or binding social capital. A network just presents a possibility that information and other sources necessary for entrepreneurship might be provided by members. However, whether the members wish to provide such information and resources depends on such things as network norms. The significant members of an individual's social network may have respect or admiration for entrepreneurs, but it is also possible that they avoid choosing to be entrepreneurs, which is true particularly under the Chinese culture where private businesses were looked down upon for over 2 thousand years (Baughn et al., 2006; Kshetri, 2007; Zhou, 2000).

The pressure from social norms within an individual's network can influence the individual's perception of desirability of choosing to be entrepreneurs (Johnston and Alvarez, 2001). This influence from within the network might be greater than that from micro-level norms. For example, the interdependence between members within a social network and the focus on collective goals (especially within family network) may exert so great an influence on an individual's career choice that it may overwhelm the individual's rational thinking and force them to follow blindly the choice made for him by parents or significant persons within the network (Batjargal, 2008; Baughn et al., 2006; Johnston, 2003; Johnston and Alvarez, 2001; Kshetri, 2007; Neace and Duan, 2002). It is found that the support and attitude of family and friends are significantly related to whether an individual choose to be entrepreneurs (Davidsson and Honig, 2003). If an individual can receive encouragement, positive feedback, and confirmation, from contacts in his social network, they are more likely to choose the entrepreneurial career. On the contrary, if these contacts are neutral or even against the individual's entrepreneurial career choice, then they are less likely to choose to open a new venture.

2.6.3 Social Capital as a Protecting Belt

To seek the particular properties of individuals' social capital so as to explain certain entrepreneurial phenomenon concerning them is an attempt to discover how entrepreneurs and non-entrepreneurs are different following the difference assumption hard core of entrepreneurship research. Like studies on entrepreneurial opportunities and cognitive

properties, most of the research in this field focuses on the relationship between certain types of social capital and entrepreneurship rather than variances between entrepreneurs and non-entrepreneurs in terms of social capital. Although many studies provide empirical evidences for the existence of regularities between certain social capital and entrepreneurial phenomenon (Judy et al., 2005; Anderson et al., 20; Baughn et al., 2006; Carr and Sequeira, 2007; Chang et al., 2009; Greve and Salaff, 2003; Matthews and Moser, 1996; Rodriguez et al., 2009; Steier, 2009; Xie and Amine, 2009), researchers have also challenged the validity of social capital theory. For example, Quibria (2003) critically reviewed social capital literature and identified five conceptual and empirical issues: social capital suffers conceptual ambiguities because different authors attribute different meanings to it. Only the productive aspects of sociability and its positive consequences are accounted for by social capital and the liability incurred is ignored. In addition, measurement and estimation problems are with social capital theory.

Popper's (1972) refutation rules seem less applicable to social science. As happened in many other fields of social sciences, though the conjecture that social capital can affect one's entrepreneurial career choice is rejected by some of the empirical evidence, yet as the social science faces a complex environment, where experimental closure does not exist (Little, 1991), researchers can always refer to other factors that are not included in the model which would affect the results, making the hypothesized relationship not explicitly shown. For example, if a Chinese student thinks that he is capable of starting-up a new venture, but his parents have already arranged for him to work in the government which is deemed as a prestigious career, these are two contradicting forces in the entrepreneurship career decision, and if the individual is approached by a survey person and is asked about their choice of entrepreneurial careers, then the answer should be "no" because they have to conform to what the family members expect (Carlisle and Flynn, 2005; Kambil et al., 2006; Fu et al., 2006; Puffer et al., 2010; Chen, 2011). The questionnaire may not include questions about family influences and include items about the respondents' perceived capability. Then under this circumstance, a conclusion might be drawn that there is no relationship between perceived entrepreneurial skills and entrepreneurial career choice when actually this relationship exist but is offset by social relations which was not included in the research design.

If experimental closure can be realized, then social scientist can separate the effect of a single factor (Chalmers, 1999). If this closure does not exist, it is wise to consider a combination of conditions that can explain most of the variances of the focal phenomenon. If an individual starts up a new venture, he must have a social network to offer him information about the business and resources required for a venture (Burt, 1992). A person without a social network is less likely to set up a firm. Social network sometimes can be an independent condition for entrepreneurship, for example, an individual may have to choose to be an entrepreneur because significant contacts around him/her are all entrepreneurs and he has to conform to the culture and norms of the family (Carlisle and Flynn, 2005; Kambil et al., 2006; Fu et al., 2006; Puffer et al., 2010; Chen, 2011). Social network can be a condition that acts together with other factors to form entrepreneurial intentions. For example, an individual might be inspired by the experiences and achievement of an entrepreneur in his social network, and wish to be like him or her and choose the entrepreneurial career, and they may also perceive their ability can cope with all these matters, and then they may choose to be entrepreneurs (Van Auken et al., 2006). Social network may influence some factors that directly affect an individual's entrepreneurial intentions. For example, if an individual finds that entrepreneurs in his social network are skillful in entrepreneurial matters, then he may also think they have the capability when in fact they have insufficient skills (Simon et al., 2000). In this case, the individual is overconfident, but this overconfidence may lead him to decide to create a new venture.

2.7 An Integrated Perspective

This chapter has shown that there are many factors at play but only certain combinations of these factors will explain the main variance. If it is assumed that entrepreneurs and non-entrepreneurs do differ in many respects, then how these differences lead an individual to choose an entrepreneurial career is an intriguing question. Then, who chooses to become an entrepreneur is a vital question. This is predicted in the thesis as depending on certain features of the social network that potential entrepreneurs draw from, their cognitive disposition, and changes in the environment, including changes to government policy. The above literatures from different perspectives show that it is both impractical and

unnecessary to include in the framework all the sufficient and necessary conditions for the development of entrepreneurial intentions. For social science research, scholars must strike a balance between high explanatory power and costs of all sorts.

This chapter has reviewed or examined five groups of factors that are closely related to EI: traits, demographic factors, entrepreneurial opportunities, cognitive mechanisms, and social networks. The empirical results of the effects of personality on entrepreneurship are equivocal. Trait theory is regarded as too static because people may have different ways of behaving in different contexts. Cognitive mechanism would be reported as an update of trait theory because it takes complex contexts into consideration. To include both the traits and cognitive mechanisms might cause redundant explanation. If only one can be included, the present research chooses cognitive mechanisms because they have higher explanatory power than trait theory (Mitchell et al., 2004 and Mitchell et al., 2007). As discussed in section 2.3, demographic variables explain too small a portion of the variance, so the present research does not include this factor in the framework. Entrepreneurial opportunity, as analyzed in section 2.4, is not a sufficient condition for an individual to choose to be entrepreneurs. As such, this research considers two broad categories of factors that may affect EI including cognitive mechanism and social networks, and it would be argued that they are necessary and sufficient conditions for EI.

This new perspective is integrative in that it takes both social capital and cognitive mechanism into consideration in explaining the influence of one's social network on cognition. Cognitive processes are likely to influence directly whether an individual chooses an entrepreneurial career, but which cognitive mechanism an individual may choose to process information is not a random event but formed within certain contexts, social, economic, and political. In fact, what information an individual can obtain also depends on the context. As economic conditions determine whether an individual choose to actually take actions after he has decided to become an entrepreneur rather than whether the individual choose this career or not, which are different stages of entrepreneurship, so this framework will not include economic conditions in the new perspective. The present research pays attention to the influences of social context on cognitive mechanisms, which in turn affect the development of EI, so that it becomes an integrative approach. In addition, the separate and direct effect that social contexts may have on EI is also included in the

new perspective.

2.8 Summary

The above discussion set out the essential argument of the hard core in the entrepreneurship domain, that entrepreneurs and non-entrepreneurs are different and the protecting belts for it are differences in specific aspects, such as traits, demographic features, information distribution, cognitive properties, and social capital.

Differences in risk propensity, need for achievement, locus of control, and ambiguity tolerance are four typical personal attributes conjectured to discern who may choose an entrepreneurial career, making up the first widely studied topic in the field. While trait theory is disproved by several studies, it is not totally refuted by scholars in the field. Instead of focusing on the differences between entrepreneurs and non-entrepreneurs, scholars shifted their attention to the relationship between certain factors and entrepreneurial intentions.

Demographic features can be used with other factors to predict who may choose to be entrepreneurs, but these characteristics explain less than 0.5% of the total variance. An entrepreneurial opportunity is either discovered or created, depending on the researcher's choice of the underlying ontological and epistemological views about the nature of an opportunity. Both Austrian economics and RBV acknowledge the crucial role of heterogeneous information in determining who may identify the opportunities. However, entrepreneurial opportunities do not emerge automatically when all pieces of information are available. In addition, cognitive mechanisms are at play before an opportunity can be recognized.

Individuals operate in complex and dynamic environments in deciding whether to choose an entrepreneurial career, making it hard to have all the information needed for the decision. In addition, they may be flawed in information processing ability. As a result, they often rely on heuristics and suffer cognitive biases during the process of decision on

whether to choose to be entrepreneurs. However, cognitive bias can be viewed positively as they are an indispensable part of human intelligence. Individuals can make entrepreneurial career decisions more quickly, frugally, and more efficiently using heuristics. The causal links that lead to the formation of entrepreneurial intentions will not be complete if the sources or reasons for the specific way of thinking adopted by an individual are not identified.

Social structure renders competition in the market imperfect. Structural holes facilitate an individual to identify entrepreneurial opportunities, and dense and cohesive networks ensure that the opportunities can be realized. The relationships with the contacts in his social network forms for the individual the social capital which has been discussed from three dimensions: structural, relational, and cognitive. The differences in social capital among individuals can influence who will be entrepreneurs. Social capital may directly affect whether an individual choose to be entrepreneurs. It can also influence the individual's cognitive mechanisms which then have an effect on entrepreneurial intentions. These are the core ideas that are suggested by the integrative framework proposed by this research to explain why some people but not others choose to be entrepreneurs, one of the basic questions for the entrepreneurship domain.

CHAPTER 3 FRAMEWORKS, THEORIES, AND MODELS

Some scholars use the terms frameworks, theories, and models interchangeably, but this research justifies and follows Ostrom's (2010) definitions of the three. The distinction between frameworks, theories, and models proposed by Ostrom (2010) is then applied in the process of critically reviewing existent literature that investigates factors affecting entrepreneurial intentions. Based on this critical review, this chapter reports the framework that is developed by this researcher, the development trend of the theories used to organize the relationships between the concepts contained in the framework, and the model specially designed for the present research. The last section poses hypotheses according to the model proposed.

3.1 The Definition of Frameworks, Theories, and Models

Researchers have proposed different relationships between frameworks, theories, and models. For example, it is proposed that theories should act as a guide to design frameworks, and models are a quantifiable version of a framework (Burns and Burns, 2008). But other scholars argue that frameworks should be more general than theories (Ostrom, 2010). As a result of different opinions in this regard, scholars often use frameworks, theories and models interchangeably. To distinguish from prior studies, this research design does not choose the concepts of these terms randomly and argues that the choice should be good for the study's objectives and settings. Graduate entrepreneurship is a complex phenomenon occurring at multiple levels. Scholars from different disciplinary background have made numerous contributions. Certain standards should be taken into consideration to better organize these numerous sets of assumptions posited to predict graduate entrepreneurial behaviors. Ostrom's (2010) thinking on frameworks, theories and models can be used to attain this purpose in that her proposal relates to three different levels of generality targeting different levels of complexity. In addition, her concepts are compatible with the methodological stance of this research, which will be discussed in

more detail in Chapter Four. As such, this research accepts Ostrom's (2010) definition of the three terms.

Frameworks, theories and models are sets of assumptions of the relationship between concepts of interest. According to Ostrom (2010, p646), frameworks can be used to organize diverse efforts to study a social phenomenon and they are "*metatheoretical devices that help provide a general language for describing relationships at multiple levels and scales*". Scholars develop specific theories by picking working parts of a framework to form core assumptions to explain diverse outcomes and their relationships. Models make precise assumptions about a limited number of variables in a theory and form very specific working examples of a theory. In summary, frameworks, theories, and models are in a nested manner ranging from general to precise.

There are always competing assumptions used to explain any topic of interest, entrepreneurial intentions is of no exception. But as the social phenomenon is always extremely complex, there is no single set of assumptions that can be applicable under all the settings. The more specific a set of assumptions, the higher is its explanatory power, but with the cost of suffering some applicability in scope. For example, the rational choice model may be used to predict people's behavior in a private goods market, and was empirically supported by many researches, but it cannot be generalized to predict people's behavior in public goods settings under which we need another model that is extracted from the same framework that has higher level of generality (Ostrom, 2010).

Some mathematical models are very successful in the prediction of outcomes in particular settings because these models capture enough core underlying structure. However, if settings change, the models may fail to explain. In this case, we need to develop new models to suit for the new situation. The accumulation of successful models at particular levels may help scholars to develop and improve more general theories. The accumulation of theories in turn may help theorists to develop and improve still more general frameworks, thus we get a set of assumptions of high generality that can explain very

complex phenomenon, graduate entrepreneurial intentions among one of them. Entrepreneurship domain experiences this process like any other field of study.

3.2 Frameworks and Models in the Extant Literature of Entrepreneurial Intentions

There are about 51 journal articles that investigate the factors leading to an individual's generation of EI. The frameworks and models researched by previous studies shed some light on design of the analysis of this thesis. Firstly, the design provides a list of concepts considered as frameworks and models by previous studies. By reviewing and categorizing these concepts this thesis will attain a more advanced understanding of the question why some people develop entrepreneurial intentions. Given that the literatures assume relationships between EI and various concepts, if we use inductive methods to study all these concepts that were contained in these frameworks, theories, and models, we hence attain some sort of generalized categorized frameworks. Essentially the analysis design of this thesis considers the terms: "entrepreneurial intentions"; "entrepreneurial intent"; and "entrepreneurial career" as the key factors for searching the Business Premier Database

Studies have classified the concepts into different groups, for example, Bird (1988) classified the influences into two broad categories: the external context of social, political, and economic; and the internal context of personal history, current personality and abilities. Most studies follow this line of logic in categorizing the factors, and the present study is consistent with the prior researches in this respect and classifies these factors into two overarching categories: individual and environmental factors, and then subcategorize each category according to the meanings of each proposed factor. The job of categorization was carried out in this way for two reasons. Firstly, categorization may enhance the generality of the framework, making it more powerful in explaining different situations. Secondly, the categorizing standards are in line with the core theories of entrepreneurship which was viewed as a nexus of individual differences and environment contexts. For example, Shane

and Venkataraman (2000) defined entrepreneurship as the nexus of entrepreneurial person and entrepreneurial opportunities. The next section describes these categories.

3.2.1 Individual Factors

Scholars argue that certain individual factors play an important role in his or her career choice decisions. They propose many individual related factors, but according to the meaning and relevant underlying theories, these person-related factors can be subcategorized into: demographic profiles, personality, cognition, personal experience, and other variables.

The first sub-category of individual factors is demographic variables. The following demographic factors are the most often cited attributions to EI: age (Kristiansen and Indarti, 2004; Sequeira et al., 2007), education background (Kristiansen and Indarti, 2004; Crant, 1996; Gurel et al., 2010), gender (Kristiansen and Indarti, 2004; Wilson et al., 2007; Barnir et al., 2011; Sequeira et al., 2007; Zhao et al., 2005; Crant, 1996), immigrant status (Sequeira et al., 2007). According to the results of empirical tests conducted in Reynolds's (1997) work, demographic factors do play a role in forming EI, but it explains less than 1% of the variance.

The second subcategory of individual factors is personality and motivation. This is a large subcategory and with a long history. The following falls into this subcategory: big five personality (Zhao et al., 2010), locus of control (Kristiansen and Indarti, 2004; Brockhaus, 1975; Gurel et al., 2010), need for achievement (Kristiansen and Indarti, 2004), personality (Hmieleski and Corbett, 2006), proactive personality (Crant, 1996), tolerance of ambiguity (Gurel et al., 2010), innovativeness (Gurel et al., 2010), risk propensity (Douglas and Shepherd, 2002; Zhao et al., 2005; Zhao et al., 2010; Gurel et al., 2010), extrinsic and intrinsic rewards (Choo and Wong, 2006), independence (Choo and Wong, 2006; Douglas

and Shepherd, 2002), motivation (Hmieleski and Corbett, 2006). The major problem with this group of factors is that early empirical results revealed contradicting results, making the theory equivocal. But recent years see a resurgent of interests in this type of study and the results of some meta-analysis verified trait theory (Zhao et al., 2010), making it once again a legitimate group of factors to explain who will choose to open new ventures.

The third sub-category of individual factors is cognitive factors that are introduced from cognitive psychology. These includes: attitude toward the act (Ajzen, 1991; Autio et al., 2001; Kautonen et al., 2010; Carr and Sequeira, 2007; Boyd and Vozikis, 1994), perceived behavior control (Ajzen, 1991; Liñán and Santos, 2007; Autio et al., 2001; Kautonen et al., 2010), perceived desirability (Shapero, 1982; Liñán and Santos, 2007; Judy et al., 2005), perceived feasibility (Shapero, 1982; Liñán and Santos, 2007; Judy et al., 2005), self-efficacy (Prodan and Drnovsek, 2010; Kristiansen and Indarti, 2004; Lee et al., 2011; Wilson et al., 2007; Barnir et al., 2011; Carr and Sequeira, 2007; Boyd and Vozikis, 1994; Sequeira et al., 2007; Zhao et al., 2005; McLaughlin, 2010), cognitive styles (Hmieleski and Corbett, 2006), confidence (Choo and Wong, 2006), self-confidence (Turker and Senem, 2009), emotional intelligence (McLaughlin, 2010), proclivity for improvisation (Hmieleski and Corbett, 2006). This sub-category of factors dominate the current studies on EI, because it is assumed that only via cognitive properties can environmental factors affect EI.

The fourth sub-category of individual factors is to do with the personal experience of an individual, including difficult childhood (Judy et al., 2005), entrepreneurial experience (Zhao et al., 2005), frequent relocation (Judy et al., 2005), work experience (Kristiansen and Indarti, 2004), work history (Kautonen et al., 2010), number of years spent at the academic institution (Prodan and Drnovsek, 2010). The theories support how prior personal experience might have an effect on an individual's choice is not so robust, so research in this field remains sporadic.

It is not the case that all individual factors may be categorized into the above four groups. As scholars with different disciplinary background develop interest in this topic, they may

bring new theoretical tools and discover new factors that are also at play. For example, sustainability orientation (Kuckertz and Wagner, 2010) was employed to explain people's entrepreneurial intentions. Kuckertz and Wagner (2010) hypothesized that there is a positive relationship between individuals' sustainability orientation and their entrepreneurial intention and this positive relationship is stronger for individuals inexperienced in business matters than for experienced individuals. The sustainability orientation is operationalized by means of six items referring to environmental protection and social responsibility. The results of their survey data provide evidence for the above alluded hypotheses.

3.2.2 Environmental Factors

Some scholars insist that the environmental context also plays an important role in shaping an individual's EI. Scholars in this field posited that political, economic, culture, and social environmental factors may generate or holdback individual's entrepreneurial intentions. Political environment include such factors as transactional impediments and government corruption (Griffiths et al., 2009). The often attributed economic factors in this field include: capital access (Kristiansen and Indarti, 2004; Choo and Wong, 2006), economic resources (Raijman, 2001), GDP per capita (Griffiths et al., 2009), information access (Kristiansen and Indarti, 2004), patents (Prodan and Drnovsek, 2010). Scholars also include culture dimensions in their framework to explain EI: culture cognitive elements (Griffiths et al., 2009), individualism (Gurel et al., 2010).

Social environment is undoubtedly the most cited environmental factors related to EI, including: close valuation of entrepreneurship, close approval, non-family entrepreneurs, contact with environment (Liñán and Santos, 2007), family entrepreneurs (Liñán and Santos, 2007; Crant, 1996; Gurel et al., 2010), family business background, perception of family business experiences (Judy et al., 2005), prior family business exposure, perceived family support (Carr and Sequeira, 2007), perceived structural support, relational support

(Turker and Senem, 2009), weak ties and strong ties (Sequeira et al., 2007), subjective norm (Ajzen, 1991; Autio et al., 2001; Kautonen et al., 2010), social ties linked to business (Raijman, 2001), Social network (Kristiansen and Indarti, 2004; Hmieleski and Corbett, 2006), role models (Prodan and Drnovsek, 2010; Raijman, 2001; Barnir et al., 2011; Van Auken et al., 2006), industry ties of a university department (Walter, 2010), personal networks (Prodan and Drnovsek, 2010), cooperation with the industry (Prodan and Drnovsek, 2010).

3.2.3 The Proposed Analytical Framework

If a framework has a high level of generality, it should consist of general concepts, allowing for various theories to assume relationships between parts of these concepts so as to explain the problem. As such, the framework is organized into three groups of concepts, namely, environmental factors, individual factors, and entrepreneurial intentions. In Figure 3.1, each group of concepts is represented by an oval shape. There is a line starting from the Environmental Factor pointing toward Entrepreneurial Intentions. There is also a line starting from the Individual Factor pointing toward Entrepreneurial Intentions. And finally, a line is drawn to point toward Individual Factor from Environment Factor. The three sets of concepts and the relationships between them form a framework that suggests both individual and environmental factors can directly influence one's entrepreneurial career choice decision, and environment factors can indirectly affect EI via the mediation of individual factors. The direction of the arrows suggest that environmental factors can exert an indirect influence on EI by having an effect on individual factors. The framework is shown in Figure 3.1.

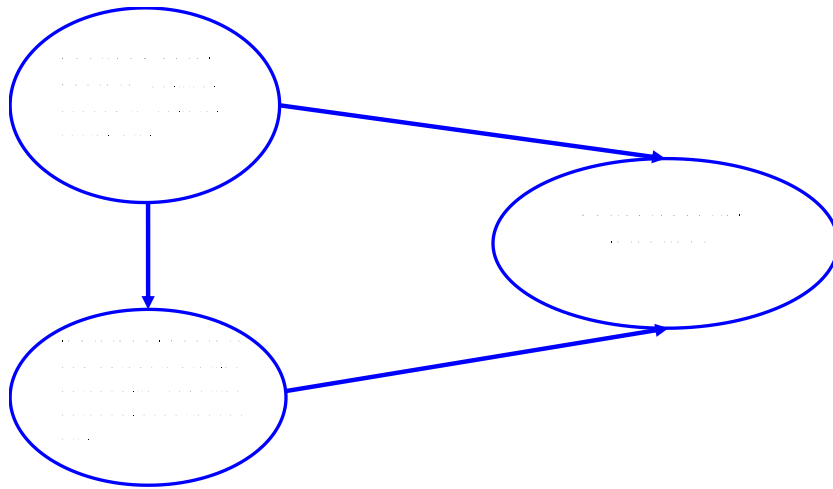


Figure 3.1 The Proposed Framework of Entrepreneurial Intentions

The framework is induced from examining what other scholars have proposed as a process of analyzing and synthesizing the differences, or at least some of the differences, between the factors depicted in Figure 3.1. Although the framework has something in common with those proposed by Bird (1988) and Boyd and Vozikis (1994) with regard to the categorization of factors, it inherits several differences. First, the frameworks of Bird (1988) and Boyd and Vozikis (1994) do not include the direct impact that environmental factors have on entrepreneurial intentions. Second, the concepts in the middle part of their frameworks are too specific, as a result, not allowing enough space for competing theories to pose equally convincing assumptions. Although the proposed framework shares certain similarities with those proposed by Kristiansen and Indarti (2004) and Sequeira et al. (2007) in terms of how it categorizes factors, it hypothesizes only the direct effect of the environmental factors and the individual factors that relate to entrepreneurial intentions. A more parsimonious set of factors serves the objectives of this thesis and the proposed framework, enabling the construction of a valid model in examining the possible effects of dynamic interactions using a range of arguments and predictions.

Looking back at the models proposed in those 51 articles, nearly all of them can be viewed as picking up some part of the concept categories and then proposing hypotheses about the relationships between them. As such, this thesis provides a comprehensive and-coordinated approach to the proposed frameworks and puts forward a coherent design enabling the researcher to undertake appropriate statistical analyses, allowing the exploration of the proposed model in relation to the assumptions derived from prior studies and the predictions set-up in this thesis. Further, the analyses are to be commenced in relation to the predicted functions and the role of the major factors and their effects on EI. The following section explains how theories are used to propose different EI models in the literature.

3.3 Theories Used in the Prior Studies of Entrepreneurial Intentions

Based on the critical review of Bird's (1998) framework and the theories contained within it, this section reviews the development trend of the theories that were used to explain entrepreneurial intentions. The inclusion of the concept of rational and analytical thinking in Bird's framework paves the way for the introduction of the Theory of Planned Behavior (TPB) whose basic assumption is rational action theory. In addition, Bird's framework brought forward several possible theories that might help to explain the emergence of EI and his framework inspired scholars to combine several theories together to explain EI.

3.3.1 The Theory underpinning Bird's (1998) Framework and Subsequent Directions

Bird (1988) proposed a framework that explains the context of entrepreneurial intentions, which is shown in Figure 3.2. According to Bird (1988), people use both rational and intuitive ways to process the cues presented in both their idiographic personal backgrounds and social, political, and economic context so as to make decisions concerning whether to choose an entrepreneurial career. This framework contributes to the knowledge of the

present research field in the following respect. Firstly, it emphasizes the significance of the study of entrepreneurial intention which is an important antecedent for other behaviors in the entrepreneurial process. Secondly, it brought forward several possible theories that might help to explain the emergence of EI. For example, the inclusion of the concept of rational and analytical thinking paves the way for the introduction of the planned behavior theory whose basic assumption is rational action theory to explain EI. The inclusion of social context in the model allows for the social capital theory to have a role in the explanation of EI. Thirdly, the model inspired scholars to combine several theories together to explain EI, rather than use one single theory, such as motivational theories or the theory of planned behavior.

Despite his pioneering contribution to the field, Bird's (1998) framework has several drawbacks. For example, social contexts are posited to have an indirect effect on EI, ignoring their possible direct impact that were tested and verified in later empirical studies (Sequeira et al., 2007; Kristiansen and Indarti, 2004; Gurel et al., 2010; Prodan and Drnovsek, 2010; Barnir et al., 2011). In the later section, the problem of whether to choose a single theory and the ways of combining different theories will be discussed using the extant research as examples. In addition, the theories that guide the model are too general, creating a design problem for research that seeks to examine the proposed assumptions in the framework by testing specific empirical models. Many scholars (Krueger et al., 2000; Thompson, 2009; Liñán and Chen, 2009) have contributed to this aspect by introducing the theory of planned behavior and the improvement efforts in order to make the theory more relevant to the EI research field.

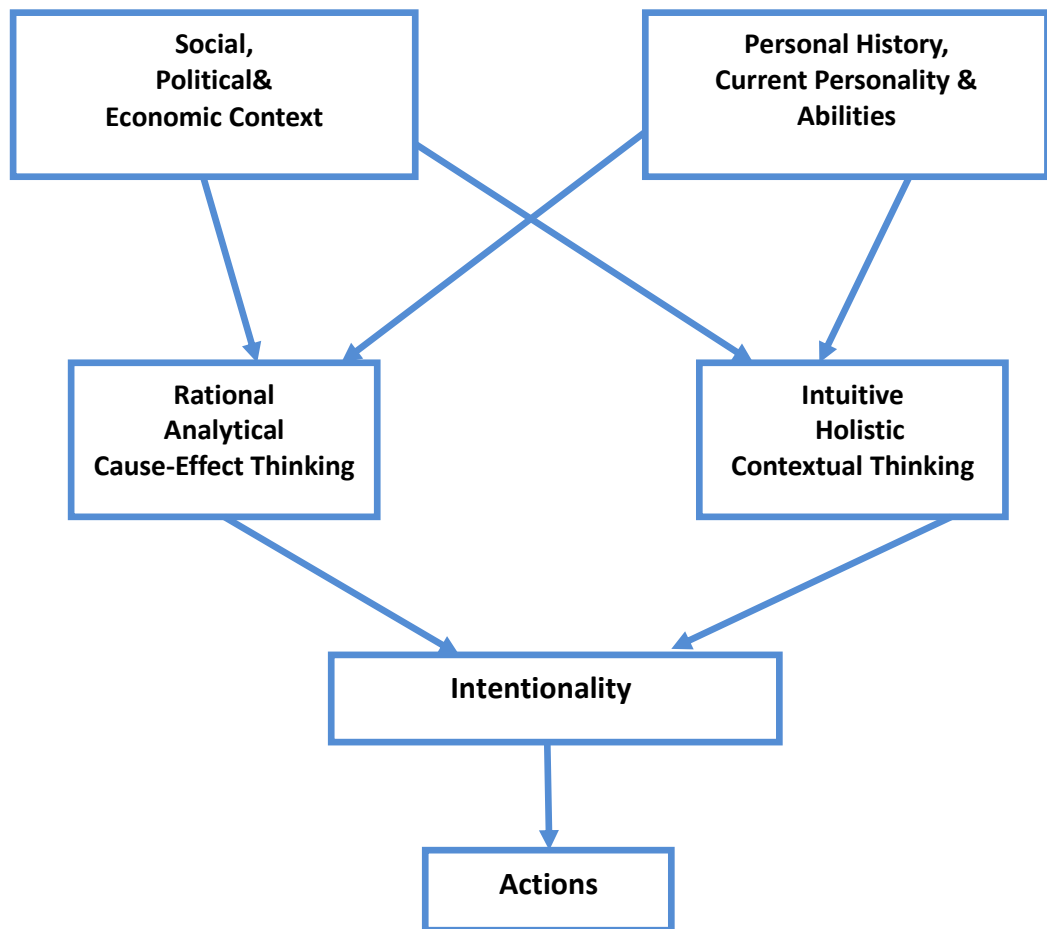


Figure 3.2 The Context of Intentionality

(Source: Bird, B. & Jelinek, M. 1988. The operation of entrepreneurial intentions. *Entrepreneurship: Theory & Practice*, 13 (2), 21-29.)

3.3.2 The Theory of Planned Behavior and EI: from General to Specific

The application of the theory of planned behavior (TPB) in the EI domain has experienced an obvious trend, i.e. from general to domain specific. When a field of research is new, there are no theories that help in understanding the relationships between concepts of interests. But these concepts cannot be totally new and will often have something in common with similar concepts in another more deeply researched domain. As such, the

tools in the mature fields are often borrowed in order to provide weight to academic arguments in the new field, yet the tools are too general and require considerable adaptation as they are not specifically designed to solve the problems in the focal field. As more attention is drawn to the new field, more specialized theories are developed. That is beginning to occur in the application of TPB to the EI domain.

Ajzen (1991) introduced TPB into the entrepreneurship domain to explain who might choose to create new ventures. At the heart of the theory is that intentions are determined by perceptions of personal attractiveness, social norms, and feasibility. This theory is rooted in the discipline of cognitive psychology and has withstood several empirical tests in other fields (Ajzen, 2002). To a certain extent, the EI studies thereafter mainly concentrated on the improvement of the theory to increase its explanatory power.

Shapero (1982) proposed an Entrepreneurial Event (SEE) model, which Krueger et al. (2000) argue it is largely homologous to the TPB model. The two models share the same underpinning cognitive framework but propose different terms for virtually the same construct, i.e., both models contain a concept associated with perceived self-efficacy (perceived behavioral control in TPB; perceived feasibility in SEE), while TPB's other two attitude constructs (attitude toward the act; subjective norms) correspond to SEE's perceived desirability (Krueger et al., 2000).

Since the SEE model is more domain specific, scholars often use part of the assumed relationships in this model to help pose their hypotheses. For example, the two concepts, the perceived feasibility and perceived desirability, are designed as antecedents of EI in models proposed by Judy et al. (2005), Liñán and Santos (2007), Autio et al. (2001) to name just a few. While perceived feasibility and perceived desirability remain as mediating variables in these models, the exogenous variables vary from model to model.

Some scholars even think that perceived feasibility and perceived desirability is still too general to account for EI, they merge TPB with contextual and individual factors. As such, Carr and Sequeira (2007) replace “attitude to the behaviour” with “attitude towards starting a business”, “subjective norm” with “perceived family support”, and “perceived behavioral control” with “entrepreneurial self-efficacy”. By doing so, they make the theory of planned behavior closer to the concepts that are familiar to the entrepreneurship domain, thus increasing the theory’s relevance.

In moving a theory from general to specific might harm the applicability range of a model. In response, scholars will sometimes move backwards to use more general theory but use constructs that are theoretically more robust. For example, the concept of perceived feasibility is more specific but does not have a strong theoretical origin compared with self-efficacy which connotes nearly the same meaning but is deeply rooted in social cognitive theory. As a result, many scholars replace perceived feasibility with the entrepreneurial self-efficacy in their models (Barnir et al., 2011; Boyd and Vozikis, 1994; Carr and Sequeira, 2007; McGee et al., 2009; McLaughlin, 2010; Mitchell et al., 2007; Sequeira et al., 2007; Wilson et al., 2007; Zhao et al., 2005). By doing so, constructs from general theories defeat the constructs specifically designed for the research domain. However, the general construct of self-efficacy has been adapted further to suit the context of entrepreneurial research in more recent studies (Zhao et al., 2005; McGee et al., 2009).

3.3.3 Single, Multiple, Combined, Independent, and Interdependent Theories

Since entrepreneurship often occurs in uncertain, novel, and turbulent environments, potential entrepreneurs face many influences at the same time in deciding whether to choose an entrepreneurial career. Individual and contextual factors are often cited in various models to explain this choice. But the results of empirical tests show that any of these factors alone has limited explanatory power (Krueger et al., 2000), revealing the major limitation that a single underlying theory might not be enough to explain such a

complex phenomenon. As such, scholars have made attempts to combine theories to explain the occurrence of EI.

As discussed in the previous chapter, trait theory was often used by scholars in the 1980s to predict who are more likely to open new ventures. But the results of the empirical research are equivocal, hurting the explanatory power of the theory. Besides using the single trait theory, scholars have already tried other single theories. For example, Autio et al. (2001) used the single theory of TPB to explain EI. In addition, Douglas and Shepherd (2002) used utility maximization theory from economics by arguing that individuals weigh the benefits against disadvantages in terms of work effort, risk, and independence in the process of decision about whether to choose to be entrepreneurs.

To use multiple theoretical perspectives might improve the model's explanatory power, so it becomes a trend. Though researchers today use multiple theories to explain EI, these theories are assumed to work independently. For example, Kristiansen and Indarti (2004) categorize the influences into three groups: demographic factors, personality and attributes, and context elements. Though the reason why each category of factors may exert influence on an individual's career choice can be explained by the underlying theories, these factors are posited to affect EI independently. There are other examples of such studies: Crant, 1996; Rajiman, 2001; Sequeira et al., 2007; Griffiths et al., 2009; Gurel et al., 2010; Prodan and Drnovsek, 2010.

Some researchers use antecedents of EI (for example, perceived desirability, perceived feasibility, self-efficacy) as mediating variable between contextual factors which are organized by various theories, e.g. social capital theory. These models combine different theories. For example, Judy et al. (2005), Liñán and Santos (2007) and Carr and Sequeira (2007) combined social capital theory and the theory of planned behavior. Concepts such as family business background, bridging and binding social capital, widely used in social capital theory, are assumed to affect perceived feasibility and desirability which are concepts within the theory of planned behavior. In the models of Bird (1988) and Boyd and

Vozikis (1994), social cognitive theories are combined with trait theory, utility maximizing theory, and social capital theory to explain EI. Zhao et al. (2005) used self-efficacy as mediating variables between context factors and EI. This group of models assumed indirect relationships between context factors and EI, but they ruled out the direct effects that contextual factors might have on EI, which can be also explained by theory, i.e. social capital theory can explain EI fairly well without the mediation of social cognitive factors.

The model proposed by Barnir et al. (2011) can be an example that considers both the role of multiple theories and the interactive effect of these theories. Barnir et al. (2011) argue that exposure to role models can directly influence career intention as well as affect them indirectly via self-efficacy. Kautonen et al. (2010) examined the direct relationship between an individual's socialization into different professional and organizational cultures and entrepreneurial intentions, and they also studied the mediating effects of attitude, subjective norm and perceived behavioural control on this relationship.

In summary, there are four kinds of models that explain EI. The first kind is the use of a single theory, e.g. trait theories, or the theory of planned behavior. As entrepreneurship is a complex problem that might be explained by multiple categories of factors, few scholars use this kind of model today. The second kind is the use of multiple theories that are assumed to play independent roles. It is an improvement of the first category of models, which should be welcomed, but it ignores the interaction between theories. The third kind is the use of the combination of different theories, but the direct effect of contextual and personal factors are assumed to be zero. This kind of model overemphasizes the explanatory power of TPB and ignores other theoretical assumptions that are also powerful in explaining immediate rather than secondary effect on EI. The fourth kind is the use of the combination of multiple theories, and taking both direct and indirect effects into consideration. The fourth kind of model does not suffer problems of the first three kinds, so the present research will establish the fourth kind of model to explain EI.

3.4 The Entrepreneurial Intention Model

As explained earlier, a framework can be limited by its function, being too general for direct empirical tests. In addition, a framework may include too many concepts, making it impossible to test all the relationships contained in it within one study. This thesis chooses to explain EI from a social capital theoretical perspective, and also from a cognitive theoretical perspective. Social capital theory argues that an individual's social capital can directly influence whether he or she chooses an entrepreneurial career. Cognitive theories insist that any decision making process should ultimately be a cognitive one, and the career choice is without exception. In addition, both social capital theory and cognitive theory suggest that these perspectives can be integrated: cognitive theory admits that people's way of thinking may be shaped by his or her social background, while social capital theory suggests that social capital may affect people's decision through the mediation of more immediate cognitive factors. Yet to advance research this thesis considers additional frameworks with a range of variables such as dimensions of social capital to enhance our further understanding about individual and EI.

As such, the combination of the two theories provides us with a social-cognitive perspective. Backed by social capital theories, the research model assumes that people's social background may influence their entrepreneurial intentions; employing cognitive theories, the research model posits that cognitive properties influence people's career choice, and from social cognitive perspective, it may be hypothesized that people's social capital can influence their EI through cognitive mechanisms.

Instead of using more technical terms, the model can be explained in simple language within the literature context. Given the contents of the model, there are three sets of explanations or three lines of logic for answering the question of why some people choose to be entrepreneurs. Firstly, the model proposes that certain characteristics of a person's social network may drive him or her to develop EI. For example, parents may offer various

kinds of support for a university graduates to open his or her new venture, even if this graduate thinks that he or she is not capable of opening a new business. The strong culture and social pressure from close ties (a common occurrence in Chinese culture) may force him or her to conform to the parents' arrangement for him or her. In this case, cognitive properties have nothing to do with the career decision, i.e., it doesn't matter how the graduate perceive his or her ability or attitude toward creating a new venture. The situation of social capital dominates the decision. Secondly, the model proposes that people might be over confident about their ability to create new ventures and this confidence dominates the choice of career. Thirdly, the model suggests that a person might look at his or her social ties and learn from other people's entrepreneurial experiences, but because of the information asymmetry, this learning very often results in false conclusions and the person develops cognitive errors regarding entrepreneurial career. Following the third line of logic, it seems that people are lured by the special elements in their social network leading to a decision error which would not have been made according to the rational model or if they had greater information.

As suggested in the framework, many other theories might also be used to explain why some people but not others choose an entrepreneurial career. While the present research only contains three lines of logic as explained above, it does not automatically exclude other explanations. On the contrary, other explanations can complement the present three to make a complete set of explanations that exhaust all other settings under which different theories might apply. One of the responsibilities of the researcher in this field should be to find as many of such explanations. The next section places the explanation of the model in the literature context.

Entrepreneurship relates to planned behavior and entrepreneurial intentions precede actual entrepreneurial actions. The decisions to create a new business would be viewed as the results of the interaction between internal cognitive mechanisms and the external environment. Each individual faces dynamic and complex environmental factors which force them to use cognitive biases in decision making with regard to whether to choose to

be an entrepreneur, thus cognitive biases are often highly related to entrepreneurial intentions.

There are many environmental factors to select from yet this research chooses the social environment and studies its effect on cognitive biases and entrepreneurial intentions. People that have entrepreneurial experiences in an individual's social networks may act as role models (Scherer et al., 1989; Van Auken et al., 2006) for this individual and they may interact with him or her in some way, thus exposing the individual to the entrepreneurial experiences (Carr and Sequeira, 2007; Krueger, 1993). An individual's social environment is often approached from three dimensions: structural, relational, and cognitive (Nahapiet and Ghoshal, 1998). Entrepreneurial experiences in one's networks can also be evaluated from these three dimensions. The first dimension is the extensity of entrepreneurial experiences in one's social networks (experience breadth), which measures the number and type of ties that have entrepreneurial experiences, relating to the structural dimension of social capital. The second dimension is the intensity of prior interaction with entrepreneurs in an individual's social network, which measures the quality of relationship through indirect observation, direct communication or participation, relating to the relational dimension of social capital. The third dimension is the positivity of the perceptions of entrepreneurial experiences within an individual's social network, focusing on the common understanding between an individual and the people with experiences in his or her networks, relating to cognitive dimension of social capital. An additional dimension of entrepreneurial experiences in one's networks is whether these networks can provide help to the potential entrepreneurs with regard to skill, knowledge and resources required for entrepreneurship.

The model is shown in Figure 3.3. In what follows, the meaning of this model is explained before the hypotheses are proposed, accordingly. This model reveals that both environment factors and individual factors have effects on an individual's entrepreneurial career choice. An individual's social network properties actually measure one aspect of the social environment that the individual find himself in. As discussed earlier, there are many environment factors that have effects on cognition and entrepreneurial career choice, and

social environment can be measured from various aspects, but we cannot include all the factors and aspects in the model. To make the research viable and better operationalize the relevant concepts, this research has chosen a parsimonious and integrative perspective. An individual's social network properties just represent one perspective to view social environment which is also a part of a wider environment. Cognitive biases are regarded as individual factors in entrepreneurship domain. As such, the model of this research shows the effects that both environment and individual factors have on an individual's career choice decision.

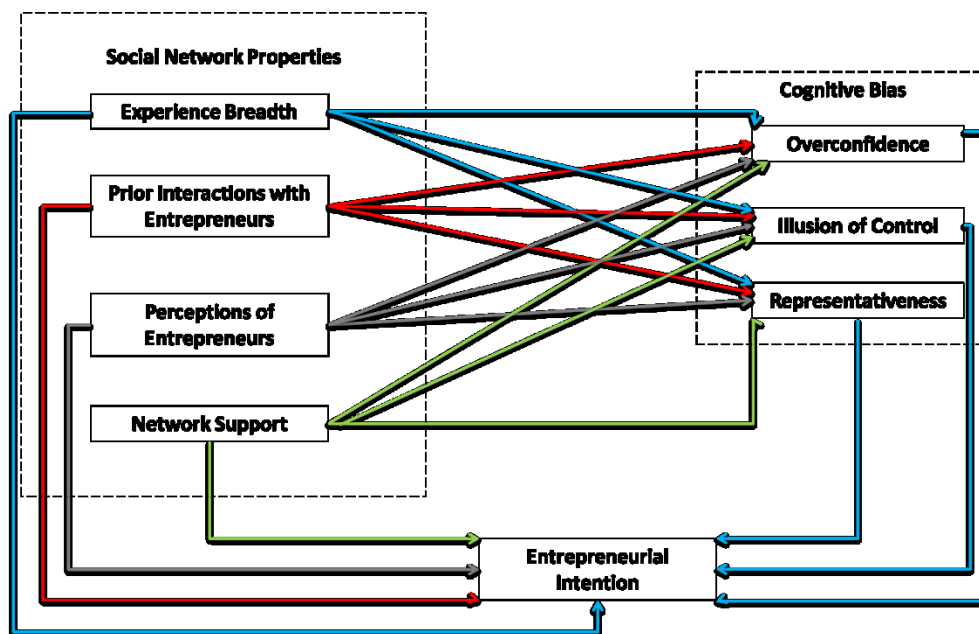


Figure 3.3 The Research Model: Multidimensional Relationships and Factors Driving Entrepreneurial Intentions

Figure 3.3 depicts the relationships between cognitive biases, the properties of an individual's social network, and entrepreneurial intentions. The idea of the framework is manifested in this model in that the three directions of arrows indicate two kinds of direct influences and one mediated influence on entrepreneurial intentions. These three directions of arrows form a triangle with social network properties, cognitive biases, and EI at each of

the three points. But the model differs from the framework proposed in extant research in that only part of the environment and individual factors are contained in the model, making it simpler and possible for empirical tests.

Entrepreneurial experiences in one's networks may precipitate certain kinds of cognitive biases that are prone to entrepreneurial intentions. In addition, these experiences may also directly affect the formation of entrepreneurial intentions. Based on this model, the following sections pose three groups of hypotheses concerning the relationships between cognition and entrepreneurial career choice; between social network properties and cognition, and between social network properties and entrepreneurial career choice.

3.5 Hypotheses

This section explains the hypothesized relationships between each pair among the total three aspects within the conceptualized framework: 1) entrepreneurial experiences in an individual's social networks; 2) individual's cognitive biases; and 3) individual entrepreneurial intentions. Together, they inform six sets of hypotheses within the conceptualized framework. These hypotheses were set up by assumptions about the interrelationships based on the current literatures and the exploratory study of this thesis. Together, these hypotheses enable the tests of the parameter variables towards the major relationship between social network properties and entrepreneurial career decision, and the mediation role played by cognitive biases. The test results contribute to the research objectives, as indicated earlier, and specifically, objective 4 and 5 of this thesis.

3.5.1 Cognition and Entrepreneurial Career Choice

Following from the above, the first theoretical aspect captures a set of assumptions based on the literature discussed in Chapter 2. The arguments from the first aspect in general consider that: *Cognitive biases can influence an individual's decision on whether to choose to be an entrepreneur*). In this sense, it leads to a set of predicted relationships that may be embedded in the cognitive mechanism driving the EI. Thus, they together also inform the contents of the first set of analysis, as shown in Figure 3.4.

At the initial stage, the assumptions are rationalized in the decision that whether to choose an entrepreneurial career is often measured by a more accurate construct: entrepreneurial intentions. The first set of predictions (three hypotheses) follows Thompson's (2009) study, which defines entrepreneurial intentions as "*a self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future*". Entrepreneurial intentions might be the result of the application of erroneous cognitive mechanisms to contextual inputs. Cognitive mechanism refers to the way of thinking, reasoning, and decision making (Baron, 1998; Mitchell et al., 2004; Mitchell et al., 2007). Human rationality is bounded and people are susceptible to various errors during the process of thinking, which is called cognitive biases. Prior research show that various kind of cognitive errors can impact an individual's decision on whether to create new business(Simon et al., 2000; Baron, 2004b; Townsend et al., 2010; Trevelyan, 2008; Koellinger et al., 2007; De Carolis and Saporito, 2006; De Carolis et al., 2009). Based on the assumption that "cognitive biases can influence an individual's decision on whether to create a new venture", this thesis, at this stage, poses three hypotheses, as the first set, (including H1a, H1b, H1c), which are captured by figure 3.4.

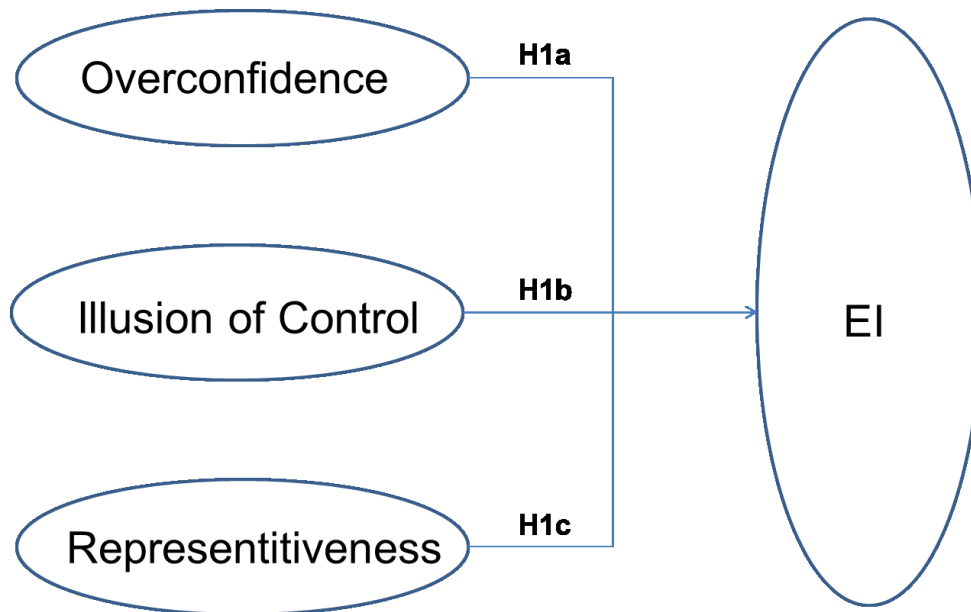


Figure 3.4 Predicted Relationship between Entrepreneurial Intentions and Cognitive Factors

Although there are numerous kinds of cognitive bias that may affect our thinking and reasoning, the ones that affect entrepreneurial process most often discussed in the extant literature are the following: overconfidence, illusions of control, and representativeness (Busenitz and Barney, 1997; Simon et al., 2000; De Carolis and Saparito, 2006; De Carolis et al., 2009). Such concepts as overconfidence and representativeness are sometimes referred to as heuristics (Kahneman, et al., 1982), however, as heuristics often lead to biases, researchers often name the bias following the heuristic that caused them. This research proposes that cognitive bias have an effect on individuals' entrepreneurial intentions.

Overconfidence is frequently used as one of the independent variables to predict who will choose an entrepreneurial career path, though researchers do not share a common definition of it. Overconfidence arises from the situation where one is not aware of the limits of his knowledge in certain contexts (Simon et al., 2000; De Carolis and Saparito, 2006). This definition only focuses on the overconfidence of knowledge, while Hayward et al. (2006) suggest three kinds of overconfidence: knowledge, outcome, and ability.

Townsend et al. (2010) select two of these dimensions and define overconfidence as the overestimation by the potential entrepreneurs that they will successfully build a business and their ability will ensure this success. Koellinger et al. (2007) defines overconfidence as the overestimation of one's ability to make accurate predictions. This research makes a synthesis and argues that overconfidence is the overestimation of one's knowledge, skills, and ability with regard to the creation of new business.

Prior research strongly support that overconfidence is related to entrepreneurial processes. Hayward et al. (2006) argue that overconfidence makes potential entrepreneurs think that they have sufficient sources for new venture creation, thus causing entry by them with insufficient resources. Townsend et al. (2010) find that individuals with inflated outcome and ability expectation are more likely to choose an entrepreneurial career. Trevelyan et al. (2008) argue that if individuals are more confident in their ability to successfully create a new venture, then they will regard entrepreneurship as a positive choice for a career, thus being more alert to the entrepreneurial opportunities hidden in the information they have access to. Koelinger et al. (2007) suggest that individual's overconfidence in their entrepreneurial skills is the major forces driving them to create new business. As such, the first hypothesis is derived:

H1a: Over confidence significantly drives the entrepreneurial intention of an individual.

Illusion of control is another cognitive bias that is often associated with entrepreneurial process. This is in line with Simon et al. (2000) proposal that when people overestimate the extent to which their skills and abilities can influence the outcomes when chance or other factors play important roles. De Carolis and Saporito (2006) support Simon et al. (2002) and define illusion of control as the overestimation of the extent to which one thinks they can control the outcome of a certain situation. Illusion of control affects people's evaluation of the probability of success in creating new ventures. The immediate research follows the definition given by De Carolis and Saporito (2006).

Illusion of control is easily confused with overconfidence in that illusion of control makes people think that they can accurately predict and control uncertain future events. Since both of the biases are included in Simon's et al. (2000) research, they distinguish the two constructs by a temporal dimension. Overconfidence refers to individuals' estimation of current facts and ability, while illusion of control represents individual's estimation of his or her skill to cope with future events (Simon et al., 2000). In other words, overconfidence is one's evaluation of the current situation with respect to knowledge, skill, and ability, while illusion of control concerns one's estimation of the extent to which these skills and abilities can be used to control the future events.

Illusion of control can influence entrepreneurial intentions for three reasons (Simon et al., 2000). Firstly, it makes potential entrepreneurs believe that they can predict the events that may affect the performance of their firms, thus underestimating the risks incurred. Secondly, individuals with illusion of control think that their ability to cope with future events is better than their competitors, thus thinking that though other people will fail, they will succeed. Thirdly, individuals with illusion of control often overestimate the performance of the firm to be created, while higher expected benefits lures people to take higher risks (Camerer and Lovallo, 1999). As such, the following hypothesis is proposed:

H1b: Illusion of control can significantly affect entrepreneurial intentions.

When individuals make generalizations regarding a person or a phenomenon according to only a few characteristics of that person or a small part of that phenomenon, then they commit the cognitive biases of representativeness (Busenitz and Barney, 1997; Kahneman, et al., 1982). In Simon's et al. (2000) research, representativeness is expressed by the concept of belief in small numbers. When people draw certain conclusions based on limited information, then they have a belief in small numbers. The present research defines

representativeness as people's propensity to make decisions based on limited information, which is in agreement with De Carolis and Saporito's (2006).

The influence of representativeness is an extensively cited factor in the entrepreneurial process. Busenitz and Barney (1997) suggest that entrepreneurs are more likely to use representativeness in their decision making than managers in large companies. Because the reports about the successful entrepreneurship is more than those about the failure, and success stays longer in the media than failed ones, people are more likely to remember the successes and make generalizations on these biased samples (Simon et al., 2000). In addition, if a potential entrepreneur discusses their business plan with only a few people, they will get more positive feedbacks than negative ones (De Carolis and Saporito, 2006). As such, representativeness may reduce individual's perceived risks of creating new firms, thus boosting their entrepreneurial intentions. So, the proposed hypothesis is as the follow:

H1c: The characteristics of being representative in a social context significantly lead to an individual's intention to be an entrepreneur.

3.5.2 Social Network Properties and Cognition

The second theoretical aspect considers a set of assumptions, which are derived from the theory discussed in Chapter 2. This enables the research to explore the question of why do some people but not others choose an entrepreneurial career. In particular, the assumption is stated as: *The properties of an individual's social network can affect his or her way of thinking when making decisions on whether to choose to be entrepreneurs.* The assumption is derived from prior studies that stress the importance of entrepreneurial exposure and role models, widely discussed properties of an individual's social network. But it is not enough to examine these influences just from the perspective of effects of entrepreneurial exposure or role model. If the two perspectives can be combined to define the entrepreneurial

structure in an individual's social network and this combination can be integrated into the three dimensions of social capital (structural, cognitive, and relational), then the logic of how entrepreneurial experiences influence cognitive biases and entrepreneurial intentions will be more robust. Krueger (1993) and Carr and Sequeira (2007) emphasize the effect that breadth of the entrepreneurial experience has on individual's likelihood of choosing an entrepreneurial career. Krueger (1993), Carr and Sequeira (2007), Scherer et al. (1989), and Van Auken et al. (2006) all examined the positive or supportive effects that entrepreneurial experiences in individuals' social networks have on their entrepreneurial intentions. By analyzing and synthesizing their research, this research defines the characteristics of an individual's social network from the following dimensions.

The immediate dimension lays in the focused breadth (extensity) of the entrepreneurial experiences in an individual's social networks, as argued earlier. This also suggests that the empirical work will measure the number and types of ties that have entrepreneurial experiences. Entrepreneurial experience breadth reveals the extensity of an individual's exposure to the entrepreneurial experience and the number of entrepreneurs an individual may have as role models. Experience breadth may coincide with the structure dimension of social capital, with the focus not on the number of ties and contact frequency, but on the whether the networks are ridden with entrepreneurial experiences. Figure 3.5 illustrates the predicted relationship between experience breadth and cognitive bias, which capture the set of hypotheses of H2a, H2b, and H2c.

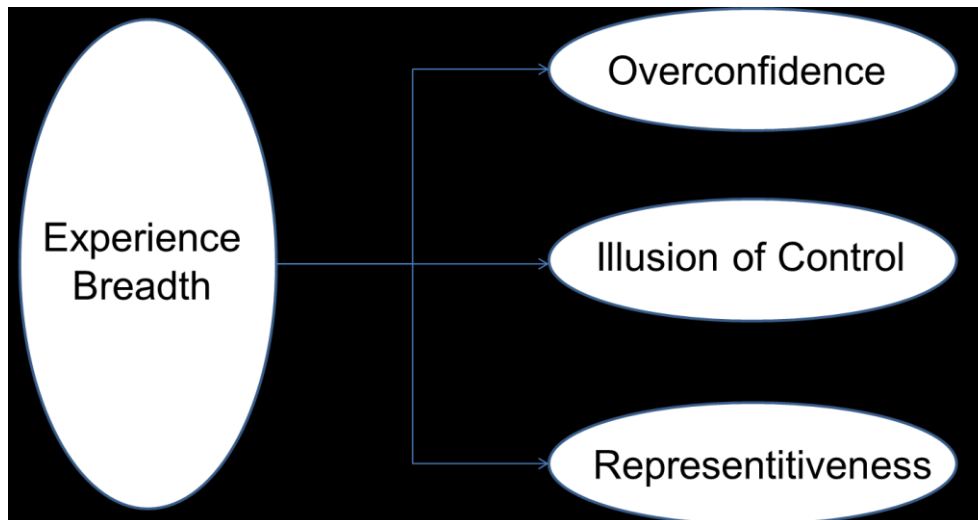


Figure 3.5 Predicted Relationship between Experience Breadth and Cognitive Bias Influencing Entrepreneurial Intentions

The extent of entrepreneurial experiences, regardless of whether they are direct or indirect, may affect cognitive mechanisms. Zhao et al. (2005) and Hmieleski and Baron (2009) argue that entrepreneurial experience may play a role in improving individual's entrepreneurial self-efficacy through the role modeling effect. According to Baron and Ensley (2006), experienced entrepreneurs may form more detailed patterns about what constitute an entrepreneurial opportunity. This detailed pattern requires more information input, while the patterns used by novice entrepreneurs are rougher and uses less information input, which may trigger overconfidence. So, the proposed hypothesis is as follows:

H2a: There are significant interrelationships between the breadth of entrepreneurial experiences in social networks and in turn, the relationships with the confidence and ability of an individual to create a new venture.

Krueger et al. (2000) proposed four likely sources of exposure: one's family business, a business started by another relative or friend, working in someone else's small business, starting one's own business. The breadth of entrepreneurial experiences in an individual's social network may be gauged by the extensity of his/her degree of exposure to business

operated by contacts in his/her social ties. This exposure may affect the individual's perception about his likelihood of success if he/she creates a new venture. Carr and Sequeira (2007) find that prior family business exposure can affect the individual's perceptions on whether he/she will get support from the family if he/she starts-up. Family support may positively affect individuals' evaluation on the possibility of success in creating new ventures, thus increasing an individual's illusion of control concerning business creation. So, the following hypothesis is posed:

H2b: The breadth of entrepreneurial experiences in an individual's social network can affect the individual's illusion of control over the events during the entrepreneurial process.

Representativeness refers to the extent to which an individual generalizes about a person or a phenomenon based on only a few observations of a specific phenomenon (Busenitz and Barney, 1997). If an individual has a few contacts in his social network that have experience in starting new ventures, then he/she may perceive that he/she has a lot of vicarious business experiences. However, in fact, this degree of exposure is still not enough for him/her to make a more reasonable decision concerning whether to choose an entrepreneurial career (Sequeira, et al., 2007). But the individual may wrongly perceive that his/her vicarious experiences are enough. In this situation, the individual may generalize about the success of the new venture creation based on only a few contacts' business experiences, thus committing representativeness, one of the cognitive biases. So, this thesis proposed the following hypothesis:

H2c: The breadth of entrepreneurial experiences in an individual's social network can affect individual's capacity for representativeness and hence his/her choice to be an entrepreneur.

The next set of assumption considers the intensity of the prior interaction with the entrepreneurial experience in an individual's social network. The predictions seek to reveal the quality of interaction between the individual and entrepreneurial role models in his or her social network, which may coincide with the relational dimension of social capital. By communicating intensively with the entrepreneurs in one's social network, an individual may develop strong affect for entrepreneurship. Baron (2008) argues that positive effect toward entrepreneurship may cause various cognitive biases such as overconfidence. The effect of "affect as information" makes an individual think that what he/she likes is what is good. If one likes a business idea, he/she will decide to pursue this idea, stopping collect more information to judge whether the idea is economically feasible or whether there are better alternatives more suitable to his or her knowledge, ability and resources. So, this researcher continues to poses hypotheses H3a, H3b, and H3c, which assume the relationship between cognitive factors and prior interactions with other entrepreneurs in one's social network as depicted in Figure 3.6.

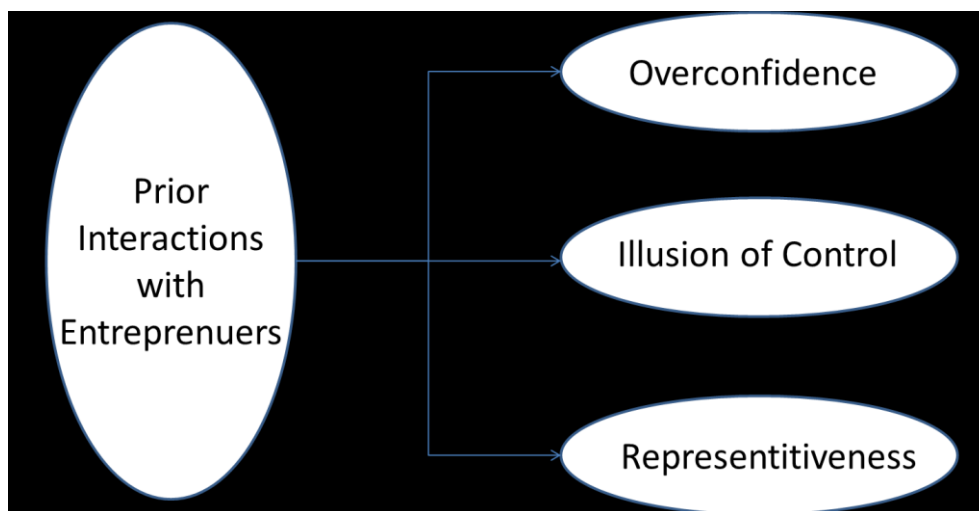


Figure 3.6 Predicted Relationship between Prior Interaction and Cognitive Bias Influencing Entrepreneurial Intentions

H3a: The intensity of prior interactions with other entrepreneurs in one's social network can influence one's overconfidence and ability to create a new venture.

The intensity of prior interaction with other entrepreneurs in an individual's social network can significantly affect the individual's illusion of control over the events during the entrepreneurial process. These entrepreneurs may include the individual in the discussion about their business strategies and operations (Van Auken et al., 2006). Together with other interactions with these entrepreneurs, the individual may underestimate the risks concerned with venture creation and believe they can predict the events that may affect the performance of the firm they seek to establish (Simon et al., 2000). The intensive prior interactions with these entrepreneurs mislead the individual to think that he/she is familiar with entrepreneurial activities and his/her ability to cope with future events is better than their competitors, thus thinking that though other people will fail, he/she will succeed. The prior interactions with entrepreneurs in an individual's social network may lead him to overestimate the performance of the firm to be created and underestimate the risks incurred in the entrepreneurial process (Camerer and Lovo, 1999; Van Auken et al., 2006), thus increasing the individual's illusion of control. The discussion brings about the hypothesis as follows:

H3b: Prior interactions with other entrepreneurs can affect the individual's illusion of control over an entrepreneurial event and the entrepreneurial process.

Van Auken et al. (2006) proposed six groups of role model factors that may affect an individual to choose an entrepreneurial career: personal involvement, professional involvement, mentoring, employment, observation, and discussion. The individual often has intensive interactions with these role models (the entrepreneurs in his/her social network). Different entrepreneurs often share many similarities. By a simple process of generalization, the individual may come to the conclusion that he/she understands the whole entrepreneurial process. Making generalization regarding entrepreneurial process based on only a few cases leads to the cognitive biases of representativeness (Busenitz and Barney, 1997). According to De Carolis and Saporito (2006), an individual's social capital is also connected with his/her propensity to make decisions based on limited information. Baron (2008) pointed out that the effect of "affect as information" makes an individual think that what he/she likes is what is good. If one likes a business idea, he/she will decide

to pursue this idea and cease collecting further information, thus making decisions based on limited information and committing the cognitive biases of representativeness. So, the further hypothesis is:

H3c: The intensity of prior interactions with entrepreneurs in an individual's social network can influence how the individual manifests his/her representativeness in the process for entrepreneurial career decision making.

The next dimension is the positivity of the evaluation of successful entrepreneurs in an individual's social network. This dimension shows whether entrepreneurs in one's social network are successful or not. In addition, this dimension also reveals one's perception of the positive and negative side in the entrepreneurial process. This dimension coincides with the cognitive dimension of social capital, which emphasizes the common understanding about entrepreneurship. Figure 3.7 depicts the relationship between cognitive properties and perceptions of entrepreneurs within one's social network, capturing H4a, H4b, and H4c.

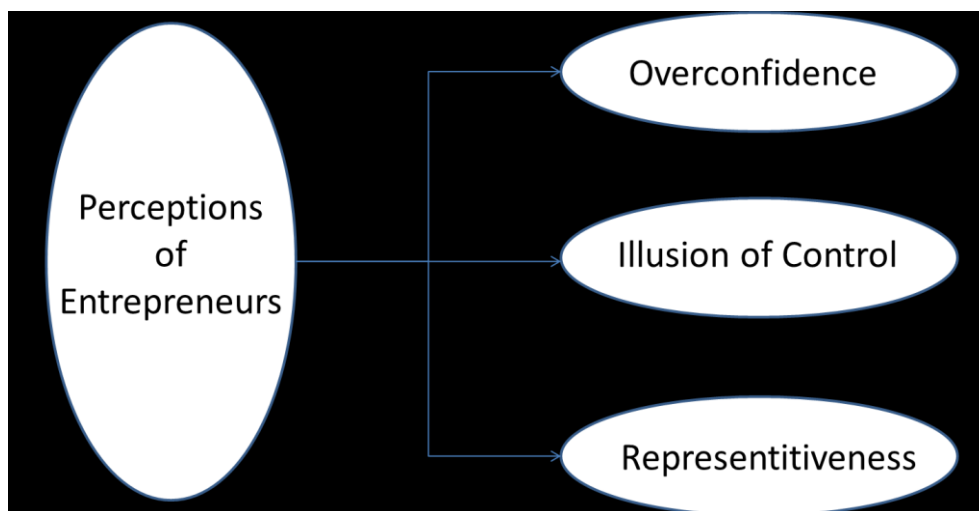


Figure 3.7 Predicted Relationship between Perceptions of Entrepreneurs and Cognitive Bias Influencing Entrepreneurial Intentions

If an individual feel strongly positive about the entrepreneurial experiences in his or her social networks, this strong affect or emotion may affect his or her memory: individuals can only remember information that are consistent with this positive effect (Baron, 2008), causing a wide range of cognitive biases including overconfidence. Krueger et al. (2000) found that positive entrepreneurial exposure can affect the perceived feasibility of entrepreneurial intentions. If the subject perceives that that the entrepreneurial experiences of the contacts in the subject's social network are successful, then the subject is regarded as having positive entrepreneurial exposure. As discussed earlier, perceived feasibility is actually the application of self-efficacy in the field of entrepreneurial domain (Zhao, et al., 2010). If an individual perceived his/her self-efficacy very high, then he/she is regarded as overconfident. So, this thesis poses the hypothesis as followed:

H4a: More positive perceptions towards entrepreneurial experiences within the individual's social network can lead to the overconfidence of the individual to create a new venture.

Individual perceptions of feasibility and self-efficacy significantly influence an individual's confidence in creating an entrepreneurial venture. An individual may perceive as very positive the entrepreneurial experiences in their social network (Krueger et al., 2000). This positive perception is based on the good results of the subjective evaluation of their role model performances (entrepreneurs in the individual's social network) from three perspectives: *"the respondent's perception of the parent entrepreneur in terms of making the business profitable, satisfaction with the work itself, and satisfying different constituencies of the business"* (Scherer et al., 1989). If an individual assigns high marks to these role model entrepreneurs in his/her social network, then it may imply that the individual may think it easy to achieve profits and satisfactions. If the individual thinks these are very hard to attain, then they may be very careful when they decide to give very good results in the evaluations concerning the above three perspectives. As such, high evaluation results may indicate an overestimation of the possibility that the individual can control the future events. The overestimation concerning the prediction of the outcome of the proposed new business bears the typical characteristics of illusions of control (Townsend et al., 2010). Because an individual's evaluation of his/her perceptions about

the entrepreneurs in his social network may affect whether he/she commit illusion of control, this thesis poses:

H4b: Strongly and positively perceived entrepreneurial experiences within an individual's social network can positively influence the individual's illusion of control over the events during the entrepreneurial process.

If an individual perceives that most of the entrepreneurs in his social network are not successful, then he/she may attribute this to the environmental factors such as political (Griffiths et al., 2009), economic (Kristiansen and Indarti, 2004; Choo and Wong, 2006), and cultural factors (Gurel et al., 2010). Considering this bleak environment for entrepreneurship, the individual may choose not to start-up. However, if an individual perceive that most of the entrepreneurs in his social network are very successful, then he may choose the entrepreneurial career. In fact, the evaluations on whether these entrepreneurs are successful are very subjective (Scherer et al., 1989; Krueger et al., 2000). In addition, no matter how many entrepreneurs there are in an individual's social network, this number is too small for making inferences concerning whether to choose to be an entrepreneur. More samples are needed to make the inference. When an individual perceive that the entrepreneurs in his/her social network is successful, this perception may motivate him/her to choose to be entrepreneurs (Scherer et al., 1989; Krueger et al., 2000). Representativeness as a type of cognitive bias is hidden in this logic chain. The individual has drawn too few samples when he/she is analyzing whether the entrepreneurial occupation is attractive. If the individual makes the decisions to be an entrepreneur, he is highly likely to have committed this cognitive bias --- representativeness. So, this thesis poses the following hypothesis:

H4c: Strongly and positively perceived entrepreneurial experiences within an individual's social network can positively influence how the individual manifests his/her representativeness in the process for entrepreneurial career decision making.

The final dimension is the usefulness of entrepreneurial experiences in an individual's social networks in terms of whether his/her social ties are willing to provide help with regard to entrepreneurial knowledge, skills, and other resources if an individual chooses to create a new venture, which is referred to as network support. Carr and Sequeira (2007) find that potential entrepreneurs often received emotional support from their social ties. Sequeira et al. (2007) argues that network support include two dimensions: support and helpfulness. Baughn et al. (2006) distinguishes between supports from weak and strong ties and includes the intention of join the entrepreneurial process as a new dimension of support. This research integrated these perspectives and approaches network support from three dimensions: emotion, participation, and helpfulness. The emotional support indicates that the ties in the individual's network will feel very good if he/she chooses to start-up. The participation support means that if the individual chooses to start-up, certain ties will choose to join him/her in the entrepreneurial process. The helpfulness support suggests that the ties in an individual's social network will support him/her with various resources if they are needed in the new venture. Individuals with these three kinds of support are more likely to overestimate the knowledge, competencies and resources available for the new start-up. That is to say, network support may boost overconfidence of the potential entrepreneurs. As such, this thesis poses the following hypotheses, which capture the relationship between network support and cognitive properties, as illustrated in Figure 3.8.

H5a: An individual's social network support can impact on his/her overconfidence in his/her ability to create a new venture.

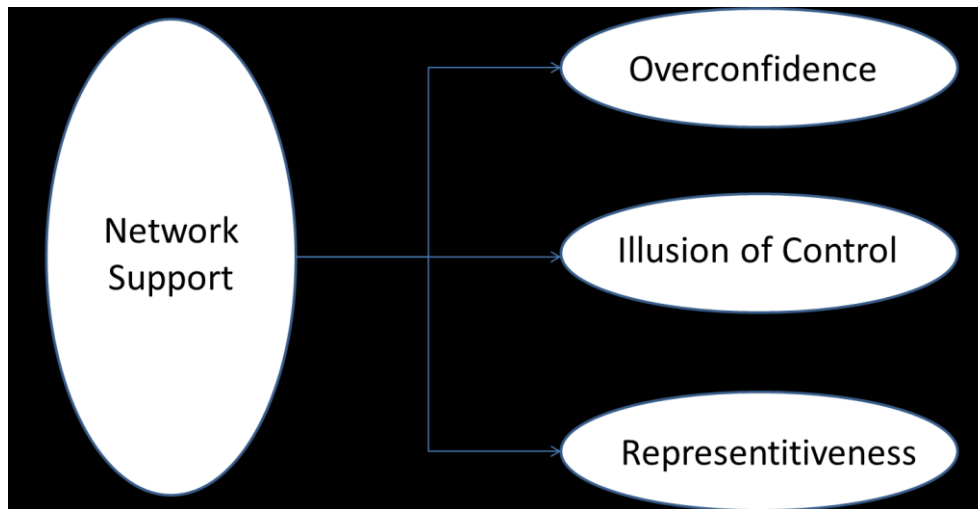


Figure 3.8 Predicted Relationship between Network Support and Cognitive Bias Influencing Entrepreneurial Intentions

Network support refers to whether an individual's network ties support him/her to start a new business. This support may influence the individual's judgment on whether he/she may succeed in the new venture creation process. Among the Chinese people, relationship (or *guanxi*) is thought to play a very important role in China's society (Carlisle and Flynn, 2005; Kambil et al., 2006; Fu et al., 2006; Puffer et al., 2010; Chen, 2011). Sometimes the success of the people in any domain (including new venture creation processes) is attributed to the influential relationships that they have in their social networks. The roles of abilities and resources other than *guanxi* are downplayed. Individuals that have the support from key relationships are more likely to have the illusion that they may control over the future events even when they actually cannot control them if anything bad happens. According to Simon and Houghton, 2002, Simon et al., 2000, De Carolis et al., 2009, De Carolis and Saporito, 2006, the way of thinking described above is termed as *illusion of control*. However, it is this illusion that may drive individuals to start-up. So, this thesis poses the following hypothesis:

H5b: Social network support can significantly influence an individual's illusion of control over the resolution of future events and their impact on the business.

Contacts from an individual's social network may choose various ways to support the individual in his/her entrepreneurial process. The individual may discuss the entrepreneurial opportunity (Shane and Venkataranman, 2000; Shane, 2000), the business idea, and the business model (Gilad, 1982; Gartner, 1985) before he/she starts to create the new venture. Influenced by this information disclosure, the contacts may show their emotional support, express their willingness to help if necessary, and even to join in the process (Carr and Sequeira, 2007; Sequeira et al., 2007; Baughn's et al. 2006). Encouraged by the support, the individual may decide not to investigate further with regard to whether the entrepreneurial opportunity, business ideas, and business model are feasible. They are likely to base their decisions on the responses of several ties in his social network, ignoring the potential customers. Although the ventures to be created may be successful in the future, the decision to start has included some cognitive biases including representativeness (Busenitz and Barney, 1997; Simon et al. 2000; De Carolis, Litzky, and Eddleston, 2009). So, this thesis poses:

H5c: Social network support can significantly influence how representativeness is manifested in the process of entrepreneurial career decision making.

It would be assumed that if a number of people from a particular relationship type in one's social ties are engaged in entrepreneurial activities and if one is in close contact with these people and they understand more about entrepreneurship, or if one feels that entrepreneurship may bring many benefits and is positive, if this social network may provide useful knowledge and resources for business creation, then when an individual is making a decision on whether to establish the firm, these ifs may have effects on their way of thinking, probably leading to such cognitive bias as overconfidence, illusion of control, and representativeness, susceptible to which individual may make decisions in favor of entrepreneurship.

3.5.3 Social Network Properties and Entrepreneurial Career Choice

The characteristics of an individual's social networks may exert direct influence on entrepreneurial intentions (Scherer et al., 1989; Krueger, 1993; Van Auken et al., 2006; Carr and Sequeira, 2007). As assumed in the above sections, *the properties of an individual's social network can affect his or her way of thinking (cognitive biases) when making decisions on whether to choose to be entrepreneurs (EI), and cognitive biases can influence an individual's decision on whether to create a new venture.* It would seem that this research seeks to identify and explicate the mechanism that underlies a would-be observed relationship between the characteristics of an individual's social network (the independent variable) and the individual's entrepreneurial intentions (the dependent variable) via the inclusion of cognitive biases (a third explanatory variable). Cognitive biases can be referred to as a mediation variable. Rather than hypothesizing a direct causal relationship between the independent variable and the dependent variable, this thesis proposes a mediational model that assumes that the independent variable causes the mediator variable, which in turn causes the dependent variable. Thus, by including the cognitive biases as the mediator variable, this thesis seeks to clarify the nature of the relationship between the characteristics of an individual's social networks and his/her entrepreneurial intentions. In other words, if cognitive biases play an important role in governing the relationship between the independent and dependent variables, then the mediating relationship occurs. As such, the third assumption is stated as: *Cognitive biases mediate the relationship between the properties of an individual's social network and his/her entrepreneurial intentions.* Based on this assumption, this thesis, at the end, poses four hypotheses regarding the relationship between social network properties and entrepreneurial career choice, as illustrated in Figure 3.9.

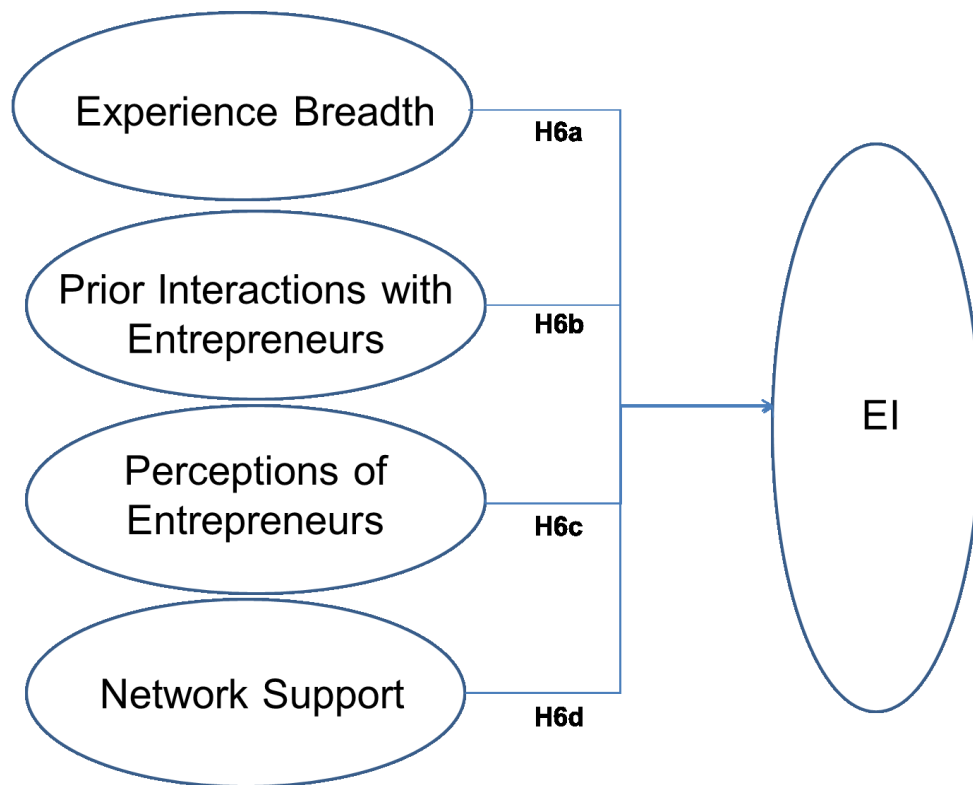


Figure 3.9 Predicted Relationship between Entrepreneurial Intentions and Factors Associated with Network Perspectives

According to Hair et al. (2010), before mediation relationship can be claimed, a researcher should confirm three relationships: the independent variable is a significant predictor of the dependent variable, the independent variable is a significant predictor of the mediator, and the mediator is a significant predictor of the dependent variable. While the statistical relationships will be revealed in Chapter Five, this chapter mainly discusses the theoretical relationship between the three variables. Because the previous sections have set the theoretical relationships between the characteristics of an individual's social networks and cognitive biases, in addition, the relationships between cognitive biases and entrepreneurial intentions have also been hypothesized, before we can say that cognitive biases have a mediating role, the direct relationships between the characteristics of an individual's social networks and entrepreneurial intentions should be examined. This chapter just hypothesizes the direct relationships between the dependent and independent variables and leaves the discussions of mediating effects to Chapter 5 because the discussions need to be

based on statistical results which will be presented in Chapter Five. As such, this chapter poses hypotheses as follows.

The entrepreneurial experience breadth refers to how extensively an individual is exposed to the entrepreneurial experiences in his social network. Krueger et al. (2000) proposed four likely sources of exposure: one's family business, a business started by another relative or friend, working in someone else small business, starting one's own business. The more the individual is exposed to these entrepreneurial experiences, the wider (or broader) his/her experiences will be. Krueger et al. (2000) found that this experience breadth can influence the perceived feasibility and perceived desirability of choosing entrepreneur as a career. Carr and Sequeira (2007) evaluated the prior family business exposure by asking whether respondent's parent or other family member has ever owned a business and whether respondent ever worked in these businesses. This evaluation is actually the assessment the experiences breadth. They found that prior family exposure has both direct and indirect effects on entrepreneurial intent. This research expects to find similar relationships, so it poses:

H6a: The greater the breadth of entrepreneurial experiences in an individual's social network, the greater the likelihood the individual chooses an entrepreneurial career.

The intensity of prior interactions refers to the depth of communication between the individual and the entrepreneur in their social networks. Both Krueger (2000) and Van Auken et al. (2006) found that the interaction between entrepreneurial role model and respondents can influence respondent's entrepreneurial intentions. Van Auken et al. (2006) examined closely 20 interactive activities between the respondents and entrepreneurs in their social network. Although they found that these activities are significantly related to entrepreneurial intentions, both of the studies did not analyze and synthesize the different interactions into a construct that is named as *intensity of prior interaction* in this research. If the activities between the individual and the entrepreneurs are too few in type, then these too superfluous interactions may not have effects on entrepreneurial intentions. As the

individual and the entrepreneurs are involved in all kinds of activities, the communication become deeper and more intense, and the individual becomes more familiar with entrepreneurial activities, increasing their perceived feasibility to choose entrepreneurial career. So, this thesis poses:

H6b: The greater intensity of the individual's prior interactions with entrepreneurs within the social network, the greater is the individual's entrepreneurial intention.

Before choosing the entrepreneurial career, an individual may evaluate whether the entrepreneurs in his/her social network are successful in terms of making the business profitable, satisfaction with the work itself, and satisfying different constituencies of the business (Scherer et al., 1989). If the individual thinks that the entrepreneurs are successful, then the result of this evaluation is positive. Otherwise, the individual gets a negative evaluation result. Krueger et al. (2000) conducted a similar study in which they asked the subjects whether the subjects thought the related entrepreneurs' experiences were positive or negative so as to measure the quality of entrepreneurial exposure. Though Scherer et al. (1989) has made attempts to evaluate the subjects' role model performances from the alluded three perspectives, they only focused on parent entrepreneurs. Krueger et al. (2000) extended this evaluation to four occasions: one's family business, a business started by another relative or friend, working in someone else small business, starting one's own business. However, the evaluation method used by Krueger et al. (2000) is too simplistic because respondents are required to just assess the overall experiences: whether the experience is negative or positive. This evaluation method ignores that respondents may assign high marks to one aspect of the experiences and give low marks to another aspect of the experiences. This research synthesizes their merits by proposing a construct: *the experience positivity of entrepreneurs in an individual's social network*, which measures whether the entrepreneurial experiences are positive or negative from the three alluded perspectives and apply to all the contacts who are entrepreneurs in the individual's social network. The quality of the entrepreneurial experiences is found to have effect on the subjects' entrepreneurial intentions (Scherer et al., 1989; Krueger et al., 2000), so, this research poses the hypothesis that follows to test whether the new construct (the

experience positivity of entrepreneurs in an individual's social network) can influence entrepreneurial intentions.

H6c: The more positively an individual perceives others's entrepreneurial experiences within the social network, the greater the intensity and positive attitudes the individual will have towards entrepreneurial intentions.

Network support refers to whether an individual's network ties support him/her if he/she chooses to start a new venture. Carr and Sequeira (2007) used emotional support that subjects would receive from their social ties if they chose to start a new venture. Although Carr and Sequeira (2007) research was published later, Baughn et al. (2006) had actually used a more holistic methods to measure the construct by the design of a six-item scale to measure the three aspects of support: whether the respondent's family and friends will join him/her if the respondent start up a new venture, whether they feel positive or negative toward the respondent's start-up, and whether they are willing to offer help if necessary during the respondent's entrepreneurial process. This research names these three aspects as: joining, emotional, and help. Although Baughn et al. (2006) have offered a comprehensive method to measure network support, their measurement only considered the strong ties in one's social network, ignoring the weak ties that may also have a significant effect on an individual's decision to become an entrepreneur. This research will go a step further by apply the alluded three aspects of support to both strong and weak ties. As Baughn et al. (2006) found that network support can be a significant social predictor of entrepreneurial interest in China, this thesis poses:

H6d: Entrepreneurial intentions significantly depend on social network support to the individual.

The theoretical model and hypotheses for this thesis can be summarized as shown in Figure 3.10. An individual's social network properties can affect his/her cognitive biases, which in turn have effects on his/her entrepreneurial intentions. In addition, an individual's social

network properties may directly influence the formation of his/her entrepreneurial intentions. Furthermore, cognitive biases may mediate the relationship between an individual's social network properties and his/her entrepreneurial intentions.

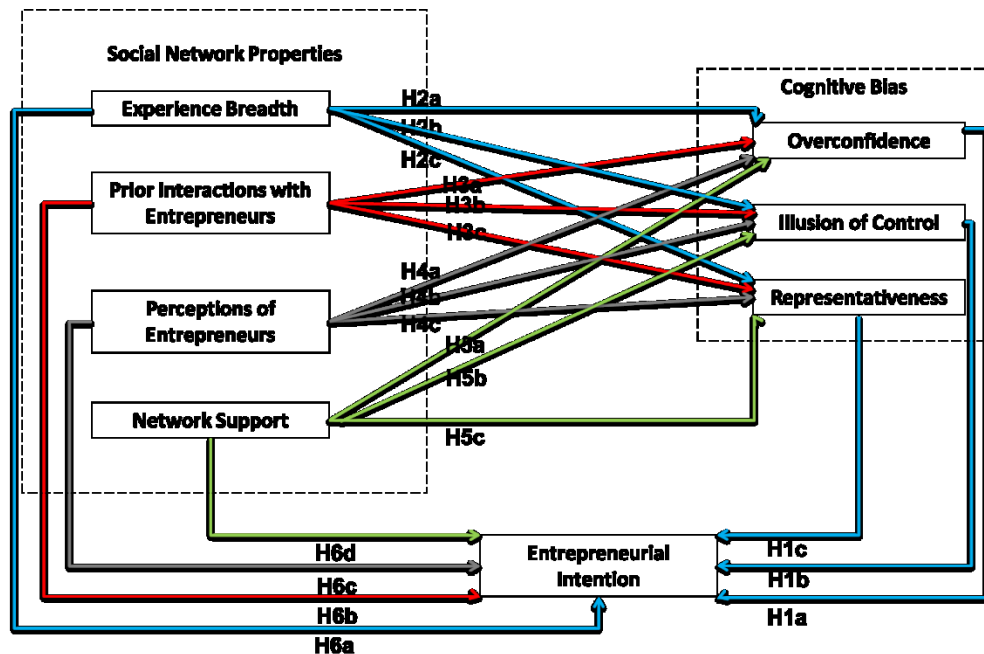


Figure 3.10 The EI Model Designed for this Research with Hypotheses Shown

3.6 Summary

Frameworks, theories and models are sets of assumptions concerning the relationships between concepts of interest, but they differ in the degree of generality in a nested manner ranging from general to precise. Chapter 3, as shown above, has mapped out the multiple relationships within the predicted model based on the theoretical framework. The model captures three sets of assumptions: 1) cognitive biases can influence an individual's decision on whether to choose to be an entrepreneur (EI); 2) the properties of an individual's social network can affect his or her way of thinking (cognitive biases) when making decisions on whether to choose to be entrepreneurs, 3) the properties of an

individual's social network can affect an individual's decision on whether to choose to be an entrepreneur (EI).

This chapter first analyzed the concepts that are contained in prior entrepreneurial frameworks and models and then by a synthesis process this chapter categorizes these concepts into two groups: individual factors and environmental factors. By adding entrepreneurial intentions as the third point, this research proposed a triangular entrepreneurial intentions model, which stresses the direct effect that individual and environmental factors have on EI as well as the indirect effect of environmental factors on EI through the mediation of individual factors.

This chapter also considered how the concepts in the frameworks and models are organized. Bird's (1988) framework introduced the concept of entrepreneurial intentions into the field and allowed for various theories to develop within the framework. The dominant theory in this field is the Theory of Planned Behavior (TPB). By combining with theoretical perspectives in the field, TPB moved from general to the specific. The other theoretical development is that single theory explanations gave way to combinations of theories. This research draws from social capital theory, cognitive theory, and social-cognitive perspectives to develop an entrepreneurial intentions model.

The EI model designed for this research proposes that the characteristics of an individual's social network would directly influence EI, that the cognitive biases would directly affect EI, and that the characteristics of an individual's social network would indirectly impact on EI through the mediation of cognitive biases. An individual would learn from the entrepreneurial experiences presented in his or her network, and this learning can result in cognitive biases that lead to entrepreneurial intentions.

This chapter closes with the description of the hypothesized relationships between concepts in the proposed model. As for the relationship between cognitive biases and

entrepreneurial intentions, this thesis hypothesized that three cognitive biases variables (overconfidence, illusion of control, and representativeness) significantly drive the entrepreneurial intentions of an individual. For the direct relationship between environmental factors and entrepreneurial intentions, this research hypothesized that four environmental variables (experiences breadth, intensity of prior interactions with entrepreneurs within an individual's social network, perceptions of entrepreneurial experience, and network support) significantly affect an individual's entrepreneurial intentions. With regard to the relationship between environmental factors and cognitive biases, this research, thus far, has assumed 12 relationships between four environmental factors and three cognitive biases factors.

CHAPTER 4 METHODOLOGY

The framework and the model in this research has evolved from the discussion of the related literatures in the leading academic journals reviewed in Chapter 2 and the discussion was further developed in Chapter 3 in the context of the framework and model that are proposed for this research . To move to the next stage, measurement instruments are designed to be used in a formal questionnaire survey to collect primary cross-sectional quantitative data. Given the requirement as indicated in the literature as a minimum sample size of 260 for research of such kind to be significant, towards power testing, this thesis pushed up the number through a wider distribution of questionnaires to 1200 potential participants. A probability sampling method was designed and conducted to reach this number of graduates in Wuhan University, China. The formal survey collected 625 valid questionnaires with a significant response rate of 50% against a significant minimum standard requirement of 45% response rate. The data is analyzed following the six-stage procedure for Structural Equation Modeling (SEM) proposed by Hair et al. (2010). In addition, this chapter defines 8 individual constructs and designed observable items to measure them based on a critical review of previous literature and makes use of path diagrams to illustrate the hypothesized dependence relationships between the 8 constructs under the guidance of a typical SEM process. Because the philosophical positions that a researcher takes determines the choices of the lower-level methodological considerations, this chapter begins with a critical analysis of the critical realist philosophical foundation on which this research is based.

4.1 Research Philosophy

Scholars in the entrepreneurial domain supply contradictory arguments regarding whether such concepts as social structures and mechanisms are objective realities (Alvarez and Barney, 2010; Hytti, 2005; Mole and Mole; 2010; Sarason et al., 2010). Among these

contradictory philosophical assumptions, this research leans towards critical realism which presumes the existence of structure and agency which are the two prime objects of the knowledge expected to be produced. Critical realism supports the positive and deductive research approach that is quantitative in nature (Bhaskar, 1976; Benton and Craib, 2001; Blaikie, 2007). Frameworks, theories and models are proposed in the first place and then empirical observations or investigations are conducted, and then the results of the empirical investigations and the theoretical predictions are compared (Bryman and Cramer, 2009). This section first discusses the philosophical foundations of the entrepreneurship domain, in an attempt to place this research ontologically and epistemologically against the backdrop of the research field. The second part explicates the philosophical stance of the present research. The third section deals with several counter criticisms that this philosophical stance may suffer and arguments are proposed.

4.1.1 The Philosophical Foundations for Entrepreneurial Research

The aim of this research is to produce knowledge about how EI is generated among university graduates. In order to critically discuss how to get this knowledge of EI mechanism and evaluate its nature, it is necessary to look into different philosophical foundations in the research area of EI. However, there are few journal articles regarding philosophical issues in this narrow area. But as EI has branched out from the stem of entrepreneurship research, the evaluation of the philosophical positions of entrepreneurship studies may shed some light on the focal research area regarding its philosophical underpinnings. Entrepreneurship researchers usually adopt ontological assumptions implicitly without articulation, but they can be evaluated as they are embedded in the theoretical perspectives, research strategies, and methods (Blaikie, 2007; Creswell, 2008). As such, this section will first examine some of the research papers in this area and infer their ontological and epistemological assumptions from theoretical perspectives, research strategies, and methods that they adopt. As the purpose of the present research is to identify mechanisms that may generate EI, the second section discusses the arguments on

whether social structures and mechanisms exist that determine the beginnings of the entrepreneur.

4.1.1.1 Ontological Assumptions in Entrepreneurship Studies

Scholars have different views regarding whether entrepreneurship and its relevant concepts are objective realities existing out there independent of observers. Objectivity turns out to be a matter of degree and ontological assumptions can be conceptualized on a continuum that ranges from objective to subjective (Burrell and Morgan, 1979). On one end of the continuum regarding the existence of entrepreneurship, some scholars view entrepreneurship as a totally social construction out of the particular social situations. For example, Hytti (2005) treat entrepreneurship as a social process constrained by such social contexts as different times, places as well as, for example, different roles, social identities and careers. Other researchers taking such a position include Jones (2009), Michael and Lounsbury (1998), Hjorth (2007), Brannback and Carsrud (2008). On the other end of the continuum, scholars regard entrepreneurship as totally objective and can be empirically observed free from the theory-laden effect of sense experience (Benton and Craib, 2001). For example, Bygrave (1989) insists that researchers should emphasize the empirical observations of entrepreneurship and inductively arrive at theories. A broad spectrum of middle grounds theories are positioned between these two extremes of the continuum. For example, Coviello and Jones (2004) propose to develop a unifying methodological direction by integrating positivist with interpretivist methodologies in the field of international entrepreneurship study. As such, the ontological stance regarding entrepreneurship is pluralized, allowing realism as well as constructivism, positivism as well as interpretivism, like the case in most of other fields of inquiry in social science.

4.1.1.2 Debates on the Mechanism and Determinants of being an Entrepreneur

The purpose of the present research is to discover mechanisms that can generate EI, so a mechanism is assumed as a reality out there. But scholars in the field supply contradictory arguments concerning the existence of social structures and mechanisms that determine the start of entrepreneurship (Mole and Mole, 2010, Sarason et al., 2010). Sarason et al. (2010) claim that they support a more subjectivist and agential approach as opposed to objectivist and deterministic approaches to the study of entrepreneurship. Sarason and Dillard (2006) view entrepreneur and opportunity nexus as a duality in which each cannot be understood as being separate and distinct from the other. They used structuration view because of the recursive nature of agent-structure interaction. Mole and Mole (2010) challenge the views that structuration theory is the most useful theory to handle the nexus of opportunity and entrepreneur. They follow Archer's (1995) view that structures objectively exist and entrepreneurship is the study of the interplay between the structures of a society and the agents within it. Mole and Mole (2010) argue that Sarason and Dillard (2006) flatten various strata of social reality to interpret social practice, indicating that they collapse ontology into epistemology. In other words, Sarason and Dillard (2006) do not distinguish between ontology and epistemology, indicating that what we think is what reality is.

This research supports the contention that social structures and mechanisms are ontologically real. The contradictions in the nature of structure described in the last paragraph are based on different ontological and epistemological foundations, "*debate about which one might be superior fundamentally reduces to a debate about which ontological and epistemological assumptions are correct*" (Sarason et al., 2010, p239). Researchers should shift their attention from judging which philosophical assumptions are superior to whether the philosophical assumptions chosen are compatible with the research methodologies. Which philosophical positions a researcher should take is a matter of free choice. Considering the aim of this research, if structures and mechanisms are not viewed as ontologically real, then it is not necessary to look into the present topic. So, this research takes a more realistic ontological and epistemological position. However, it is necessary to make clear the logic of social structures and mechanisms as external realities.

Empiricist may challenge the existence of social structure and mechanisms since they cannot be observed by sense experiences (Chalmers, 1999). In addition, methodological individualists may argue that “*without individual people and their activities, there could be no structure, structures do not exist independently of activities of people, but, on the contrary, are nothing but regularities in the aggregate patterning of those activities*” (Benton and Craib, 2001, p132). Accordingly, Sarason et al. (2010) citing Giddens (1984), view structure as virtual and held in the minds of agents until instantiated in the action of agents. They believe that structures result from the present actions of agents. In this case, people are regarded as both products and conditions of possible social structures. On the contrary, if structure and agent are assumed to hold a dualistic existence, this assumption enables the explanation of the structures that have to be in place in the first place for entrepreneurship to occur. Critical realism holds the assumption of the dualistic existence of structures and agents. Benton and Craib (2001) cite Bhaskar (1976) and argue that society and agents are located at distinct levels --- both real, but interdependent and interacting with one another. Structures are the results of the prior actions of the agents (Archer, 2003).

According to Bhaskar (1976), it is only through the activity of social agents that social structures are kept in being (reproduced), but individual or collective agent may also modify or transform social structure. Archer (2003) developed this idea and takes it as axiomatic that structures are objective, with independent causal powers, that constrain and enable the actions of agents, agents have causal power, they also have ultimate concerns that they try, fallibly, to put into practice. Following this line of logic, we can argue effectively against methodological individualist and empiricist tendencies to dismiss the reality of social structures.

4.1.2 The Philosophical Position of the Research

The present research leans towards critical realism that presumes the existence of structure and agency, which are the two prime objects of the knowledge expected to be produced. This is in accordance with Blaikie's (2007, p22) arguments on the nature of knowledge in critical realism: "*a scientific theory is a description of structures and mechanisms which causally generate the observable phenomena, a description of which enables us to explain them*". But how can we know these social structures and mechanisms? This question should be answered by examining the epistemologies that make claims about which scientific procedures produce reliable social scientific knowledge (Blaikie, 2007). This section begins with a reflection of how the mechanisms that generate EI were postulated by the present researchers.

"Another way of thinking about epistemology is in terms of relationship between researchers and the things of which they wish to have knowledge" (Blaikie, 2007, p18). Fundamentally, these things can be regarded as either real or ideal, which is the topic of ontology which is concerned with the nature of what exists. Different ontological assumptions may be combined with different epistemological assumptions. But these different combinations should make logical sense. As such, the second section deals with the ontological underpinnings of this research and evaluates the research's compatibility between ontological and epistemological assumptions.

Although there are various logic combinations of ontological and epistemological assumptions, no combination can claim to be correct, though some might appear more coherent than others, it is at its best the result of the faith of the researcher in a particular view of the world. Attention should be given to the logic sense rather than the superiority of any single combination. As such, the third section will put forward some possible criticism against the research's philosophical position and the corresponding defending arguments are also presented, for the purpose of locating or positioning the present research against a vast and complex web of inquiries into entrepreneurship.

4.1.2.1 Retroduction as the Key Epistemological Process Underpinning this Research

The present study uses a retroductive research strategy to inquire why some university students but not others in China have EI. The nature of this research question calls for a causal explanatory methodology in which the objective is to explain rather than to describe or deconstruct entrepreneurial career choice. The retroductive mode of inference (Blaikie, 2007) is used to tackle this problem in the sense that putative causal relations are imputed by reasoning backwards from the phenomena under investigation and asking “*what, if it existed, would account for this phenomenon?*” This method is the core epistemic process of critical realism, which seeks to find the underlying structures and mechanisms from the observation of surface events and regularities. The inference process or the discovery logic of the underlying mechanism that generate EI is illustrated as follows.

If one has the intentions to become an entrepreneur, he or she should first know what an entrepreneur is like. On the one hand, one may get to know this through indirect experience, e.g. learning through reading stories about life of entrepreneurs in newspapers and magazines, which this discussion will not cover. On the other hand, one may make sense of the entrepreneur by his or her direct experiences with people who are entrepreneurs in his or her social network. One may participate in activities of someone’s business, or observe actively or passively the life of entrepreneurs in his or her social network. One may even communicate or interact with these people. These vicarious entrepreneurial experiences may influence one’s future decision on whether to choose an entrepreneurial career. Through this logic, this research tentatively postulates an important antecedent of EI: entrepreneurial experiences in one’s social network. The next step is to see whether EI and entrepreneurial experiences, as separate events, coexist.

Possible mechanisms sought by critical realist can be gleaned from existing theories (Blaikie, 2007). By a search and review of the literature, it is found that entrepreneurial

exposure (Krueger, 1993; Carr and Sequeira, 2007) and role models (Matthews and Moser, 1996; Van Auken et al., 2006) are often used as proxies for entrepreneurial experiences in one's social network. These researchers often find that entrepreneurial exposure or role models are positively related with EI but they do not propose a convincing mechanism through which they can generate EI. The covariation of two events is not enough to identify causal relationships (Hair et al., 2010). This is also a problem with empirical positivism that can be used to identify highly probable co-occurrences rather than a relationship structure in which one event explains the other (Benton and Craib, 2001). To identify causal relationships, three additional conditions should be met aside from covariation: temporal sequence, non-spurious covariation, and theory to relate cause to effect (Hair et al., 2010). If entrepreneurial experiences really matter in one's career decision, then how do they contribute to the formation of EI? What are the theories that account for the mechanisms that generate EI?

Entrepreneurial cognition research provides explanations about entrepreneurial phenomena including EI by linking doing with thinking (Anderson, 2008; Armstrong and Hird, 2009; Baron, 1998; Baron, 2004a; Baron, 2004b; Mitchell et al., 2004; Mitchell et al., 2007). But most of this group of studies only look into the role that different kind of cognitive styles, cognitive biases in particular, play in an individual's career decision. It is very often that the causes or sources of these cognitive biases (e.g. over confidence, illusion of control, representativeness) are not discussed in these studies. If we integrate the research results of entrepreneurial cognition and entrepreneurial experience, we may draw a more convincing theoretical picture to explain why some but not others wish to choose an entrepreneurial career. Entrepreneurial experiences in an individual's social network may lead to certain kinds of cognitive biases that encourage the individual to evaluate positively the feasibility and desirability of being an entrepreneur resulting in the individual's intention to start his or her own business. This relationship can be depicted as in Figure 4.1. Thus, the discovery of the mechanism that generates EI is by retroductive reference and theoretical reflection and abstraction.

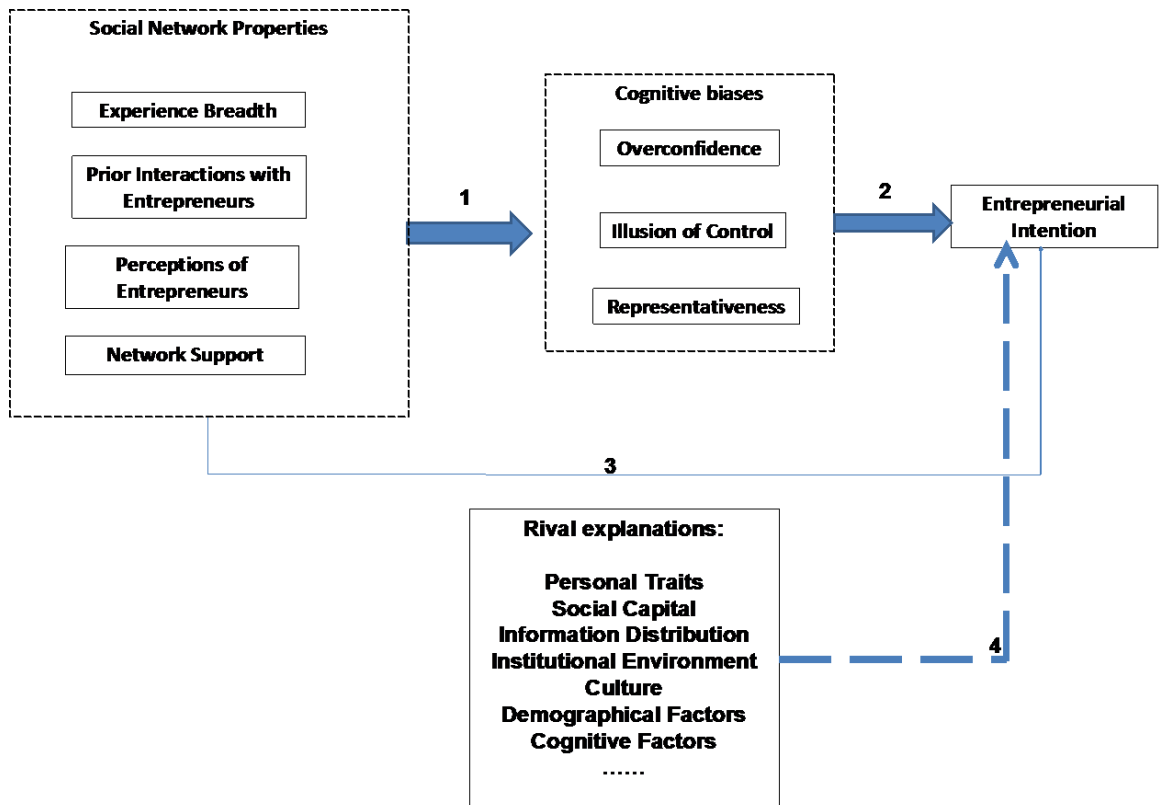


Figure 4.1 Initial Assumptions of Constructs and Relationships

Retroduction is critical realism’s key epistemological process. Through the process illustrated above, a theory (mechanism) is postulated to explain the constant conjunctions of indirect entrepreneurial experiences and one’s EI: the intense communication with and positive perception of entrepreneurs in one’s social network lure one to think that one can be a successful entrepreneur as well, thus making a decision to choose an entrepreneurial career. But what is the nature of this knowledge? Is the knowledge of one’s personal interpretation a precise representation of something just out there independent of the individual? It is argued in this thesis that the mechanisms that generate EI are objective reality independent of the observer and theories proposed by this research about EI approximate this reality and are set to be improved over time. Before going on to discuss the nature of this knowledge about the EI mechanism, the following section discusses this study’s ontological assumptions to account for the independent reality of EI mechanisms.

4.1.2.2 Layers of the World --- the Stratified Ontology Informing the Research

This research argues that some mechanisms that can produce EI exist and have characteristics described below. Firstly, the mechanisms exist independent of whether or not people have developed EI or researchers have discovered them. Secondly, the mechanisms have causal efficacy in generating EI. Thirdly, these mechanisms are the results of the prior activities of people and can be reproduced by social actors' activities. Fourthly, these mechanisms belong to the real domain proposed by Bhaskar (1998). Fifthly, knowledge about these mechanisms is conjectures which are fallible and constitute a social practice rather than an absolute truth.

Many mechanisms are at work when social actors make decisions on whether to become entrepreneurs. These mechanisms may compete with and cancel each other out and produce a synthesized effect on social actors' decisions. As a result, individuals may choose not to start up a business not because the mechanisms that produce this decision do not work, but because the effects of these mechanisms are offset by counter mechanisms. Therefore, these mechanisms can be independent of whether the events (EI) can be observed.

This research does not follow the empirical paradigm since the mechanisms that produce EI cannot be observed directly. In addition, empirical logic does not support the inquiry aiming to find the underlying causes of the formation of EI. The frequent concurrence of events can be regarded as patterns or regularities in the lenses of empiricism. For example, empirical examination may find that individuals with either parent as entrepreneurs are more likely to choose an entrepreneurial career (Carr and Sequeira, 2007). However, empiricism cannot explain why these two events often co-occur. Critical realism argues that theories are needed to explain the links between frequent concurrences of events. These theories are referred to as mechanisms or social structures that are the forces underlying events. In particular circumstances things must act in particular ways. The mechanisms that produce EI are in the real domain and have causal efficacy.

Mechanisms are how things act. How and when do the mechanisms producing EI come into existence? This research argues that these mechanisms are the result of joint actions of people in the prior. When people make decisions on whether to start up a new business, these mechanisms are already there in play and are reproduced when individual's decision are restricted by these mechanisms. The task of entrepreneurship scholars is to produce knowledge that reflects these mechanisms. The fulfillment of this task is based on the ontologically stratified reality.

This research argues that there is a reality out there waiting for researchers to discover. Some constructivist argues that reality is constructed by social actors and cannot be known by research. Some forms of constructivism even deny the existence of a reality out there independent of subjects or the researcher (Blaikie, 2007). This research will not follow a constructivism epistemology. On the contrary, it supports Bhaskar's (1998) ontology that there are three overlapping and stratified reality domains: empirical, actual, and real. Empirical domain includes events that can be observed, for example, whether an individual has a parent who is an entrepreneur. Actual domain includes events that exist whether they can be observed or not, EI as an example. The real domain includes mechanisms and social structures that produce these events. The mechanisms that produce EI are in the real domain and are the central research objects of this study.

To gain knowledge about the externally existing reality is a social practice by scientist. The knowledge claimed is thus fallible. The researchers' task is to continually improve their explanations of the reality, but not to pursue absolute truth (Benton and Craib, 2001). For example, in research into who might choose an entrepreneurial career, earlier scholars proposed that people with high risk propensity are more likely to become entrepreneurs, the theory of which was challenged by empirical evidence. Other scholars then proposed that due to overconfidence of cognitive biases, some individuals are able to perceive relatively small amount of the actual risk, thus individuals choose to start up a business because they perceive less risk than actual risk (Simon et al., 2000). This line of

development on the knowledge manifests scholars' improvements with regard to entrepreneurial mechanism.

In summary, the study, using a retroductive research strategy, is designed to explicate the mechanisms that generate EI which is viewed as situated in the real domain. The research may be challenged philosophically in the following respects. Can social structures or mechanisms be viewed as something real that exist out there independent of both the researchers and subjects? If a mechanism is an objective reality and cannot be observed by sense experience, and if many methods are allowed to theorize the regularities observed, then different researchers may postulate different theories out of the same set of data to explain the same events. Does this mean that the knowledge developed is relevant and contingent to the contexts like the situations under constructivism? The sections that follow argue against several counter criticisms.

4.1.3 Possible Criticisms of Critical Realism Regarding its Epistemology and the Defense

Critics may challenge whether it is logically sound to assume the external existence of the mechanisms that generate EI, how we can produce the knowledge about these mechanisms, whether the knowledge produced about EI and their generative mechanisms is objective, and whether the knowledge produced are tentative or relative. This section first presents each aspect of the above criticism and then provides counter arguments.

4.1.3.1 Do Social Structures and Mechanisms Have an External Existence?

Critics may challenge whether it is logically sound to assume the external existence of social structures and mechanisms, where the mechanisms that generate EI exist independent of the researcher. Critical realism is sometimes criticized in the sense that its stratified ontology cannot be proved (Contu and Willmott, 2005). As discussed earlier, researchers are faced with a choice between alternative ontological assumptions of particular world views which cannot be reconciled and are thus incommensurable (Benton and Craib, 2001). The choice is a matter of ontological preference. It is not the case that one ontological assumption might be superior in all senses compared with others. In addition, according to Benton and Craib (2001), realist theories of science do not seek to prove the existence of some particular class of entities or mechanisms claimed by science, but to justify the realist account of science as an attempt to discover and study such mechanisms. The focus of critical realism should be on the transitive dimensions of science where “*critical realism is close to Kuhn, Feyerabend and the sociologists of science, in recognizing the social and historical character of science* (Benton and Craib, 2001, p129)”.

4.1.3.2 How can We Produce the Knowledge about the Mechanisms Generating EI?

Even if these mechanisms exist, since they are unobservable and knowledge of them cannot be gained through experimental closure because they necessarily occur in open systems, is it possible for researchers to know them? Philosophy of knowledge may be used by scientist to understand the forms of investigation and reasoning that enabled scientists to do this. There are many research paradigms that propose very different methods regarding how to produce knowledge (Benton and Craib, 2001; Blaikie, 2007). Each of these methods is flawed in some way. The epistemology of empiricism accepts both the existence of an external world and the idea that humans have the capacity to observe this world directly and objectively (Chalmers, 1999). The knowledge is thus produced as a result of observing the world around us by human sense and knowledge is a

matter of accurate representation. However, any observation is theory laden (Benton and Craib, 2001), for example, psychologists and economists observe different aspects that might lead to the generation of EI. In addition, things may exist out there as realities but we have no direct access to them (i.e. to know by observation), as was discussed by Russell (1912) in his book “The Problems of Philosophy”. In this case, critical realist researchers, by selecting the appropriate concepts and ideas, through a trial-and-error process, might see the social world as it really is (Blaikie, 2007). Knowledge is regarded in this situation as an epistemic gain rather than the final word. As such, critical realism agrees with empiricism that there is an external reality, but insists that reality are layered and some domains of reality cannot be accessed by sense experience. Critical realism separates ontology from epistemology.

This distinction between ontology and epistemology is described by Bhaskar (1976) as the transitive dimension which is the social process of production of knowledge and intransitive dimension which is the independently existing objects. Empiricism insists that we gain knowledge by observing and knowledge is an accurate representation of what is observed, so it conflates ontology with epistemology. Constructivism admits the possibility of a plurality of truths associated with different constructions of reality (Blaikie, 2007), so it collapses ontology into epistemology. Critical realism admits an external reality yet at the same time acknowledges that to gain knowledge of this external reality is a social practice and the epistemic gain is judged by practical social progress.

However, different from empiricism which does not say how the world is layered or otherwise, critical realism argues that the world is layered and only those realities situated in the empirical domain can be observed by human senses (Bhaskar, 1976). Critical realism regards social structures and mechanisms that generate events as having independent existence and reside in the real domain. The task of the scientist is to search for these structures and mechanisms so as to find the causal power underling the occurrence of events. While empiricism may use a pattern model of explanation generated from observed regularities between events, but in critical realism, establishing such regularities is just the beginning of the process. What is then required is to locate the

structures or mechanisms that have produced the pattern or relationship (Benton and Craib, 2001). As such, empiricism treats causal law as constant conjunctions of events, while critical realism insists that for constant conjunction to become causal law, it should be backed by a theory that provides an explanation of the link. Accordingly, Benton and Craib (2001) proposed a three-stage process of theory building: the first stage is the collection of evidence about patterns of observable phenomena, the second stage is the retrodution phase to postulate the mechanisms at work, and the third stage is to test the hypothetical mechanisms. The research follows this three-stage model in its research design so as to generate knowledge about EI mechanisms.

4.1.3.3 Is the Knowledge Produced about EI and their Generative Mechanisms Objective?

The research insists that social structures and mechanisms are realities independent of the observer but theories do not directly reflect or precisely represent these realities, instead theories approximate them. All observation in EI research is theory laden and involves interpretation, thus there are no pure facts in this research area. Mainstream studies in the 1980s attributed the reason why some people choose to be entrepreneurs to personal traits (Low and MacMillan, 1988), the popularity of this theoretical perspective and the focus of observation can be explained by the application of psychological lenses to entrepreneurship, e. g. McClelland (1965) brings the concept of needs of achievement into the area. Different scholars with different disciplinary backgrounds have brought during the recent three decades different theoretical perspectives and different focuses of observation in addressing the research question of why some people but not others choose an entrepreneurial career (Ireland and Webb, 2007), making the entrepreneurship research in a fractured state without dominating research paradigms, threatening the status of the field as a legitimate discipline (Shane and Venkataraman, 2000).

4.1.3.4 The Tentative Nature of Knowledge to be Produced by this Research

One solution to the problem of direct accessing objective reality in entrepreneurship research is to accept that all knowledge is tentative and open to revision. By a process of trial and error, scholars may achieve the closest approximation to truth, but can never hit it. Trait theory declined in importance after the 1980s in entrepreneurship research because of evidence against the existence of the co-occurrence of certain personal traits in entrepreneurs (Zhao et al., 2010). Trait theory is to a certain degree not supported by the data. However, the hard core (Lakatos, 1970, 1978; Chalmers, 1999) of this line of thinking remains untouched because its hidden assumption is that entrepreneurs and non-entrepreneurs are different in some particular aspects. Even personality is found to be irrelevant, other scholars find that entrepreneurs and non-entrepreneurs are different in terms of information distribution (Shane and Venkataraman, 2000), alertness to entrepreneurial opportunity (Kirzner, 1973), and ways of thinking (Baron, 1998; Mitchell et al., 2007). The refutation of trait theory is just a loss of one of the protecting belts of the enquiry into the difference between entrepreneurs and non-entrepreneurs. After other protecting belts are tested and not disproved, even trait theory returns as a legitimate area of research (Stewart and Roth, 2007, Zhao et al., 2010).

4.1.3.5 Knowledge of Structures and Mechanisms is Tentative, not Relative

Critical realism and falsification (Popper, 1934, 1972; Chalmers, 1999) can be combined to form a logically coherent theory generating process in which knowledge generated has the nature of tentativeness rather than absoluteness. *“This is due to the fact that our observations and measurement are always theory-dependent; we cannot eliminate the effects of language and culture, preconceptions and expectations, and scientific perspective and theories, on the way we both see and interpret the world around us”* (Blaikie, 2007, p24). However, some opponents make use of these and attack critical

realism by arguing it has a relative epistemology (Contu and Willmott, 2005). These accusations inappropriately and artificially enlarge the inconsistency between critical realist ontology and epistemology.

Following critical realism, *“the real objects of scientific study and explanation are the generative mechanisms or structures that exist and act independently of the patterns of event that they generate”* (Reed, 2005, p1625). However, critical realism does not offer a strict set of rules on how to know these generative mechanisms or structures. There is no discovery logic in critical realism, instead, the hypothesized mechanism or structures should be *“constructed in respect of which local, institutional and historical context are conducive to the action of the mechanism”* (Blaikie, 2007, p87). Viewed from the very surface, it seems that critical realism adopts a relativist epistemology, which forms a major point of criticism by scholars taking other philosophical positions. For example, Contu and Willmott (2005) argue that critical realism has a realist ontology, relativist epistemology and clear-cut methodology, implying the contradictions and incompatibility between critical realism’s ontological and epistemological assumptions. From a close examination of the alleged *“relativism”* of critical realist epistemology, it can be argued that this relativism is totally different from the relativism which epistemologically characterize constructivism or interpretivism, because critical realism insists that one hypothesized mechanism can be better than the other, and by a trial-and-error process researchers can approximate truth more closely, while constructivism or interpretivism insist on a plurality of truths and argue that truth is local and cannot be compared universally (Benton and Craib, 2001). Relativist theories of knowledge insulate themselves from the possibility of being rejected by doing away with the idea of a knowable independent reality. In this sense, critical realism is not relativism.

Critical realism is compatible with falsificationism (Popper, 1934, 1972; Chalmers, 1999) in science which argues that theories approximate truth because of their ability to resist refutation. Epistemologically, critical realism acknowledges that the knowledge generating and diffusion process is temporally and spatially located in historical and social settings, making theories generated fallible, contested and revisable. Scientific theories at their best

offer provisional descriptions and accounts of phenomena that are always open to revision and reformulation (Reed, 2005). It is both possible and necessary for researchers to evaluate competing scientific theories and explanations, and this has an effect on methodology and methods as the present research which uses structural equation modeling which includes a model comparing processes in which the model that fits best with the data will be chosen to explain the generation of EI of university graduates in China. In addition, during the literature review phase, alternative theories explaining the formation of EI are planned to be carefully compared and evaluated so as to estimate less convincing explanations and replace them with ones that have greater explanatory power.

4.2 Methodology

The choices of the lower-level methodological considerations (such as data collection methods and statistical packages) are determined by the philosophical perspectives chosen by the researcher (Creswell, 2008). From a critical realist perspective, a researcher can choose to conduct a quantitative research using questionnaire survey as the method to gather information (Hair et al., 2010). Critical realism can provide a solid foundation for Structural Equation Modeling (SEM) methods in that the two are philosophically compatible.

4.2.1 Quantitative Methodology

Studies in the field of EI seldom discuss explicitly their epistemological assumptions. But as methodology is closely tied to epistemology, the latter can be inferred from the methodologies that these studies use. Quantitative methodologies that draw upon survey research and large data sets usually assume what are generally characterized as more objective epistemologies (Creswell, 2008). Qualitative methodologies include narratives, case studies, and ethnographies, and assume more subjective epistemologies (Sarason et al.,

2010). Examples of both types of methodologies have been used in entrepreneurial research and have yielded significant insights to the field. The majority of studies in the EI research area that are published in mainstream academic journals are quantitative and draw upon survey research and large data sets, for example: Boyd and Vozikis, 1994, Brockhaus, 1975, Cassar, 2007, Crant, 1996, Douglas and Shepherd, 2002, Griffiths et al., 2009, Gupta et al., 2008, Hmieleski and Corbett, 2006, Judy et al., 2005, Kickul et al., 2009, Krueger, 1993, Krueger et al., 2000, Liñán and Chen, 2009, Liñán and Santos, 2007, Prodan and Drnovsek, 2010, Sequeira et al., 2007, Souitaris et al., 2007, Tegtmeier, 2006, Van Auken et al., 2006, Wilson et al., 2007, Zhao et al., 2010, Zhao et al., 2005. This unbalanced choice in favour of quantitative methods in entrepreneurial research, which can be verified by a search in major databases, possibly reveals that the field is currently dominated by more objectivist epistemologies.

As discussed earlier, this research takes critical realism as its philosophical underpinning. Based on the critical realist's ontology and epistemology, this research acknowledges the existence of mechanisms that drive the formation of EI, and proposes tentative theories about these mechanisms by retroductive reference and theoretical reflection and abstraction. Now that these tentative theories are hypothesized, they should be tested through recourse to a systematical empirical investigation. Accordingly, these tentative theories might be verified, perhaps amended or even significantly developed in order to take account of research findings (Bryman and Cramer, 2009). The revised theory, in turn, is subsequently tested through further research and so forth. Through this quantitative research process, this research can infer from the research findings the real mechanisms that determine why some but not others wish to choose an entrepreneurial career. Quantitative methodology can facilitate this process of theory development, testing, and comparison so as to explain what exist in the actual domain. So, this research is able to look into the overlapping and stratified empirical, actual, and real domains of the mechanisms that generate EI by employing quantitative methodology. According to Creswell (2008) and Blaikie (2007), the philosophical foundation of a research determines its choice of lower-level methodological considerations, so, the compatibility between critical realism and the nature of quantitative methodology supports the validity of the research design for this present research.

4.2.2 Questionnaire Survey

Quantitative research often involves the systematic empirical investigation of social phenomena via statistical, mathematical or computational techniques (Bryman and Cramer, 2009; Creswell, 2008). Quantitative research often has three steps: firstly, theories and mathematical models are developed to simulate the relationships among things in the world. Secondly, empirical observations of the things are conducted by various methods, for example, questionnaire, experiments, and interviews. Thirdly, the results of the empirical observations and the mathematical expression of the quantitative relationships are compared so as to test the hypothesized theory (Bryman and Bell, 2003). It can be seen in this process that measurement is central to quantitative research because it determines the results of the empirical observations. A questionnaire offers a research instrument consisting of a series of questions and other prompts, and the further numerically processed responses to these questions can be regarded as the measurement of the empirical observations (Robson, 2002). The quantitative data derived from the empirical observations can then be analyzed statistically and may yield unbiased results that can be generalized to some larger population.

Questionnaires are the most frequently used method in survey research for collecting quantitative data. According to Robson (2002), questionnaire surveys can provide a relatively simple and straightforward approach to the study of attitudes, values, beliefs and motives, and they may be adapted to collect generalisable information from almost any human population. Because of these advantages brought by questionnaires, this research is able to obtain data from a large number of final year university students within a relatively short time. As the questionnaires of this present survey are designed to be self-completed online by respondents, the absence of direct researcher involvement in the data collection removes some aspects of bias. Although bias cannot be entirely overcome simply by reducing contact, questionnaire survey help maintaining a distance between this researcher and the respondents so that bias and “contamination” by this researcher is kept to a

minimum. In addition, the survey conducted by this research is highly structured and have high amounts of standardisation and therefore reliability and validity can be tested (Robson, 2002).

One of the major purposes of the positivist position is to generalize the statistically tested results to a larger population (Creswell, 2008). This positivist-deductive approach suggests that theories should be generated in the first place and then tested by empirical observations from in which advanced statistical analysis can be used in order to generate the findings (Creswell, 2008). Structural Equation Modeling (SEM) fits the positivist-deductive approach very well. SEM requires that researchers firstly formulate theory by setting measurement or structural models. Secondly, researchers are required to collect actual data. Thirdly, the actual data is then processed by computer program and matrices are produced and compared with the matrices estimated by the measurement or the structural model (Hair, et al., 2010). If the differences between the actual and estimated matrices are not significant, then the models (theories) can be tentatively accepted as they fit the actual observations very well. If the differences are significant, then the models (theories) are disproved and the researcher is expected to reject the theory and replace it with newly formulated theories that should be tested with a new round of empirical observations. The section below explains why Structural Equation Modeling is compatible with the critical realist perspective.

4.2.3 Structural Equation Modeling (SEM) and Critical Realism

The retroductive research strategy based on critical realism was used to inquire why some university students in China developed EI. The question calls for a causal explanatory methodology in which the objective is to explain rather than to describe or deconstruct entrepreneurial career choice. This study investigates the causal links between characteristics of university graduates' social network, their cognitive properties, and the development of their EI in an attempt to establish and empirically test a theoretical framework that can explain why some graduates but not others choose to be entrepreneurs.

The way in which the knowledge about this causal link is generated was explained earlier in this chapter. The argument is that the knowledge generated is tentative; it may closely approximate the theory underlying the relationships between constructs but it cannot reveal the true nature of the relationships. The knowledge produced is a conjecture which is fallible and open to refutation.

SEM requires that the researcher has a strong theoretical basis for specification of the measurement and structural models, the modifications to the proposed relationships, and many other aspects of estimating a model (Blunch, 2008, Hair et al., 2010). So, only after sound theories regarding the generation of EI is built can SEM be used to confirm the theory. SEM is guided more by theory than by empirical results. A theory is a number of hypothesized connections among conceptually defined variables (Blunch, 2008). Some of the concepts in a theory cannot be measured directly, they are measured by indicators. The indicator variables that can be directly measured are called manifest variable and those that cannot are called latent variables in SEM. Before a model can be verified, the concept must be defined both conceptually and operationally. SEM uses the measurement model to describe the connections between the latent variables and their manifest indicators and the structural model describing the causal connections among the latent variables. The measurement and structural model for this research will be presented in Chapter 5.

It can be seen that SEM is dedicated to investigate the relationships between variables, which satisfy this research's attempt to identify causal relationships. However, SEM can never prove a causal relationship, though it can render it probable. Four conditions should be satisfied to identify causal relationships: temporal sequence, covariance of events, not spurious relations, and theoretical support (Hair et al., 2010). SEM can provide evidence of systematic covariation and can help in demonstrating that a relationship is not spurious. If longitudinal study is designed, SEM can also provide evidence of temporal sequence. But a causal connection should be based on substantiated theoretical arguments. Though this research proposes a theory to explain graduate EI, many other theories exist. Causation as a force from cause to effect can never be directly observed. SEM can provide information on the extent to which the model fits with the data, but it cannot say that the model is the only

correct one. But that is enough, which means a theory can be proposed and it is proved that the data does not refute it. Social structures or mechanism exist out there, but to know this mechanism is a social practice.

With the philosophical stance of the research explicated (this study positioned itself on critical realism perspective), the methodological issues discussed (this study conducted a quantitative research using questionnaire survey to collect data, and the SEM was used to establish and test the theories), a researcher should then come to the issues regarding data, sample size, sampling methods, measures, analytical tools and techniques to be used (Benton and Craib, 2001; Blaikie, 2007; Creswell, 2008).

4.3 Methods for the Survey

This research conducted a pilot and a formal questionnaire survey to collect primary data in order to provide measurement for the variables presented in the theoretical model shown in Chapter 3. To ensure the reliability and validity of the measurement, issues such as sample size and sampling methods should be closely evaluated and justified (Bryman and Cramer, 2009). Using stratified random sampling methods, the formal survey collected 625 valid questionnaires. The use of question items tested in the prior research may increase the reliability and validity of the measurement (Burns and Burns, 2008). As such, this section explains how the question items were derived from the previous research, the data sources, sample size, etc., along with design of the pilot study, as well as the formal survey. The analytical techniques are disclosed in the final part of this section.

4.3.1 Data Sources

Secondary data is used in the process of the critical evaluation of competing theories explaining who choose to be entrepreneurs as well as in the process of establishing my own theoretical framework from a social cognitive perspective to find causal links between characteristics of one's social network, cognitive properties, and EI. The measuring scales for the research were designed with reference to prior research. The secondary data mainly includes research reports or articles published in the high-standard academic journals in the focal research area including Strategic Entrepreneurship Journal, Entrepreneurship Theory and Practice, Journal of Business Venturing, Organizational Studies, Academy of Management Review and Academy of Management Journal. The researcher used systematic review methods proposed by Tranfield et al. (2003) to search such data bases as Web of Knowledge, Business Source Premier by following the ten-step systematic review process.

After the research model is designed, primary data is needed for analysis to test the theory. Concepts involved in the model were operationalized and measured using a 5-point Likert scale. SEM is used in analyzing the covariance of these constructs to examine whether the characteristics of one's social network directly influence one's EI or indirectly with cognitive properties playing a mediating role.

4.3.2 Sample Size

The data collection in the formal survey targeted a large sample size, and hence distributed the questionnaires to a total number of 1200 potential participants. It was promising that a total number of 625 valid questionnaires were collected and used for the analysis. Given a standard requirement of a response rate as 45%-50%, the data collections, in effect,

exceeded the basic rate required for social science research of fieldwork (Yu and Cooper, 1983; Ozgen and Baron, 2007).

Before deciding how many samples might be chosen, it is necessary to decide the sample size which is related to sampling method. However, the appropriate sample size is determined by many factors including: time and resource constraints, the precision required, problem of non-response, and the kind of analysis (Bryman and Cramer, 2009). This section will first deal with the last two factors (precision and analysis method) from the statistical perspective before going on to discuss the practical effects that problems of survey methods (constraints and non-response) has on sample size decision. Finally, the question of sampling method will be addressed. The reliability and validity of the questionnaire could be evaluated by following the above steps.

Statistically, sample size is related to the significance level chosen, effect size, and power (Burns and Burns, 2008). Firstly, the selection of the cut-off point of significance level is directly related to the possibility that our hypotheses testing results might be erroneous (Burns and Burns, 2008). High significance level reduces the chance of a type I error. However, lowering the amount of acceptable type I errors increases the chance of type II errors. Type I errors occur when the true null hypothesis is rejected, and type II errors occur when the false null hypothesis is retained. The null hypotheses for this research are that the characteristics of an individual's social network are not related to cognitive bias, or cognitive biases are not related to entrepreneurial intentions. If a type I error occurs, the policy implication is that governments should interfere when it is not necessary. If a type II error occurs, governments will ignore the effects of relevant factors on EI when intervention and action are necessary. Since government policies have already ignored these factors and the policy effects are not satisfying at present, governments face higher risks if choosing not to act. So type II errors need to be strictly curbed. As such, this research will choose 5% as the cut-off point to allow acceptable level of both type I and type II errors.

Secondly, sample size is also related to effect size. Significance in this study means no more than whether cognitive bias or characteristics of network (IV) have effects on EI (DV), while the strength of the relationship between the IV and DV is measured by effect size, in this case, the correlation coefficients. Even a small correlation can be statistically significant given a large enough sample. All things being equal, if a small sample reaches the significance level, that significance must be due to large size effects. As revealed by many of the articles reviewed on this topic, it was found that their correlation coefficients tend to be around 0.20, for example, Simon et al. (2000), Van Auken et al. (2006), Ozgen and Baron (2007), De Carolis et al. (2009), Zhao et al. (2010). If sample size is too large, correlations can be significant but have no substantive meaning.

Thirdly, the power of the hypotheses tests of this study, or the possibility that the test will correctly reject false null hypotheses, requires an increase in the sample size (Burns and Burns, 2008). As a result, the study should have a large enough sample size to be sensitive to relationships between cognitive biases and EI, but not so large as to produce significant but trivial results. Burns and Burns (2008) cited Cohen's (1992) suggested sample size table with different level of power and effect size. According to the review of previous findings, the effect size are more often to be around $r = 0.20$. Therefore according to the table, if this research seeks a 0.80 power level, then the sample size should be 195, and if the power level is set at 0.90, the sample size should be 260. Since the research is more susceptible to type II errors, higher power level is preferred. As a result, 260 was set as the minimum valid questionnaire that the formal survey should collect.

The sample size is also consistent with the major research conducted in the study area. The researcher carefully examined the sampling issues described in 16 published studies that used the survey method, cross sectional data and quantitative analysis to investigate either the relationship between social capital, cognitive biases, and entrepreneurial intentions or differences among samples with regard to the alluded variables. The results are presented in Appendix 1. It would seem that 50% of the reviewed studies have a sample size between 200 and 400. In addition, more samples may lead to more convincing results. The research plan therefore included the intent to analyze primary data from about 600 cases.

If about 600 valid cases are needed for rigorous statistical analysis, the number of samples to be chosen should be much larger than 600 depending on the response rate. Over 30% percent of the articles reviewed did not report the response rate (see appendix 1). But those studies with high response rates were conducted among researchers' close relationships, e.g. the samples are their current students, such as the survey conducted by Simon et al. (2000). Yu and Cooper (1983) found an average response rate for questionnaires is 48.8%. However, Ozgen and Baron (2007) suggested that the response rate for research based on internet surveys are typically below 10%.

According to Yu and Cooper (1983), sampling methods have effects on response rate, but mediated by nature of the population, methods of contacts, questionnaire length, and monetary incentives. The research employed random sampling methods. The circumstances of the research population, final year undergraduate students in Wuhan University, could have compromised data collection because the students are busy writing dissertations and searching for jobs, making them less accessible. So the researcher uploaded the questionnaire to a web survey site (surveymonkey.com) and sent emails to samples selected with a link to the web questionnaire. Through a joint effort, this study aimed to reach a response rate of 45-50%. Therefore, to get 600 valid cases in the formal survey, the number of samples to be contacted should be approximately 1200.

4.3.3 Sampling Procedures and Approach

This research conducted a pilot survey and a formal survey. The procedures for drawing the sample for the pilot study and the main study are described in this section.

4.3.3.1 Sampling Procedures for the Pilot Study

The critical reasoning to the pilot study is as the follows. First, this study has designed the construct measures, which have a great degree of specificity in the entrepreneurship domain with reference to prior well-performed scales published in highly regarded academic journals. When measures are taken from various sources, some type of pretest or pilot study should be performed using respondents similar to those from the population to be studied so as to screen items for appropriateness (Hair et al., 2010). Second, the pilot study enable research to check the reliability and validity of the measures (variables), measurement scales, and foal sample validity and understanding to the design of the questionnaires.

A convenient sampling method is used in the pilot study to draw samples because of their convenient accessibility. However, the pilot study also takes the representativeness of the samples into consideration by trying to select final year undergraduate students dispersed in various disciplinary courses or programmes. With the help of an academic colleague in one of universities in Wuhan, using snowball sampling methods, I distributed questionnaires via emails to 106 final year undergraduate students in that university who had diverse disciplinary backgrounds (studying in different fields). In total, 83 of the 106 questionnaires were completed correctly and were therefore valid. At this stage, the study employed factor analysis to test the sets of data. According to Burns and Burns (2008), when conducting a factor analysis, the sample size should be at least 5 times as much as the number of question items used to measure a factor. As described in Figure 4.2, each factor is measured by at most 6 variables. So, the sample size of the pilot study is sufficient for a factor analysis. The test procedures and outputs significantly contributed to the further questionnaire adjustment and guided the formal survey. The results of the pilot study are presented in section 4.6.

4.3.3.2 Sampling Procedures for the Formal Survey

The formal survey employed larger sample size with both techniques of random sampling and stratified sampling, in order to enhance the data validity. To enhance the data validity, the survey study also used the continuous approach to data collection across the Spring to Summer, which explain how the study extended the sample size. More importantly, the formal survey enable the study to seek insight, building upon the pilot study, given the literature suggests that strong tests require either repeated measurements, or the manipulation of one projected reason that may be subsequently linked to another (Bono and McNamara 2011).

“The ultimate test of a sample design is how well it represents the characteristics of the population it purports to represent” (Cooper and Schindler, 2008: pp: 181). The validity of a sample can be examined by two criteria: accuracy and precision. Precision criterion suggests that sampling error should consist of random fluctuations only. The precision of a sample mainly involves the decisions about the sample size. The previous section has justified the sample size of the formal survey, and this section mainly discusses the problem of accuracy in order to justify the validity of the sampling procedure followed by this research. Accuracy is the degree to which bias is absent from the sample. The rest of this section examines the problem of accuracy and the validity of the sample design from four aspects.

According to Cooper and Schindler (2008), during the process of designing a sample, a researcher has to make decisions from aspects such as defining relevant population, selecting sample type (non-probability or probability), and selecting the sampling techniques, and determining sampling frame rules. The first aspect involves the definition of the population for this study. A population is the total collection of elements about which we wish to make some inference (Cooper and Schindler, 2008). The definition of the population is apparent from the research problem of this present study. The population of the formal survey is the final-year undergraduate students (from Sept, 2010 to July, 2011) of Wuhan University, China. The use of students as study population in EI is very

common among scholars in this field (see appendix: about 60% of 16 studies chose students as samples). According to its official statistics, Wuhan University has over 10,000 final-year undergraduate students who face immediate career choice in the Spring and Summer 2011.

The second aspect regarding sample design decisions is related to whether to choose a probability or non-probability sample. The formal survey chooses a random selected sample. Unlike non-probability sampling which is arbitrary and subjective, probability sampling follows an objective and controlled procedure that assures that each population element is given a known nonzero chance of selection (Cooper and Schindler, 2008). The objective nature of probability sampling complies with the philosophical and methodological foundations that this research is based on. And the controlled procedure ensures that this researcher cannot modify the selections made, and that only the selected elements from the original sampling frame are included, thus overcoming certain bias caused by arbitrary and subjective samples. As such, the choice of random sample by the formal survey helps to increase the accuracy through reducing the bias that is present in the sample, thus pushing up the validity of the sample.

The third consideration about sample design is the selection of sampling techniques, which depends on the requirements of this research project, its objectives, and the funds available. As it is based on objective philosophical underpinnings and the collection of quantitative data for statistical analysis, the formal survey chose a probability sampling technique that ensure each population element has known and equal chance of selection so as to increase the accuracy of the sample and thus improving the validity of the sample. A stratified sampling technique is employed but its justification is presented after the sampling frame rules are discussed. At each stratum, simple random sampling techniques and a table of random numbers are employed to accomplish the process of selecting the random sample.

The fourth consideration about the sample design involves determining sampling frame rules. The sampling frame is the list of elements from which the sample is actually drawn.

Although there may be a complete and correct population members list that can be generated from the registrar data-bases of the university, as this research is self-funded, this researcher has no authority to access this data base. In addition, as the number of members of the population is very large, if simple random sampling techniques are applied directly on the lists containing over 10000 students from numerous programs (major), students from certain programs might be underrepresented or overrepresented, thus making the sampling frame for this study less representative of the population.

To avoid this problem, the program (major) of the students should be taken into consideration to ensure that students with different majors have an equal probability of being selected in the sample. As such, the formal survey segregates the population into several mutually exclusive strata that are divided by the programs that the students have enrolled on. Although this research does not study the impact of different majors on the formation of EI, some of the previous research argues that different education background may correlate well with students' entrepreneurial career choice (Reynolds, 1997; Prodan and Drnovsek, 2010), so stratification may increase the representativeness of the sample. By stratifying students into programs, this research ensures that students in each stratum is homogeneous internally and heterogeneous with other strata. Thus, the objective is to maximize the difference among strata means and minimize the within-stratum variance for the EI variable and the seven latent variables that have an influence on it. If each program stratum has an equal probability of being selected, then the validity of this sample design will be improved.

As programs are offered by departments, and departments are affiliated to schools, and it is the schools that form the university, departments and schools should be randomly selected at first to ensure that every program in the university has an equal chance of being selected. As such, the formal survey designed a four-step sampling method. The official website of Wuhan University shows that there are 38 schools within the university. Each school has at least two departments and each department has at least three programs for undergraduate students. The information of the schools, departments, and programs are publicly available and listed on the website of the university and each of its 38 Schools. The first step is to

randomly select ten out of thirty eight schools. The second step is to select at random two departments from each selected school. The third step is to choose randomly 3 programs from each selected department. The last step is to choose randomly 20 students that enrolled for each of the selected program. A simple random sample is taken at each step with the help of a random table. Through these four steps of random sampling, a sample of 120 students per school and a total sample of 1200 students were selected for contacts and questionnaire distribution.

4.4 Measures

Three sets of constructs should be measured according to the theoretical model proposed for this research and the hypotheses posed. The first set comprises only one construct: Entrepreneurial Intention (EI). The second set contains three constructs that are used to represent cognitive bias including: Overconfidence (OC), Illusion of Control (IC), and Representativeness (RE). The third set includes four constructs that are employed to indicate dimensions of an individual's social network properties in terms of social capital: Experience Breadth (EB), Intensity of Prior Interactions with entrepreneurs in an individual's social network (IPI), Experience Positivity (EP), and Network Support (NS). This research proposes that variables about social network properties and cognitive bias variables can directly influence the EI variable, and social network property variables can indirectly impact on EI variable through the mediation of cognitive bias variable. Before the dependence relationships among them can be analyzed statistically, these eight constructs should be capable of measurement. Reliable and valid measures should be used in the formal survey, but these measures should first go through a pilot study to test and assure their reliability and validity. The measures used in the pilot study are described below. The items and scales on these items are presented in Appendix 2. The survey was carried out in the Chinese language and so the entire questionnaire was firstly developed in Chinese and then each instrument with all the question items was translated into the English language and English formatting is used. In the end, both versions of the

questionnaires were checked to ensure there is a good match in terms of meaning and constructs.

4.4.1 Entrepreneurial Intentions (EI)

There is a debate on the measure of Entrepreneurial Intentions (EI) and scholars disagree on the current definitions of EI. Thus, different scales have been designed containing items asking for different dimensions of EI. For example, Baughn et al. (2006) assessed the desirability and feasibility of starting one's own business. Carr and Sequeira (2007) measured behavioral dimension of EI by asking whether respondents have carried out six activities necessary for creating a new business. Zhao et al. (2005) assess EI by asking respondents how interested they were in engaging in prototypical entrepreneurial activities in the next 5 to 10 years. Although the research disagrees on the makeup of the scale (instrument), they do agree that more than one item is needed to measure the construct. However, other scholars even assess EI using just one item. For more examples, in assessing EI, Van Auken et al. (2006) directly ask students to rate the extent to which they want to own a business in the future. Krueger et al. (2000) asked a yes or no question "*Do you think you'll ever start a business?*" in measuring EI. As such, before measuring EI, a clear definition should be in place.

Given the above debates, this research argues that EI is a phase of the entrepreneurial gestation and includes a series of actions that are backed by an entrepreneurially friendly attitude. Therefore, a multi-item measurement scale (or instrument) is more accurate in measuring the extent to which an individual has EI. The argument finds support in Thompson's (2009) study, which has developed a more reliable and international applicable EI measurement scale with a Cronbach's alpha coefficient of 0.89. In order to further validate the scale, this research design, additionally uses both exploratory and confirmatory factor analyses, which can strongly support the unidimensionality of the scale.

Overall, the EI in this research analysis uses Thompson's (2009) EI measurement scale which contains 6 items, as follows. Thinking of yourself, how true or untrue is that of you: intend to set up a company in the future, never search for business start-up opportunities, are saving money to start a business, read books on how to set up a firm, have plans to launch your own business, spend time learning about starting a firm. The measures use Likert 5-point scale with answers ranging from "very untrue" to "very true".

4.4.2 Overconfidence (OC)

Overconfidence is a variable defined for evaluating if one may overestimate his/her knowledge, skills, and ability with regard to the creation of a new business (Simon et al., 2000; Hayward et al., 2006; Koellinger et al., 2007; Townsend et al., 2010). If an individual has high self-efficacy, it could imply that he or she is overconfident. According to McGee et al., (2009), self-efficacy refers to "*an individual's belief in their personal capability to accomplish a job or a specific set of tasks*". As such, scholars often use self-efficacy as a proxy in measuring overconfidence (Koellinger et al., 2007; Townsend et al., 2010; Trevelyan, 2008). A high score in self-efficacy indicates a higher score in self-confidence. However, when assessing self-efficacy in entrepreneurial context, McGee et al. (2009) found that some scholars use general scales while other scholars use entrepreneurial specific scales. The argument for using general scales are that entrepreneurs need a variety of skill sets, which makes it "*too difficult to identify a comprehensive, yet parsimonious, list of specific tasks explicitly associated with entrepreneurial activities*" (McGee et al., 2009). This argument ignores the fact that entrepreneurial activities are context dependent (Mitchell et al., 2007), i.e. individuals under different social context may act differently. An individual might be confident in something that they think they are more familiar with, i.e., confidence is context specific (Trevelyan, 2008). Therefore, entrepreneurial specific self-efficacy scales may have stronger predictive power than general ones. As such, this research will use the former one.

Both unidimensional and multi-dimensional scales may be used to evaluate overconfidence or self-efficacy. For example, Tominc and Rebernik (2007) used one question in assessing entrepreneur's confidence: "*do you have the knowledge, skills, and experience required to start a new business*". Unidimensional scale ignored the multi-dimensional nature of entrepreneurial activities and harms the reliability of the scale, so scholars are increasingly using multi-dimensional scales (Zhao et al., 2005; McGee et al., 2009). Entrepreneurial process includes four phases of activities, i.e. searching, planning, marshalling, and implementing (Mueller and Goic, 2003). Accordingly, it is reasonable to measure overconfidence with regard to respondent's estimation of their ability in these four kinds of activities.

This research refers to the self-efficacy scale developed by McGee et al. (2009) by asking how much confidence the subjects have in their ability to engage in entrepreneurial tasks: design a product or service that will satisfy customer needs and wants, determine a competitive price for a new product or service, network, and manage finance for the business. Likert 5-point scale will be used with a range from "not at all" to "very much".

4.4.3 Illusion of Control (IC)

As argued in the extant literature, it is possible that an individual may have high confidence with regard to his entrepreneurial ability, yet be very careful in judging whether these abilities leads to success since dynamic and complex environmental factors are at play. Thus, one can construct overconfidence by emphasizing one's overestimation about his current entrepreneurial ability, while the construct of illusion of control focuses on

one's certainty in their ability to master and predict difficult-to-control, future business event (Simon et al., 2000). In this sense, the degree of illusion of control is assessed by the extent to which an individual wrongly believes that he or she can accurately predict and control future business events, as Simon et al. (2000) have revealed, the problem in the literature shows that potential entrepreneurs often make inaccurate predictions about the timing of the competitive entry, overestimate their ability to fend off competitors, and falsely believe that they can develop technology that others cannot readily copy. Further, Townsend et al. (2010) used an item that ask respondent to rate the possibility that their business would be in operation in five years so as to assess the respondents' prediction of the outcome of the proposed new business.

Building on the above arguments, this research design intends to overcome the problem and biases in the analysis, it hence has developed six items of questions to assess the 'illusion of control', as follows. For instance, the question asks, to indicate, under what circumstance (or at what kind of situation) you may create a new business, and please tick the level of the possibility that the venture business will be successfully in operation in 5 years; then, please predict as accurately as possible the total market demand for the product or service; you can accurately predict when larger competitors would enter the market; succeed at making this venture a success, even though many other managers will fail, you can successfully fend off competitors, you can develop a technology that others cannot readily copy. Likert 5-point scale will be used ranging from very low possibility to very high possibility.

4.4.4 Representativeness (RE)

Representativeness is a variable used to identify the extent to which an individual can generalize about a person or a phenomenon based on only a few observations of a specific phenomenon (Busenitz and Barney, 1997). This construct will also be assessed based on various real-to-life strategic decisions scenarios to be given to the respondents. Two

scenarios will be provided with each containing two competing alternatives, one of which favors decisions based on statistical information and the other endorse heuristic reasoning. Scenario one is about a machine purchase decision and scenario two describes an automation upgrade decision. These two scenarios were both used by Busenitz and Barney (1997) in assessing the respondents' representativeness and are slightly modified to fit for this research's subjects.

Respondents were expected to choose one alternative out of the two in each scenario and describe the reasoning for the choice. Therefore, each scenario contains a closed question (to specify the choice) and an open question (to explain the reason for the choice). The answers to the open question will then be content analyzed. If a respondent does not mention any statistical reasoning and resorts to subjective opinions or simple rules of thumb in his or her answer, then the response will be assigned a mark of "1". A mark of "0" is given for responses that contained some form of statistical reasoning. According to above rules, if a response cannot be clearly marked as 0 or 1, then the response will be omitted from the analysis. This present researcher then sums the marks that each respondent obtains from the two scenarios. If a respondent gets a sum of "0", then the respondent is regarded as having used statistical reasoning across both scenarios. If a respondent gets a sum of "2", then it indicates that the respondent has used heuristic reasoning. The nominal data is transferred to scale data using this coding method.

4.4.5 Experience Breadth (EB)

Entrepreneurial experience breadth identifies how extensively an individual is exposed to the entrepreneurial experiences in his social network. Carr and Sequeira (2007) assessed prior family business exposure by asking whether respondent's parent or other family members have ever owned a business and whether respondents ever worked in these businesses. Krueger et al. (2000) proposed four likely sources of exposure: one's family business, a business started by another relative or friend, working in someone else's small

business, starting one's own business. This research planned to investigate a respondent's exposure to entrepreneurial experiences in his social network which can be classified as strong ties and weak ties that includes people with different relationship with an individual. Therefore, this research will use 9 yes/no questions to ask whether a respondent's 9 different social ties ever started a business. In addition, two questions will be asked about respondent's participation in the new business, with one asking whether the respondent ever worked for a small or new company, and the other asking whether the respondent ever started a business. If a respondent says yes to a question, it will be coded 1 otherwise 0.

4.4.6 Intensity of Prior Interactions with Entrepreneurs in an Individual's Social Network (IPI)

IPI refers to the depth of communication between respondents and the entrepreneur in their social networks. According to Krueger (2000) and Van Auken et al. (2006), the interaction between entrepreneurial role model and respondents can influence respondent's entrepreneurial intentions. Van Auken et al. (2006) developed from literature and empirically tested 20 activities that have an effect on EI. By factor analysis, 17 activities are significant and reduced to 6 groups: personal involvement, professional involvement, mentoring, employment, observation, discussions. The present research designed 6 questions derived from Van Auken et al. (2006) measuring the experience intensity. A typical question is: Did anybody in your social network who once started a new business ever (1) take you to work with them when you were ten years old or younger, (2) encourage you to know their colleagues, (3) teach you about managing a business? Each question includes an average of 3 yes or no sub-questions. A sub-question will be coded 0 if the answer is "no", and 1 for "yes". The points for each sub-question will be summated to get a mark for each question. The highest mark for each question is 4 and lowest is 0. One question asked 4 activities (sub-question) and if a respondent selects "yes" to all these 4, this question will get 4 points. However, respondents may have no such interactions described by a question, thus getting 0 points for that question. Altogether there are 6 questions covering 17 activities.

4.4.7 The Experience Positivity of Entrepreneurs in an Individual's Social Network (EP)

Experience positivity (EP) measures the extent to which respondents feel positive toward entrepreneurial experience in their social network. Scholars have designed scales to measure similar construct such as exposure quality. For example, Krueger et al. (2000) asked the respondents to rate each type of experience that the subject had been exposed to as positive or negative to measure the quality of entrepreneurial exposure. This research argue that respondents' subjective evaluations of the performance of the entrepreneurs in their social network are good indicators for this construct. Scherer et al. (1989, pp: 60) measured the subjects' subjective evaluation of their role model performances from three perspectives: *“the respondent's perception of the parent entrepreneur in terms of making the business profitable, satisfaction with the work itself, and satisfying different constituencies of the business”*. Referring to these items, this research designed questions as follows. Among the people in your social network that started a new business, considering the ones that have influenced you most, how do you feel the extent to which they are successful in the following aspects: making business profitable, satisfaction with the work, satisfying customers, satisfying employees, and comfortable life styles? Likert 5-point scale will be used ranging from extremely unsuccessful to extremely successful.

4.4.8 Network Support (NS)

Network support refers to whether respondents' network ties support them to start a new business. Some research only consider emotional support subjects received from their social ties to starting a business (Carr and Sequeira, 2007), other research regard support and helpfulness as two separate constructs (Sequeira et al., 2007). However, Baughn et al. (2006) designed a six-item scale to assess support for entrepreneurial activity available from family and friends. The assessment items measured three aspects of support: whether

the respondent's family and friends will join him/her if the respondent starts up a new venture, whether they feel positive or negative toward the respondent's start-up, and whether they are willing to offer help if necessary during the respondent's entrepreneurial process. This research supports Baughn's et al. (2006) multi-dimensional items in measuring network support. Typical questions include: how does your parent feel about you starting a business. Likert 5 point scale will be used ranging from extremely negative to extremely positive. The questions cover all the three dimension of network support as mentioned above. With regard to each dimension, the scale asks the extent to which 8 different relationships will support respondents. If a respondent choose either "extremely positive (agree)" or "slightly positive (agree)" for a particular relationship category (e.g. parent), then that category of relationship will be assigned "1" as supportive. If a respondent choose "neutral", "extremely negative (disagree)", or "slightly negative (disagree)" for a particular relationship category, then that category of relationship will be assigned "0" as non-supportive. The "1" and "0" will be totaled across 8 categories of relationship yielding a composite "level of support" score for each dimension of three kinds of network support. Using this method, the maximum level of support achievable is 8 (all eight categories are supportive) for each dimension of network support. The minimum level of support is 0 if all eight categories are non-supportive.

4.4.9 Factor Variables and Parameter Estimates

To make an empirical investigation into the proposed measurement theory that specifies how sets of measured items represent a set of constructs as shown in the above sections and depicted in figure 4.2, this research examines estimates of the key relationships that link constructs to variables (factor loading estimates) and constructs to each other (construct correlations) so as to find ways of measuring concepts in a reliable and valid manner. The relationships that link constructs to variables are technically termed as relationship between latent and manifest variables in SEM. Section 4.4.9.1 discusses the latent and manifest relationships. The structural model expresses the structural theory,

which conceptually represents the dependence relationships between latent constructs. By an empirical examination of the structural parameter estimates (path estimates), a researcher can test the structural relationship between any two constructs. The dependent variables in SEM model are termed as endogenous variable and the variables that are not determined by factors within the model are termed as exogenous variables. Section 4.4.9.2 discusses endogenous and exogenous variables.

4.4.9.1 Latent and Manifest Variables

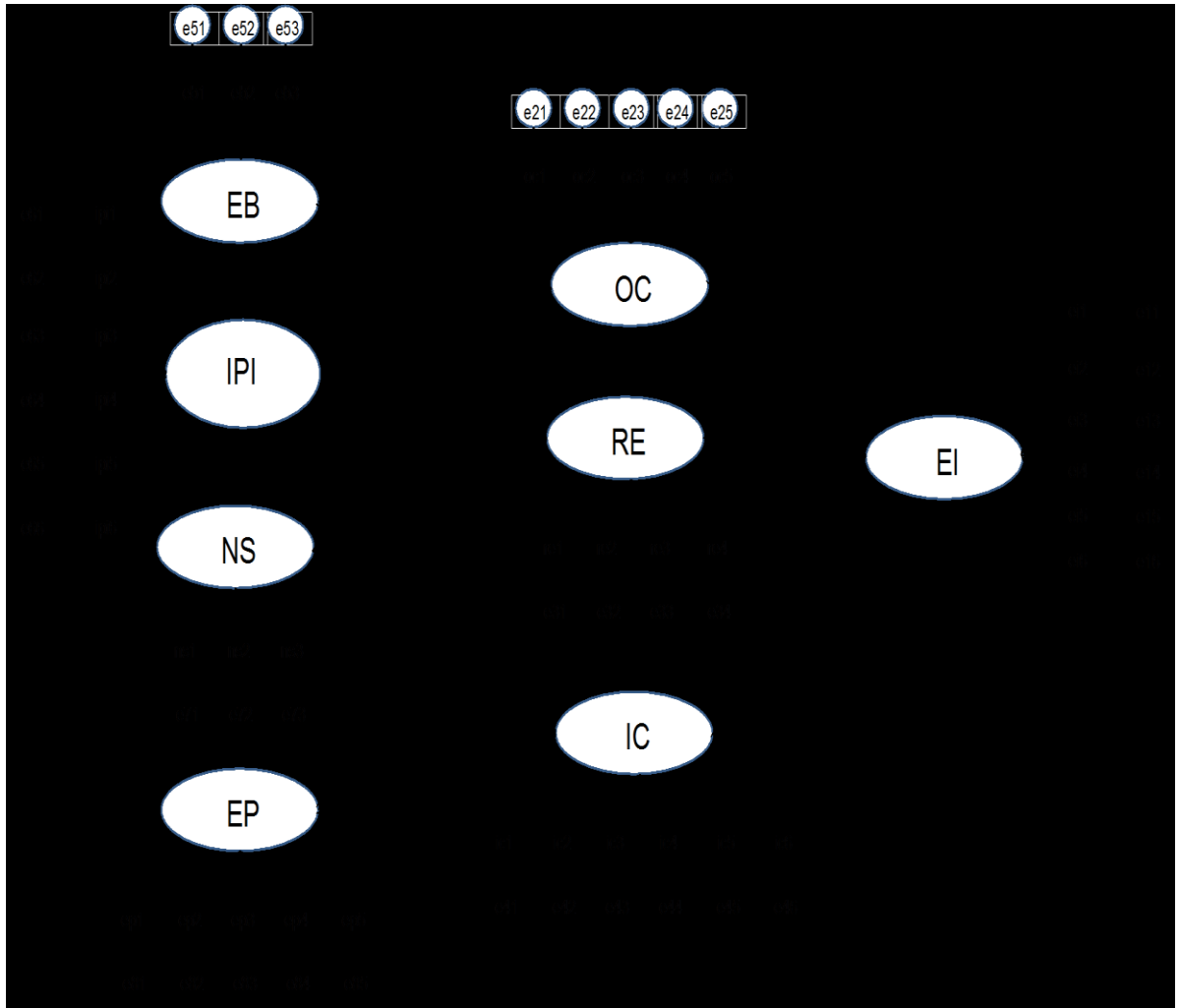
This research has invested much time and effort early in the research process to make sure the measurement quality will enable valid conclusions to be drawn, because how the researcher selects the items to measure each construct sets the foundation for the remainder of SEM analysis (Hair et al., 2010). This study first search the literature on individual constructs and identify previously well-performed scales published in academic studies. Individual constructs are then defined and operationalized with reference to previous research studies. As such, each of the above 8 sub-sections begins with a theoretical definition of the construct in question, providing the basis for selecting individual items that used to measure these individual constructs, thus each of the 8 constructs got operationalized. Defining individual constructs is the first stage of SEM, so, the above 8 sub-sections have fulfilled these tasks.

Constructs in SEM model are unobservable or latent factors represented by multiple observable or measurable variables. Those unobservable constructs in the model are often referred to as latent constructs or variable, and those observable or measurable variables are sometimes referred to as manifest variables, or indicators (Blunch, 2008; Hair, et al., 2010). According to these definitions, the eight constructs defined in the above sections are latent variables or constructs, including Entrepreneurial Intentions (EI), Overconfidence (OC), Illusion of Control (IC), Representativeness (RE), Experience Breadth (EB), Intensity of Prior Interactions (IPI), Experience Positivity (EP), and Network Support (NS). And the items selected to measure the individual latent constructs are manifest variables.

According to section 4.4.1, the latent construct EI is measured by 6 manifest variables including ei1-ei6. Similarly, latent variables OC, IC, RE, EB, IPI, EP, and NS are measured respectively by their corresponding manifest variables. The relationship between each latent construct and their manifest variables can be seen in Figure 4.2.

4.4.9.2 Endogenous and Exogenous Variables

SEM is a family of statistical models that seek to explain the relationship among multiple variables so as to examine the structure of interrelationships among constructs. Researchers use SEM to predict latent constructs with other latent constructs. Some constructs in a SEM model are determined by factors outside of the model thus these constructs act as independent variables in the model. These constructs are termed as exogenous constructs. And those constructs that are theoretically determined by factors within the model are referred to as endogenous constructs which act as dependent variables in the model (Hair et al., 2010). As such, the exogenous constructs in the SEM models in this research are the four social network constructs: EB, IPI, EP and NS, because they are not determined by the factors within the model. The three cognitive bias variables act as dependent variables in the relationship between social network variables and cognitive variables, but they act as independent variables in the relationship between cognitive variables and EI, so the three cognitive variables (OC, IC and RE) are endogenous constructs. The EI construct is also an endogenous construct that are determined by cognitive and social network variables. Based on the literature review and hypotheses of this research, Figure 4.2 portrayed the theoretical model to be tested by this research using a path diagram that employs specific conventions both for the latent constructs and measured variables towards the projected relationships among them.



(Note: Latent constructs are represented by ovals, which also present the exogenous and endogenous variables in their own positions to be determined by the structural relationships and manifest variables are presented in the squares.)

Figure 4.2 The Formal Predicted Model: Multiple Constructs and Relationships among All Parameter Variables

4.5 Analytical Tools and Techniques

“If a researcher can express a theory in terms of relationship among measured variables and latent constructs, then SEM will assess how well the theory fits reality as represented by the data” (Hair, et.al., 2010, pp: 653). As such, this research employs SEM as a set of

conceptually appealing tools and techniques to test the theories and models that have been developed in chapter 3. This thesis follows Hair et al. (2010) six-stage SEM decision process including: defining individual constructs (stage 1), developing overall measurement model (stage 2), designing a study to produce empirical results (stage 3), assessing the measurement model validity (stage 4), specifying the structural model (stage 5), and assessing structural model validity (stage 6). This section discusses the analytical tools and techniques used in each stage.

4.5.1 Stage 1: Defining Individual Constructs

As Figure 4.2 shows, there are eight elemental constructs, which comprise the measurement model. They are: Entrepreneurial Intentions (EI), Overconfidence (OC), Illusion of Control (IC), Representativeness (RE), Experience Breadth (EB), Intensity of Prior Interactions (IPI), Experience Positivity (EP), and Network Support (NS). This research critically reviews scales, as instruments, which have been developed by prior studies to measure constructs similar to those listed above. In this intention, Section 4.4 has critically analyzed the requirements of the operationalization of these constructs such as the number of items and dimensionality. Question items used by this research to measure a construct are not directly taken from a single prior study, but this research has integrated question items used to measure the same or similar construct in several relevant prior studies, so the construct measure of this study has a greater degree of specificity. Pretest should be performed under this condition as the scales developed are applied in specific context of this present research, but the methods for pretest are left for discussion in stage 3 in section 4.5.3

4.5.2 Stage 2: Developing and Specifying the Measurement Model

As indicated earlier, after the scales were specified, the measurement model can be specified, as it will be shown in what follows. This research represents the measurement model that specifies the process with a diagram as shown in Figure 4.2 and Figure 5.2 in which each latent construct to be included in the model is identified and the measured indicator variables (items) are assigned to latent constructs. Thus, the core tasks in stage 2 have also been completed. Though the specification of the measurement model can be a straightforward process, a researcher should consider such issues as the validity and unidimensionality of the constructs, the number of indicators used to measure each construct, and whether to regard measures as portraying or explaining the construct. Unidimensionality means that a set of measured variables can be explained by only one underlying construct (Hair, et al., 2010).

This enables the researcher to examine the factor loadings of each measured variable to ensure that each of them does not cross load on to two constructs so as to avoid the problem that a single indicator might be caused by more than one construct. Identification deals with whether enough information exists to identify a solution to a set of structural equations. Statistical identification suggests that each construct should be measured by three or four items (Hair, et al., 2010). This research follows this suggestion. The measurement model of this research is guided by a reflective measurement theory based on the idea that latent constructs causes measured variables, thus measures are considered as portraying the construct. For example, EI is believed to cause specific measured indicators, such as intending to set up a company in the future, searching for business start-up opportunities, saving money to start a business, and reading books on how to set up a firm.

4.5.3 Stage 3: Analysis Design for Empirical Results

Stage 3 involves research design and model estimation. Section 4.3 has discussed issues related to research design, such as type of data, sample size, and sampling procedures. Besides these general research design issues, SEM analysis has several unique issues including model structure, estimation technique, and computer program selected for the analysis. Path diagram is used to determine and communicate the theoretical model structure to the AMOS (Analysis of Moment Structure) program which is a module in SPSS and uses graphical interface for all functions, freeing researcher from writing tedious computer codes. The model parameters to be estimated are specified at this stage. Maximum likelihood estimation (MLE) is chosen as estimation method to identify estimates for each free parameters, because MLE is more efficient and unbiased when the assumption of multivariate normality is met and MLE has proven fairly robust to violations of the normality assumptions (Hair, et al., 2010).

The question items in the instruments for this research are taken from various sources, before the formal survey is conducted, the reliability and validity of the instruments should be tested by a pilot study. This paragraph discusses analytical tools and technique used in the pre-tests. Because exploratory factor analysis (EFA) can be used to explore and reduce data (Field, 2009), the pilot study used exploratory factor analysis to factor analyze the measured indicator variables assigned to the 8 latent constructs. Principal component analysis was used to extract factors on which question items should have over 0.7 loading. The factors extracted for each of the three groups of latent variables (characteristics of one's social network, one' cognitive properties, and EI) should explain more than 50% of the variance of each manifest variables (question items). The Cronbach alpha of each sub-scale should be at around 0.7 or above. Common factor analysis was used to provide results for comparison. Constructs and items that do not behave statistically as expected are to be refined or deleted to avoid the same issues when the final model is analyzed.

4.5.4 Stage 4: Assessing Measurement Model Validity

With the measurement model specified, sufficient data collected, and key decisions such as the estimation technique already made, this research then comes to the most fundamental event in SEM testing: assessing measurement model validity by establishing acceptable levels of goodness-of-fit (GOF) for the measurement model and finding specific evidence of construct validity. GOF indicates how well the specified model reproduces the observed covariance matrix among the indicator items. The covariance matrix of the observed variables is compared with the covariance matrix that is estimated. The null hypothesis is that the two matrices are not significantly different. Chi-Square statistics are calculated to test this hypothesis. Since Chi-Square value is sensitive to sample size, the results might be misleading, so a group of fit indices that are less sensitive to sample size such as CMIN/DF, CFI, RMSEA were used to judge the fit of theory with the data. The acceptable values are as follows when the sample size is more than 250 and the total indicator variables is bigger than 12 and less than 30: CMIN/DF < 3, GFI > 0.92, CFI > 0.92 and RMSEA < 0.07 (Hair et al., 2010, pp. 672). If the theory fits the data, the construct validity of the measurement scales would then be tested. The residual matrix and modification index are also examined to help make decisions in modifying the model.

4.5.5 Stage 5: Specifying the Structural Model

Stage 5 involves specifying the structural model by assigning relationships from one construct to another based on the proposed theoretical model. Chapter 3 has used dependence relationship type to represent structural hypotheses of the theoretical model that was established for this research. Based on the literature review, this research believes that there is a strong reason to suspect that three cognitive variables can influence the formation of EI, and four social network property variables can affect cognitive variables and EI. Based on the theory, the dependence relationships among eight constructs are assumed in the theoretical mode and accordingly 19 hypotheses were posed to represent

these assumed relationships. And each hypothesis represents a specific relationship that must be specified in the structural model, thus the structural model can be specified by this research.

4.5.6 Stage 6: Assessing the Structural Model Validity

The final stage involves efforts to test the validity of the structural model and its corresponding hypothesized theoretical relationships (e.g. 6 sets of hypotheses in this research). After the measurement model is validated and achieves acceptable model fit, this research shifts the attention to the test of the structural relationships. The overall fit of the structural model is tested by examining the $\Delta\chi^2$ value to see whether the hypothesized model which constrains some of the path between 8 latent variables fit as good as the saturated model (the measurement model). Other fit indices like CIM/DF, CFI, and RMSEA would also be used. Even if an acceptable overall model fit is established, alternative (competing models) are encouraged to support a model's superiority, which is in line with the critical realist philosophical foundation that this research stands on. Unlike testing the fit of the measurement model, that of the structural model emphasizes the estimated parameters for the structural relationships, because they provide direct empirical evidence relating to the hypothesized relationships depicted in the structural model. So this research carefully examines the regression weights of each of the hypothesized relationships between the eight constructs. In addition, the regression weights between characteristics of one's social network and EI (or the direct effect) are compared with the regression weights when adding in cognitive properties between characteristics of one's social network and EI to see whether cognitive properties play a mediating role.

4.6 Reliability and Validity

The justification of the validity of a research design should start from the research's ontological and epistemological assumptions, to such methodological issues such as the choice of qualitative or quantitative methodology, and the selection of survey, interview or other methods, to lower level methods issues such as sample size, sampling methods, and instruments designed to measure the constructs in the theoretical model (Creswell, 2008). This section summarizes the justifications presented in the various part of this chapter for the validity of research design at philosophical, methodological, and methods levels.

4.6.1 The Validity of the Research Design

Any valid research should build on a solid philosophical foundation. This research first critically evaluated and defended the choice of critical realism as its underlying research philosophy with reference to ontological and epistemological assumptions that prior studies take in the entrepreneurship domain. Critical realist holds that the world exists objectively out there and the world is stratified into three domains: real, actual, and empirical. Researchers can use retroductive methods to gain knowledge about these three domains. In line with this philosophy, this research argues that the mechanisms that can generate entrepreneurial intentions really exist and researchers can combine inductive and deductive strategy in the process of gaining knowledge about these mechanisms. After the researcher is fully aware of its philosophical foundations, to assure the validity of the research design, the research must now examine whether the choices of methodological issues at various level conform to the ontological and epistemological stance that the research takes. The compatibility between critical realism and the nature of quantitative methodology supports the validity of the research design for this present study. Questionnaires are the most frequently used method in survey research that collects quantitative data about attitudes, values, beliefs and motives from almost any human population. The absence of direct researcher involvement in the data collection helps to

keep bias and “contamination” by this researcher to a minimum. In addition, the survey conducted by this research is highly structured and have high amounts of standardisation and therefore reliability and validity can be tested.

For a questionnaire survey to be valid, a researcher must have a valid sample design. Validity of a sample depends on precision and accuracy. Considering such issues as significance level, effect size, and power, and the methods used in the data analysis, the sample size of the formal survey is set to be over 600 so as to improve the precision of estimate and randomize the sample thus improving validity of the sample design. Furthermore, this research uses probability sampling methods to improve the validity of the sample design. The objective nature of probability sampling is in accordance with this research’s philosophical and methodological foundations. And the controlled procedure in the probability sampling process ensures that the selections made cannot be modified, and that only the selected elements from the original sampling frame are included, thus overcoming certain bias caused by arbitrary and subjective sampling methods, resulting in an increase of the accuracy through reducing the bias that is present in the sample, thus pushing up the validity of sample design.

Consequently, the formal survey chooses stratified sampling methods, and at each stratum, simple random sampling techniques and a table of random numbers are employed to accomplish the process of selecting the random sample. If simple random sampling techniques are applied directly on the lists containing over 10000 students from numerous programs (major), students from certain programs might be underrepresented or overrepresented, thus making the sampling frame for this study less representative of the population. As such, the formal survey segregates the population into several mutually exclusive strata that are divided by the programs that the students have enrolled in. By stratifying students into programs, this research assures that students in each stratum is homogeneous internally and heterogeneous with other strata, thus maximizing the difference among strata means and minimizing the within-stratum variance for the EI variable and the seven latent variables that have influences on it. If each program stratum

has the equal probability to be selected, then the validity of this sample design will be improved.

For the research design to be valid, the reliability and validity of the measures must also be strictly scrutinized. With reference to prior well-performed scales published in academic studies, this study designs the construct measures which has a great degree of specificity. When measures are developed to measure the 8 latent constructs, some type of pretest should be performed to test the reliability and validity of the instruments. Latent constructs should be deleted from the theoretical model if they are unreliable. After the pilot study, a formal survey was conducted and 625 valid copies of questionnaire were collected. The results and analysis of the data collected in the pilot study (pre-test instruments) and the reliability and validity tests of the data collected from the formal survey are presented in this section before the results of the model analysis are presented in Chapter 5.

4.6.2 The Pre-Test Instruments

According to Field (2009) and Burns and Burns (2008), exploratory factor analysis can be used in the pre-tests so as to explore and reduce data before the formal survey. So, the pretest used exploratory factor analysis to factor analyze the variables (items in the questionnaire) designed to measure the eight latent variables. The results suggest that the latent variable *Representativeness* cannot pass the reliability tests and should be dropped. The results of this pilot study also suggest that variables used to measure *Experience Breadth* (EB) cross-load on variables used to measure EP, IPI, and NS, so the latent variable *Experience Breadth* should also be deleted.

As discussed earlier in this chapter, this study planned to measure the three dimensions of cognitive biases: overconfidence (OC), illusion of control (IC), and representativeness (RE). The three dimensions are measured by 5, 6 and 2 items respectively. Principal

Component Analysis (Burns and Burns, 2008) was planned to extract underlying structure for these 13 (5+6+2) variables during the pilot study. The reliability of the data should be examined before factor analysis. By observing the correlation between items, it is found that the 2 items used to measure RE are very low, most of them are below 0.20, and the correlation between the two items is 0.092. According to the basic assumptions of factor analysis, the variables used to measure the same factor should be highly correlated, and the correlation between variables used to measure different factor should be relatively lower. The results of correlations of these 13 variables suggest that the two items used to measure RE cannot be combined with any other items to form a factor and explained by this factor. The Cronbach alpha values of the sub-scale for OC, IC and RE are 0.808, 0.883, and 0.169 respectively. The Cronbach alpha for the 13 item scale measuring cognitive biases is 0.843, but if the two items for RE are deleted, the alpha value for the 11 items increases to 0.877.

Considering all these results, there might be two possibilities, first, the measuring scale for RE is not reliable. If this is the case, then as reliability is the necessary condition of validity, and no reliability means the absence of validity, so the two items should be deleted. Second, the two items represent two different dimensions of cognitive biases, so, the RE should be broken down into two dimensions, with each dimension measured by one item. If a latent variable is measured by one item, it may be more susceptible to errors. In addition, if SEM methods are used, one item may cause identification problem. As a result, these two items and the latent variable RE were deleted from the questionnaire used in the second stage of the pilot study. As such, cognitive biases in this research are expressed by two latent variables: overconfidence (OC) and illusion of control(IC), measured by 11 items.

At the stage of the model design, the characteristics of social network was planned to be measured by 15 items. The results of pilot data reveal that the Cronbach alpha for this scale is 0.773, the KMO value is 0.792, and the result of Bartlett test is significant, indicating that the data is suitable for factor analysis. The results show that the coefficients between five variables used to measure EP are very high, while these variables are not so highly correlated with other variables, indicating that these five factors may be explained by one

factor. Similar results exist among variables used to measure IPI and NS respectively. But the items used to measure EB are highly correlated with variables used to measure IPI and EP, but not so highly correlated with variables of NS. These results suggest that there exist possibly only three factors.

By a further examination, it is found that four components have eigenvalues of more than one. But considering that there are 15 variables, each eigenvalue can explain less than 6% percent of the total variances, and it may be safer to consider those components that can explain more than 10% of the total variance, or the eigenvalue of more than 1.5. Through both orthogonal and oblique rotations, variables used to measure EB cross load on EP and IPI, which might be caused by the effects of EW on both EP and IPI. As such, variables used to measure EB were deleted from the questionnaire used in the formal survey.

After the two latent variables (RE and EB) were deleted, using principal component analysis, six factors were extracted. They belong to higher order latent variables respectively: entrepreneurial intentions (including factor EI), cognitive biases (including two factors OC and IC), and social network properties of an individual (including three factors EP, IPI, and NS). Based on the principal of factor loadings and other considerations, the question items used to measure EI was reduced to three, coded as ei1, ei2, and ei3 respectively. The number of question items used to measure cognitive biases was reduced to six: coded as oc1, oc2, oc3, and ic1, ic2, ic3. The number of question items used to measure an individual's social network properties was reduced to 12, coded as ns1, ns2, ns3, and ipi1, ipi2, ipi3, ipi4, ipi5, and ep1, ep2, ep3, ep4. As such, 21 (3+6+12) question items (manifest variables) were left in the questionnaire for use in the formal survey. The subscale measuring each factor or dimension passed the reliability tests, with Cronbach alpha values between 0.7 and 0.9, indicating high reliability.

Originally the theoretical model as shown in Chapter 3 contained nineteen hypothesized relationships between eight latent variables. As the results of the pilot study suggest that RE cannot pass the reliability test and should be deleted, and the factor EB cannot be

successfully extracted from the variables used to measure the properties of one's social network. Eight hypotheses presented in Chapter 3 are related to RE and EB. Eleven hypotheses are not related to EB and RE and can be retained for further testing. A new number should be assigned to each retained hypothesized relationship in order to avoid the chaos in identifying these 11 remaining hypotheses. For ease of understanding, Table 4.1 below compares the old and the new number assigned to each hypothesis.

4.6.3 Testing Formal Survey Data

This section presents the results of the data reliability and validity using the scales in the formal survey. The reliability here refers to “*the consistency and stability of a score from a measurement scale*” and validity refers to “*the evidence that the measurement is actually measuring the intended construct*” (Chandler and Lyon, 2001, pp: 103).

4.6.3.1 Reliability Tests for Instruments Measuring EI, Cognitive Bias, and Social Network Characteristic

The reliability of the three sub-scales used to measure characteristics of social network, cognitive properties, and EI were tested respectively. As proposed by Field (2009), to test the reliability, this research examined the correlation between each item and the total score of its corresponding sub-scale from the questionnaire (*item-total correlation*), *Cronbach alpha if the item is deleted* and the overall *Cronbach alpha*.

Table 4.1 The Hypothesis ID *ex ante* and *ex post*

H. ID <i>ex ante</i>	H. ID <i>ex post</i>
H1a	H1a
H1b	H1b
H1c	dropped
H2a	dropped
H2b	dropped
H2c	dropped
H3a	H2a
H3b	H2b
H3c	dropped
H4a	H3a
H4b	H3b
H4c	dropped
H5a	H4a
H5b	H4b
H5c	dropped
H6a	dropped
H6b	H5a
H6c	H5b
H6d	H5c

In a reliability scale all items should correlate with the overall score from the scale. The value of *Item-total correlation* informs the analyzer which item does not correlate well with the overall scale and should be deleted. Field (2009) suggests that any of the *item-total correlation* values less than 0.3 indicates that a particular item does not correlate so perfectly with the scale overall and will have to be dropped. *Cronbach alpha if the item is deleted* tells us what the overall alpha value would be if that item is not included in the calculation. A reliable questionnaire requires that any one item does not greatly affect the overall questionnaire. If the value of *Cronbach alpha if the item is deleted* is substantially greater than the alpha value if the item is not deleted, then this means that the deletion of the item improves reliability. So, this statistic tells us which item would substantially affect reliability if it was deleted. *Cronbach alpha* is the most common measure of scale reliability that tests the split-half reliability. Theoretically, we can examine whether two people who are the same in terms of the construct being measured should get the same

score. In practice, we split the scale into two halves, and across all the respondents scores from the two halves should correlate perfectly. *Cronbach alpha* provides the correlation coefficient for each split to measure whether the two-halves correlate perfectly. So, the overall Cronbach alpha indicates the overall reliability of the scale.

The correlation between each item and the total score for EI scales are presented in the column labeled *corrected item-total correlation* in Table 4.2. For this statistic, all the data has good item-total correlations. It would seem from the column labeled *Cronbach's alpha if item deleted* whether any of the three items need to be deleted. The overall alpha is 0.767, and no value of alpha in this column is greater than 0.767, indicating no items needed to be deleted. According to Field (2009, pp: 675), “a value of .7 to .8 is an acceptable value for *Cronbach's alpha*; values substantially lower indicate an unreliable scale”. Thus, the EI scales may be considered reliable.

Table 4.2 The Item-total Statistics of the EI Scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ei1	6.84	2.561	.562	.729
ei2	6.69	2.124	.636	.646
ei3	6.57	2.303	.607	.679

It would seem from Table 4.3 that all items have good item-total correlation, all values are over 0.4. The overall Cronbach alpha is 0.762. If any item is deleted, the overall alpha value will drop. All these values indicate that cognitive biases scales may be considered as reliable.

Table 4.3 The Item-total Statistics of Cognitive Biases Scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ic1	13.98	10.497	.408	.750
ic2	14.08	9.813	.506	.727
ic3	13.68	10.239	.448	.741
oc1	14.42	8.975	.566	.709
oc2	14.32	8.955	.540	.717
oc3	14.44	9.032	.552	.713

The overall Cronbach alpha for social network characteristics is 0.845. The correlations between each item and the total score are all greater than 0.3. If any item is deleted, the overall Cronbach alpha becomes smaller. The data suggests that the scale may be considered as reliable. The data is presented in table 4.4.

Table 4.4 The Item-total Statistics of Social Network Scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ns1	38.589	38.701	.453	.839
ns2	38.542	38.614	.476	.837
ns3	38.811	39.022	.466	.837
ep1	38.555	41.779	.482	.836
ep2	38.571	41.893	.474	.837
ep3	38.485	41.593	.480	.836
ep4	38.517	41.571	.451	.837
ipi1	38.499	38.510	.515	.833
ipi2	38.266	38.612	.559	.830
ipi3	38.133	38.397	.623	.825
ipi4	38.256	38.925	.591	.828
ipi5	38.042	38.569	.590	.828

4.6.3.2 Validity Tests for Instruments Measuring EI, Cognitive Bias, Social Network Characteristic

There are several validation procedures: structural validity, content validity, substantive validity (Chandler and Lyon, 2001). Structural and content validities have been carefully considered during the stage of instrument development. All items used in the questionnaire had been used and tested by researchers in the field and these items are carefully matched to the construction of the theoretical model. The relevance and representativeness of the items are carefully considered when they are used to measure a construct. The substantive validity would be tested from two aspects: convergent and discriminant characteristics of the construct. Convergent validity requires that the items that are indicators of a specific construct should converge or share a high proportion of variance in common, while discriminant validity is the extent to which a construct is truly distinct from other constructs (Hair et al., 2010). Convergent and discriminant validity can be best examined by factor analysis (Field, 2009).

Before carrying out the factor analysis, the data should be explored to see whether it is suitable for factor analysis. Kaiser-Meyer-Okin (KMO) and Bartlett's test are the most commonly used checking tools before conducting a factor analysis. Kaiser-Meyer-Okin (KMO) measures the sample adequacy by comparing the magnitudes of the squared correlation between variables to the squared partial correlation between variables. Small values for KMO measures indicates that the sum of partial correlations is large relative to the sum of correlations thus suggesting the diffusion in the pattern of correlations hence a factor analysis of the variables is not a good idea. Large values for KMO measures indicates the patterns of correlations are relatively compact and so factor analysis should produce distinct and reliable factors. Before conducting a factor analysis, researchers should check whether the correlations between all the question items are high enough to suggest an underlying dimension thus a factor can be extracted from these items. If all items measure the same underlying dimension then they should correlate with each other, which can be observed in the item correlation matrix. If all the items are perfectly independent from one another, then the correlation matrix would be an identity matrix. Bartlett's test examine whether the correlation matrix is significantly different from an

identity matrix. If it is significant, then we can say that the item correlation matrix is significantly different from the identity matrix, indicating it is appropriate for factor analysis.

In the sample for the formal survey, the Kaiser-Meyer-Olkin tests for sample adequacy were 0.691, 0.746, and 0.861 for EI, cognitive biases, and social network characteristics respectively. And the values of Bartlett's sphericity tests for the three scales are highly significant ($p < 0.001$), indicating that correlation matrix is not an identity matrix. It may be seen from these statistics that the data are suitable for factor analysis. Unlike in other multivariate analysis, researchers using factor analysis should consider the selection of factor analysis methods, the number of factors to be extracted, and rotation methods.

As the purpose of the factor analysis conducted at this stage is to explore the structure underlying the data rather than test a specific hypothesis, compared with confirmatory factor analysis whose primary concern is to test the theories, principal component analysis and principal factor analysis are the more appropriate methods to meet the objectives of this study. The total variance of any variable can be divided into three types of variance: common variance, specific variance, and error variance. Principal component factor analysis considers the total variance and derives factors that contain small proportions of unique and error variance. In contrast, common factor analysis considers only the common variance based on the assumptions that both unique and error variance do not define the structure of the variables (Hair et al., 2010). As such, the primary objective of principal factor analysis is to reduce data while the primary concern of common factor analysis is to identify the latent dimensions represented in the original variables (Hair et al., 2010). This research chooses common factor analysis because it fits better with the objective of this study to find the latent dimensions represented in various questions items used to measure the characteristics of one's social network. Principal axis factor analysis is a type of common factor analysis that is suitable for data that are not normally distributed. Since the normality in items' distribution is not supported by the K-S test, the principal axis factorization is selected as the extraction method in this study.

The number of factor to be extracted can be determined before the factor analysis. The scales may be designed in accordance with the extant literature, with a set of designated

items or manifested variable measuring each latent variable. This research follows the above standard. In other words, before the analysis begins, this research has presumed the number of factors to be extracted. There are other criteria that help to decide how many factors should be extracted from a factor analysis, for example, eigenvalue, scree plot, percentage of variance explained. Eigenvalue is the column sum of squared loadings for a factor and represents the amount of variance accounted for by a factor (Hair et al., 2010). Eigenvalue standard requires that researchers retain components that have an eigenvalue of more than 1. Scree plot standard determines the factor number at the point that the scree plot levels off. Percentage of variance explained standard requires that sufficient number of factors should be extracted to explain certain percentage of variance of the total set of variables. There is no absolute standard that is suitable for all occasions. When discussing the results, all these standards will be considered and the results will be compared so as to get the most appropriate decision. The results for the factor analysis are presented and discussed as follows.

A principal axis factor analysis was conducted on the 3 items supposed to have a common underlying construct: EI. The Kaiser-Meyer-Olkin measure verified the sample adequacy for the analysis, $KMO = 0.691$ (mediocre according to Field, 2009)¹, and all KMO values for individual items were > 0.66 , which is above the acceptable limit of 0.5 (Field, 2009). Bartlett's test of sphericity $\chi^2 (3) = 486.49$, $p < 0.001$ indicated that correlations between items were sufficiently large for principal factor analysis. An initial analysis was run to obtain eigenvalues for factors in the data. Only one factor had eigenvalues at 1.583, which is over Kaiser's criteria and explained 52.78% of the variance. The scree plot was also very clear in supporting that only one factor could be extracted. Given the large sample size, and the convergence of the scree plot and Kaiser's criterion on one factor, this is the number of factor that was retained in the final analysis. The loadings of item ei1, ei2, and ei3 on the extracted factor are 0.658, 0.787, and 0.729 respectively. The items that cluster on the same factor suggest it can be named as entrepreneurial intentions (EI).

¹Kaiser (1974) recommends KMO values greater than 0.5 as barely acceptable, values between 0.5 and 0.7 as mediocre, values between 0.7 and 0.8 as good, values between 0.8 and 0.9 as great, and values above 0.9 as superb.

The principal factor axis factorization method is chosen for the factor analysis of those six items designed to measure cognitive biases. The rotation method is direct Oblimin. The Kaiser-Meyer-Olkin measure verified the sample adequacy for the analysis, $KMO = 0.746$ (good according to Field 2009), and all KMO values for individual items were > 0.703 , which is well above the acceptable limit of 0.5 (Field, 2009). Bartlett's test of sphericity $(15) = 1151.59, p < 0.001$, indicated that correlations between items were sufficiently large for factor analysis. An initial analysis was run to obtain eigenvalues for each factor in the data. Two factors have eigenvalues over Kaiser's criteria and in combination explained 55.32% of the variance. The scree plot also very clearly shows that it is justified to retain two factors. Given the large sample size, and the convergence of the scree plot and Kaiser's criterion on two factors, this is the number of factors that were retained in the final analysis. Table 4.5 shows the factor loadings after rotation. The items that cluster on the same factor suggest that factor one can be named as Overconfidence and factor two can be named as Illusion of Control.

Table 4.5 Summary of EFA Results for Cognitive Biases

Item	Rotated Factor loading	
	OC	IC
ic1	.024	.598
ic2	.037	.759
ic3	.056	.797
oc1	.823	.026
oc2	.765	.014
oc3	.701	.045
Eigenvalues	2.31	1.01
% of variance explained	38.46	16.86
Cronbach alpha	.807	.757

Extraction Method: Principal Axis Factoring

Rotation Method: Oblimin with Kaiser Normalization

A principal axis factoring factor analysis was conducted on the 12 items with Oblimin rotation (direct Oblimin). The Kaiser-Meyer-Olkin measure verified the sample adequacy for the analysis, KMO = 0.861 (Field, 2009), and all KMO values for individual items were > 0.79, which is well above the acceptable limit of 0.5 (Field, 2009). Bartlett's test of Sphericity (78) = 3452.26, $p < 0.001$, indicated that correlations between items were sufficiently large for factor analysis. An initial analysis was run to obtain eigenvalues for each factor in the data. Three factors have eigenvalues that meet Kaiser's criteria and in combination explained 55.67% of the variance. The scree plot shows that from the fourth factor, the eigenvalue levels off suggesting it is appropriate to extract three factors. Given the large sample size, and the convergence of the scree plot and Kaiser's criterion on three factors, this is the number of factors which were retained in the final analysis. Table 4.6 shows the factor loadings after rotation. The items that cluster on the same factors suggest that factor one represents the intensity of prior interaction (IPI), factor two the evaluation of the prior experience (EP), and factor three the network support (NS).

Table 4.6 Summary of EFA Results of Characteristic of an Individual's Social Network

Item	Rotate Factor Loading		
	EP	IPI	NS
ep1	.716	.013	.005
ep2	.743	.026	.011
ep3	.682	.006	.052
ep4	.682	.006	.057
ipi1	.047	.713	.074
ipi2	.027	.770	.007
ipi3	.027	.893	.019
ipi4	.020	.764	.007
ipi5	.004	.697	.104
ns1	.012	.003	.801
ns2	.010	.017	.806
ns3	.042	.004	.741
Eigenvalue	4.30	1.63	1.31
% of variance explained	33.05	12.55	10.07
Cronbach alpha	.815	.876	.829

Extraction Method: Principal Axis Factoring

Rotation Method: Oblimin with Kaiser Normalization

It is recommended that correlations be checked to ensure discriminant validity. If respondents perceive several items as belonging to a specific theoretical construct, these several items should correlate with this specific theoretical construct better than with any other construct. It would seem from the tables above that items designed to measure overconfidence have a stronger correlation with the factor 'Overconfidence' than with the factor of 'Illusion of Control'. This is also true for items used to measure 'Illusion of Control'. As can also be observed, for items designed to measure the characteristic of an individual's social network, the average correlation of each item to its own construct

(factor) are always higher than its correlations to other constructs. These results provide evidence that a construct is unique and captures some phenomena other measures do not, indicating high discriminant validity which refers to the extent to which a construct is truly distinct from other constructs (Hair, et al., 2010)

Drawing from the results of the above tests for reliability and validity, it would be appropriate to say that the scales used in the formal survey reliability and validity requirements. The factors extracted fully correspond to theoretical expectations. The next section presents the test results for the SEM model.

4.7 Summary

The distinction of the methodological approach, as the above discussion shows, lay in the combined approach to the model analysis. There is a majority of accepted journal articles choosing quantitative methods. However, objectivities of this thesis drive the investigations and design of this study in degree of considerations that is tied to both ontological and epistemological assumptions in order to examine entrepreneurship in the nature of problem itself. This research leans toward critical realism in terms of ontological and epistemological assumptions. It assumes that mechanisms generating EI have an external existence, situated in the “real” domain, but to gain knowledge about them is a social practice.

This research also adopts retroductive research strategy to gain knowledge about EI mechanisms. It proposes that experience intensity (in terms of how intensively an individual communicate and interact with entrepreneurs in respect of financial success and lifestyle and experience positivity (in terms of how positive an individual feel about entrepreneurs in his or her social network) help an individual to form such cognitive bias as over-confidence and illusion of control that motivate an individual to start his or her own business. To assume that these mechanisms exist out there as reality is a matter of ontological preference and I regard science as an attempt to approximate such mechanisms that has causal efficacies. The knowledge produced by the retroductive process is tentative

but not relative. It is tentative in that theories explaining EI do evolve as those that cannot stand the test of data are modified or eliminated, e.g. trait theory was not supported by empirical data in the 1990s as a viable perspective to investigate who becomes an entrepreneur. It is not relative in that relativists insists the plurality of truth and argue that truth is local and cannot be compared universally. Relativist theories of knowledge are immune from being rejected on the basis that they reject the idea of a knowable independent reality.

This researcher designed scales and used them to collect primary cross-sectional quantitative data using survey method. Given the requirement as indicated in the literature as a minimum sample size of 260 for research of such kind to be significant, towards power testing, this thesis pushed up the number by such a wider distribution of questionnaires to 1200 participants and from which collected 625 valid questionnaires with a significant response rate of 50% against a significant minimum standard requirement of 45% response rate. A random sampling method was designed to reach about 1200 graduates in Wuhan University, China. A contingency plan was in place just in case the random sampling method cannot be fulfilled.

With reference to prior studies and the model specially designed for the present research, scales are designed to measure eight latent variables contained in the model. EI is measured by a six-item scale that was validated by Thompson (2009). Overconfidence is measured through the proxy of self-efficacy scales that were designed and validated by McGee et al. (2009), which contains five items asking how much confidence the subjects have in 5 entrepreneurial tasks. Illusion of control scale is adapted from Simon's et al. (2000) questionnaire and contains 6 items. With reference to Busenitz and Barney's (1997) study, representativeness is measured by subjects' answers to two real-to-life strategic scenarios.

Breadth of the experience is measured by the number of ties in the subject's social network that have entrepreneurial experiences. With reference to Van Auken's et al. (2006) classification of various interactive activities with entrepreneurial role models, experience

intensity is measured by the number of activities that the subject has experienced with the entrepreneurs in his or her social network. Experience positivity is measured by asking subjects about how they feel about the extent to which the entrepreneurs in their social networks are successful with regard to 5 aspects endorsed by Scherer et al. (1989) and Krueger et al. (2000). Network support is measured by testing how many kinds of ties would like to offer three kinds of support if they choose the entrepreneurial career.

The compatibility between critical realism and the nature of quantitative methodology supports the validity of the research design for this present study. Questionnaires are the most frequently used method in survey research that collects quantitative data about attitudes, values, beliefs and motives from almost any human population. The absence of direct researcher involvement in the data collection helps keeping bias and “contamination” by this researcher to a minimum. In addition, the survey conducted by this research is highly structured and have high amounts of standardisation and therefore reliability and validity can be tested. For a questionnaire survey to be valid, a research must have a valid sample design. Considering such issues as significance level, effect size, and power, and the methods used in the data analysis, the sample size of this research is set to be over 600 so as to improve the precision of estimate and randomize the sample thus improving validity of the sample design.

By stratifying students into programs, this research assures that students in each stratum is homogeneous internally and heterogeneous with other strata, thus maximizing the difference among strata means and minimizing the within-stratum variance for the EI variable and the seven latent variables that have influences on it. If each program stratum has the equal probability to be selected, then the validity of this sample design will be improved. Structural Equation Modeling methods are compatible with the methodological stance. Exploratory and confirmatory factor analysis was used in the pilot study to test the reliability and validity of scales designed. Additionally, this chapter has presented the results of the pilot study and the reliability and validity testing results from data collected by the formal survey.

CHAPTER 5 ANALYSIS AND RESULTS

The data testing results presented in Chapter 4 show that the measures used in this research fulfill reliability and validity requirements, and the factors extracted fully correspond to theoretical expectations. It is time to present the test results for the SEM model in this Chapter. So, Chapter 5, firstly, presents the descriptive statistics of the variables to examine data normality that is required by SEM analysis. Secondly, the chapter reveals the results of confirmatory factor analysis, in which process the validity of an initial measurement model and an adjusted measurement model are compared to verify the better measurement theory. To find a good measurement model is not an end in itself, it should be a means to an end of verifying the structural relationships between the individual constructs. As such, thirdly, this chapter specifies three structural models (initial, adjusted, and final) and compares the results of validity assessment of three models with the purpose of identifying the theory that has the strongest explanatory power. Finally, the results in this chapter were presented following the sequential examination of the proposed model and through the model fit statistics, including path estimates, and the diagnosis and modifications. The hypotheses posed in Chapter 3 and the models in Chapter 4 are tested in the process of assessing structural model validity. Overall, the analysis finds support from Hair et al.'s (2010) study, which is generally used as guidance for the SEM analysis.

As described earlier, there are six stages of the SEM analysis: defining individual constructs, developing the overall measurement model, designing a study to produce empirical results, assessing measurement model validity, specifying the structural model, and assessing structural model validity. The first four stages form a complete process of confirmatory factor analysis which is a way of testing the measurement model of this research: how well 21 measured variables (ei1, ei2, ei3, ic1, ic2, ic3, oc1, oc2, oc3, ep1, ep2, ep3, ep4, ipi1, ipi2, ipi3, ipi4, ipi5, ns1, ns2, ns3) represent 6 constructs (EI, IC, OC, EP, IPI, NS), and how well six constructs are linked to each other, this is because measurement model represents the measurement theory that is used to specify how sets of measured items represent a set of constructs by empirically examining factor loading estimates which indicate relationship link constructs to variables and construct correlation

which suggests relationship link constructs to each other.

Now that individual constructs are defined and the measurement model is specified in section 4.4, and the results of the pilot study are presented in section 4.6, it is time to go to the fourth stage of SEM: assessing measurement model validity. This research first specifies the initial measurement model as depicted in Figure 5.1. Because it is much more difficult to determine when a model is good or bad than to determine that one model is better than another, besides assessing the validity of the initial measurement model, this research compares the initial measurement model and a modified measurement model in which adjustments are made based on a careful examination of such model diagnostics as path estimates, standardized residuals, and modification indices. The adjusted measurement model depicted in Figure 5.2 improves the validity and it is chosen as the final measurement model that represents the measurement theory which produces ways of measuring concepts in a reliable and valid manner. However, although it can provide evidence of the validity of individual measures, and it can reveal simple correlations between constructs, confirmatory factor analysis (CFA) alone is limited in its ability to examine the nature of relationships between constructs, thus CFA is not an end in itself, but a means to an end of examining structural relationships between constructs (Hair et al., 2010).

In what follows, this research develops the structural model to test the hypotheses posed in Chapter 3, based on the analysis of the validity of the final measurement model. To specify the structural model and assess its validity is the final two stages of SEM analysis. Chapter 3 and 4 hypothesized structural relationships between cognitive bias constructs (OC and IC) and EI construct, and between social network property constructs (IPI, EP, and NS) and cognitive bias constructs. Following the theory that underlies these two groups of hypotheses, this research firstly specified the initial structural model as depicted in Figure 5.3. It can be seen in this model that the relationships within social network property constructs (IPI, EP, and NS) are constrained to zero. And the relationship between OC and IC are also set to zero. In addition, this model does not free the direct relationship between social network property constructs and EI for estimation.

As discussed in Chapter 4, critical realism argues that we may infer knowledge about the

world in the real domain by examining reality in the actual and empirical domains. However, as the world in the real domain cannot be empirically observed, it is difficult to determine whether the hypothesized mechanism is the one that exist in the real domain. But it is much easier to determine whether one hypothesized mechanism is better than the other by examining which mechanisms have better explanatory power. The initial structural model represents one of the hypothesized mechanisms. We can say that the initial structural model fit the reality well by assessing its validity, but we cannot say that this model is the best one. So, with the help of the model diagnosis tools, this research compares the initial structural model and an adjusted one which taking into the combined effects that all the three social network property constructs have on the two cognitive bias constructs by freeing the correlations between IPI, EP, and NS for estimation. The adjusted model is depicted as a path diagram in Figure 5.5. The validity and path estimates of the initial and adjusted structural model are then compared to see which hypothesized mechanism is better.

However, the above initial and adjusted structural model only represents two groups of theoretical hypotheses posed in Chapter 3 and 4. So, this research developed a final model that adds the direct relationship between EI construct and the three social network property constructs to the adjusted model. As such, the final model comprises all the theoretical relationships represented by the three groups of hypotheses. The final structural model is specified as depicted in Figure 5.7. And then, this research carefully examined the fit indices, path estimates, and such model diagnostics as standardized residuals and modification indices to determine whether the final model is the best one. It would seem from the above discussions that having three structural models in comparison is consistent with the philosophical (critical realism) and methodological assumptions (SEM) set for this research. So, the rest of this chapter presents and discusses the results of confirmatory factor analysis and structural model validity assessment. As SEM analysis assumes data normality, so before the results of SEM are presented, this chapter begins with a summary of the descriptive statistics.

5.1 Descriptive Statistical Results

Through a questionnaire survey, this research has obtained its attribute on each of 21 variables from 625 samples and ends up with a data matrix presented in the SPSS file. To describe the raw data presented in the SPSS data file, a researcher must examine measures of central tendency, variability, and data distribution (Black, 2007). In addition, if there are more than one variable, the relationships must be presented in such form as correlation coefficients (Black, 2007). This research chooses arithmetic mean as the statistics to describe central tendency, and standard deviation as the statistics to describe data variability. Skewness and Kurtosis are measures chosen to infer the shape of the distributions of the data. Skewed distributions are not symmetrical in that frequency scores cluster at one end of the scale and tail off towards the other end. Kurtosis is defined as: “the degree to which scores cluster at the ends of the distribution and how pointy a distribution is” (Field, 2009, pp: 19). And the correlation matrix between the variables will be presented in the later sections because those correlation coefficients will be used to help inferring the reliability and validity of the models proposed. The results of the descriptive statistics are presented in Table 5.1.

Table 5.1 The Descriptive Statistical Results of the Measured Variables

Item	Sample Size	Mean	Standard Deviation	Skewness	Skewness Std. Error	Kurtosis	Kurtosis Std. Error
ei1	625	3.21	.816	-.128	.098	-.277	.195
ei2	625	3.36	.925	-.111	.098	-.405	.195
ei3	625	3.48	.879	-.249	.098	-.210	.195
oc1	625	2.56	.964	.250	.098	-.405	.195
oc2	625	2.67	.998	.225	.098	-.463	.195
oc3	625	2.55	.967	.234	.098	-.316	.195
ic1	625	3.00	.781	-.043	.098	.306	.195
ic2	625	2.91	.838	.242	.098	.202	.195
ic3	625	3.30	.800	.046	.098	.020	.195
ns1	625	3.06	1.104	-.089	.098	-.433	.195
ns2	625	3.102	1.076	-.234	.098	-.438	.195
ns3	625	2.83	1.038	.096	.098	-.445	.195
ep1	625	3.09	.637	.184	.098	.426	.195
ep2	625	3.07	.629	.232	.098	.422	.195
ep3	625	3.16	.655	.202	.098	.431	.195
ep4	625	3.13	.702	.234	.098	.482	.195
ipi1	625	3.15	1.030	.024	.098	-.480	.195
ipi2	625	3.38	.953	-.052	.098	-.490	.195
ipi3	625	3.51	.899	-.129	.098	-.279	.195
ipi4	625	3.39	.876	-.095	.098	.009	.195
ipi5	625	3.60	.920	-.200	.098	-.393	.195

The mean is a measure to calculate where the center of a frequency distribution lies. One can see from Table 5.1 that most of the mean values are around 3, the middle point of a Likert 5-point scale. Standard deviation quantifies the spread of the scores in the data. One can see from Table 5.1 that most of the values of the standard deviation are less than 1.

Means and standard deviations do not provide enough information about the distribution of the data. In addition, statistical analysis methods have their assumptions, before carrying out a certain analysis; it is recommended that the normality of the data be checked. Skewness and kurtosis are the two principal ways in which a distribution can deviate from normal. The shapes of distribution can be quantified by examining the values of skewness and kurtosis which should be zero in a normal distribution. The further these values are from zero, the more likely it is that the data are not normally distributed. Although the values of skew and kurtosis are informative, they can be converted to *z-scores* to see how likely the values of skew and kurtosis are to occur. Skewness is converted to z-score by dividing the value of skewness by skewness standard error (Field, 2009). Similarly, Kurtosis is converted to z-score by dividing the value of kurtosis by kurtosis standard error. The z-score of the skewness and kurtosis for all the 21 items were computed according to data presented in Table 5.1. The sample size for this research is large ($n=625$), but no z-score of the 21 items are more than 2.58, indicating the normality of items' distributions.

The next step is to perform the Kolmogorov-Smirnov test, which compares the scores in the sample to a normally distributed set of scores with the same mean and standard deviation (Field, 2009). Non-significant test results suggest that the distribution in question is not significantly different from a normal distribution. Significant test results indicate that the distribution of sample is significantly different from a normal distribution. However, large sample size may magnify small deviation from normality and produce significant results. The results of the Kolmogorov-Smirnov test for the 21 items used in the research are presented in Table 5.2.

Table 5.2 The Results of the Kolmogorov-Smirnov Tests of Normality of the 21 Items

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
ei1	.231	625	.000
ei2	.210	625	.000
ei3	.241	625	.000
oc1	.274	625	.000
oc2	.256	625	.000
oc3	.269	625	.000
ic1	.235	625	.000
ic2	.215	625	.000
ic3	.234	625	.000
ns1	.173	625	.000
ns2	.195	625	.000
ns3	.186	625	.000
ep1	.380	625	.000
ep2	.366	625	.000
ep3	.353	625	.000
ep4	.331	625	.000
ipi1	.179	625	.000
ipi2	.208	625	.000
ipi3	.220	625	.000
ipi4	.243	625	.000
ipi5	.209	625	.000

From the results in Table 5.2, one can see that for all the scores of all items, the K-S test are highly significant, suggesting that not all the distributions are normal. However, considering the sample size of 625, even small deviations from normality may get significant results. So the results do not necessarily suggest that the deviation from normality is enough to bias the statistical procedures performed in this research. Drawing from the results from the three steps above, the items' distribution is roughly normal, though with small deviations. In order to reduce the impact of these deviations, certain methods are considered more preferable than others, as will be stated in later sections where necessary.

5.2 The Results of Confirmatory Factor Analysis

The Structural Equation Modelling (SEM) is a family of statistical models that model complex relationships between multiple variables, estimating many equations at once. The SEM has the strength to employ multiple measures (the measurement model) to represent a construct in a manner similar to factor analysis. The constructs involved in this research are operationalized in Chapter 4 as a series of scaled indicators with reference to prior scales published in academic studies that previously performed well. With the individual constructs defined and measured variables assigned to each of the constructs, the research must then specify the measurement model, which this research has done as depicted in Figure 5.1. Even if a study has well-established measures, their validity and unidimensionality should be confirmed considering each study has its specific context. So the sections below focus on issues related to both research design and model estimation.

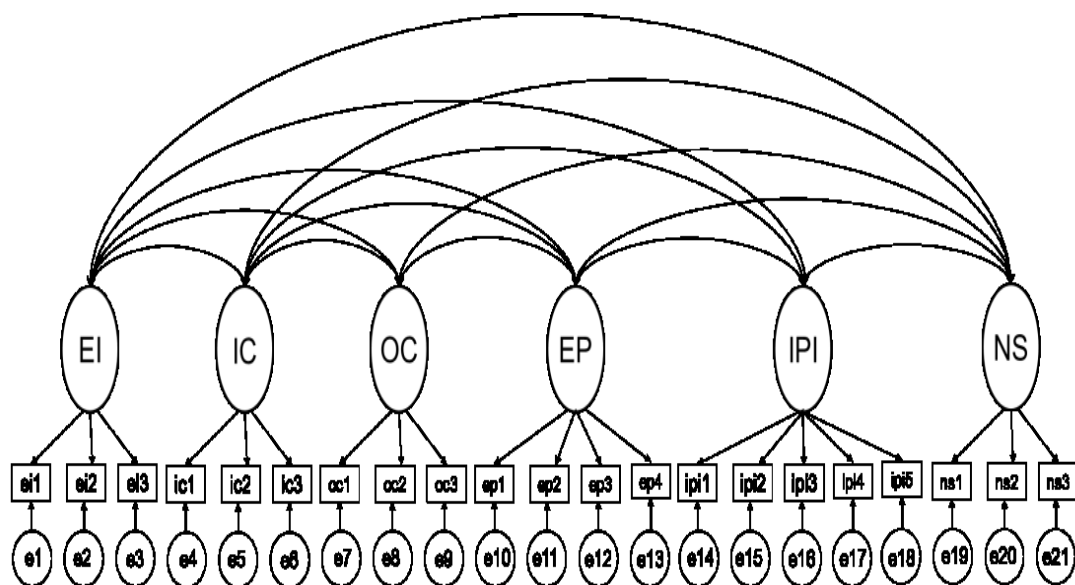


Figure 5.1 The Initial Test of the Interrelationships among the Overall Construct Variables

Issues in research design include type of data to be analysed (covariance or correlation), missing data, and sample size (Hair et al., 2010). Although SEM can be estimated with either covariances or correlations, the covariances have advantages in terms of interpretive

and statistical properties versus correlations. So the thesis chose to estimate the models with covariances. Because all 625 questionnaires are fully completed, there is no missing data issue for this research. Considering multivariate normality, estimation technique, model complexity, missing data, and average error variance of indicators, Hair et al. (2010) suggest the minimum required sample size are 300 for models with fewer than 7 constructs, lower communalities, and multiple under identified (fewer than 3 items) constructs. This research has 625 samples and far exceeds the suggested lowest sample size required.

Issues with model estimation mainly include the model structure, the various estimation techniques, and computer program selected for the analysis. Figure 5.1 communicate the theoretical model structure to the program. The parameters to be estimated are specified in Figure 5.1. Then the next step is to choose the estimation method. Because maximum likelihood estimation (MLE) has been proved to be robust to violations of normality assumption and can produce reliable results under many circumstances (Hair et al., 2010), this thesis chose MLE as the approach to parameter estimation in which the most likely parameter to achieve the best model fit are found. Several statistical programs are convenient for performing SEM: LISREL, AMOS, and SAS. AMOS was chosen to perform SEM in this research because AMOS is a module in SPSS and SPSS was used as the computer program to perform the factor analysis in this thesis, in addition, the AMOS has the graphical interface for all functions thus freeing this researcher from writing syntax commands.

After the measurement model has been specified in Figure 5.1, sufficient data has been collected by the questionnaire survey, and the decision to choose MLE as the estimation method has been made, this research comes to the most fundamental event in SEM testing: measurement model validity which depends on establishing acceptable levels of goodness-of-fit (GOF). GOF evaluates the similarity of the estimated covariance matrix (theory) to the observed covariance matrix (reality) to indicate how well the theory fits reality. If the observed and estimated matrix were the same, the researcher's theory would be perfect. A GOF indicator measures the results from a mathematical comparison of these two matrices and quantifies the differences. The only statistical test of the difference between matrices in SEM is Chi-Square test, which assesses the statistical probability that the observed sample and SEM estimated covariance matrices are actually equal in a given

population. As such, Chi-Square test was chosen to provide the most basic assessment of how well the measurement and structural model developed for this research fit the sample data.

The implied null hypothesis of SEM is that the observed sample and SEM estimated covariance matrices have no differences. If the p-value for the χ^2 test is too small, then the null hypotheses should be rejected, indicating a problem with the fit. So we look for relatively large p-value (corresponding small χ^2 value). However, as Chi-Square test is represented by the following equation: $\chi^2 = (N-1)$ (sample covariance matrix – SEM estimated matrix). The estimated covariance is influenced by how many parameters are specified (degree of freedom). So, it can be seen that χ^2 statistic is a mathematical function of sample size (N) and degree of freedom, causing a bias against large samples and increased model complexity. For this reason, χ^2 GOF test was not used as the sole GOF measure. In addition, following Hair's et al. (2010, pp: 672) recommendations, this research examines the values of normed Chi-Square (CMIN/DF), goodness-of-fit index (GFI), Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI), in order to judge the overall model fit.

5.2.1 Parameter Variable Testing through the Exploratory Analysis

The measurement model has 21 manifest variables including: ei1, ei2, ei3, ic1, ic2, ic3, oc1, oc2, oc3, ep1, ep2, ep3, ep4, ipi1, ipi2, ipi3, ipi4, ipi5, ns1, ns2, ns3 (see figure 5.1), and each with an error variable; 6 latent variables and their corresponding error variable. So the model has 48 variables in total. By a careful examination of the matrix of correlation coefficient between manifest variables, it can be seen that the manifest variables used to measure the same latent variables correlate significantly stronger to each other than they correlate to manifest variables designed to measure other variables, indicating high internal consistency as suggested by Hair et al. (2010).

Table 5.3 Correlation Matrix for Manifest Variables

	ei1	ei2	ei3	ic1	ic2	ic3	oc1	oc2	oc3	ep1	ep2	ep3	ep4	ipi1	ipi2	ipi3	ipi4	ipi5	ns1	ns2	ns3	
ei1	1																					
ei2	.518	1																				
ei3	.479	.574	1																			
ic1	.316	.352	.180	1																		
ic2	.289	.320	.356	.463	1																	
ic3	.316	.348	.297	.463	.598	1																
oc1	.123	.130	.175	.209	.241	.187	1															
oc2	.130	.151	.151	.167	.256	.184	.618	1														
oc3	.150	.170	.180	.203	.266	.214	.584	.545	1													
ep1	.141	.236	.189	.222	.238	.271	.235	.277	.184	1												
ep2	.170	.211	.193	.255	.208	.253	.219	.267	.151	.528	1											
ep3	.151	.225	.184	.230	.252	.274	.258	.256	.237	.451	.491	1										
ep4	.090	.138	.098	.222	.238	.271	.152	.166	.208	.455	.429	.429	1									
ipi1	.175	.129	.166	.223	.203	.246	.130	.217	.162	.179	.207	.222	.241	1								
ipi2	.252	.207	.268	.214	.188	.266	.149	.186	.118	.234	.164	.236	.167	.577	1							
ipi3	.243	.234	.273	.229	.216	.296	.147	.186	.115	.234	.238	.229	.197	.607	.667	1						
ipi4	.240	.212	.227	.236	.226	.251	.167	.215	.154	.233	.256	.232	.208	.586	.533	.679	1					
ipi5	.304	.277	.238	.260	.235	.278	.125	.136	.080	.214	.261	.220	.184	.447	.574	.650	.586	1				
ns1	.170	.151	.195	.115	.196	.215	.360	.362	.357	.213	.237	.204	.109	.139	.190	.186	.181	.237	1			
ns2	.198	.184	.218	.196	.188	.277	.355	.314	.390	.211	.210	.207	.157	.133	.196	.219	.206	.264	.643	1		
ns3	.156	.161	.215	.145	.238	.219	.400	.359	.412	.213	.247	.194	.188	.131	.176	.181	.211	.268	.599	.612	1	

The highlighted are significant Pearson's coefficients at level $p < 0.001$, and the rest, at level $p < 0.01$. These significant variables are used for modelling building.

The measurement model has $21 * (21-1) / 2 = 210$ covariances and 21 variances. The total number of covariances and variances is 231. There are 57 distinctive parameters to be estimated including 15 correlations between the latent variables, 15 regression weights between each latent variable and their manifested variables, and 27 variances. As such, the degree of freedom for this model is $231-57= 174$. Since the degree of freedom is greater than zero, the model can be identified. More degrees of freedom may imply more precise estimation and more powerful tests (Blunch, 2008).

The Chi-Square for the measurement model is 310.504. If the observed matrix of covariance between the variables is the same as that estimated by the measurement model, then it can be concluded that the measurement model fits the reality completely. The Chi-Square test is the only statistical test of the difference in the observed and estimated covariance matrices, and it can be represented by the following equation: $\chi^2 = (N-1) (\text{observed covariance matrix} - \text{SEM estimated covariance matrix})$, where N represents the overall sample size. It can be concluded from the equation that as the sample size increases, even differences between matrices remains the same, the value of Chi-Square increases accordingly. With the $\chi^2 = 310.504$, and $df = 174$, the corresponding p-value is less than 0.001. This p-value is significant even using a type I error rate of 0.001, seemingly indicating the observed covariance does not match the estimated covariance. However, given the problems associated with using Chi-Square test alone as described above, and the effective sample size of 625, several other fit statistics were closely examined to correct the bias for the large sample.

According to Hair et al. (2010), apart from reading the results of Chi-square to evaluate the goodness of fit of the SEM model, other statistics should also be examined including: CMIN/DF, GFI, CFI and RMSEA. The acceptable values are as follows when the sample size is more than 250 and the total indicator variables is bigger than 12 and less than 30: $CMIN/DF < 3$, $GFI > 0.92$, $CFI > 0.92$ and $RMSEA < 0.07$ (Hair et al., 2010, pp. 672). The measurement model's $CMIN/DF = 1.785$, $GFI = 0.955$, $CFI = 0.974$. the model's $RMSEA = 0.035$, with the confidence interval ranging from 0.029 to 0.042, even the upper limit of confidence interval is below the recommended 0.07 cut-off points. Comparing against the above criteria, the measurement model fits the data well.

5.2.2 Testing the Construct Validity of the Measurement Model

Construct validity gives clues to the extent to which the manifested variables designed to measure the latent variables actually measured the latter as proposed by the theory. Convergent validity, discriminant validity, nomological validity, and face validity are often used in testing a model's construct validity. As the face validity has been discussed in the section on instrument design in the previous chapter, the following section pays attention to the other three classes of validity.

Convergent validity examines to what extent a group of items used to measure the same latent variable share common variances. Confirmatory factor analysis provided information required for the testing of convergent validity: factor loadings and average variance extracted. Though there is no clear criteria regarding the acceptance value range of the factor loading using the method of maximum likelihood method, it is necessary to examine the size, direction, and significance of these factor loadings. The significance of the factor loading is a start point for assessing the model's convergent validity. Table 5.4 is extracted from the AMOS text output. It can be seen that each of the 21 manifest variables loaded significantly on its corresponding latent variables, and the factor loadings are positive. If a group of manifest variables loads highly on one latent variable compared with their loadings on the other latent variables, then it suggests that these manifest variables converge to a common factor, the latent variable to be measured. Hair et al. (2010) suggests that the standardized factor loading should exceed 0.5, ideal if it reaches over 0.7. The standard factor loadings for the measurement model are presented in Table5.4, and all loadings are more than 50%.

Table 5.4 Factor Loadings of Each Item on its Corresponding Factor

	EI	IC	OC	IPI	EP	NS
ei1	.671					
ei2	.763					
ei3	.741					
ic1		.653				
ic2		.741				
ic3		.776				
oc1			.799			
oc2			.759			
oc3			.734			
ipi1				.702		
ipi2				.758		
ipi3				.871		
ipi4				.775		
ipi5				.742		
ep1					.712	
ep2					.720	
ep3					.675	
ep4					.678	
ns1						.788
ns2						.802
ns3						.770
AVE	.527	.526	.584	.595	.490	.619

The results in Table 5.4 show the values of the average variance extracted (AVE) that measures the proportion that the variance of a manifest variable can be explained by its corresponding latent variable. It can be seen from Table 5.4 that the AVE values of 5 of the 6 latent variables are over 50%, with EP slightly less than 0.5 at 0.490, indicating good reliability, which suggests good convergent validity.

Discriminant validity examines whether one latent variable is actually different from the other. A conservative method to establish discriminant validity is to compare each latent variable's AVE and its squared coefficient of correlation to other latent variables (Hair, et al. 2010). If the value of AVE is greater, then the discriminant validity of the model can be accepted, because the variances that a latent variable can explain about its manifest variables is expected to be greater than the amount of variance that one latent variable shares with other latent variables in the model. It can be seen from table 5.5 that all the values of the squared coefficients of correlation between latent variables are lower than their AVE values, indicating good discriminant validity.

Table 5.5 The Correlative Statistics in the Matrix of the Latent Variables

	IPI	EP	NS	OC	IC	EI
IPI	1.000	.166	.099	.063	.176	.171
EP	.407***	1.000	.141	.175*	.233	.125
NS	.314***	.375***	1.000	.366	.130	.102
OC	.251***	.418***	.605***	1.000	.146	.073
IC	.420***	.483***	.360***	.382***	1.000	.389
EI	.413***	.353***	.319***	.270***	.624***	1.000

Note: *** $p < .001$, ** $p < .01$, and * $p < .05$. The numbers below the diagonal line are the coefficients of correlations between latent variables and the numbers above the diagonal line are the squared coefficients of correlation.

Table 5.5 show the results from the so called nomological validity tests, in terms of whether the correlations between the constructs in the measurement theory make sense for the modelling building process (Hair et al., 2010). Nomological validity can be examined by observing the correlations between factors in the correlation matrix. From the results depicted in Table 5.5, one can see that the latent variables are significantly related to each other (e.g. IPI) and the size of these correlations support that there are certain relationships between the six latent variables.

5.2.3 Model diagnosis and revision

Apart from examining the model fit indices, researchers often use model diagnosis tools, for measurement model, the following statistics are also evaluated: path analysis, standard residual, and the modification index. Path analysis evaluates the factor loadings of the manifest variables on its corresponding latent variable thus providing clues for the deletion of certain items. Those loadings that fall below the cut-off point should be scrutinized and decision made considering whether to delete the measuring items in question. As the factor loadings of all the 21 manifest variables are greater than 0.6, it is not necessary to delete

any item according to path analysis. Residual refers to the difference between the observed and estimated covariances. The better the model fit with the data, the smaller the residuals. It is recommended that researcher should look into the standardized residuals with values greater than 2.5 (Hair, et al., 2010).

The standardized residual covariance table produced by AMOS suggested that there are three standardized residual covariance with absolute values greater than 2. They are the covariance between oc2 and ipi1 (at 2.068), ei2 and ipi1 (at 2.263), ei1 and ipi5 (at 2.398). All the three outlier residuals are connected with ipi items. This group of items deserve more attention when examining the modification indices which provide another angle for model diagnosis.

The relationships appear in the modification indices are those that were restrained by the model. For example, the model set that every manifest variables loads just on one latent variable, while setting its loadings on other latent variables in the model to be zero. Modification indices let these assumptions loose and let the system estimate the correlation between variables that were set as zero. The results of the modification indices suggest that if these relationships are freed for estimation, how much better the model fit will improve in terms of χ^2 values.

By observing the modification indices for covariance, e18, which is the error terms for ipi5, caused much of the problem, with 4 values more than 10 and one value more than 4. By observing the modification indices for regression weights, many of the problems are also caused by ipi5, with ten of the residuals of the regression weight between ipi5 and other variables are more than 4, this might indicate that ipi5 cross loaded on more than two latent variables. As the number measuring IPI is sufficient, the deletion of ipi5 may increase the parsimony of the model. So ipi5 is deleted from the model and thus establishing a new measurement model as in Figure 5.2 below.

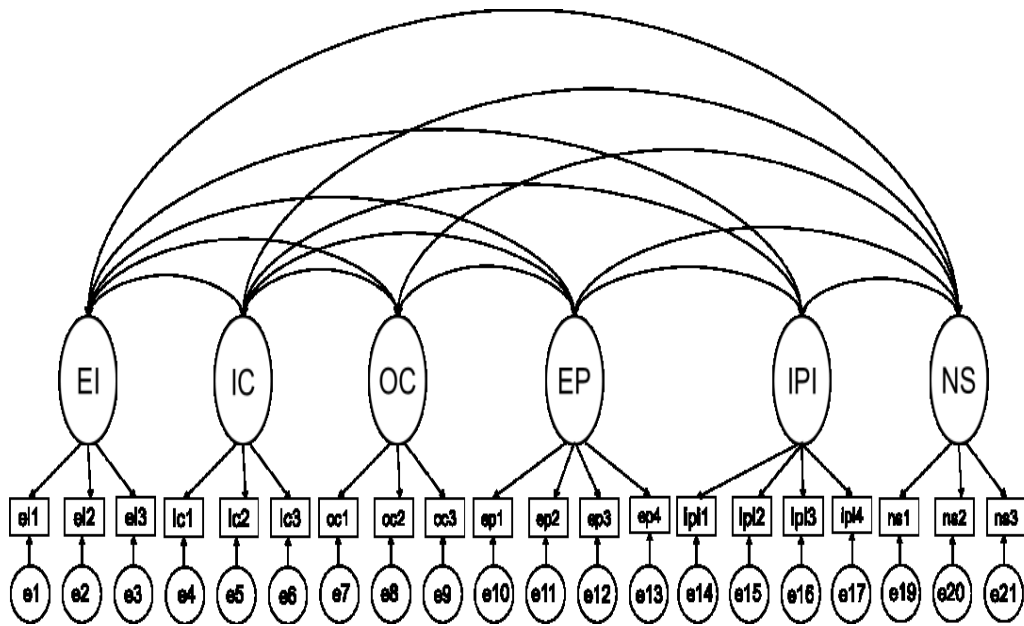


Figure 5.2 The Test of the Adjusted Interrelationships among the Overall Construct Variables

There are 46 variables in the modified measurement model. The total number of variance and covariance is 210 and 55 parameters are to be estimated, thus making the degree of freedom at 155. The χ^2 for the modified measurement model is 249.074 (df =155, $p < 0.001$), which is 61.43 (nearly 20%) less than the previous one at 310.504. The comparison of the model fit indices is presented as follows, with those for the previous model in the brackets: CMIN/DF = 1.607 (1.785), GFI = 0.962 (0.955), CFI = 0.980 (0.974), RMSEA = 0.031(0.035), with the confidence interval ranging from 0.024 (0.029) to 0.038 (0.042), even the upper limit of confidence interval is below the recommended 0.07 cut-off points. Comparing against the criteria summarized by Hair et al. (2010), the modified measurement model fits the data well. And compared with the previous model, all fit indices are increased.

In general, the statistical results support the measurement model, suggesting that the hypothesis that no significant differences exist between the observed and estimated covariance matrix cannot be rejected by the evidence. Convergent validity, discriminant validity, nomological validity, and face validity are examined and the evidence suggests that the measurement model has good construct validity. The residual covariance matrix

and modification indices also do not suggest any significant improvement for the modified measurement model. The next step is to analyse the structural model. As one of the manifest variables is deleted, so the structural model is slightly upgraded as shown in the Figure 5.3 below.

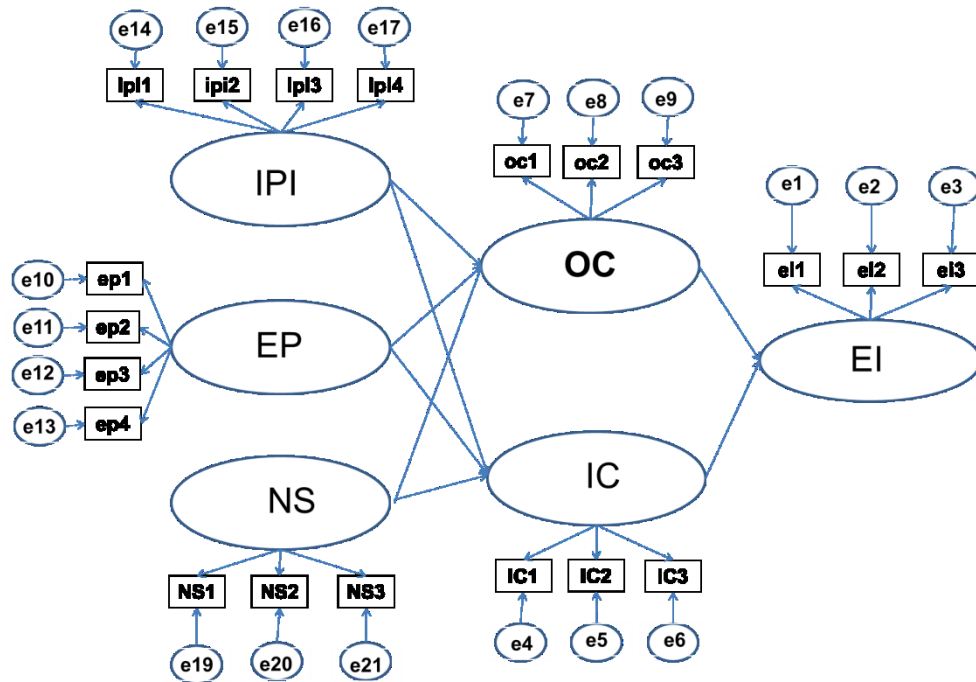


Figure 5.3 The Adjusted Structural Model

5.3 Testing the Results of the Structural Model

Firstly, the structural model was set with six constructs and some of the relationships between them were freed for estimation. Secondly, the two-step structural equation modelling has been used. The tests of the structural model were based on the comparison of the goodness of fit of the measurement and structural model and on the model diagnosis tools. Thirdly, the path coefficients and factor loadings were examined to ensure that they do not change too much from the measurement model to the structural model. Finally, model diagnosis and modifications were conducted to help making the decision on whether the structural model should be modified or not.

5.3.1 Resetting of the Structural Model

Based on the prior literature, the thesis proposed a model to explain why some people choose to be entrepreneurs. Many factors are at play to determine whether an individual has EI, but we cannot include all these factors in this model because it is restricted by the analytical methods chosen. The model in this thesis only includes 5 influencing variables: the intensity of the prior interactions with the entrepreneurs in an individual's social network (IPI), the evaluation positivity of the entrepreneurs in an individual's social network (EP), the social network support for an individual to choose to be entrepreneurs (NS), the overconfidence of an individual (OC), and the illusion of control of an individual (IC). The model aims to test the hypotheses that were posed in Chapter 3 and Chapter 4. The constructs and the hypothesized relationships are presented in the structural model as shown in Figure 5.4. To be succinct, the measurement items and error terms are not included in the figure. The model also suggests that OC and IC would mediate the relationships between IPI and EI, EP and EI, and NS and EI. But the model does not include the direct effects that IPI, EP and NS on EI. These mediating effects will be examined in the later part of this chapter.

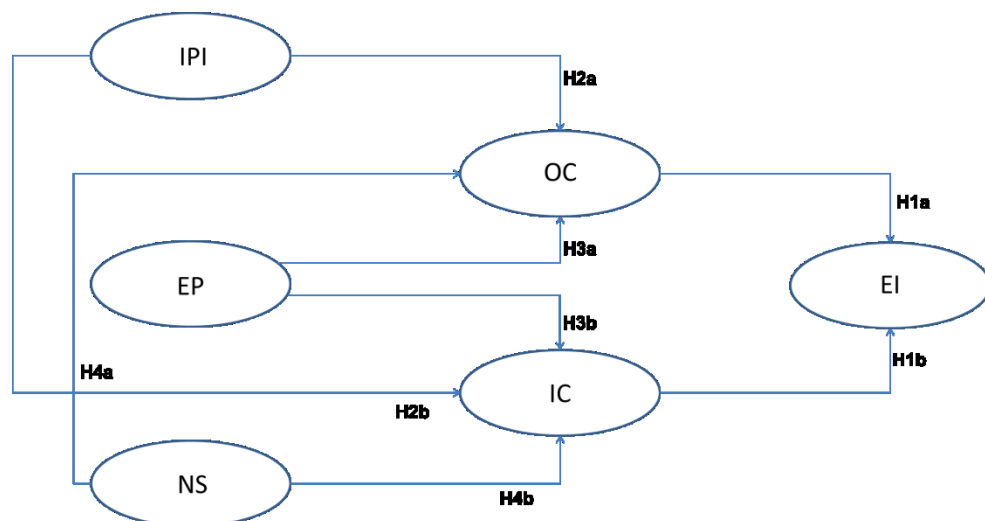


Figure 5.4 The Structural Model for the Hypotheses Tests

IPI, EP and NS are exogenous variables which are determined by factors that are not included in the structural model. The relationships between these three variables are

constrained, i.e., the coefficients of correlations between the three variables are set to zero. OC, IC and EI are three endogenous variables, with one-way arrow pointing from the predicting variables to the predicted variables. Every line with the one-way arrow indicates a direct influencing path, or a sub-hypothesis. Comparing with the measurement model, the testing results of the measurement model are presented below.

The aim of the measurement model is to find reliable and valid methods to measure the concepts. The measurement model focuses on how manifest variables are related to latent variables, which is indicated by the covariance matrix. Confirmatory factor analyses test the measurement model by examining the goodness of fit of the model and the construct validity. Confirmatory factor analysis limits the relationship between latent variables to their correlations. Structural model shifts the focus from the relationships between manifest variables and its corresponding latent variable to the nature and strength of the relationships between latent variables. Researchers usually have interest in two aspects of the structural models: first, the model's overall and relative goodness of fit, in an attempt to test whether the model can be accepted; and second the estimated parameters.

There are one-step and two-step structural equation modelling (SEM) (Hair et al., 2010). Under one-step SEM, the measurement and structural model are estimated in one step, which requires that validity of the measuring scales are believed to be very high before the analysis. The present research used two-step SEM. The first step is the estimation of the measurement model and the examination of the model's goodness of fit and construct-validity. The second step is the estimation of the structural model and its testing. The validity of the measurement model is very important. If we are not sure what the scales are measuring, then the latent variables will make no sense. The measurement model for this research passed the validity test. So the second step is to test the structural model.

The tests of the structural model are based on the comparison of the goodness of fit of the measurement and structural model and on the model diagnosis tools. As such, the section below first compared the relevant fit indices to evaluate the extent to which the goodness of fit of the structural model was reduced as the results of constraining relationships between certain latent variables to be zero, while in the measurement model, the relationships between all latent variables were freed for estimation. The second evaluation

was about the extent to which the hypothesised relationships between the latent variables in the structural model were supported by the actual collected data. Thirdly, diagnosis tools were used to help decide whether the model should be modified.

5.3.2 The Model Fit Tests

In this set of tests, the first step is to compare the fit indices of the measurement and structural model. So long as the structural model is recursive, then it contains fewer relationships between latent variables than the measurement model contains. As such, it is impossible that the value of the statistic χ^2 of the recursive model is less than that of the measurement model, i.e., we cannot improve the goodness of fit of the measurement model by proposing a structural model. However, if the goodness of fit of the structural model reduced substantively compared with the measurement model, it may suggest that there is a problem with the validity of the structural model. If the statistic $\Delta\chi^2$ is not significant, then it strongly suggests that the structural model fits the data very well.

Table 5.6 The Comparison of the Fit Indices for the Measurement and Structural Model

	Measurement model	Structural model
Absolute index		
χ^2	249.407	414.409
df	155	162
Sig.	.000	.000
GFI	.962	.937
RMSEA	.031	.050
The confidence interval of RMESA	.024 --- .038	.044 --- .056
RMR	.024	.090
Incremental index		
NFI	.950	.917
CFI	.980	.948
Parsimony index		
PNFI	.775	.782
AGFI	.949	.918

Table 5.6 presents the overall goodness of fit indices for the both the measurement and the structural model. The fit indices for the structural models are: $\chi^2 = 414.409$ (df = 162, $p < 0.001$), CMIN/DF = 2.558, GFI = 0.937, CFI = 0.948, RMSEA = 0.050 (with the 90% confidence interval between 0.044 and 0.056, indicating an acceptable level of fit. The $\Delta\chi^2$ is at approximately 165, and as the degrees of freedom increased by 7, the Chi-Square table reports a significant Chi-Square value, indicating that the two models are not significantly different. It would be seen from the table above that other fit indices do not change much as well, tentatively indicating that the structural model can be accepted. The standardized path coefficients are shown in Table 5.7 in the next section.

5.3.3 The Path Estimates

In the next step, the path coefficients and factor loadings were examined to ensure that they do not change too much from the measurement model to the structural model.

Table 5.7 Comparisons of the Factor Loadings for the Measurement and Structural Models

Measuring items	Factor	Structural Model	Measurement Model
ei1	EI	.658	.671
ei2	EI	.762	.765
ei3	EI	.728	.740
oc1	OC	.786	.799
oc2	OC	.747	.760
oc3	OC	.717	.734
ic1	IC	.615	.635
ic2	IC	.727	.741
ic3	IC	.759	.776
ep2	EP	.713	.712
ep3	EP	.716	.719
ep4	EP	.672	.676
ipi1	IPI	.730	.728
ipi2	IPI	.754	.755
ipi3	IPI	.868	.886
ipi4	IPI	.769	.772
ns1	NS	.789	.788
ns2	NS	.802	.802
ns3	NS	.768	.770

It would seem from Table 5.7 that the changes in the factor loadings in the measurement and structural model are very small, all less than 0.02, suggesting the validity of the structural model. Each relationship between the latent variables suggested by the structural model was compared with that in the measurement model. The relationship in the structural model is called structural relationship while that in the measurement model it is called correlation.

Table 5.8 Comparison of the Regression Estimates for the Measurement and Structural Model

Structural Model			Measurement Model		
Structural relationships	Standardized coefficients	Sig.	Correlations	Standardized coefficients	Sig.
OC on EI	.053	.271	OC and EI	.269	.000
IC on EI	.605	.000	IC and EI	.624	.000
NS on OC	.545	.000	NS and OC	.605	.000
IPI on OC	.065	.149	IPI and OC	.261	.000
EP on OC	.251	.000	EP and OC	.418	.000
NS on IC	.226	.000	NS and IC	.360	.000
IPI on IC	.297	.000	IPI and IC	.410	.000
EP on IC	.352	.000	EP and IC	.483	.000

It can be seen from Table 5.8, wherein the effect of OC on EI and that of IPI on OC become insignificant in the structural model, but the two corresponding correlations in the measurement model are significant, though very small compared with other correlations. These changes might be the consequence that some of the relationships between latent variables are constrained to be zero in the structural model. For example, the coefficient of correlation between IPI and EP, IPI and NS, OC and IC are constrained. If the constraints are lifted, then IPI can influence EI via EP or NS. These results also suggest that if the limits on the correlations between three variables of social network characteristics are lifted, then the model might fit the reality better.

As mentioned in the tests of the measurement model, several model diagnosis statistics would be used to help evaluate the structural model, including fit indices, residual matrix, and modification indices. These tools will also be used in the evaluation of the structural model to see whether the structural model should be improved.

First the Chi-Square of the measurement and structural models are compared. As reported earlier, the $\Delta\chi^2 = 165$ ($p < 0.000$), $df = 162-155 = 7$. Because 7 of the relationships in the measurement model are set as zero, they are: IPI and EI, EP and EI, NS and EI, OC and EI, IPI and EP, IPI and NS, and NS and EP, the structural model thus gaining 7 degrees of freedom. Since the Chi-Square value is significant, it might suggest that the 7 constrained relationships should be freed and let the model estimate the regression weights. However, as discussed earlier, the value of Chi-Square is sensitive to sample size, so the other two diagnostic tools should be used to examine the structural model.

5.3.4 Model Diagnosis and Modifications

By an examination of the standardized residuals, it can be seen that the values of 37 standardized residuals are greater than 4, raising many red flags, as Hair et al. (2010) recommend that standardized residuals less than 2.5 in absolute value do not suggest a problem but greater than 4 raise a red flag. But it is unclear where the problems are. Then the modification indices are examined. It suggests that if the limitation of the relationship between NS and IPI is lifted, the Chi-Square value will decrease by 38.163. If the relationship between EP and IPI is lifted, the Chi-Square value will decrease by 67.659. The resetting of the relationship between EP and NS will decrease the Chi-Square value by 55.286. And most other modification indices are relatively small. The results of the path analysis, standardized residuals, and modification indices may strongly suggest that the model will be much better if the relationships between three social network characteristics variables are freed for estimation. As such, this research changed the structural model as depicted in the Figure 5.5.

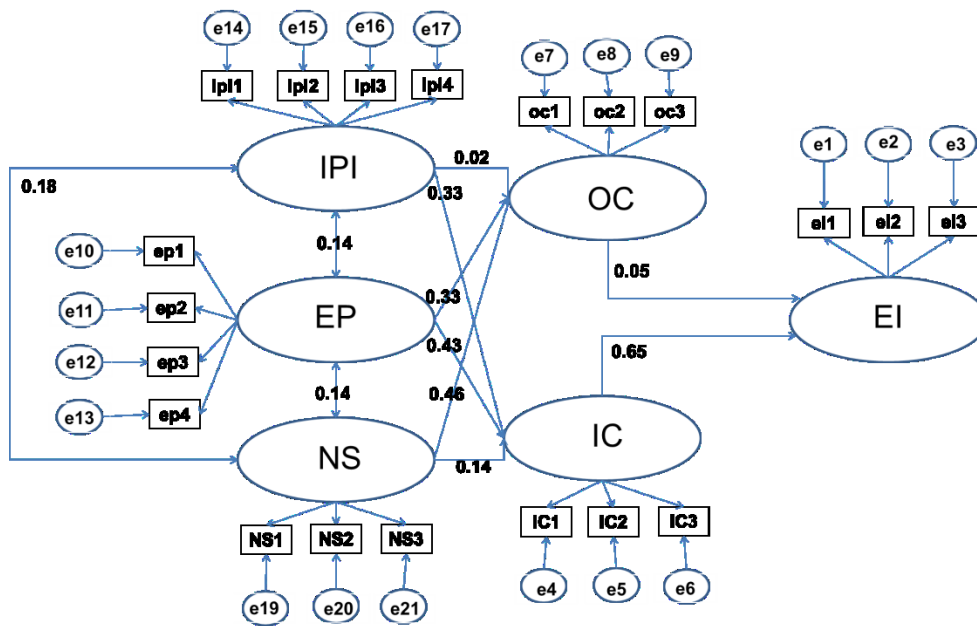


Figure 5.5 The Adjusted Structural Model with the Path Estimates between Latent Variables

Compared with the old structural model, the new model fits the reality better, as can be seen in Table 5.9.

Table 5.9 Goodness of Fit Indices of the Initial and the Modified Structural Model

	The old structural model	The new structural model
χ^2	414.409 (df = 162, p < 0.001)	264.955 (df = 159, p < 0.001)
CMIN/DF	2.558	1.666
GFI	.937	.960
CFI	.948	.978
RMSEA	.050	.033

As can be seen from the coefficients in Table 5.10, the differences in regression weights between the old and new models are small. And the relationship between OC and EI and between IPI and OC are still not significant, these might be caused by the limit of the following relationships: the EP and EI, the NS and EI, and OC and IC, giving a preliminary suggestion that direct effects between social network characteristics variables and EI exist.

Table 5.10 Comparison of the Regression Estimates in the Initial and the Adjusted Structural Models

The Initial Structural Model			The Modified Structural Model		
Structural relationships	Standardized coefficients	Sig.	Structural relationships	Standardized coefficients	Sig.
OC on EI	.053	.271	OC on EI	.054	.265
IC on EI	.605***	.000	IC on EI	.625***	.000
NS on OC	.545***	.000	NS on OC	.519***	.000
IPI on OC	.065	.149	IPI on OC	.024	.600
EP on OC	.251***	.000	EP on OC	.221***	.000
NS on IC	.226***	.000	NS on IC	.186***	.000
IPI on IC	.297***	.000	IPI on IC	.250***	.000
EP on IC	.352	.000	EP on IC	.326***	.000

Note: ***p < .001, **p < .01, and * p < .05.

After such amendments were made to the initial model, there is no standardized residual with an absolute value greater than 4, and only two of them are greater than 2.5, i.e., the standardized residuals of the covariance between ei1 and ipi2 at 2.660, and ei3 and ipi2 at 2.663. And the modification indices remain low. As such, the modified structural model better fit the reality. According to the new structural model, H1a and H2a are rejected and H1b, H2b, H3a, H3b, H4a, H4b are not rejected.

5.4 Mediating Effects of the Cognitive Properties

This section first discusses the methods used to test the mediating effects before going on to present the test results. If the direct relationships between social network property constructs and entrepreneurial intention construct can be verified, then H5a, H5b, and H5c cannot be rejected. It can be informed whether cognitive bias constructs can mediate the

relationship between social network properties and entrepreneurial intentions by examining the direct effects between these three groups of constructs.

5.4.1 Methods for Testing the Mediating Effects

Mediating effects require that the three variables in question are correlated. For example, if we wish to examine the mediating effects of OC on the relationship between IPI and EI, then these three variables should be significantly correlated with each other. The mediating variable facilitates the relationship between the other two variables. If the mediating variable fully explained the relationship between the two variables, then it would say that complete mediation exists. If there are still significant relationships between the two variables after the mediation is taken into consideration, then it would say that part mediation exists. Figure 5.6 is used as an example to delineate how the methods that this research used to examine whether mediating effects exist.

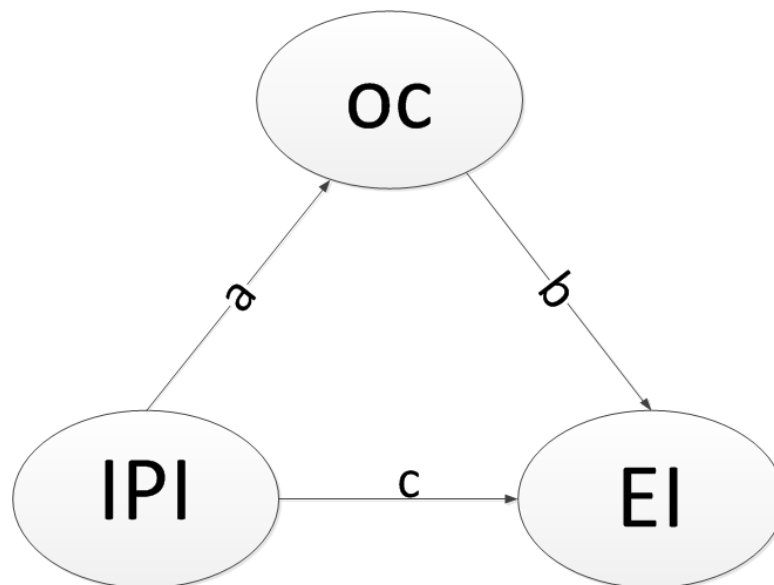


Figure 5.6 Methods to Explore the Mediating Effects

If complete mediation effects exist, then the standardized coefficients of path C should be zero, then the structural model can include path A and path B but exclude path C which indicates direct effects. The structural model hypothesized this mediation effects and does

include the direct effects. Then we can compare the goodness of fit of the models including and excluding direct effects, and if the model that excludes the direct effects fits the data better, then it suggests that mediating effects are at play. However, if after the direct effects are included in the model and the value of $\Delta\chi^2$ suggests a significantly improved goodness of fit of the model, then the mediating effects cannot be supported. If after the direct effects are included in the structural model and the value of $\Delta\chi^2$ suggests no significantly improved goodness of fit of the model, then the mediating effects are supported. According to this principle, this research used two steps in testing the mediating effects. The first step is to make sure that all the relationships are significant, and the second step is to examine the mediating effects.

The structural model presented in Figure 5.6 assumed several mediating effects, e.g. cognitive properties variables OC and IC are hypothesized to mediate the relationship between social network characteristics variables (IPI, NS, EP) and EI. In the last section, by examining relevant statistics, the structural model is confirmed. A two-step method was used in this section to examine the mediating effects of cognitive property variables.

The first step is to examine whether the relationships between the latent variables are significant in the measurement model. The coefficients of correlation between IPI and EI, EP and EI, and NS and EI are 0.385, 0.353, 0.318 respectively, all of which are significant at 0.001 level. This suggests that direct and unmediated relationships are significant. It can also be found that IPI and OC, NS and OC, and EP and OC are also significantly related with the correlation coefficients at 0.261, 0.605, and 0.418 respectively ($p < 0.001$). The coefficients of correlation between IPI and IC, NS and IC, and EP and IC are 0.410, 0.360, 0.483 respectively, and all are significant at 0.001 level. These significant coefficients of correlations establish the relationship between three exogenous variables and the two proposed mediating variables. At last, the correlation between OC and EI and between IC and EI are also significant and the coefficients are 0.269, and 0.624 respectively, supporting the relationship between the proposed mediating variables and the outcome variables. The second step is to establish a mediating model and evaluate the mediating effects. The new structural model confirmed in the previous section does not include the direct effects of three exogenous variables (IPI, NS, EP) on EI. This model is modified by adding these direct relationships in order to test whether the goodness of fit of the model

will be significantly improved.

5.4.2 Results of the Direct and Mediating Effects

The value of the χ^2 of the model with the direct effects included is 253.676 (df = 156, $p < 0.001$). The differences in values of Chi-Square before and after modification is 264.955 - 253.676 = 11.279. As the three relationships set at zero in the structural model before modification are freed for estimation in the structural model after modification, three degrees of freedom is gained. By consulting the Chi-Square table, the significance level of the value of $\Delta\chi^2 = 16.062$ (df = 3) is $p < 0.001$, indicating a substantive improvement in model fit. The modified model is illustrated in Figure 5.7, where three direct relationships are added with the dotted line with arrows pointing at EI, and the parameters are estimated using this model.

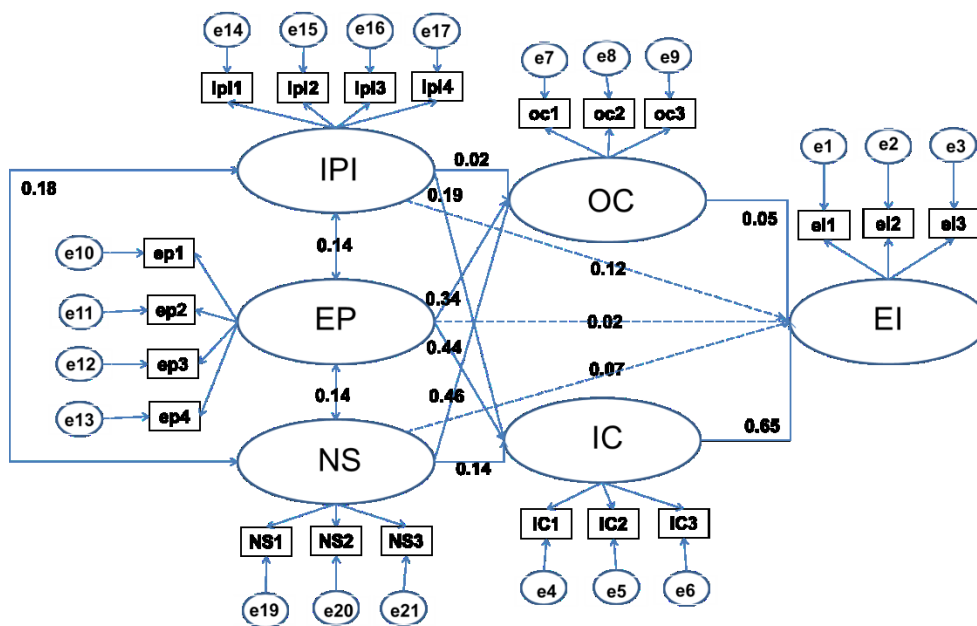


Figure 5.7 The Final Structural Model

In the revised model with the three direct relationships between NS and EI, IPI and EI, and EP and EI, two path estimates become insignificant: NS and EI ($p = 0.140$) and EP and EI ($p = 0.821$), indicating that full mediation is supported. However, the path estimate for the

IPI on EI relationship is significant, suggesting that there is not complete mediation. To establish the partial mediating effect that cognitive biases have on EI, the compound paths reflecting indirect and mediated effects are identified: IPI to OC to EI, and IPI to IC to EI. Though the relationships between IPI and OC and between OC and EI are not statistically significant, but the relationships between IPI and IC and between IC and EI are significant, suggesting that IC provides partial mediation on the relationship between IPI and EI.

5.5 A Summary of the Results of Hypotheses Testing

The overall test results of the hypotheses are presented in Table 5.11. In addition, the test results suggest that *overconfidence* does not mediate the relationship between social network property constructs and the EI construct. However, the *mediating* effects that the construct illusion of control has on the relationship between *social network property* constructs and the construct EI cannot be rejected.

The results of the current study suggest that the properties of an individual's social network can influence whether he/she has cognitive biases in the process of career decision. The results show that such cognitive biases as overconfidence and illusion of control can influence an individual's decision on whether to choose to be an entrepreneur. In addition, the results reveal that the properties of an individual's social network can directly influence an individual's entrepreneurial career decision. Although the results do not support that over confidence can mediate the relationship between an individual's social network properties and his/her entrepreneurial intention formation, they suggest that illusion of control can partially mediate this relationship. From a theoretical perspective, these findings support the basic predictions of the social cognitive theory applied in the entrepreneurship domain, which suggests that an individual's entrepreneurial career decision is bounded by both complex external social factors and imperfect internal cognitive capabilities (Mitchell et al., 2007, Gigerenzer and Gaissmaier, 2011). In addition, the results are consistent with the integrative perspective proposed in Chapter 2 which is essential in the entrepreneurship domain for continued improvement and refinement of researchers' knowledge base and theoretical models and for gaining a better understanding

of complex entrepreneurial processes in which the formation of entrepreneurial intentions is the earliest stage.

Table 5.11 A Summary of the Overall Hypothesis Test Results (H1a-H5c)/

No.	Hypotheses	Test Results
H1a	Overconfidence significantly drives the entrepreneurial intention of an individual.	Rejected
H1b	Illusion of control can significantly affect entrepreneurial intentions.	Not rejected
H2a	The intensity of prior interactions with other entrepreneurs in one's social network can influence one's overconfidence and ability to create a new venture.	Rejected
H2b	Prior interactions with other entrepreneurs can affect the individual's illusion of control over an entrepreneurial event and the entrepreneurial process.	Not rejected
H3a	Strongly positive perceptions of entrepreneurial experiences within an individual's social network can lead to the overconfidence of the individual to create a new venture.	Not rejected
H3b	Strongly positive perceptions of entrepreneurial experiences within an individual's social network can affect the individual's illusion of control over the events during the entrepreneurial process.	Not rejected
H4a	An individual's social network support can create impact on his/her overconfidence in his/her ability to create a new venture.	Not rejected
H4b	Social network support can significantly influence an individual's illusion of control over matters related to entrepreneurial events and establishments.	Not rejected
H5a	The greater intensity of the individual's prior interactions with entrepreneurs within the social network, the greater probability is the individual's entrepreneurial intention.	Not rejected
H5b	The more positively an individual perceives other people's entrepreneurial experiences within the social network, the greater intensity and positive attitudes the individual will have towards entrepreneurial intentions.	Not rejected
H5c	Entrepreneurial intentions significantly depend on social network support to the individual.	Not rejected

5.6 Summary

To highlight, as the test results show, the scale used to measure entrepreneurial intentions, cognitive biases, and the characteristics of one's network are reliable and valid. The proposed parameters statistically or conceptually play a significant role to construct the proposed model. The level of goodness of fit, based on all the variables in the measurement model is acceptable. After the relationships between the three social network characteristics variables are freed for estimation, the revised structural model improved goodness of fit. The research results show that the three social network characteristic variables can directly impact on EI. But illusion of control can fully mediate the relationship between EP and EI, and between NS and EI. Illusion of control partly mediates the relationship between IPI and EI.

CHAPTER 6 DISCUSSION

This research thesis has posed five sets of hypotheses to capture three aspects of relationships. The first set of hypotheses contains H1a and H1b, representing the relationships between cognitive bias and entrepreneurial intentions. The middle three sets of hypotheses (H2a, H2b, H3a, H3b, H4a, H4b) capture the relationships between three social network properties constructs (IPI, EP, and NS) and two cognitive bias constructs (OC and IC). The final set of hypotheses (H5a, H5b and H5c) assumes the direct relationship between social network properties and entrepreneurial intentions. Now that the test results of these five sets of hypotheses have been presented in Chapter 5, this chapter should discuss the findings from the above mentioned three aspects that contain all the relationships captured by these five sets of hypotheses, and when the direct relationship between social network properties and EI is discussed, the mediating effects of cognitive bias should be taken into consideration so that all direct and indirect effects can be taken into consideration. As such, this chapter first moves step-by-step to illustrate findings from the three aspects, based on which the final section explicates the contributions made by this research.

6.1 Cognitive Bias and Entrepreneurial Intentions

The findings of the measurement model suggest that cognitive biases are significantly related to entrepreneurial intentions. As noted in Chapters 2 and 3, there are strong grounds for predicting such a relationship. Individuals who have high degrees of overconfidence and illusion of control over future events are more likely to start-up (Simon et al., 2000; De Carolis and Saporito, 2006; Hayward et al., 2006; Koellinger et al., 2007; Townsend et al., 2010; Trevelyan et al., 2008). It is important to note, however, that the results of the structural model support the significant relationship between illusion of control and EI but there was no support for a significant relationship between overconfidence and EI. An individual's perceptions on whether the new venture will succeed under his or her control are closely related to whether he or she will choose the entrepreneurial career, as the results

from the final structural model show that the coefficient of correlation between the construct illusion of control and EI is 0.65, this is consistent with many in the prior literature on the role of illusion of control in the entrepreneurial process (Keh et al., 2002; Simon and Houghton, 2002; Simon et al., 2000; De Carolis et al., 2009; De Carolis and Saporito, 2006).

However, according to the results of the final structural model, an individual's perception on his ability as an entrepreneur have nothing to do with whether an individual chooses an entrepreneurial career, indicated by the insignificant relationship between the construct 'Overconfidence' and EI. This result is at odds with most of the prior research about the role of overconfidence in the entrepreneurial process (Simon et al., 2000; De Carolis and Saporito, 2006; Hayward et al., 2006; Koellinger et al., 2007; Townsend et al., 2010; Trevelyan et al., 2008).

The results presented in the measurement model do not conform in principle to those presented in the structural model concerning the relationship between cognitive bias and EI. This failure to conform demands some discussion. The respondents in this research might have made the decision concerning whether to choose to be entrepreneurs before the survey started. The extent to which a respondent is overconfident and the incidence of EI formation are measured at almost the same time in the survey. A cross-sectional research may identify the regular co-occurrence of overconfidence and EI, but it cannot show which one occurs before the other. As such, the nature of the cross-sectional survey makes it difficult to infer causal relationships (Hair, et al. 2010). In the measurement model of this research, the theory that predicts the co-occurrence of overconfidence and EI fits well with the data. However, in the structural model of the present research, overconfidence is hypothesized as a cause of the formation of entrepreneurial intentions. This hypothesized relationship does not fit the empirical data very well. However, both measurement model and structural model have acceptable levels of goodness of fit, which require further explanation.

Several possible explanations can be proposed to account for the misfit of the theory to the data in the structural model. First, although overconfidence and EI do co-occur and

overconfidence is assumed to be the cause for EI, it is possible that overconfidence is actually a consequence of the entrepreneurial intentions formation process. The results of simulations operated by Hogarth and Karelaia (2012) suggest that those individuals who are overconfident and under confident demonstrate no differences in intentions to start new ventures. The results also indicate that individuals who have made the decision to start-up are more confident than those who have not. Hogarth and Karelaia (2012) thus come to the conclusion that overconfidence is a consequence rather than the cause of the decision to start a new business. Following Hogarth and Karelaia's (2012) logic, the significant correlation between overconfidence and EI in the measurement model can be explained: the EI formation process causes an individual to be overconfident. This explanation is against the assumption underlying the structural model that overconfidence leads to EI formation. But, overall, the structural model fits the data well. This degree of goodness of fit might be achieved because the other cognitive variable in the model lend support to the hypothesis that cognitive biases cause the formation of EI.

The misfit of the theory that overconfidence leads to the formation of EI to the empirical data can be explained from other perspectives as well. Thus, second, other parallel relationships in the structural model may absorb the majority of the effects that cognitive bias has on the formation of EI. For example, the construct of illusion of control is far more important than overconfidence in the process that leads to the formation of EI. Third, constructs that are not presented in the structural model can play an important role. For example, guanxi (relationship) may play a key role but it was not included in the structural model. Fourth, compared with the usual significant relationship between overconfidence and the formation of EI in other studies, the insignificance of the relationship might be attributed to the data analyzing methods and techniques employed by this research. The following sections accounts for these three possibilities.

Although some prior empirical studies have failed to demonstrate a connection between overconfidence and start-up decisions by potential entrepreneurs (Lowe and Ziedonis, 2006), most of the prior studies suggest a significant relationship between overconfidence and entrepreneurial process (Simon et al., 2000; De Carolis and Saporito, 2006; Hayward et al., 2006; Koellinger et al., 2007; Townsend et al., 2010; Trevelyan et al., 2008). The results about the relationship between overconfidence and EI in the structural model are

not inconsistent with the studies that support the relationship. This inconsistency motivates the researcher to seek explanations with reference to the differences in the methods used by the present and prior studies. The majority of the prior research relies mainly on binary correlations or regression techniques. If the binary regression method is used, overconfidence and EI are also significantly correlated, as can be revealed in the measurement model of this research. But these piecemeal or less robust measurement techniques assume that the factors other than the two constructs in question should exert no influence. This assumption is not consistent with both the theory and the reality. EI is a complex phenomenon that allows many factors to come into the play at the same time, the simultaneous measurement of multi-item constructs and the correlations among these constructs are important, which is enabled by the SEM technique. *“By accounting for error in the measurement of individual items, SEM allows a more meaningful gauging of substantive relationship among constructs”* (McGee et al., 2009, pp: 983).

Although the inconsistency can be partly explained and supported by the methods used by this study, if this inconsistency cannot be explained theoretically by introducing some appropriate auxiliary propositions or assumptions, the structural model proposed by this study would be invalidated. The auxiliary propositions are as follows. Whether one believes that he has the ability does not count in one’s entrepreneurial career decision, but whether one believes he has control over his success does count. This logic suggests that people don’t think the ability decides the outcome. This logic fits well with the data results presented in the measurement model that suggest a low but significant correlation between overconfidence and illusion of control. If the low correlation between one’s perception of his ability and on his control on the rate of success can be explained theoretically, then the structural model proposed in this research can still withstand the empirical tests.

Many prior studies (Carlisle and Flynn, 2005; Kambil et al., 2006; Fu et al., 2006; Puffer et al., 2010; Chen, 2011) suggest that people believe that guanxi (relationship) but not ability determines whether a person will succeed in nearly all social arenas in China. If one has high ability but not well related to a group of significant people, then one may think that he/she has no chance of success. On the contrary, if one has a good relationship network, then one may think that he/she will succeed regardless of their ability. This way of thinking is also very prominent among Chinese university graduates who face career choices. For

example, according to China Youth Daily, the results of a survey conducted in Chongqing disclosed that 44.8% of the university graduates believe that the most important way of starting a career relies on all kinds of social relationships or *guanxi* of the family and friends. Similar surveys were conducted by many universities and *guanxi* is always considered as a significant factor that influences graduates' career decisions in China. This way of thinking explained why respondents don't regard their ability is related to whether he or she chooses the entrepreneurial career.

In summary, although the present findings clearly indicate a significant relationship between cognitive bias and the formation of EI, it seems premature to conclude that cognitive bias cause the formation of EI. In fact, two points suggest that the relationship between cognitive bias and EI formation may be more complex than it has been assumed. First, not all cognitive biases lead to the formation of EI. For example, such cognitive biases as overconfidence might be the consequence rather than the causes for the formation of EI. We need to design longitudinal research to identify the cognitive bias that are causal and which are consequences. Second, more constructs of cognitive biases and its social sources (such as *guanxi*) should be included in the theoretical model so as to achieve better explanatory power in different cultural and social backgrounds.

6.2 Social Network Properties and Cognitive Biases

Overall, the findings of the study suggest that the characteristics of an individual's social network can affect whether the individual make cognitive errors during the entrepreneurial career choice decision. As noted in the hypotheses setting section of the thesis, there are strong grounds for predicting these relationships (Scherer et al., 1989; Busenitz and Barney, 1997; Camerer and Lovo, 1999; Krueger et al., 2000; Simon et al., 2000; Simon and Houghton, 2002; Zhao et al., 2005; Baron and Ensley, 2006; Baughn's et al., 2006; De Carolis and Saporito, 2006; Van Auken et al., 2006; Carr and Sequeira, 2007; Baron, 2008; Townsend et al., 2010; De Carolis et al., 2009; Hmieleski and Baron, 2009). Positive evaluations on the successfulness of the entrepreneurs in his/her social networks often contribute to an individual's confidence in his or her ability to create a new venture and

affect the individual's illusion of control over the events during the entrepreneurial process. Network supports have similar effects on overconfidence and illusion of control as well. It is important to note, however, that other evidence suggests that the intensity of past interactions with entrepreneurs sometimes cannot significantly exert influences on overconfidence. Research shows that successful entrepreneurs become less confident as they accumulate more experiences with various activities in the entrepreneurial process (Hogarth and Karelaia, 2012). If an individual interacts intensively with those successful entrepreneurs in his/her social network, the vicarious learning effect can make him/her less confident with entrepreneurial activities than those who do not communicate deeply with successful entrepreneurs. Thus, although the present findings clearly indicate a positive relationship between the characteristics of an individual's social network and his/her cognitive properties in the entrepreneurial career choice decision, it seem premature to conclude that relationships between any one type of social network characteristics and entrepreneurial cognitions is always present. In fact, these characteristics can influence each other to form a combined influence.

After setting the correlations among the three social network characteristics: the intensity of the prior interaction with entrepreneurs in one's social network (IPI), the evaluation positivity of the entrepreneurs in one's social network (EP), and the support from one's network (NS), the revised structural model fits the reality better. Although the test results of the measurement model show that any of the variables related to the characteristics of an individual's social network is significantly related to any of the variables about an individual's cognitive properties, the test results of the modified structural model do not support the significant relationship between IPI and OC. The change from significant to insignificant with regard to the relationship between IPI and OC would be the consequence that some of the relations between latent variables are constrained to be zero in the structural model. For example, the coefficient of correlation between IPI and EP, IPI and NS, and EP and NS are constrained. If the limits are lifted, then IPI can influence OC via EP or NS. The lift of the constrained relationship can explain the differences in the test results in the measurement and structural model. However, after these constraints are lifted, the results suggest that any of these characteristics can exert influences alone on cognitive bias. In addition, the three characteristics can exert combined influences. These results are in agreement with the results reported in other studies (Van Auken et al., 2006, Scherer et al.,

1989, Sequeira et al., 2007, Carr and Sequeira, 2007, Baughn et al., 2006). But these studies examined the three characteristics separately unlike the present research, where all the three aspects are included in one measurement scale to measure the characteristics of one's social network. The three characteristics are correlated but the size of the effect is small, suggesting that they are measuring different aspects of the same thing. As such, this research has a contribution with regard to the gauging of an individual's social capital related to entrepreneurial intention generation.

6.3 Social Network Properties and Entrepreneurial Intentions

Overall, the results presented in the measurement model suggest that an individual's social network properties can directly affect the entrepreneurial formation process. IPI, EP, and NS are reported to be significantly and positively related with EI. As hypothesized in chapter 3, there are strong grounds for predicting such a relationship (Greve and Salaff, 2003; Baughn et al., 2006; Van Auken et al., 2006; Carr and Sequeira, 2007; Koellinger et al. 2007; Liñán and Santos, 2007). Individuals can learn vicariously from the entrepreneurial experiences of other people in their social networks. Individuals may be involved in various types of interactions with those entrepreneurs in their social networks. They may develop positive evaluation toward the successfulness of these entrepreneurs. In addition, they may receive help from various types of ties in their social network. This type of entrepreneurship related social capital may facilitate individuals to choose to be entrepreneurs during their career choice decisions. The present results indicate that any of the three individual's social network characteristics can influence the formation process of entrepreneurial intentions and these three characteristic can combine to exert an influence on the entrepreneurial career choice. It is important to note, however, that empirical evidence from prior research suggest that the effects of social capital on the formation of entrepreneurial intentions are small (De Carolis, et al., 2009) and indirect effects may exist (Krueger, 2000; Carr and Sequeira, 2007; Koelinger et al. 2007).

The link between an individual's social capital and the formation of entrepreneurial intentions is an intuitive connection and one that has been frequently assumed to be

positive (Scherer et al., 1989; Krueger, 1993; Krueger, 2000; Baughn et al., 2006; Van Auken et al., 2006; Carr and Sequeira, 2007). Empirical evidence concerning this relationship has, however, generally low values in coefficients of correlation or other relevant statistics that denote the strength of the relationship (Greve and Salaff, 2003; Koellinger et al. 2007; Liñán and Santos, 2007; De Carolis, et al., 2009). These findings of weak relationships in prior research may be due, in part, to the fact that social capital relevant to entrepreneurship context rather than that in generic sense may influence the entrepreneurial intentions formation process. For example, social capital measured in the general sense of bonding and bridging is found to be weakly correlated with the progress of new venture including the formation of the respondents' entrepreneurial intentions (De Carolis, et al., 2009). It is possible that one has a cohesive social network that is rich in structural holes, but most of the ties in the network are negative toward an entrepreneurial career and positive toward choosing a political career. In this case, the brokerage effects across structural holes may lead the individual to choose a political career and the density and cohesiveness of the ties ensure that this choice can be successfully fulfilled. As such, if social capital is not measured with reference to the contexts of entrepreneurial process, the results of the relationship between social capital and various entrepreneurial activities would be weak or insignificant.

The line of reasoning that constructs should be measured with reference to their context is supported by previous research that examines the role that cognitive properties (for example, self-efficacy) play in the entrepreneurial intention formation process (McGee et al., 2009). Domain specific measures of social capital should be introduced to identify the relationship between social capital and various activities in the entrepreneurial process. Although it is always difficult to move from general to domain specific measures of social capital, this thesis tentatively suggest that structural, relational, and cognitive dimensions of social capital can be measured by network support, intensity of past interaction, and positivity in evaluation respectively and hence, affect the formation of cognitive biases and entrepreneurial intentions. Only future research can better refine the measurements of the entrepreneurship related social capital and fully examine its relationship with various cognitive properties. Contrarily, the present findings strongly suggest that entrepreneurship related social capital indeed, can affect the formation of cognitive biases and entrepreneurial intentions.

Considering that other variables are likely to mediate the relationship between an individual's social network characteristics relevant to the entrepreneurial process and the formation of the entrepreneurial intentions, the effects can be divided into direct and indirect since social network characteristics can influence cognitive properties which in turn can affect the formation of the entrepreneurial intentions, suggesting a possible mediating role played by cognitive properties in the relationship between social network characteristics and the formation of entrepreneurial intentions. There is full mediation and partial mediation (Hair, et al., 2010). The following section discusses full or partial mediation and the role played by cognitive bias constructs: overconfidence and illusion of control.

The findings of the present research show that IPI can directly influence EI, which is in line with the research results of Van Auken et al. (2006). In addition, illusion of control(IC) can partially mediate the relationship between IPI and EI, that is to say, IPI can indirectly influence EI via IPI's effects on IC. The direct effects that IPI has on the formation of EI have been explained earlier. The mediating role of IC can be accounted for as follows. As an individual has interacted more and more deeply with successful entrepreneurs in his/her social network, the individual is more likely to be exposed to details of entrepreneurial activities and develop more knowledge about the key success factors of running a new venture. These experiences and knowledge may lead the individual to falsely believe that when he/she runs a new venture, he/she is sailing in chartered water and believe they can control the outcome of the new venture as well as the successful entrepreneurs in their network. But in fact the individual's start-off process is more like sailing in uncharted than in chartered waters, because seeing and doing are quite different. This might explain the relationship between IPI and IC, which has received less discussion by other researchers and this research makes a contribution. In this case, the chance of success is over estimated and according to the results of the present research this overestimation of good outcomes (referred to as illusion of control) may lead to the formation of the entrepreneurial intentions.

Illusion of control partly explains the relationship between IPI and EI, but there is still some of the relationship between IPI and EI that is not explained away by the mediator IC,

because when the meditating effects are considered, the direct effects are still significant. Unlike IC that plays a partial mediating role between IPI and EI, IC plays a full mediating role in the relationship between EP and EI, and in the relationship between NS and EI. The section below first explains the full mediating role played by illusion of control before moving on to point out that not all cognitive biases can mediate the relationship between entrepreneurship related social capital and the formation of the entrepreneurial intentions.

When the mediating construct IC is included in the structural model, the relationship between EP and EI and between NS and EI are no longer significant, indicating complete mediation. These results may suggest that an individual's entrepreneurship related social capital can decide whether he/she can develop EI or not on the condition that the social capital can make him/her to believe that under his/her control he/she may succeed in the new venture creation process. Even though one's entrepreneurship related social capital may increase his/her perceived entrepreneurial abilities, it does not influence the formation of EI. The direct relationships between EP and EI and between NS and EI presented in the measurement model seem to be spurious. If EP and NS do not change one's perception of the probability of success in creating the new venture, EP and NS are irrelevant to EI. At the micro level, an individual may choose to create a new venture in the area where he or she has the vital *guanxi* or relationship (measured by the network support). An individual that has many relationships in business area A may not choose to create a new venture in business area B, and an individual having *guanxi* in a political career does not consider an entrepreneurial career. These findings are also in line with similar studies that show social capital variables can indirectly influence the intentions to create new ventures via some mediating variables (Liñán and Santos, 2007, De Carolis et al., 2009).

Although the present findings clearly indicate that some cognitive biases (for example, illusion of control) mediate the relationship between social network characteristics and the formation of EI, it seems inappropriate to conclude that other cognitive biases also mediate the relationship. In fact, the results achieved from the current sample of the respondents suggest that overconfidence cannot mediate the relationship between entrepreneurship related social capital and the formation of EI. As discussed earlier, if people think that they have entrepreneurial skills, but they believe that they have no control over the events during the entrepreneurial process because they lack the crucial *guanxi*, then they may

choose not to start-up. The findings of many previous studies indicate that culture and institutional factors may decide the formation of entrepreneurial intentions (Griffiths et al., 2009; Gurel et al., 2010; Prodan and Drnovsek, 2010). In sum, taking these results into account, this thesis suggests that only some of the cognitive bias mediate the relationship between social network properties and the formation of EI. Among those cognitive biases that play mediating roles, some relationships between social capital and EI are fully mediated, and others are partially mediated. Only future research can do more to identify more cognitive biases that may mediate the relationship between entrepreneurship related social capital and the formation of EI.

6.4 Theoretical Contributions

This section brings up the major contribution to the extant literature body. Other contributions such as to managerial practice and policy choice will be discussed together with the research implications in Chapter 7. Prior studies seldom use domain specific scales to measure social capital, a crucial influencing factor in the entrepreneurial career choice decision. General scales do not consider the role of prior vicarious entrepreneurial experiences within an individual's social network. However, many previous studies have found that prior entrepreneurial experiences can significantly influence whether an individual would like to choose to be an entrepreneur. To fill this gap, this research infuses vicarious entrepreneurial experiences into the constructs of social capital in the field of entrepreneurship by introducing *intensity of prior interactions*, *positive perception of entrepreneurial experience*, and *network support* into the new measurement scale. The results show that this specially designed scale has passed the reliability and validity tests. As such, this research has contributed to a way of measuring social capital from the perspective of vicarious entrepreneurial experiences present in an individual's social network. This scale will be very useful particularly in future studies that examine the effects that social capital have on one's entrepreneurial career choice decision.

Many prior studies have investigated the direct relationship between social capital and certain phenomenon in early entrepreneurial processes (e.g. entrepreneurial intentions).

However, these studies often find very weak correlations or statistically insignificant (though logically sound) relationships between social capital and entrepreneurship. These outcomes might be caused by ignoring mediating effects of such variables as cognitive bias, which is widely used to explain entrepreneurship. In addition, prior literature also reveals that the link between social networks and cognitive bias are under-researched. To address these gaps, this research has investigated the relationship between social capital and cognitive biases and finds that social network properties can significantly affect certain types of cognitive bias. Furthermore, the findings of this research indicate that certain types of cognitive biases (e.g. illusion of control) can mediate the relationship between social network properties and the formation of entrepreneurial intentions. These findings seem to support the integrated perspective and framework that this research proposed in Chapters 2 and 3 to explain why some people but not others choose to be entrepreneurs. As such, this research has made contributions to the focal area in that it is among the early research attempts aiming to introduce cognitive factors to mediate the relationship between entrepreneurial related social capital and the formation of entrepreneurial intentions. Prior studies often use a single group of factors to explain the formation of EI, and only recently have integrative perspectives been proposed that take into account multiple groups of factors.

Early investigation of the roles of cognitive biases in start-up processes failed to provide clear or consistent findings (Hayward et al., 2006; Hogarth and Karelaia, 2012). These disappointing results may be attributed to the inappropriate handling of the process of new ventures as one smooth stage. In fact, the early start-up process can be divided into several sub-stages, gestation is among one of these stages in which the formation of entrepreneurial intentions is the earliest phase. Cognitive biases play different roles at different stages. If these stages are regarded as belonging to one continuous process, the positive and negative effects of a certain cognitive bias may cancel each other out. To fill this gap, this research, focusing on the role of cognitive biases in the start-up process has been based on partitioning the process into stages or episodes and carefully selecting measures in order to improve research design. The resulting findings provide evidence that such cognitive factors as overconfidence and illusion of control do facilitate the formation of entrepreneurial intentions.

Although an integrative perspective is increasingly used in the literature to solve the problem of why some people but not others choose to be entrepreneurs, many of the studies focus on whether relationships exist between social capital, cognition, and entrepreneurship using correlation or regression methods. The direction of the relationship cannot be verified by using these methods. It is not clear which factors are causes and which factors are the effects. To remedy this limitation of prior studies, this research chooses Structural Equation Modeling (SEM) which hypothesizes a model that contains all the relationships and their directions before the statistical tests are conducted. The parameters of the model are then simultaneously estimated to examine whether the data fit with the theory. By using this method, this research finds that overconfidence does not lead to the formation of EI. Although both this study and many prior studies support the significant relationship between overconfidence and EI, it is possible that the formation of EI leads an individual to feel overconfident. This finding indicates that it is very important to examine the functions and roles of the methods before conducting analysis to explain the reasons of entrepreneurial career choice, in this sense, this research makes a contribution.

6.5 Summary

Although results from the measurement model support cognitive bias including overconfidence and illusion of control are significantly related to the formation of EI, the hypothesized causal direction that overconfidence leads to the formation of EI is not supported by the data. The reasons are as follows. First, these results may suggest that overconfidence is a consequence of the EI formation process rather than its cause. Second, these results are achieved because illusion of control absorbs most of the effects that cognitive bias constructs have on EI formation. Third, the simultaneous measurement of multi-item constructs and the correlations among these constructs may highlight the overall effects, though some paths may become insignificant. Fourth, guanxi (relationship) plays an important role in EI formation but it is not included in the model and does not have an effect on one's judgment of their entrepreneurial capabilities. University graduates in China think that guanxi (or relationship) plays a very important role in career choice. Guanxi can change one's perception on his/her control over the success of the new venture.

The results in the measurement model show that any of the three variables of an individual's social network characteristics are significantly and positively related to overconfidence and illusion of control. However, the relationship between the intensity of the past interaction with entrepreneurs in one's social network and overconfidence become insignificant in the structural model. Successful entrepreneurs often get less confident and the interactions with them make an individual less confident about his/her entrepreneurial abilities. But the intensity of the past interactions may exert influences on overconfidence and illusion of control via the effects that it has on EP and NS.

Although it is always difficult to move from general to domain specific measures of social capital, this thesis tentatively suggest that structural, relational, and cognitive dimensions of social capital can be measured by network support, intensity of past interaction, and positivity in evaluation respectively and hence, affect the formation of cognitive biases and entrepreneurial intentions. Any of the three individual's social network characteristics can influence the formation process of entrepreneurial intentions and these three characteristic can combine in some way to exert an influence on the entrepreneurial career choice. The effects of social network characteristics on the formation of EI can be direct or indirect. IC (illusion of control) partially mediates the relationship between IPI and EI and fully mediates the relationship between NS and EI and the relationship between EP and EI. Not all cognitive biases may mediate the relationship between social network properties and the formation of EI. Among those cognitive biases that play mediating roles, some relationships between social capital and EI are fully mediated, and others are partially mediated.

CHAPTER 7 CONCLUSIONS AND LIMITATIONS

This research started with the motivations to advance academic literatures and to contribute to managerial practice, while an immediate purpose also lies in the study that would offer suggestions for various levels of Chinese governments, which are interested in making policies by which the governments can encourage graduate entrepreneurship. With reference to the findings by this research, this chapter firstly provides the highlight (or the conclusion) of major findings, against the extant literatures, which is an extended discussion of Chapter 6. Then, it presents seven pieces of policy suggestions. Finally, this chapter points out some limitations of this research and some areas that may constitute a significant research agenda for the near future.

7.1 The Findings against the Aims of Theory Advancement

The first objective of this research is to contribute to the understanding of the evolution of different theoretical perspectives in explaining why some people but not others choose to be entrepreneurs. Researchers in this field have experienced many breakthroughs and setbacks whilst attempting to provide an explanation to this focal question (Shane and Venkataraman, 2000; Gregoire et al., 2006). Early efforts focused on the search for differences between entrepreneurs and non-entrepreneurs with regard to personality (Stewart and Roth, 2007; Zhao et al., 2010). Scholars have hypothesized that such major traits as risk propensity (Cromie, 2000; Thomas and Mueller, 2000), need for achievement (McClelland, 1965, 1987), locus of control (Brockhaus, 1975), ambiguity tolerance (Dollinger, 1983) can be employed to predict who may choose an entrepreneurial career. However, the opponents have challenged trait theory by arguing that those who do not choose to be entrepreneurs have similar traits as those who choose (Mancuso, 1975; Brockhaus, 1980).

For example, the results of an empirical research conducted by Brockhaus (1980) show that entrepreneurs are not significantly different from managers and the general public with

regard to the risk taking propensity. Furthermore, the results of the empirical research of Mancuso (1975) also suggest that successful entrepreneurs are moderate risk takers. The role of needs for achievement is also debatable in front of empirical observations. For example, Begley and Boyd's (1987) empirical study suggests that managers have higher needs for achievement than entrepreneurs do. Cromie and Johns (1983) did not find any significant difference between managers and entrepreneurs in terms of need for achievement. The role of locus of control is also contentious given its inconsistency with empirical findings. Boone and Brabander (1997) suggest that the relationship between locus of control and entrepreneurship cannot be identified clearly, and according to Cromie (2000), the results of some studies do not support that entrepreneurs and managers differ significantly on locus of control. The role of ambiguity tolerance is also questionable. For example, Wagener et al. (2010) used data collected from 194 business owners and found that ambiguity tolerance is not a typical personal characteristic universally present across all entrepreneurs and only a small portion of entrepreneurs has this entrepreneurial characteristic.

For empirical studies, early research attempted to compare entrepreneurs with non-entrepreneurs to infer the traits that are specific to entrepreneurs (Stewart and Roth, 2007), but the empirical results are equivocal (Zhao et al., 2010), jeopardizing the legitimacy of entrepreneurship as a research domain (Shane and Venkataraman, 2000), and forcing scholars to shift from trait theory to other theoretical perspectives that may explain the focal question (Gregoire et al., 2006). From a careful examination of the question "why do some people but not others choose to be entrepreneurs", this study suggests that research can find that the question has at least two meanings. Firstly, it may seek an answer to the question of why a particular group of people choose to be entrepreneurs, which aims to find the difference between entrepreneurs and non-entrepreneurs. This would be better solved using variance analysis (Hair et al., 2010). Secondly, research may seek to answer the question such that why one chooses the entrepreneurial career through the exploration of the factors that can affect entrepreneurial career choice by certain causes and effects, the causal-effect relationship. This approach would be advantageous in resolving ambiguity related problems, while prior research lacks a precision in establishing the confirmatory techniques for examinations (see Hair et al., 2010). Although the variance part of the question could be abandoned through lack of empirical support, the research on the

relationship part on the other hand has gained some ground in the analysis that follows.

With the shift from variance analysis to relationship analysis, scholars have changed the focus from the person to the entrepreneurial opportunity, the domain defining concepts for entrepreneurship research (Shane and Ventataraman, 2000). If the issue has little to do with intention but opportunity, new questions follow: what is the origin of entrepreneurial opportunities? Kirzner (1973) argues that it is the asymmetry in the distribution of information and knowledge idiosyncrasy that determines who can discover the opportunities (Kirzner, 1973). In other words, taking advantage of the knowledge that are known only to themselves, alert and bold entrepreneurs then use their imaginations to discover the hitherto unnoticed opportunities which are also a surprise to them (Kirzner, 1973). However, even though all pieces of information that form an opportunity are presented before an individual, the individual may still fail to identify the opportunity. Entrepreneurial opportunities do not automatically emerge without cognitive processes present at the first place. That is to say, prior knowledge should be combined with cognition to form a sufficient condition for the choice of an entrepreneurial career. In addition, cognition not only influences who can identify an opportunity, but also the perceived desirability and feasibility of the decision to create a new venture (Krueger, et al. 2000). As such, some scholars focus their attention to investigate the role of cognitive mechanisms in an individual's entrepreneurial career choice (Baron, 1998; Mitchell et al., 2004).

Consequently, the above also has implications for theory advancement. For instance, entrepreneurial cognition theories emphasize the think-doing link and can be used to explain many phenomena in the entrepreneurial process (Mitchell et al., 2004; Mitchell et al., 2007). However, individuals often face dynamic and complex environments when they are confronted with entrepreneurial career decisions. Under this circumstance, Simon (1990) and Gigerenzer and Gaissmaier, (2011) argue that problems with cognitive mechanisms and the structures of the information in the environment form two sets of bounds to rationality. This research shows that uncertain and complex environment very often, if not always, lead potential entrepreneurs to follow heuristic decision-making principles, which lead to certain cognitive errors or biases (Gigerenzer and Gaissmaier, 2011). Heuristics can be biased and individuals have to overcome the 'black box' of mental

constraints in choice to be made in complex environments (Levinthal, 1997; Zajac and Bazerman, 1991). The reality is that different people have different patterns of recognition (Baron and Ensley, 2006). And research in threat-rigidity theory has argued that due to human inefficacious cognition one can respond to identical situations differently (Chattopadhyay et al., 2001). As such, the remaining question: why do individuals use certain types of cognitive mechanisms instead of others when they are contemplating whether to start up their own ventures, rather is a more holistic picture that may emerge to demand new answers, under new or a changing social-organizational environment. To this end, related studies can be conducted across nations and space of time by building upon the measures and survey questions developed by this thesis.

Using cognitive mechanisms to predict who may choose to be entrepreneurs is not appropriate without considering the source for cognitive mechanisms. Mitchell et al. (2007) indicates that the core of entrepreneurial cognition theories focus on how the interaction between entrepreneurial environments and cognitive properties affect individual attitudes, intentions, and the behaviors of entrepreneurs. In other words, entrepreneurial cognition theories assume that contextual factors play an important role. Social and culture factors are among those contextual factors that may influence an individual's cognitive properties (Todd and Gigerenzer, 2003).

Social capital, as a multi-faceted and multi-dimensional social phenomenon (Lee, 2009), can be better approached by way of understanding from three dimensions proposed by Nahapiet and Ghoshal's (1998) which are structural, cognitive, and relational dimensions. Social structure renders competition in the market imperfect. Structural holes facilitate an individual to identify entrepreneurial opportunities (Burt, 1992), and dense and cohesive networks ensure that the opportunities can be realized (Coleman, 1988). The relationships with the contacts in his social network forms for the individual the social capital three dimensions: structural, relational, and cognitive. The differences in social capital among individuals can influence who will be entrepreneurs (Coleman, 1988; Burt, 1992). Social capital may directly affect whether an individual choose to be entrepreneurs.

The implications for developing theoretical frameworks include the above discussion, which has led one to an analytical framework that is motivated by the progress of science

developed by Popper (1972) and Lakatos (1970, 1978). In this respect, the study of this thesis has developed a holistic approach with the critical evaluation of how knowledge has developed regarding entrepreneurial career decisions. The research findings show that although various perspectives and approaches are chosen to explain entrepreneurship phenomenon, the main stream of studies have developed and shared a clear hard core: the difference assumption, that is, entrepreneurs and non-entrepreneurs are different in certain aspects. Protecting belts are also formed outside this hard core. Differences in specific aspects such as demographic features, entrepreneurial opportunity identification, cognitive properties, social capital, just to name a few, form the protecting belts and guard the hard core from direct refutation. It would seem that the protecting belts rely on different theoretical perspectives that bring the generally accepted concepts from corresponding disciplines to the entrepreneurship domain. As such, there are now different theoretical angles one can start from to understand entrepreneurial intentions, with each angle bearing the research paradigm of its discipline. It seems that the domain is a little fractured, fortunately, these different theoretical angles can be commensurate, as a result, a growing number of scholars have been making attempts to integrate different perspectives to unite the fragments and explain this complex problem (Simon et al., 2000, De Carolis and Saporito, 2006; Ozgen and Baron, 2007). As the first objective is thus met, this thesis has made a contribution by applying the analytical tools from the philosophy of knowledge, for example, the analytical framework of the progress of science by Popper (1934, 1972) and Lakatos (1970, 1978), to critically reflect and provide a more holistic picture of the nature of knowledge and its development in the entrepreneurship domain. Hence this thesis is among the earliest attempts to apply this analytical framework in the entrepreneurship research field.

For establishing a theoretical framework, the second objective of this study is to draw on theory from both study fields of social networks and individual cognition and to develop them towards a model that can predict who may engage with EI in a more comprehensive way. Frameworks, theories and models are sets of assumptions of the relationship between concepts of interest (Ostrom, 2010). Frameworks are metatheoretical devices that help provide a general language for describing relationships at multiple levels and scales. Scholars develop specific theories by picking working parts of a framework to form core assumptions to explain diverse outcomes and their relationships. Models make precise

assumptions about a limited number of variables in a theory and form very specific working examples of a theory. As such, this research argues that frameworks, theories, and models are in a nested manner ranging from general to precise.

Back to the prior point of research developments, as discussed above, the further implication is there are always competing assumptions used to explain the emergence of entrepreneurial intentions but with no single set of assumptions that can be applicable under all the settings. By an evaluation of 51 journal articles that investigate the factors leading to an individual's generation of EI, this thesis classifies these factors into two overarching concept categories: individual and environmental factors, and then subcategorizes each category according to the meanings of each proposed factor. Individual factors can be subcategorized into: demographic profiles (Crant, 1996; Reynolds, 1997; Kristiansen and Indarti, 2004; Sequeira et al., 2007; Wilson et al., 2007; Gurel et al., 2010; Barnir et al., 2011), personality (Stewart and Roth, 2007; Zhao et al., 2010), cognition (Mitchell et al., 2004, 2007), personal experience (Zhao et al., 2005; Judy et al., 2005; Kautonen et al., 2010; Prodan and Drnovsek, 2010), and other variables. Environmental factors can be subcategorized into political (Griffiths et al., 2009), economic (Raijman, 2001; Kristiansen and Indarti, 2004; Choo and Wong, 2006; Griffiths et al., 2009; Prodan and Drnovsek, 2010), culture (Griffiths et al., 2009; Gurel et al., 2010), and social environmental aspects (Crant, 1996; Autio et al., 2001; Judy et al., 2005; Hmieleski and Corbett, 2006; Van Auken et al., 2006; Carr and Sequeira, 2007; Sequeira et al., 2007; Liñán and Santos, 2007; Turker and Senem, 2009; Gurel et al., 2010; Kautonen et al., 2010; Walter, 2010; Barnir et al., 2011). Based on concepts presented in the framework to explain the formation of EI in the prior literature, this thesis designed a theoretical framework that includes three groups of concepts, namely, environmental factors, individual factors, and entrepreneurial intentions. The framework argues that both individual and environmental factors can directly influence one's entrepreneurial career choice decision, and environment factors can indirectly affect EI via the mediation of individual factors.

After setting what concepts should be in the framework, the next step is to consider how these concepts should be assumed to be related by theories. Bird's (1988) framework introduced the concept of entrepreneurial intentions into the field and allowed for various

theories to assume the relationship between concepts within the framework. However, the dominant theory in this field is the Theory of Planned Behavior (TPB) (Ajzen, 1991, 2002). By combining with theoretical perspectives in the entrepreneurship domain, TPB moved from general to domain specific (Krueger et al. 2000). The other theoretical development is that single theory explanations gave way to combinations of theories. This research combines social capital and cognition theories and is among those early attempts to integrate multiple theoretical lenses in search for the reasons causing entrepreneurial intentions. This thesis applies social capital theory to the contexts of entrepreneurial intentions and proposes that social capital would be represented by one's social network properties that can be measured by the dimensions below: the intensity of interactions with entrepreneurs in one's social network, the positivity of the perceptions of entrepreneurial experiences in one's social network, and the network support if one choose to be entrepreneurs.

More precisely, guided by the framework and theories, this thesis proposed a model that chooses overconfidence, illusion of control, and representativeness to represent certain aspects of cognitive mechanisms. Social network properties influence ways of thinking in the entrepreneurial career choice decision process, and the ways of thinking directly determine whether one would like choose to be entrepreneurs. In addition, social network properties may directly influence an individual's entrepreneurial career decision. Hypotheses are posed according to this model. The resulting findings of this research provide evidence that cognitive factors and entrepreneurship related social capital do matter: they are significantly related to the formation of entrepreneurial intentions and certain types of cognitive bias (e.g. illusion of control) can play a mediating role. Through the achievement of the second objective, this thesis has made a contribution of theory advancement that specifically relates to the argument that one's social network directly influence how one's cognition shapes the generation of EI. Hence one of the contribution of this thesis lies in the filling of the gap in the prior literature that have ignored mediating effects of such variables as cognitive biases in determining who may choose to be entrepreneurs (Hayward et al., 2006; Camerer and Lovallo, 1999; Koellinger et al., 2007; Trevelyan, 2008; Baron, 1998; Busenitz and Barney, 1997; De Carolis and Saporito, 2006; Simon et al., 2000; De Carolis et al., 2009).

Regarding the third objective of this research of design, the procedures can shed light on future research, in terms of hypothesis testing, refine, and confirmations of the scales of measurement, in relation to individual social network characteristics, relevant cognitive properties. Three sets of constructs should be measured according to the theoretical model proposed for this research and the hypotheses posed. The first set comprises only one construct: Entrepreneurial Intention (EI). The second set contains three constructs that are used to represent cognitive bias including: Overconfidence (OC), Illusion of Control (IC), and Representativeness (RE). The third set includes four constructs that are employed to indicate dimensions of an individual's social network properties in terms of social capital: Experience Breadth (EB), Intensity of Prior Interactions with entrepreneurs in an individual's social network (IPI), Experience Positivity (EP), and Network Support (NS). This research critically reviews scales, as instruments, which have been developed by prior studies to measure constructs similar to those listed above. With this intention, the thesis critically analyzed the requirements for how these constructs should be operationalized, such as the number of items and dimensionality.

EI is a phase within the entrepreneurial process and includes a series of actions that are supported by a positive entrepreneurial orientation. With reference to Zhao et al. (2005), Baughn et al. (2006), Carr and Sequeira (2007), and Thompson (2009), this research designed a 6-item measurement scale to measure the extent to which an individual has EI. Overconfidence is a variable defined for evaluating if one may overestimate his/her knowledge, skills, and ability with regard to the creation of a new business (Simon et al., 2000; Hayward et al., 2006; Koellinger et al., 2007; Townsend et al., 2010). Scholars often use self-efficacy as a proxy in measuring overconfidence (Koellinger et al., 2007; Townsend et al., 2010; Trevelyan, 2008). A high score in self-efficacy indicates a higher score in self-confidence. Referring to the above studies, this research designed a domain specific 5-item multi-dimensional scale to evaluate overconfidence. Illusion of control focuses on one's certainty in their ability to master and predict difficult-to-control, future business events (Simon et al., 2000). The degree of illusion of control is assessed by the extent to which an individual wrongly believes that he or she can accurately predict and control future business events, as Simon et al. (2000) revealed, so this research adapted Simon's et al.'s (2000) 6 items to measure illusion of control. Representativeness is a variable used to identify the extent to which an individual can generalize about a person or

a phenomenon based on only a few observations of a specific phenomenon (Busenitz and Barney, 1997). This construct is assessed based on various real-life strategic decisions scenarios to be given to the respondents. Two scenarios adapted from Busenitz and Barney (1997) were provided with each containing two competing alternatives, one of which favors decisions based on statistical information and the other endorses heuristic reasoning.

Entrepreneurial experience breadth identifies how extensively an individual is exposed to the entrepreneurial experiences in his social network. With reference to measuring methods adopted by Carr and Sequeira (2007) and Krueger et al. (2000), this research used nine questions to ask whether a respondent's nine different social ties ever started a business. Intensity of Prior Interactions with entrepreneurs in an individual's social network refers to the depth of communication between respondents and the entrepreneur in their social networks. This research designed six questions derived from Van Auken et al. (2006) measuring the experience intensity. Experience Positivity measures the extent to which respondents feel positive toward entrepreneurial experience in their social network. Based on the instruments used by Krueger et al. (2000) and Scherer et al. (1989), this research used five items to capture the respondents' subjective evaluations of the performance of the entrepreneurs in their social network to measure the EP construct. Network support refers to whether respondents' network ties support them to start a new business. (Carr and Sequeira, 2007; Sequeira et al., 2007; Baughn et al., 2006). This research supports Baughn's et al. (2006) multi-dimensional items in measuring network support and used three items to measure the emotional support, the joint support, and the help support that respondents may enjoy from various kinds of social ties.

According to these definitions of latent and manifest variables in a SEM model (Hair, et al., 2010), the eight constructs thus defined and measured are latent variables or constructs, including EI, OC, IC, RE, EB, IP, EP, NS. And the items selected to measure the individual latent constructs are manifest variables. The latent construct EI is measured by six manifest variables including ei1-ei6. Similarly, latent variables OC, IC, RE, EB, IPI, EP, and NS are measured respectively by their corresponding manifest variables. The exogenous constructs (Hair et al., 2010) in the SEM models in this research are the four social network constructs: EB, IPI, EP and NS, because they are not determined by the factors within the model. The three cognitive bias variables act as dependent variables in the

relationship between social network variables and cognitive variables, but they act as independent variables in the relationship between cognitive variables and EI, so the three cognitive variables (OC, IC and RE) are endogenous constructs. The EI construct is also an endogenous construct that are determined by cognitive and social network variables.

It is clear from the above that question items used by this research to measure a construct are not usually taken directly from a single prior study, but this research has integrated question items used to measure the same or similar construct in several relevant prior studies, so the construct measure of this study has a greater degree of specificity. Under this condition, as the scales developed are applied in a specific context of the present research (before the formal survey is conducted) a pilot study was conducted to test the reliability and validity of the instruments using exploratory factor analysis to factor analyze the measured manifest variables assigned to the eight latent constructs. Principal component analysis was used to extract factors on which question items should have over 0.7 loading. The pilot study distributed a total of 106 copies of questionnaire to a group of the final-year undergraduate students in a university in Wuhan. The results suggest that the latent variable Representativeness cannot pass the reliability tests and should be dropped. The results of this pilot study also suggest that variables used to measure Experience Breadth (EB) cross-load on variables used to measure EP, IPI, and NS, so the latent variable Experience Breadth should also be deleted. After the modification, three dimensions were retained to measure one's social network property and two dimensions are still available to measure cognitive mechanisms. The modified model enjoyed improved parsimony.

Before the SEM analysis, this research also tested the data collected in the formal survey to ensure the reliability and validity of instruments used to measure EI, cognitive bias, and social network characteristics. Drawing from the results these tests for reliability and validity, it would be appropriate to say that the scales used in the formal survey fulfill reliability and validity requirements. The factors extracted fully correspond to theoretical expectations. Even if the above conclusions suggest that measures are well established, this research goes a step further to use confirmatory factor analysis to test the validity and unidimensionality of the measures. The χ^2 for the modified measurement model is 249.074 (df =155, $p < 0.001$). The model fit indices are presented as follows: CMIN/DF = 1.607,

GFI = 0.962, CFI = 0.980, RMSEA = 0.031, with the confidence interval ranging from 0.024 to 0.038, even the upper limit of confidence interval is below the recommended 0.07 cut-off points. As a result, the statistical results support the measurement model, suggesting that the hypothesis that no significant differences exist between the observed and estimated covariance matrix cannot be rejected by the evidence. Convergent validity, discriminant validity, nomological validity, and face validity are examined and the evidence suggests that the measurement model has good construct validity. The residual covariance matrix and modification indices also do not suggest any significant improvement for the modified measurement model. So far, these results have indicated that this research has contributed to a way of measuring social capital from the perspective of vicarious entrepreneurial experiences present in an individual's social network. This scale will be very useful particularly in future studies that examine the effects that social capital have on one's entrepreneurial career choice decision.

The fourth objective of this research is to identify the direct effects that one's social network has on cognition in the development of EI. Entrepreneurship related social capital is represented by the results extracted from the answers to a series of scales to measure the three dimensions of social network properties. The results in the measurement model show that any of the three variables of one's social network characteristics are significantly and positively related to such cognitive biases as overconfidence and illusion of control. However, the relationship between the intensity of the past interactions with entrepreneurs in one's social network and overconfidence become insignificant in the structural model. Successful entrepreneurs often get less confident and this thinking is passed on via their interactions with the individuals who in turn become less confident about his/her entrepreneurial abilities (Hogarth and Karelaia, 2012). But the intensity of the past interactions may exert influences on overconfidence and illusion of control via the effects that it has on EP and NS.

Although the present findings from the measurement and structural model clearly indicate a significant relationship between cognitive bias and the formation of EI, it seems premature to conclude that cognitive bias cause the formation of EI, because the findings suggest that not all cognitive biases lead to the formation of EI and more constructs of cognitive biases and its social sources (such as guanxi) may be needed to be included in the

theoretical model so as to achieve better explanatory power in different cultural and social backgrounds. The findings from the structural model support the significant relationship between illusion of control and EI, but they do not support for that relationship between overconfidence and EI, indicated by the insignificant path estimate between the construct OC and EI, which is at odds with most of the prior research about the role of overconfidence in the entrepreneurial process (Simon et al., 2000; De Carolis and Saporito, 2006; Hayward et al., 2006; Koellinger et al., 2007; Townsend et al., 2010; Trevelyan et al., 2008). This thesis proposed several possible explanations to account for this misfit of the theory to the data: overconfidence is actually a consequence of the entrepreneurial intentions formation process (Hogarth and Karelaia, 2012); other parallel relationships in the structural model may absorb the majority of the effects that cognitive bias has on the formation of EI; constructs that are not presented in the structural model can play an important role, e.g. guanxi (Carlisle and Flynn, 2005; Kambil et al., 2006; Fu et al., 2006; Puffer et al., 2010; Chen, 2011); and finally the insignificance of the relationship might be attributed to the data analyzing methods and techniques employed by this research (McGee et al., 2009; Hair et al., 2010).

Prior literature frequently find empirical evidence that supports positive relationships between an individual's social capital and the formation of entrepreneurial intentions (Scherer et al., 1989; Krueger, 1993; Krueger, 2000; Baughn et al., 2006; Van Auken et al., 2006; Carr and Sequeira, 2007). However, the empirical results concerning these relationships have generally low values in coefficients of correlation or other relevant statistics that denote the strength of the relationship (Greve and Salaff, 2003; Koellinger et al. 2007; Liñán and Santos, 2007; De Carolis, et al., 2009), which may be due, in part, to the fact that social capital relevant to entrepreneurship context rather than that in generic sense may influence the entrepreneurial intentions formation process. To cope with this problem, this research introduced domain specific measures of social capital by proposing that structural, relational, and cognitive dimensions of social capital can be measured by network support, intensity of past interaction, and positivity in evaluation respectively and hence, affecting the formation of cognitive biases and entrepreneurial intentions. As revealed by the coefficient of correlation in the measurement model, all three latent variables of one's social network properties are significantly related to entrepreneurial intentions, supporting a statistically significant relationship between them. Considering

that the three variables do influence each other, the research modified the model by setting the correlation among the three variables, resulting in the improved model fit, suggesting that the social network may exert a combined direct influence on entrepreneurial intentions. As such, the findings of the present research support the direct effects that entrepreneurship related social capital has on cognitive biases and formation of EI respectively. By using SEM methods to simultaneously estimate the parameters in the hypothesized model, this thesis has made methodological contributions in that many of the prior studies (e.g. Simon et al., 2000; De Carolis et al., 2009) that were based on integrative perspectives employed correlation or regression methods that cannot be used to verify the direction of relationship in question thus failing to identify which factor is cause and which factor is effect.

The fifth objective is to identify the mediating effects that cognitive properties have on the relationship between one's social network characteristics and the generation of EI." This research employed a two-step method to examine the mediating effects of cognitive property variables. The first step is to examine whether the relationships between the latent variables are significant in the measurement model. The results of the measurement model has identified significant ($p < 0.001$) coefficients of correlation between IPI and EI (0.385), EP and EI (0.353), NS and EI (0.318), IPI and OC (0.261), NS and OC (0.605), EP and OC (0.418), IPI and IC (0.410), NS and IC (0.360), EP and IC (0.483), OC and EI (0.269), and IC and EI (0.624). These results indicate that direct and unmediated relationships are significant between latent variables.

The second step is to establish a mediating model and evaluate the mediating effects. The findings at this step suggest that certain types of cognitive bias can mediate the relationship between one's social network properties and the formation of entrepreneurial intentions. Illusion of control can partly mediate the relationship between intensity of prior interactions and entrepreneurial intentions. Furthermore, illusion of control can fully mediate the effects that network support and positive perception of entrepreneurial experience have on entrepreneurial intentions. This might suggest one's social capital determines the formation of his entrepreneurial intentions on condition that one's social capital can make one to think that under his control he may succeed in the new venture creation. Even though one's entrepreneurial social capital may increase his perceived entrepreneurial abilities, it cannot affect the formation of entrepreneurial intentions. The

direct relationships between positive perception of entrepreneurial experience in one's social network and EI and between network support and EI presented in the measurement model seem to be spurious. If positive perceptions of entrepreneurial experience and network support do not change one's perception of the probability of success in creating the new venture, they become irrelevant to EI. These findings support the integrated perspective and framework proposed by this research to fulfil objective 2 and explain why some people but not others choose to be entrepreneurs. Up until now, these findings may tentatively support the claims of contributions made by this research to the focal area, in that it is among the early research attempts aiming to introduce cognitive factors to mediate the relationship between entrepreneurial related social capital and the formation of entrepreneurial intentions. Prior studies often use a single group of factors to explain the formation of EI, and only recently have integrative perspectives been proposed that take into account multiple groups of factors.

7.2 Policy Implications

The central and local governments in China have proposed and carried out many policy initiatives in the recent years to encourage university graduates to create their new ventures. The Speech of Chinese President Hu Jintao at the 17th National Congress of the Communist Party of China offered the strategic direction of government policies to encourage entrepreneurship among university graduates: “to *encourage entrepreneurship to create more employment opportunities*.”²To facilitate the implementation of this strategy, China State Council issued *Guiding Opinions of the State Council on Stimulating and Expanding Employment by Encouraging Business Startups* in 2008 for various levels of government and industry administrative bodies to design and conduct their policy initiatives accordingly. The *Guiding Opinion* contains five aspects. The first aspect is to unify thoughts and understand the target tasks. This aspect requires that relevant government institutions at various levels should know that entrepreneurship can improve employment, take measures to stimulate people's awareness and passion for

² The full text of the speech can be found on this webpage: <http://www.china.org.cn/english/congress/229611.htm>

entrepreneurship, and emphasize the guidance and facilitation of new venture creation by university graduate. The second aspect is to improve the entrepreneurship support policy and change entrepreneurship environment. This aspect contains suggestions to the relevant government institutions at various levels about the market access, improving government entrepreneurship administration, strengthening the policy support for entrepreneurship, and broadening the financing channel for the new venture. The third aspect is to strengthen the entrepreneurship education and improve the entrepreneurship capability of the potential entrepreneurs. The fourth aspect is to promote the government service system and provide good service to potential entrepreneurs including establishing entrepreneurship service and guidance team and information transmission platform that disseminates government entrepreneurship promoting policy, improving the communications among entrepreneurs, and providing recruitment service for the newly created ventures. The fifth aspect is to improve the leadership and organization in entrepreneurship promotion policy, strengthen the government responsibility, and create an entrepreneurship friendly social atmosphere. None of the five aspects takes into consideration people's intention to create new ventures.

Governments at various levels, industry administrative bodies and universities in China have designed and conducted their entrepreneurship promotion policy initiatives following the above guiding opinions. These policies have started with a good purpose but they also have limitations, leading to the low entrepreneurship rate among graduates and low success rate among those who were stimulated by the policy to create new ventures. If these policies were informed by the understandings of who are more likely to choose an entrepreneurial career, then the effects of these policies would be largely improved. According to the findings of this research, following suggestions are made in an attempt to offer possible future reference for the improvement of the future policies concerning encouraging graduates to choose entrepreneurial careers.

7.2.1 Informing Entrepreneurship Policy with EI Theories

A complex combination of factors is at play to cause individual to choose to be entrepreneurs. If policies that encourage entrepreneurship are based on the theory of

attributions to entrepreneurship, then the policy may improve its effectiveness by focusing on groups of people likely to benefit from government policies directed at encouraging graduates to pursue entrepreneurship as a career. This research has reviewed prior literature on entrepreneurship intentions and proposed an integrative framework from a social cognitive perspective to predict who are more likely to develop entrepreneurial intentions. The research findings can be used to inform graduate entrepreneurship encouragement policies by infusing individual (e.g. cognitive factors) and environment factors (e.g. social network properties) into criteria for the selection and evaluation of the correct group of graduates who are more likely to choose to become entrepreneurs.

The integrative framework proposed by this research, taking both individual and environment factors into consideration, proposes that an individual's social environment and his cognitive properties can form a mechanism to determine whether the individual may form entrepreneurial intentions. Yet the current policies seem show some weakness for instance, relying only on external economic incentives to lure graduate to engage in entrepreneurial activities. Graduate entrepreneurs in China are usually nascent entrepreneurs, if it is not the integrative mechanism that includes both individual and environment factors that are in place to drive and maintain their entrepreneurship interest, graduate entrepreneurs may choose to quit whenever they suffer drawbacks in the venture creation process. Furthermore, if the benefits brought by the policy incentives are deemed not to be enough to compensate the loss brought by these difficulties, then this group of graduate entrepreneurs may choose to exit, thus raising the failure rate of graduate entrepreneurship. Individual and environment factors act together to form internal motivations for a graduate to choose the entrepreneurial career. Internal motivation may offer more enduring energy for graduate entrepreneurs to challenge all difficult situations so as to realize themselves. As such, it is suggested that government may fund more studies that explore and investigate the factors that leading to the formation of entrepreneurship intentions. By applying the research results, government policies might become smarter and target those who have internal drivers for creating new ventures, instead of persuading all graduates indiscriminately to take the entrepreneurial career.

7.2.2 Testing of the Characteristics of Graduate Social Networks

This research finds that people in a graduate's social network if he chooses to start up have an impact on his entrepreneurial intentions mediated by illusion of control. This may suggest that the willingness of the social ties to support may play a more important role in the formation of his entrepreneurial intentions than how the graduate thinks independently by himself about the start-up decision. If people around him support him to start up, and if these people are perceived to be the crucial guanxi for the success of the new venture to be created, the graduate may choose to create the new venture even if he is not at all confident at his entrepreneurship related abilities and skills. On the contrary, even if the graduate has confidence in his abilities and skills, if he feels he cannot get the support of the people in his social network, he may not choose to create new ventures. As such, it is necessary to test the characteristics of the social network of the candidates that may be the target of entrepreneurship encouragement policies so that it pinpoints that those people who are more likely to create new ventures thus making most out the limited public resources available. Following the indiscriminant training policy, those who did well in the training program may choose not to start up because family and friends do not support them, rendering training investment sinking costs. Before implementing the entrepreneurship encouragement policy, it is wise to discern who are more likely to develop entrepreneurial intentions by tests of the characteristics of one's social network. These tests may help to save costs and improve policy efficiency. Regarding the scales used to measure entrepreneurship related social capital theory, the findings of this research may provide a reference or guidance to the design of these tests.

7.2.3 Focusing on Entrepreneurial Intention Formation Stage

Cognitive bias may play different role at different stages of an entrepreneurial process. The same cognitive biases that cause entrepreneurial intentions may cause entrepreneurial failure once the start-up activities have begun. This research separated entrepreneurial intention formation stage from other stages of early entrepreneurship process and the findings suggest that certain cognitive bias (e.g. illusion of control) can drive an individual

to form entrepreneurial intentions. However, current entrepreneurship encouragement policies only consider economic and other support measures after the start-up activities have been carried out. Entrepreneurial intention formation is an important and the earliest stage in the entrepreneurship gestation process and it is a necessary condition for entrepreneurial behaviors. The mechanisms that help produce entrepreneurial intentions include individual and environment factors that are different from the mechanisms that may bring a start-up to a successful venture. Guided by these findings, this research recommends that entrepreneurship encouragement policy should intervene at the entrepreneurial intention formation stage.

7.2.4 Encouraging Graduates to Interact with Entrepreneurs

Following the State Council's guiding opinion, many entrepreneurship encouragement policies include measures to train the graduating students to improve their entrepreneurial abilities. This kind of training often centered on such skills as marketing and human resource management. The training is believed to be important in that it may encourage graduates to take the entrepreneurial career. However, the findings of this research suggest that a graduate's confidence in new venture creation skills do not significantly improve their entrepreneurial intentions. Thus, this training may not lead the graduate to form entrepreneurial intentions, as a result, the initiative fails to target the core population and therefore a great many of the training efforts are wasted on students who have no intentions of creating a new venture. So the first priority for this kind of training should be to push up the graduate's desire to choose an entrepreneurial career. The findings of this research regarding the mediating role of illusion of control in the relationship between the formation of entrepreneurial intention and prior interactions with entrepreneurs in one's social network can be used to inform the design of curriculum of the entrepreneurship training programs aiming to encourage more final year undergraduate students to become entrepreneurs.

The findings of this research indicate that illusion of control as a cognitive property may affect the formation of entrepreneurial intentions among university graduates. If a graduate

think that he has more control over the success of the new ventures to be created by him, he may be more likely to create the new venture. However, according to the findings, this type of cognitive property is originated and affected by the social environment that the graduate finds himself in. The research findings suggest that the intensity of the prior interactions with the entrepreneurs in one's social network may enhance his illusion of control over the success of the new ventures to be created. Furthermore, the findings indicate that these interactions may directly affect the formation of entrepreneurial intentions. Informed by these findings, when designing the training programs to encourage entrepreneurship, trainers should put more effort on the cultivation of entrepreneurial friendly cognitive properties which can be gained by intensive interaction between graduates and entrepreneurs. The policy containing training should encourage and emphasize the socializing process between graduates and experienced entrepreneurs so as to make the graduates' social network more conducive to knowledge exchanges between graduates and entrepreneurs. The substantial part of this kind of training should be communications between entrepreneurs and graduates on various aspects, even to participate in the real life consulting program. If graduates see these entrepreneurs in their social network can be successful, they may think that they themselves can succeed as well. An example is worth a thousand skill classes.

7.2.5 Tolerating Cognitive Biases in the Entrepreneurship Encouragement Training Program

The findings of this research suggest that certain cognitive biases are significantly and positively related to entrepreneurial intentions, i.e. the higher level the illusion of control is, the more likely that one may form entrepreneurial intentions. Although these biases may negatively affect the success or failure of the new ventures, people will not even ever choose to start up without the effects of these biases. If we wait until all the information necessary to make an unbiased decision on whether to start up shows up, then the window of opportunity might be closed. To successfully create a new venture means that the potential entrepreneur should encounter many challenging obstacles. Cognitive biases make graduates become more courageous not to fear these difficulties. If a graduate

consider more thoroughly or calculate more accurately about these challenges, he may be deterred and miss the best decision point. As such, high illusion of control is very important for the formation of entrepreneurial intentions, as demonstrated by the findings of this research. The illusion of control may also help graduates to convince people around them and get access to material and spiritual supports that are crucial for a successful start-up. As such, in the entrepreneurial training program provided to those students that have not yet made up their mind to choose an entrepreneurial career, trainers should not encourage these students to abandon various kinds of cognitive biases that may lead to the formation of entrepreneurial intentions.

7.2.6 Encouraging Graduates to Participate in Ongoing Entrepreneurial Activities

The findings of this research suggest that the intensity of prior interaction with entrepreneurs in a graduate's social network may directly influence the formation of his entrepreneurial intentions. Graduates often have internship opportunities in China. But the aim of the internship is usually centered on the learning of routine practices of established businesses. Besides these, policy makers may create opportunities for graduates to participate in some ongoing entrepreneurship processes. They may participate in the new market or new product development projects undertaken by established companies, or in the entrepreneurial activities being carried out by other entrepreneurs. By these activities, the intensity of interaction between graduates and the entrepreneurs may be enhanced and the graduates may be more certain about whether they really like to start up. If they find they are not suitable for entrepreneurship, they may choose not to start to avoid further loss incurred by unsuccessful start-up in the future.

7.2.7 Establishing Positive Perceptions of Entrepreneurial Experiences

The findings of this research suggest that positive perceptions of entrepreneurial experiences in one's social network can directly affect the formation of entrepreneurial intentions. These findings suggest that entrepreneurship training programs include a part that centers on telling the stories of successful entrepreneurs. This story telling part may

improve the image of the entrepreneurs and make the students to positively perceive their entrepreneurial experiences in terms of making business profitable, admirable life style, and satisfactions with the work itself, the customers and employees. These positive perceptions may encourage students to develop entrepreneurial intentions. Furthermore, according to the findings of this research, these positive perceptions of entrepreneurs may affect the trainee' illusion of control which leads to the formation of entrepreneurial intentions. So, including the story of successful entrepreneurs may have both direct and indirect effects.

7.3 Limitations and Future Research

At this end, the study identifies two major limitation of this research. First, this research develops assumptions, by focusing on entrepreneurs vs non-entrepreneurs. In this respect, prior studies indicate that the two groups of people are different in such aspects as personal trait, opportunity identification, cognition, and social capital and so on. However, the limitation may lie in some aspects, which may not precisely, or at least, incompletely to describe and discern people who have various reasons in various positions of being an entrepreneurs or not an entrepreneur. For instance, auxiliary hypotheses have always been posed subsequently which argue that the two groups of people are different in other aspects. Yet, given the empirical evidence in prior studies, research can become equivocal concerning whether the two groups are different in some type of personal traits (McClelland, 1965; Begley and Boyd's, 1987). Consequently, researchers have shifted the focus to differences in such other aspects as cognition and opportunity identification (Shane and Venkataraman, 2000). Nevertheless, who may choose to become entrepreneurs may be hypothesized as at random, i.e. it is the luck that determines whether an individual may choose an entrepreneurial career. Thus, future studies could investigate whether the choice of whether to become an entrepreneur is actually a random event and, if so, these future studies can provide further insight into the theories that may be used to explain why some people but not others choose to be entrepreneurs.

Secondly, this thesis only reviewed those studies that are underpinned by objective

epistemology but did not review those studies that are based on subjective epistemology. Following objective ontology and epistemology, differences in various aspects can be clearly identified and compared across individuals. Moreover, even if studies based on subjective epistemology admit that entrepreneurs and non-entrepreneurs are different, these differences may not be compared across people as the differences may be constructed or interpreted at the local level and cannot be generalized to be applicable to a wider group of people. Given the complexity differences in epistemological assumptions between different methods within the big umbrella of qualitative research methods (Denzin and Lincoln, 2005), it is unwise to expect to extract common factors that can be used to differentiate entrepreneurs from the general public by reviewing studies that uses different qualitative methods. It will be even worse if we mix together prior studies that use either quantitative or qualitative methods and review them so as to induce common aspects of difference. However, studies using qualitative methods can as well provide knowledge concerning why some people but not others choose to be entrepreneurs. Thus, future work could critically review studies that use qualitative methods to understand the differences between entrepreneurs and non-entrepreneur and, if so, combined with this research, a more comprehensive understanding would be achieved with regard to the theories associated with explaining why people choose to become entrepreneurs. To close these two gaps will further advance research in this area.

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Appendix I: Sampling Methods of Selected Articles on Entrepreneurial Career Decision

Table 1: Sampling Methods of Selected Articles on Determinants of the Formation of Entrepreneurial Intention

Study	Sampling method	sampling frame	Contact methods	No. of contacts	Sample Size	Response rate
(Scherer et al., 1989)	N/A	students	N/A	N/A	366	N/A
(Krueger, 1993)	N/A	students	N/A	N/A	126	N/A
(Simon et al., 2000)	N/A	students	As optional class assignment	232	192	83%
(Krueger et al., 2000)	N/A	students	N/A	N/A	97	N/A
(Davidsson and Honig, 2002)	random	Swedish population	N/A	623	380	61%
(Greve and Salaff, 2003)	N/A	Applicant of entrepreneurship training program,	Network questionnaire	N/A	213	35%
					52	34%
					261	48%
					62	55%
(Baughn et al., 2006)	N/A	students	N/A	N/A	205	N/A
				N/A	479	N/A
				N/A	150	N/A
(Van Auken et al., 2006)	N/A	students	In class survey	N/A	82	N/A
(Sequeira et al., 2007)	Snowball and other methods	Students and others	Email + website	N/A	93	N/A
				290	111	38%
				296	185	62%
(Carr and Sequeira, 2007)	N/A	N/A	Email + web survey + on site	679	308	45%
(Liñán and Santos, 2007)	N/A	students	N/A	N/A	354	N/A
(Ozgen and Baron, 2007)	N/A	Membership list of IT association	Email + website	3090	201	6.5%
(Trevelyan, 2008)	N/A	N/A	Online survey	N/A	73	N/A
(Liñán and Chen, 2009)	mixed ³	students	N/A	N/A	387	N/A
				180	132	73%
(Thompson, 2009)	random	International academic conference attendee	N/A	450	106	24%
(De Carolis et al., 2009b)	N/A	Alumni to a US university	Email + web page	1656	269	16%

Note: Greve and Salaff (2003) uses samples from US, Italy, Sweden, and Norway, each

³ The research uses random sampling in Taiwan and the sampling method used in Spain is not disclosed.

row of the last three columns correspond to each of this country samples. Baughn et al., (2006) uses samples from China, Vietnam, Philippine, and Norway, each row of the last three columns corresponds to each of this country samples. Sequeira et al., (2007) uses mixed sampling method to collect data from three different sources.

Appendix II: The Results of Reliability and Validity Tests of the Pilot Study

Study

Table 2: The Factor Loadings and the α Values of Items Used in the Pilot Study

Item No.	Retain Or Delete	Factor loadings after rotation						Total variance	Cronbach α
		EI	OC	IC	IPI	EP	NS		
ei1	retain	.829						61.42%	.790
ei2	retain	.743							
ei3	delete	-							
ei4	delete	-							
ei5	delete	-							
ei6	retain	.796							
oc1	retain		.860					34.96%	.794
oc2	retain		.827						
oc3	delete		-						
oc4	retain		.609						
oc5	delete		-						
ic1	retain			.786				31.40%	.819
ic2	retain			.799					
ic3	delete			-					
ic4	delete			-					
ic5	retain			.792					
ic6	delete			-	-				
ipi7	retain				.793			19.73%	.766
ipi8	retain				.752				
ipi9	retain				.793				
ipi10	delete				-				
ipi11	delete				-				
ipi12	delete				-				
ep1	retain					.83		31.31%	.764
ep2	retain					.78			
ep3	retain					.80			
ep4	retain					.78			
ep5	delete					-			
ES	retain						.81	15.36	.701
HS	retain						.84		
JS	retain						.76		

Note: rotation method is orthogonal varimax, EI = entrepreneurial intentions, OC = overconfidence, IC = illusion of control, IPI = intensity of past interaction with entrepreneurs in one's social network, EP = positivity of evaluation of entrepreneurs in one's social network, NS = network support

Appendix III: The English Version Questionnaire

Dear friends,

Thank you very much for participating in this survey that aims to investigate why some university graduates choose to be entrepreneurs in the future. The data will be quantitatively coded for statistical analysis. You may choose to do it anonymously and no data will be disclosed to the third party. Please ensure that you answer all the questions. There is no right or wrong answer to each question and you are expected to answer them according to your true facts or perceptions.

Section I Your Basic Information

- 1. Your gender:** _____
- 2. Your birth year:** _____
- 3. Your birth place:** _____
- 4. Title of your programme:** _____
- 5. Your QQ number:** _____
- 6. Your email address:** _____

Section II Questions

Thinking of yourself, how true or untrue is it that you (1= very untrue, 2= untrue, 3= slightly true, 4 = true, 5 = very true):

Question Items	Marks				
	1	2	3	4	5
7. intend to set up a company in the future?	1	2	3	4	5
8. never search for business start-up opportunities?	1	2	3	4	5
9. save money to start a business?	1	2	3	4	5
10. do not read books on how to set up a firm	1	2	3	4	5
11. have no plans to launch your own business	1	2	3	4	5
12. spend time learning about starting a firm	1	2	3	4	5

Thinking of yourself, how much confidence do you have in your ability to (1= not at all, 2= very little, 3= some, 4 = much, 5 = very much):

Question Items	Marks				
	1	2	3	4	5
13. design a product or service that will satisfy customer needs and wants?	1	2	3	4	5
14. determine a competitive price for a new product or service?	1	2	3	4	5
15. network--- i.e. make contact with and exchange information with others?	1	2	3	4	5
16. recruit and hire employees?	1	2	3	4	5
17. manage financial assets of your business?	1	2	3	4	5

Imagine that you have created a new business (if you have already started a business, consider the actual business), please rate the probability that (1 = very low possibility, 2= low possibility, 3 = moderate possibility, 4= high possibility, 5= very high possibility):

Question Items	Marks				
18. the venture will be a successful business in 5 years regardless of ownership.	1	2	3	4	5
19. you could accurately predict the total market demand for the product or the service.	1	2	3	4	5
20. you could accurately predict when larger competitors would enter the market.	1	2	3	4	5
21. you could make this venture a success, even though many other managers could fail	1	2	3	4	5
22. you could successfully fend off competitors.	1	2	3	4	5
23. you could develop a technology that others cannot readily copy.	1	2	3	4	5

24. Did anybody having a strong tie with you in your social network ever start a business? People having a strong tie with you in your social network include: parent, spouse, sibling, and other relative, close friends. Please tick yes or no in each row of the table below according to whether each type of relationship ever started a business.

Did your	parent	ever start a business?	Yes	No
	Spouse (or girlfriend or boyfriend)		Yes	No
	siblings		Yes	No
	other relatives		Yes	No
	close friends		Yes	No

25. Did anybody having a weak tie with you in your social network ever start a business? People having a weak tie with you in your social network include: acquaintance, teacher, classmates, and other people. Please tick yes or no in each row of the table below according to whether each type of relationship ever started a business.

Did	your acquaintance	ever start a business?	Yes	No
	your teacher		Yes	No
	your classmate		Yes	No
	any other people you know ⁴		Yes	No

26. Did you ever work for a small or new company?

Yes

No

27. Have you ever started a business?

Yes

No

28. Did anybody in your social network who once started a business ever

(1) take you to work with them when you were 10 years old or younger?

Yes

No

⁴ Note: "any other people you know " refers to people that cannot categorized into the 8 categories above

(2) encourage you to know their colleagues?

Yes

No

(3) teach you about managing a business?

Yes

No

29. Did anybody in your social network who once started a business ever

(1) work long hours in the organization they did not own?

Yes

No

(2) discuss work at home?

Yes

No

(3) include you in that discussion?

Yes

No

(4) encourage you to have a career other than the organization in which they worked?

Yes

No

30. Did anybody in your social network who once started a business ever

(1) encourage you to read about their business?

Yes

No

(2) take you to business meetings?

Yes

No

(3) assume that you would follow their career path?

Yes

No

31. Did anybody in your social network who once started a business ever

(1) pay you to do minor tasks at work when you were 10 – 15 years old?

Yes

No

(2) hire you in their organization when you were in high school or college?

Yes

No

32. Did (were) anybody in your social network who once started a business ever

(1) work long hours in a business they owned?

Yes

No

(2) away from home a lot on business?

Yes

No

(3) brought work home?

Yes

No

33. Did anybody in your social network who once started a business ever

(1) discuss the advantage and disadvantage of joining the business in which they worked?

Yes

No

(2) encourage you to work for a few years before joining the business in which they owned or worked?

Yes

No

Among the people in your social network that started a new business, considering the ones that have influenced you most, how do you feel the extent to which they are successful in the following aspects?(Note that 1 = extremely unsuccessful, 2 = very unsuccessful, 3 = successful, 4 = very successful, 5 = extremely successful)

Question Items	Marks				
	1	2	3	4	5
34. In terms of making the business profitable, these people are:					
35. In terms of satisfaction with the work itself, these people are:					
36. In terms of satisfying customers of their business, these people are:					
37. In terms of satisfying employees, these people are:					
38. In terms of comfortable lifestyle as a result of their business, these people are:					

39. How does your parent, spouse, sibling, other relative, close friends, acquaintance, teacher, and classmates feel about your starting a business? Please tick the appropriate number in each row of the table. Note that: 1 = extremely negative, 2 =slightly negative, 3 = neutral, 4 = slightly positive, 5 = extremely positive

Your	parent	feel(s)	1	2	3	4	5	about your starting a business.
	Spouse (or girlfriend or boyfriend)		1	2	3	4	5	
	siblings		1	2	3	4	5	
	other relatives		1	2	3	4	5	
	close friends		1	2	3	4	5	
	acquaintance		1	2	3	4	5	
	teacher		1	2	3	4	5	
	classmate		1	2	3	4	5	

40. To what extent do you agree that your parent, spouse, sibling, other relative, close friends, acquaintance, teacher, and classmates would help you to succeed if you started a new business? Please tick the appropriate number in each row of the table. Note that: 1 = strongly disagree, 2 = slightly disagree, 3= neutral, 4 = slightly agree, 5 = strongly agree.

Your	parent	Would help me to succeed if you started a new business	1	2	3	4	5
	Spouse (or girlfriend or boyfriend)		1	2	3	4	5
	siblings		1	2	3	4	5
	other relatives		1	2	3	4	5
	close friends		1	2	3	4	5
	acquaintance		1	2	3	4	5
	teacher		1	2	3	4	5
	classmate		1	2	3	4	5

41. To what extent do you agree that your parent, spouse, sibling, other relative, close friends, acquaintance, teacher, and classmates would work with you if you started a new business? Please tick the appropriate number in each row of the table. Note that: 1 = strongly disagree, 2 = slightly disagree, 3= neutral, 4 = slightly agree, 5 = strongly agree.

Your	parent	would work with you if you started a new business	1	2	3	4	5
	Spouse (or girlfriend or boyfriend)		1	2	3	4	5
	siblings		1	2	3	4	5
	other relatives		1	2	3	4	5
	close friends		1	2	3	4	5
	acquaintance		1	2	3	4	5
	teacher		1	2	3	4	5
	classmate		1	2	3	4	5

Problem 1: Equipment Purchase Decision

Mr. Wang is about to invest in a new machine and has narrowed his options to Machine A, which is made in Shanghai or Machine B, which is made in south China. Both machines are equally capable of performing the same function. In considering this decision, Mr. Wang said to his friend, “You know, it seems that every time I buy a piece of equipment made by a manufacturer from south china, it breaks down in the first month of use”.

After further discussion, Mr. Wang’s friend remembers a recent industrial report that gives a significantly higher ranking to Machine B (the one made in south China) compared with Machine A. This report based its recommendation on extensive testing as well as on feedback from dozens of users.

Question 42: If you were in Mr. Wang's position, which machine would you purchase? Please tick the one that you will purchase.

machine A

machine B

Question 43: Why?

Problem 2: Automation Update Decision

The president is urging the board of directors to accept the purchase of a state-of-the-art computerized machine that would fundamentally change their operations. After describing the capability of this machine, the president cites a recent nationwide study which examined 120 businesses making similar upgrades. Results indicated that at least 85% showed a sizeable increase in productivity. In a parallel control group of firms not making the upgrade, about half as many firms (40%) showed a sizable increase in productivity. Based on this study, the president concludes that the computerized machine needs to be purchased.

One of the directors now takes the floor giving two reasons why computerized equipment is not the real reason for increased productivity. First, the managers of business that make such changes are likely to be more energetic and adventurous, thus creating environment for superior performance. Second, any change is likely to lead to

superior performance because of the increased interest and commitment on the part of management.

Question 44: If you were participating in such a decision, whose line of reasoning (president or director) would you be more likely to accept? Please tick the one that you support

the president

the director

Question 45: Why?

Thank you again for your participation! Please feel free to contact me if you need to make any enquiries.

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Manchester Metropolitan University

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Appendix IV The Chinese version of the questionnaire

亲爱的朋友：

感谢你参与本次调查。本调查的主要目的是研究为什么有些大学生会选择创业道路。本研究的结论将被用来对政府促进就业的政策提出建议。问卷的数据只供本研究使用，将不披露给任何第三方。你可以选择使用匿名的方式做本问卷。请确保你回答了本问卷的所有问题。答案没有对错之分，请根据你的真实情况或者感受填写。

第一部分 基本信息

1. 你的性别

男

女

2. 你出生于哪一年？

_____。

3. 你的出生地在哪里呢？

_____。

4. 你所就读的专业名称是什么呢？

_____。

5. 请问你的qq号码或者msn帐号:

6. 请问你的电子邮箱的地址?

第二部分 问卷问题

友情提示：本问卷把“开创自己的公司、企业或者做生意”的意义当成一回事，均被视为创业。因此，无论你或者你的亲朋好友是干个体（比如夜市摊点等），还是注册公司或者开办企业，我们均认为他是做生意的创业者。

对照自己的情形思考一下，下列陈述的真实程度如何（1= 非常不真实，2= 不真实，3= 有一点点真实，4= 真实，5= 非常真实）

7. 我有意在将来做生意、开公司或者办企业

1 2 3 4 5

8. 我从来不去寻找生意机会

1 2 3 4 5

9. 我正在存钱以便开始做生意，办企业或者开公司

1 2 3 4 5

10. 我从不阅读关于如何做生意，办企业或者开公司的书

1 2 3 4 5

11. 我没有计划开创我自己的生意，企业或者公司

1 2 3 4 5

12. 我花了时间来学习怎么做生意，开公司或者办企业

1 2 3 4 5

思考一下你自身的情形，判断一下你对你在以下几个方面的能力的自信程度

如何（1= 完全不自信，2 = 不自信：3 = 有点自信，4 = 较为自信，5 = 十分自信）

13. 在设计产品（服务）来满足顾客的需要方面，我的自信程度为：

1 2 3 4 5

14. 在给新产品（服务）制定一个有竞争力的价格方面，我的自信程度为：

1 2 3 4 5

15. 在网络建设，即与他人建立联系并交换信息方面，我的自信程度为：

1 2 3 4 5

16. 在招募和雇佣员工方面，我的自信程度为：

1 2 3 4 5

17. 在管理我的公司（企业）的金钱财产方面，我的自信程度为：

1 2 3 4 5

想象你已经成立了一个新企业（如果你已经实际成立了一个企业，则考虑这个企业的情形），请为下列陈述的可能性的高低评分**（1 = 极低可能性, 2= 比较低的可能性, 3 = 中等程度的可能性, 4= 高可能性, 5= 极高的可能性）:**

18. 所成立的公司（企业）5年后还会在成功的运营

1 2 3 4 5

19. 你能够准确的预测你的企业（公司）所提供的产品的市场总需求

1 2 3 4 5

20. 你能够准确预测主要的竞争对手将于什么时候进入市场

1 2 3 4 5

21. 你能够使这个企业成功，即使很多其他人管理的同类企业可能倒闭

1 2 3 4 5

22. 你能够打败竞争对手

1 2 3 4 5

23. 你能够开发出一种别人不太容易抄袭的技术

1 2 3 4 5

24. 在你联系比较紧密的社会网络中，有人开办了企业或者做过生意吗？请依据每种类型的关系是否开创了新企业，在下表中对应的每行的“是”或者“否”上打勾。

你的	父母	曾经做过生意吗?	是	否
	配偶 (男朋友或者女朋友)		是	否
	兄弟姐妹		是	否
	其他亲属		是	否
	好友		是	否

25. 在你的下列社会关系中，有人开办了企业或者做过生意吗？请依据每种类型的关系是否开创了新企业，在下表中对应的每行的“是”或者“否”上打勾。

你的	同学	曾经做过生意吗?	是	否
	老师		是	否
	除同学和老师之外熟人 (指认识但是交往不深的人)		是	否
	除上述关系之外的其他社会关系		是	否

26. 你曾经为小公司或者新公司工作过吗？（校外兼职及实习等临时性工作均视为工作）

是

否

27. 你曾经做过生意吗（开办过新企业吗？）

是

否

28. 在你的社会网络中，那些曾经做过生意或者开创过企业的人，他们当中的任何人曾经有下列行为吗？

(1) 在你还在 10 岁或者 10 岁以下时，就把你带着去工作

是

否

(2) 鼓励你认识他们的同事

是

否

(3) 教你如何做生意或者管理企业

是

否

29. 在你的社会网络中，那些曾经做过生意或者开创过企业的人，他们当中的任何人曾经有下列行为吗？

(1) 他们在他们没有股份的公司中每天工作很长时间

是

否

(2) 在家讨论工作

是

否

(3) 在家讨论工作时，把你也拉入到讨论中

是

否

(4) 鼓励你到一个他们不曾工作过的组织中开始你的事业

是

否

30. 在你的社会网络中，那些曾经做过生意或者开创过企业的人，他们当中的任何人曾经有下列行为吗？

(1) 鼓励你阅读与他们的生意相关的信息

是

否

(2) 带着你去参加生意场合的会议或者聚会

是

否

(3) 他们预期你也将走他们曾经走过的事业道路

是

否

3 1. 在你的社会网络中，那些曾经做过生意或者开创过企业的人，他们当中的任何人曾经有下列行为吗？

(1) 在你 10--15 岁的时候，支付给你报酬让你做一些工作中的小事情

是

否

(2) 在你上高中或者大学后，雇佣你为他们的企业工作

是

否

3 2. 在你的社会网络中，那些曾经做过生意或者开创过企业的人，他们当中的任何人曾经有下列行为吗？

(1) 他们为自己的企业每天工作很长时间

是

否

(2) 为做生意，他们经常离家外出

是

否

(3) 他们把工作带回家做

是

否

3.3. 在你的社会网络中，那些曾经做过生意或者开创过企业的人，他们当中的任何人曾经有下列行为吗？

(1) 与你讨论如果你加入他们所拥有的企业，对你来说有哪些好处和坏处

是

否

(2) 鼓励你在加入他们所拥有的企业之前，到其它地方工作几年

是

否

考虑一下，在你的社会网络中，那些曾经创办过企业或者做过生意的人当中，对你影响最大的人，你感觉他们在如下方面的成功程度如何：

(注：1 = 极其失败, 2 = 非常失败, 3 = 成功, 4 = 非常成功, 5 = 极其成功)

3 4. 从能挣到钱的角度讲，这些人的成功程度是：

1 2 3 4 5

3 5. 从对这些人自己工作本身的满意度方面讲，这些人的成功程度是：

1 2 3 4 5

3 6. 从使他们企业的客户满意的角度来讲，这些人的成功程度是：

1 2 3 4 5

3 7. 从使他们企业的员工满意的角度讲，这些人的成功程度是：

1 2 3 4 5

3 8. 从由于生意成功而获得的舒适生活方面讲，这些人的成功程度是：

1 2 3 4 5

39. 你的（父母，配偶，兄弟姐妹，其他亲属，好友，熟人，老师，同学）对你开创一个新企业的感觉如何呢？请在下表每行相应的数字上打勾。1 = 非常不好，2 = 不太好，3 = 无所谓，4 = 有点好，5 = 非常好

如果你开始做生意，你的	父母	感觉这是一件	1	2	3	4	5	的事情
	配偶							
	或者男朋友		1	2	3	4	5	
	或者女朋友							
	兄弟姐妹		1	2	3	4	5	
	其他亲戚		1	2	3	4	5	
	好友		1	2	3	4	5	
	熟人（指认识但是交往不深的人）		1	2	3	4	5	
	老师		1	2	3	4	5	
同学	1	2	3	4	5			

40. 你在多大程度上同意下列陈述：如果你开办一个新企业，你的（父母，配偶，兄弟姐妹，其他亲属，好友，熟人，老师，同学）将为你的成功提供帮助。

请在下表每行相应的数字上打勾。1 = 强烈不同意，2 = 不同意，3 = 中立，4 = 同意，5 = 强烈同意

如果我开办一个新企业，我的	父母	会提供帮助使得我能成功	1	2	3	4	5
	配偶 (男朋友或者女朋友)		1	2	3	4	5
	兄弟姐妹		1	2	3	4	5
	其他亲戚		1	2	3	4	5
	好友		1	2	3	4	5
	熟人（指认识但是交往不深的人）		1	2	3	4	5
	老师		1	2	3	4	5
	同学		1	2	3	4	5

4 1. 你在多大程度上同意下列陈述：如果你开办一个新企业，你的（父母，配偶，兄弟姐妹，其他亲属，好友，熟人，老师，同学）将与你一起工作。请在下表每行相应的数字上打勾。1 = 强烈不同意，2 = 不同意，3 = 中立，4 = 同意，5 = 强烈同意

如果我开办一个新企业，我的	父母	会跟我一起工作	1	2	3	4	5
	配偶 (男朋友或者女朋友)		1	2	3	4	5
	兄弟姐妹		1	2	3	4	5
	其他亲戚		1	2	3	4	5
	好友		1	2	3	4	5
	熟人（指认识但是交往不深的人）		1	2	3	4	5
	老师		1	2	3	4	5
	同学		1	2	3	4	5

请依据情形回答问题

情形一：机器采购决策

王老板正准备投资购买一台新机器，候选对象已经缩小到了机器甲（上海制）和机器乙（华南造）。两台机器的功能都是一样的。在考虑到底买哪台机器的决策

时，王老板跟他朋友说：“好像每次我购买由华南的厂商制造的设备的时候，在使用的第一个月，这些设备就会出故障”。

在讨论中，王老板的朋友援引了一份最新的工业报告，该报告认为机器乙（华南制造）好于机器甲（上海制）。该报告的结论是建立在大量的测试，以及几十个机器使用者反馈的基础上的。

如果你在王老板的位置上，你将购买哪个机器？为什么？

4 2：我将购买

机器甲

机器乙

4 3：为什么？

情形二：自动化升级决策

公司总经理正迫切说服董事会接受购买能够从根本上改进公司运营的、最先进的自动化设备。在对设备的能力作了描述之后，总经理援引了一个在全国范围内展开研究的数据，在 120 家做了类似升级的公司中，至少 85% 的公司大幅提高了生产力。而在没有采用该升级的企业中，只有大约 40% 的企业大幅提高了生产力。基于这个研究数据，总经理做出了需要购买该自动化设备的结论。

一位董事反对总经理的观点，并发言陈述了两点理由，以说明为什么自动化设备不是生产力提高的真正原因。第一，作出了升级变革的公司的经理，他们可能更有魄力并敢于冒险，因此创造出了能产生高绩效的环境，即使不作出自动化升级，他们领导的公司的生产力也会提高。第二，任何变革都可能导致更高的绩效，因为变革能使经理们更集中精力，并且提高他们的主人翁精神，从而提高了绩效。

如果你参与了本项决策，你将更可能支持谁的观点（总经理的或者董事的）？
为什么？

4 4：我将支持_____的观点

总经理

董事

4 5：为什么？

再次感谢你参与本次调查。如果有任何问题，欢迎垂询：

程智辉 （博士生）

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