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Singapore Management University, lixiang.2007@mm.smu.edu.sg

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**ENTREPRENEURIAL COMPETENCIES AS AN
ENTREPRENEURIAL DISTINCTIVE: AN
EXAMINATION OF THE COMPETENCY
APPROACH IN DEFINING ENTREPRENEURS**

LI XIANG

SINGAPORE MANAGEMENT UNIVERSITY

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ENTREPRENEURIAL DISTINCTIVE: AN
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LI XIANG

**SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER
OF SCIENCE IN MANAGEMENT**

SINGAPORE MANAGEMENT UNIVERSITY

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Abstract

Entrepreneurship is of critical importance to the modern economy. Researchers have studied entrepreneurship for decades. In recent years, significant relationship between entrepreneurial competencies and firm performance has been reported in empirical studies. Applying the competency approach, researchers have assumed that entrepreneurial competency differentiates entrepreneurs from non-entrepreneurs without empirically examining if this is the case. The research conducted under this thesis addresses this gap.

Drawing upon a thorough literature review regarding the components, antecedents and performance outcomes of the entrepreneurial competency, we propose the following hypothesis: the entrepreneurs generally possess higher level of entrepreneurial competencies than the non-entrepreneurs, and the entrepreneurs and

the non-entrepreneurs can be discriminated based on their entrepreneurial competency level.

A survey is conducted among the business owners and the managers. Employing discriminant analysis, we find empirical evidence that the business owners generally possess higher level of entrepreneurial competencies than the managers, and the business owners and the managers can be discriminated based on their entrepreneurial competency level, which supports our hypothesis.

Key words: Competency Approach; Entrepreneur; Non-Entrepreneur

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Acknowledgement

I highly appreciate my supervisor Prof. TAN Wee Liang, who patiently motivates me to conceive and finish the thesis. This thesis owes much to his thoughtful and helpful comments. This paper would not have been possible without his guidance and inspiration. I also want to thank the MOE of Singapore for providing me this previous opportunity to study at Singapore.

Also, my gratitude is devoted to all the professors in the Lee Kong Chian School of Business. I have learned a lot through their class and their guidance.

My classmates from the Department of Management have supported me in many ways. I want to thank them for all their help, support and valuable comments.

My deepest appreciation goes to my family. My parents, LI Ze Yun and ZHA Zhi Rong, give me constant encouragement and love, which I will forever be grateful to.

Chapter 1 INTRODUCTION

Entrepreneurship has been one of the most promising management research fields (Wortman, 1987), with the entrepreneur at the centre of entrepreneurship research. Research on the entrepreneur began with the personality traits approach. Scholars tried to differentiate entrepreneurs from non-entrepreneurs by identifying their personality traits. Although attractive for its simplicity, there are limits to the usefulness of the approach, with results reported in literature showing considerable inconsistency (Begley and Boyd, 1985). Since 1990s, the traits approach was out of favor and researchers began to look at entrepreneurs from a behavioral and contextual perspective.

From a behavioral perspective, Boyatzis (1982) proposed the competency approach to identify and define the characteristics of successful managers. In his seminal work, Boyatzis (1982) defined competencies as underlying characteristics that are causally related to effective and/or superior performance in a job. Since then, studies in competencies have grown in volume and extended to different managerial positions (e.g. Burgoyne, 1988; Albanese, 1989; Stuart and Lindsay, 1997).

In the study of managerial competencies, competencies are assessed in terms of actual behavior observed in the workplace and are usually defined in terms of underlying personal characteristics like traits, knowledge, skills and attitudes of the individual managers. As entrepreneurs and managers share similar roles and tasks in many aspects like organizing and personnel management, it is natural that the researchers in the entrepreneurship field adopt the competency approach to study

entrepreneurs. In recent years, the competency approach has become an increasingly popular means of studying entrepreneurial characteristics (e.g. Huck and McEwen, 1991; Chandler and Jansen, 1992; Minet and Morris, 2000; Baum et al., 2001; Man et al., 2002; Sony and Iman, 2005). Like managerial competencies, entrepreneurial competencies can be defined as underlying characteristics such as generic and specific knowledge, motives, traits, self-images, social roles, and skills which result in venture birth, survival, and/or growth (Bird, 1995).

All current research that involves entrepreneurial competencies implicitly presumes that entrepreneurs are different from non-entrepreneurs in terms of the competencies they possess (e.g. Huck and McEwen, 1991; Chandler and Jansen, 1992; Minet and Morris, 2000; Baum et al., 2001; Man et al., 2002; Sony and Iman, 2005). However, no one has empirically examined whether or not entrepreneurial competencies can discriminate between entrepreneurs and non-entrepreneurs. Our research aims to address this gap.

This paper is structured as follow. Chapter 1 introduces the research background and the research question. In chapter 2, we provide a thorough literature review regarding personality research on entrepreneurs, managerial competencies and entrepreneurial competencies. Chapter 3 elaborates the methodology used in this study. Chapter 4 reports the empirical results and chapter 5 draws the conclusion remarks.

Chapter 2 LITERATURE REVIEW

2.1 Personality Research on Entrepreneurs

At present, entrepreneurship is of fundamental importance for our society. Entrepreneurial companies contribute to economic welfare as they increase the innovative capacity of the economy. These enterprises also lead to more flexible markets and intensified competition. Moreover, through entrepreneurship, new businesses and jobs are created, which is of critical importance in today's global business environment. As Low and MacMillan (1988) argued, new firm creation is a critical driving force of economic growth, creating hundreds of thousands of new jobs, as well as enhancing federal and local tax revenues, boosting exports, and generally increasing national productivity.

The research in entrepreneur began with the personality traits approach. The personality traits approach assumes that there are distinct traits and motives that distinguish entrepreneurs from non-entrepreneurs, and successful entrepreneurs from unsuccessful entrepreneurs. The study in entrepreneurial characteristics or traits is not only of major concern of the mainstream academics, but also is appealing to the practitioners such as venture capitalists when they are evaluating new venture proposals (MacMillan et al., 1985).

Various types of entrepreneurial characteristics have been suggested and examined for their relationships with firm performance. One category of these characteristics is demographic characteristics like gender (Changanti and Parasmaman, 1996), age (Begley and Boyd, 1985), ethnic (Cooper, Dunkelberg, and Woo, 1988), and parental

background (Cooper and Dunkelberg, 1987). A common theme in these literatures is that whether possessing some certain characteristics will make the firm more successful or less successful.

A second category is the entrepreneur's psychological and behavioral characteristics by making use of different approaches like motivation, personality attributes, values, goals and attitudes (Begley and Boyd, 1987; Barkham, 1994; Kotey and Meredith, 1997). While the approaches may vary, prior studies have highlighted the importance of individual characteristics like need for achievement or achievement motivation, internal locus of control, risk-taking propensity, tolerance of ambiguity, type A behavior, creativity, and innovativeness. These characteristics are found to have effects not only on the decision to start up, but also on the continuous success of the business.

The third category is human capital factors like their education level, work experience, start-up experience, training and skills and technical know-how (Dyke, Fischer and Rueber, 1992). These characteristics determine whether an entrepreneur possesses the appropriate abilities, the possession of which in turn affects his or her decision to start up the business and also its success. A particular kind of human capital is the entrepreneur's networks or social relationships (Aldrich and Zimmer, 1986), which are affected by the entrepreneur's background, affiliation with different associations, and also his or her personality. These relationships may in turn affect the entrepreneur's ability to seek resources, supports, and business opportunities.

Many entrepreneurial characteristics are found to be positively related to firm

performance (Dyke et al., 1992; Barkham, 1994). They have highlighted the importance of psychological characteristics, managerial skills, as well as background and experience factors. However, insignificant and mixed relationships are also reported (Begley and Boyd, 1985). There are no conclusive results on which of and how these characteristics affect firm performance.

A second problem concerns the large number of traits that have been identified as being associated with successful entrepreneurs. As Gartner (1988) argues, a startling number of traits and characteristics had been attributed to the entrepreneur, and a "psychological profile" of the entrepreneur assembled from these studies would portray someone larger than life, full of contradictions, and, conversely, someone so full of traits that he/she would have to be a sort of generic "Everyman".

In view of this, Gartner (1988) suggests that the utilization of a behavioral approach is a more productive perspective in studying issues related to entrepreneurship, especially in linking individual behavior to firm performance.

2.2 Managerial Competencies

The underlying purpose for managerial competency research is to identify the characteristics of a good and effective manager (Mintzberg, 1973) so that organizations can be successful. Built on McClelland (1973)'s work, Boyatzis (1982) developed a classification of managerial competencies and defined managerial competencies as underlying characteristics of a person which results in effective and/or superior performance in a job. He articulated that competency generally refers to possession and utilization of structures of knowledge and particular behaviors/skills

in order to perform particular work tasks.

Since then, researchers had developed different models which are primarily based on the study of the competencies of outstanding managers. Spencer and Spencer (1993) analyzed the data from previous studies and defined competency as an underlying characteristic of an individual that is causally related to criterion referenced effective and/or superior performance in a job or situation. What is more, they explicitly differentiated competencies into threshold competency and differentiating competency.

Schroder (1989) built on Boyatzis (1982)'s research and developed three classes of competencies: entry level competencies, which comprise individual characteristics of his model; basic competencies, which consist of knowledge and skills needed to perform the jobs or functions of managing; and high performance competencies, which include behaviors that produce significantly superior workgroup performance in more complex organizational environments. By using a different definition of superior performance from Boyatzis (1982), he identified eleven high performance competencies.

From a behavioral perspective, the managerial competency research focuses on identifying what kinds of competencies underlying successful performance and the researchers always develop a list of relevant competencies. While there are differences in definitions and measurements of the competencies, the similarities between the models are obvious and show that there are indeed some managerial competencies that are causally related to effective or superior performance in a job.

2.3 Entrepreneurial Competencies

As entrepreneurs and managers share similar roles and tasks in organizations, particularly in small business or SMEs, researchers in the entrepreneurship field can “borrow” the concept and related theory of competency from the management literature (Bird, 1995). As a result, the competency approach has become an increasingly popular means of studying entrepreneurial characteristics (e.g. Huck and McEwen, 1991; Chandler and Jansen, 1992; Minet and Morris, 2000; Baum et al., 2001; Man et al., 2002; Sony and Iman, 2005).

According to Mole et al. (1993), competency can be studied from its inputs (antecedents to competencies), process (task or behavior leading to competencies), or outcomes (achieving standards of competence in functional areas). In line with this, we will provide details on these three aspects of entrepreneurial competencies in the remaining of this section.

2.3.1 Components of Entrepreneurial Competencies

In addition to defining competencies in terms of the possession of traits, skills, and knowledge, researchers have attempted to organize these entrepreneurial characteristics into key competency areas. For instance, Huck and McEwen (1991) find that management, planning and budgeting, and marketing/selling are the three most important competency areas for Jamaican entrepreneurs. Minet and Morris(2000) argue that adaptation is the core of entrepreneurial competency. Chandler and Jansen (1992) argue that to function effectively in entrepreneurial role, two competencies are required: one is the ability to recognize and envision taking advantage of opportunity; the other is the drive to see firm creation through to fruition, which requires the

willingness and capacity to generate intense effort for long, hard hours. Baum et al. (2001) distinguish between specific competency and general competency. Specific competency consists of industry skills and technical skills, while general competency includes organization skills and opportunity recognition skills. Sony and Iman (2005) decompose entrepreneurial competency into four dimensions: management skills, industry skills, opportunity skills and technical skills.

Man et al. (2002) defined entrepreneurial competencies as higher-level characteristics encompassing personality traits, skills and knowledge, which can be seen as the total ability of the entrepreneur to perform a job successfully. Six major competency areas are identified in their work: (1) opportunity, (2) organizing, (3) strategic, (4) relationship, (5) commitment, and (6) conceptual competencies, as shown in Table 2.1. It can be seen from Table 2.1 that the behaviors identified in most other studies could be categorized according to the competency areas defined by Man et al. (2002). Because of its comprehensiveness, Man et al. (2002)'s categorization of entrepreneurial competencies is utilized in the current study.

Table 2.1 The six competency areas identified in the literature

(Man et al., 2002)

Competency Area	Behavioral focus	Literature source*												
		1	2	3	4	5	6	7	8	9	10	11	12	
Opportunity competencies	Competencies related to recognizing and developing market opportunities through various means	*	*	*	*	*	*	*	*	*	*	*	*	*
Relationship competencies	Competencies related to person-to-person or individual-to-group-based interactions, e.g., building a context of cooperation and trust, using contacts and connections, persuasive ability, communication and interpersonal skill	*	*	*	*	*	*	*	*	*	*	*	*	*
Conceptual competencies	Competencies related to different conceptual abilities, which are reflected in the behaviors of the entrepreneur, e.g., decision skills, absorbing and understanding complex information, and risk-taking, and innovativeness	*	*	*	*	*	*	*	*	*	*	*	*	*
Organizing competencies	Competencies related to the organization of different internal and external human, physical, financial and technological resources, including team-building, leading employees, training, and controlling	*	*	*	*	*	*	*	*	*	*	*	*	*
Strategic competencies	Competencies related to setting, evaluating and implementing the strategies of the firm	*	*	*	*	*	*	*	*	*	*	*	*	*
Commitment competencies	Competencies that drive the entrepreneur to move ahead with the business	*	*	*	*	*	*	*	*	*	*	*	*	*

Literature source* : (1). Adam and Cheil (1993); (2) Bartlett and Ghoshal (1997); (3) Baum (1994); (4) Bird (1995); (5) Chandler and Jansen (1992); (6) Durkan et al. (1993); (7) Gasse (1997); (8) Hunt (1998); (9) Lau et al. (1999); (10) McClelland (1987); (11) Mitton (1989); (12) Snell and Lau (1994).

(1) Opportunity Competencies

One of the most distinguishing competencies for the entrepreneur is the opportunity related competency. For instance, McClelland (1987) finds “to see and act on opportunities” as one of the competencies for successful entrepreneurs. Chandler and Jansen (1992) suggest that one of the most important entrepreneurial roles is the ability to recognize and envision taking advantage of opportunities. This category of competencies comprises of the entrepreneurial activities in spotting opportunities, actively seeking new opportunities, and developing the opportunities.

(2) Organizing Competencies

The second group of competencies is similar to the managerial competencies suggested in the literature. For instance, McClelland’s (1987) “efficiency orientation”, “concern for high quality of work”, and “monitoring” should be the required competencies in managing various functional areas in a firm so as to keep the firm operating efficiently. Chandler and Jansen (1992) also suggested the importance of managerial roles of an entrepreneur in human competence. In general, organizing competencies are similar to the managerial competencies identified in the literature (Boyatzis, 1982). This group of competencies calls for the ability to lead, control, monitor, organize, and develop the external and internal resources towards the firm’s capabilities through the entrepreneur’s organizing competencies in different areas.

(3) Strategic Competencies

Being the owner of the firm, the entrepreneur must set the direction for the whole company. This category of competencies requires the entrepreneur to have a vision or a big picture in their mind for their business, to have clear goals to achieve, or to

formulate and implement strategies to achieve these vision and goals, for or example, McClelland's (1987) systematic planning, and Lau et al.'s (2000) strategic planning competencies. In essence, these competencies are related to setting, evaluating and implementing the strategies of the firm, while calling for abilities and skills from a broader and long-term perspective.

(4) Relationship Competencies

This group of competencies relates to person-to-person or individual-to-group based interactions, e.g., building a context of cooperation and trust, using contacts and connections, persuasive ability, communication and interpersonal skill (Man et al., 2002). To successfully do so, the entrepreneur needs to possess competencies in relationship building, communication, persuasive and interpersonal abilities (McClelland, 1987; Lau et al., 2000). Bird (1995) described this relationship building activities as entrepreneurial bonding, which includes not only the creation of relationship, but also the restructuring of relationships as the company grows or a partnership is dissolved.

Evidence suggests that small firms in particular are critically dependent on their networks, because it is through these that they gain advice and support from professionals and experts such as lawyers, accountants, and consultants (Ramsden and Bennett, 2005), government bodies, research and training institutes, and even suppliers and customers (Ritter and Gemunden, 2004).

(5) Commitment Competencies

Successful entrepreneurs are often characterized as diligent people with a restless

attitude in their work. In other words, they have a strong competency in totally committing, determining and dedicating, as well as taking proactive actions towards their responsibilities and duties. This corresponds to the entrepreneurial role of the drive to see firm through to fruition applied by Chandler and Jansen (1992). Another aspect of this competency area is the initiative or proactive orientation, which calls for the entrepreneurs taking actions before being asked or forced to by events (McClelland, 1987). To sum up, commitment competencies are those drive the entrepreneur to move ahead with the business.

(6) Conceptual Competencies

Conceptual competencies represent a category of competencies which are not easily identifiable behaviors but are often considered to be important for entrepreneurial success. The ability in making cognitive and analytical thinking, learning, decision making and problem solving, sustaining temporal tension, innovating and in coping with uncertainty and risk belong to this category (McClelland, 1987; Bird, 1995). They have a stronger linkage with entrepreneurial traits and are less directly observable. They involve high level of conceptual activities and are reflected in the entrepreneur's behaviors when they conduct analysis, learn, make decisions and solve problems etc. They may also enhance the effectiveness of carrying a task in the present or in the future. Similar to strategic competencies, conceptual competencies require a more abstract level of abilities. However, unlike strategic competencies, conceptual competencies are concerned with a shorter-term perspective, resolving instant events, or requiring intuitive responses (Man et al., 2002).

2.3.2 Antecedents of Entrepreneurial competencies

In general, Boytazis (1982) argues that the characteristics leading to competence can be a person's motive, trait, aspect of the person's self-image or social role, skill, or a body of knowledge which he or she uses.

Specifically, regarding to entrepreneurial competency, entrepreneurs' experience, training, education, family background and other demographic variables are considered as factors influencing entrepreneurial competency (Herron and Robinson, 1993; Bird, 1995).

However, there is only limited research that empirically examines the antecedents of entrepreneurial competency. Chandler and Jansen (1992) find a somewhat surprising result that previous experience as a founder is not related to the self-assessed entrepreneurial competencies. Sony and Iman (2005) argue that the learning process is a process of ability and capability development, and they find a positive relationship between entrepreneurial learning and entrepreneurial competency.

2.3.3 Outcome of Entrepreneurial competencies

Almost all research studying the outcome of entrepreneurial competency use firm performance as the indicator of outcome. Several models are proposed to explain how entrepreneurial competencies would affect firm performance (Herron and Robinson, 1993; Man et al., 2002), besides most studies empirically examine the relationship between entrepreneurial competencies and firm performance (Chandler and Jansen, 1992; Chandler and Hanks, 1994; Baum et al., 2001; Sony and Iman, 2005). In general, significant relationships are reported in empirical studies.

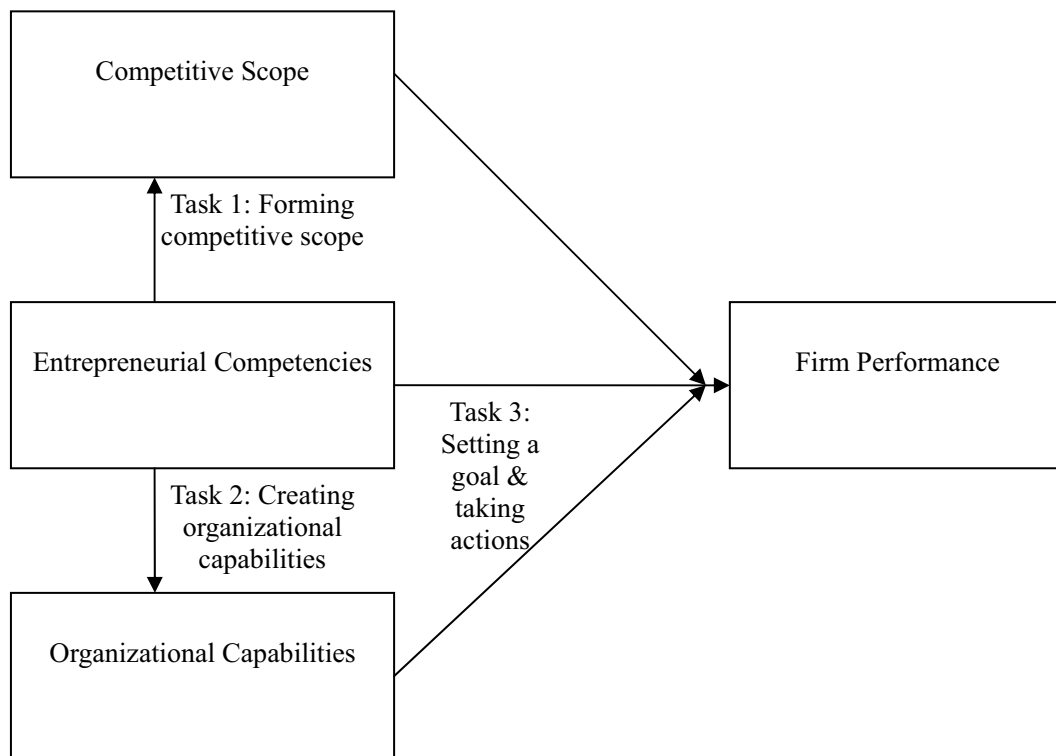


Figure 2.1. A model of SME competitiveness. (Man et al., 2002)

By drawing upon the concept of competitiveness and the competency approach, Man et al. (2002) proposed a conceptual model linking the characteristics of small and medium sized enterprises' (SMEs') owner-managers and their firms' performance. As shown in figure 2.1, the model distinguishes between four major constructs: entrepreneurial competencies, competitive scope, organizational capabilities, and firm performance. The competitive scope and organizational capabilities represent the constructs of external environmental factors and internal firm factors, respectively. Central to the model are the relationships between entrepreneurial competencies and other constructs. These relationships are conceptualized as three principal entrepreneurial tasks: forming the competitive scope of the firm, creating the organizational capabilities, and setting a goal and taking actions for the goal through assessing competitive scope and using organizational capabilities.

In Man et al. (2002)'s model, entrepreneurial competencies play a key role in determining firm performance. Although competitive scope and organizational capabilities still are two determinants of firm performance, they are influenced by entrepreneurial competencies.

Empirically, significant relationships between entrepreneurial competencies and firm performance are reported. Chandler and Jansen (1992) find that the founder's self-assessed entrepreneurial competencies are positively related to firm growth. Chandler and Hanks (1994) again find that entrepreneurial competencies are directly correlated with venture growth. Baum et al. (2001) find that CEOs' specific competencies, which consist of industry skill and technical skill, have significant direct effects on venture growth, while CEOs' general competencies, which are composed of organizational skill and opportunity recognition skill, have significant indirect effects on venture growth. In a more recent paper, Sony and Iman (2005) confirm that entrepreneurial competencies which comprise management skill, industry skill, opportunity skill, and technical skill are positively related to venture growth.

2.4 Our Research Question

The current research on entrepreneurial competency has examined its components and has shown significant positive relationship between entrepreneurial competency and firm performance. As the researchers in the entrepreneurship field typically "borrow" the concept and related theory of competency from management literature, potential problems may arise. For instance, despite there are similarities of roles and

tasks between entrepreneurs and managers, it has been argued that the competencies required by managers and entrepreneurs may differ, with those required by the entrepreneur being more complex (Busenitz and Barney, 1997). However, research to date typically does not distinguish entrepreneurial competencies from managerial competencies (Sadler-Smith et al., 2003). It is implicitly presumed that entrepreneurial competency has discriminating power between entrepreneurs and non-entrepreneurs, although it is derived from managerial competency. But no one has empirically examined this presumption. Our research aims to address this gap. Specifically, we are going to investigate whether or not entrepreneurial competencies can discriminate between entrepreneurs and non-entrepreneurs.

Our work is important to the entrepreneurship researchers, because it aims to examine the presumption that is fundamental to competency approach. If the presumption is confirmed by empirical results, then researchers get a solid foundation when they employ competency approach in their studies. If entrepreneurial competency can not discriminate entrepreneurs from non-entrepreneurs, this means that entrepreneurial competencies are common and indiscriminate among the public. In that case, the competency approach suffers the same drawbacks as the previous personality traits approach (portray someone who would be a sort of generic "Everyman"), then we must change our current angle of looking at entrepreneurial competency.

Our study is also important to the practitioners and policy makers. If we find that entrepreneurs are different from non-entrepreneurs in terms of the competencies they possess, then we can intentionally build certain competencies of non-entrepreneurs to

make them entrepreneurs, given the importance of entrepreneurship to economic growth and new job creation.

In this study, entrepreneurial competencies are defined as individual characteristics that include both attitudes and behaviors, which enable entrepreneurs to achieve and maintain business success. Specifically, entrepreneurial competencies are comprised of the entrepreneur's motives, traits, self-image, attitudes, behaviors, skills and knowledge (Boyatzis, 1982; Bird, 1995). Operationally, Man et al. (2002)'s categorization of entrepreneurial competencies is utilized in this study. Namely, there are six competency areas (competency sub-constructs): (1) Opportunity Competencies; (2) Organizing Competencies; (3) Strategic Competencies; (4) Relationship Competencies; (5) Commitment Competencies and (6) Conceptual Competencies.

Comparing to non-entrepreneurs, entrepreneurs play a more important role in SMEs as they need to identify business opportunities, build relationship with both suppliers and customers, and make sure the firm operate efficiently, etc. These roles for entrepreneurs require them to be opportunity sensitive, to be good at relationship building, to be an efficient organizer, etc. For those entrepreneurs who are not competent enough, their firms can hardly survive in fierce competition. Thus entrepreneurs generally possess higher level of entrepreneurial competency than non-entrepreneurs. Based on this argument, we propose the following hypothesis:

H: The entrepreneurs generally possess higher level of entrepreneurial competencies than the non-entrepreneurs, and the entrepreneurs and the non-entrepreneurs can be discriminated based on their entrepreneurial competency level.

Chapter 3 METHODOLOGY

To empirically examine whether or not entrepreneurial competencies can discriminate between entrepreneurs and non-entrepreneurs, we need to collect data on entrepreneurs and non-entrepreneurs. Because there is no existing database, we have to collect the data ourselves. Operationally, we use SME owners as the surrogate for entrepreneur and SME managers as the surrogate for non-entrepreneurs.

3.1 Survey Instrument

In this study, we use the survey instrument developed by Man (2001), who develops it by combining the existing instruments (Chandler and Jansen, 1992; Roemer, 1996; Evers and Rush, 1996; Quinn et al., 1990) and his own qualitative analysis. There are three parts in the survey: 1) personal job activities, 2) firm performance and 3) personal background information (See Appendix 1 Cover Letter for Survey, Appendix 2 Survey of Owners and Appendix 3 Survey of Managers). In the first part of the survey, we add 9 items to measure the entrepreneurial orientation of the firm for further research.

3.2 Sample

Convenient sampling is the sampling method adopted in this research. For most survey research, external validity is important, which requires a representative sample. However, our research aims at testing whether competency approach can be used to discriminate between entrepreneur and non-entrepreneur. The consistency or inconsistency of the findings with the theoretical presumption that entrepreneur and non-entrepreneur are different is the key to our research. Whether the results can be

generalized to the population is not the main focus of interest to us. So it is reasonable to use the convenient sampling method, given its convenience and economy (Hoyle et al. 2002).

Specifically, a local organization called “Spirit of Enterprise” (hereafter referred to as SOE) nominates over one hundred enterprises for the SOE award every year. We approach those enterprises nominated for the SOE award to get in contact with the entrepreneur and the manager. The number of enterprises we approached is 500.

3.3 Data Collection

We use mail survey as the main data collection method. We sent to each SME owner in our sample with one cover letter and two questionnaires inside: one questionnaire for him/her as the business owner entitled ‘Survey of Business Owner’, and the other for one of his/her managers to complete called ‘Survey of Business Manager’. Two business reply envelopes were attached for the prospective subjects to reply.

To increase response, we carried out two rounds of follow up phone calls on the 360 contacts for whom we had contact information. We also provide online survey for the respondents who prefer to complete the questionnaires online instead of hard copies.

In total we have received 146 responses, 75 business owners and 71 managers. Besides the 30 undeliverable and returned questionnaires, 77 subjects declared that they wouldn’t participate in our research either through email or by phone call. Thus

the response rates in our research are 19.1% for business owners and 18.1% for managers.

Out of these 146 responses, 9 of them are incomplete. Therefore, there are in total 137 useful cases in our sample, of which 70 are from business owners and the rest 67 are from managers. Thus the effective response rates are 17.8% for business owners and 17% for managers. In the next chapter, we will examine these 137 cases in detail.

Chapter 4 EMPIRICAL RESULTS

4.1 Sample Characteristics

This part gives an overview on the descriptive characteristics of our sample, so as to get a better understanding on the respondents' demographic and background information.

4.1.1 Age

As shown in table 4.1, the current age for the 80% of all respondents falls within the range from 27 to 51. The average age of the business owner is 39.8, whereas the mean age of the manager is 37.7.

Table 4.1 The current age of the business owner/manager

	Managers	Business Owners	Total
No. of Observation	65	69	134
Mean	37.7	39.8	38.8
Standard Deviation	10.8	10.1	10.5
Minimum	22	21	21
Maximum	78	78	78
10% Percentile	27	27	27
50% Percentile	35	39	38
90% Percentile	52	51	51

4.1.2 Gender

Table 4.2 shows the gender distribution of the business owners and the managers. As we can see, the percentage of female is much smaller in the business owner group (26.5%) than in the manager group (49%), reflecting the different perceptions on

career orientation on entrepreneurship between male and female. What is more, the t-test analysis showed that the difference in the gender distribution between the business owner group and the manager group is statistically significant (See Appendix 4 for more details).

Table 4.2 Gender of the business owner/manager

	Managers	Business Owners	Total
No. of Observation	65	68	133
Female	32	18	50
(%)	(49%)	(26.5%)	(37.6%)
Male	33	50	83
(%)	(51%)	(73.5%)	(62.4%)

4.1.3 Educational Level

Table 4.3 shows the education levels attained by the sample. The results reveal that 67% of all respondents hold bachelor or higher levels of education, which suggests that the business owners and the managers are among the better educated group in the population. More importantly, the t-test analysis showed that the average education level attained by the business owner is significantly higher than that of the manager (See Appendix 4 for more details).

Table 4.3 Education attainment of the business owner/manager

	Managers	Business Owners	Total
No. of Observation	65	69	134
Primary	0	1	1
(%)	(0%)	(1.4%)	(0.7%)
Secondary	17	7	24
(%)	(26.2%)	(10.1%)	(17.9%)

Diploma (%)	9 (13.8%)	10 (14.5%)	19 (14.2%)
Bachelor (%)	29 (44.6%)	32 (46.4%)	61 (45.5%)
Master (%)	9 (13.8%)	18 (26.1%)	27 (20.1%)
Ph.D (%)	1 (1.5%)	1 (1.4%)	2 (1.5%)

4.1.4 Ethnic Group

Singapore is a multiracial country. Around 70% of Singapore's population is Chinese. In our sample, most of the respondents are Chinese, but we do get responses from other ethnic groups such as Indian, especially in the business owner group. Details are shown in table 4.4.

Table 4.4 Ethnic groups of the business owner/manager

	Managers	Business Owners	Total
No. of Observation	65	69	134
Chinese	61	54	115
Indian	3	10	13
Others	1	5	6

4.1.5 Training

Apart from education, training is also important to one's career success. In our study, the managerial training and technical training are investigated. As shown in table 4.5, 53.7% of all respondents have received at least one kind of training (Four kinds of training are included in our research, namely, managerial training before running the business; technical training before running the business; managerial

training after running the business; and technical training after running the business). Specifically, 25.4% of the sample has received managerial training before running the business, and 23.1% has received technical training before running the business. After running the business, 23.1% has received managerial training and 8.7% has received technical training. Between the business owner group and the manager group, there is no significant difference in training (See Appendix 4 for more details).

Table 4.5 Training received by the business owner/manager

	Managers	Business Owners	Total
No. of Observation	65	69	134
Managerial training before running the business (%)	14 (21.5%)	20 (29.0%)	34 (25.4%)
Technical training before running the business (%)	15 (23.1%)	18 (26.1%)	31 (23.1%)
Managerial training after running the business (%)	18 (27.7%)	13 (18.8%)	31 (23.1%)
Technical training after running the business (%)	6 (9.2%)	6 (8.7%)	12 (8.7%)
None training at all (%)	31 (47.7%)	31 (44.9%)	62 (46.3%)

4.1.6 Involvement in the Business

As shown in table 4.6, 80% of the business owners spend 35 hours to 80 hours per week in their business, while 80% of the managers only spend 12 hours to 60 hours per week in their business. On average, business owners spend 55.6 hours per week

on work, while managers only spend 43.4 hours on work. The t-test analysis showed that business owners spend significantly more time on work than managers, which implies that being an entrepreneur requires a more devoted work pattern compared with being a manager (See Appendix 4 for more details).

Table 4.6 Hours spent on the business each week

	Managers	Business Owners	Total
No. of Observation	65	67	132
Mean	43.4	55.6	49.6
Standard Deviation	16.2	17.5	17.9
Minimum	9	8	8
Maximum	80	100	100
10% Percentile	12	35	18
50% Percentile	48	57.5	50
90% Percentile	60	80	70

4.2 Analyses of Variables

The analyses of variables are carried out for two main purposes: firstly, to determine the competency variables that we are going to use in the subsequent hypothesis test; secondly, to provide evidence of reliability and validity on these competency variables.

4.2.1 Exploratory Factor Analysis

In literature, six entrepreneurial competency sub-constructs are identified: (1) Opportunity Competency; (2) Relationship Competency; (3) Conceptual Competency; (4) Organizing Competency; (5) Strategic Competency and (6) Commitment

Competency (See Chapter 2 for more details). In our survey questionnaires, we use multiple items to measure each competency sub-construct. Table 4.7 shows the match between the survey items and the competency sub-constructs.

Table 4.7 Match between the Survey Items and the Competency Sub-Constructs

Survey Item	Competency sub-Construct
Item 1-4	Opportunity Competency
Item 5-10	Relationship Competency
Item 11-17	Conceptual Competency
Item 18-27	Organizing Competency
Item 28-36	Strategic Competency
Item 37-40	Commitment Competency

The exploratory factor analysis serves to determine the number of factors within each competency sub-construct which are reflected in the loading patterns of the survey items. We conduct the factor analysis using varimax rotation and principal component analysis. The results are shown in Table 4.8, with the figures in bold and italic fonts representing the pre-determined loading patterns which are given in Table 4.7 (For details of the factor analysis, see Appendix 5).

In general, the factor loading patterns correspond with the pre-determined sets of competency sub-constructs. In our factor analysis, factors are extracted when the eigenvalues are greater than 1. The seven factors extracted have explained over 70% of the total variance, which means that they are satisfactory solutions. The factor loading pattern also indicates that the organizing competency shall be separated into two competency areas-operational competency and human competency-to better reflect the organizing competency in business operations and in people management.

Table 4.8 Rotated Factor Loadings (Correlation Matrix) for Item1 to Item 40

Items	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7
item1	0.2067	0.0849	0.2007	0.2378	0.1267	0.1308	0.7990
item2	0.5102	0.0040	0.0508	0.2879	-0.1404	0.2166	0.6459
item3	0.2182	0.1607	0.0956	-0.0340	0.2667	0.2465	0.6897
item4	0.3603	-0.0488	0.2396	-0.0462	0.3424	0.4670	0.3362
item5	0.1141	0.1310	0.4805	-0.0967	0.2361	0.4282	0.2837
item6	0.1753	0.3352	0.1095	0.1658	0.0153	0.7385	0.1422
item7	0.0746	-0.0469	0.2312	0.2081	0.0560	0.7203	0.3392
item8	0.2906	0.2404	0.3310	0.1511	0.0050	0.6635	0.0141
item9	0.2101	0.0583	0.6577	0.2262	0.1243	0.3388	0.1032
item10	0.2516	0.1928	0.6918	0.1832	0.0497	0.1649	0.2269
item11	0.2968	-0.1588	0.6028	0.3900	0.0990	0.1680	0.0506
item12	0.4697	0.1289	0.1761	0.5872	0.0127	0.2566	-0.0369
item13	0.7702	-0.0509	0.1041	0.3026	0.1409	0.0490	0.1028
item14	0.7768	0.1259	0.2717	0.1926	0.0654	0.0065	0.1340
item15	0.5793	0.0172	0.2547	0.1710	0.5605	0.0225	0.1155
item16	0.2477	0.1720	0.1729	0.2561	0.7240	0.1197	0.0163
item17	0.4116	0.1363	0.1684	0.1128	0.6925	0.0229	0.2172
item18	0.2850	0.7280	0.0733	0.0590	0.3299	-0.0850	0.2231
item19	0.1314	0.8225	0.1467	0.2715	0.2016	0.0038	-0.0081
item20	0.1201	0.7704	0.2589	0.0578	0.0967	0.1701	0.1825
item21	0.2559	0.8040	0.0931	0.2386	0.0571	0.1613	-0.0704
item22	0.2242	0.7647	0.3182	-0.0488	-0.1249	0.2220	0.0378
item23	0.2888	0.4065	0.7218	0.0515	-0.1416	0.0387	-0.0090
item24	0.0989	0.3746	0.6920	0.2122	0.2301	0.2143	-0.0161
item25	0.1091	0.6389	0.5888	-0.0572	0.0629	0.1052	0.0035
item26	0.1069	0.3016	0.6148	0.1842	0.2985	0.1086	0.1537
item27	0.3050	0.3303	0.5698	0.0415	0.2616	0.0079	0.1189
item28	0.6788	0.2252	0.0394	0.1884	0.3727	0.0842	0.1597
item29	0.5721	0.3304	0.1151	0.2740	0.3686	0.0671	0.1457
item30	0.7429	0.2966	0.2019	-0.0535	0.2587	0.2102	0.0471
item31	0.6639	0.2351	-0.0271	0.0690	0.2529	0.2781	-0.0441
item32	0.7121	0.2185	0.1019	0.1267	0.2389	0.2047	0.1674
item33	0.7252	0.3672	0.1988	0.0282	-0.1039	0.1274	0.0917
item34	0.8228	0.1260	0.3074	-0.0028	0.0917	0.1550	0.1366
item35	0.8485	0.1173	0.2300	0.1143	0.0198	0.0180	0.1901
item36	0.7903	0.1061	0.1519	0.1769	0.1681	0.1031	0.1581
item37	0.4897	0.0922	0.3666	0.4875	0.0086	0.3608	-0.1627
item38	0.2361	0.0952	0.1117	0.6625	0.0068	0.1992	0.1735
item39	0.0893	0.2214	0.2187	0.7533	0.3586	-0.0699	0.1311
item40	0.1464	0.1934	0.1755	0.6619	0.4574	0.1113	0.1868

Therefore, there are in total 7 factors generated from the factor analysis, and this 7 factor model will be used in the subsequent analyses. The value of these 7 factors/variables is derived by calculating the mean of the corresponding survey items (we dropped those survey items whose correlation coefficient is less than 0.5).

4.2.2 Scale Reliability and Correlation Analysis

As shown in Table 4.9, the reported Cronbach's Alpha for the 7 competency variables range from 0.82 to 0.85, all of which are higher than the acceptable value of 0.7 suggested by Nunnally (1978), indicating a high level of reliability for the variables used.

Table 4.9 Reliability of the Competency Variables

Competency Variable	Item	Cronbach's Alpha
Opportunity Competency	Item 1-3	0.84
Relationship Competency	Item 6-8	0.84
Conceptual Competency	Item 15-17	0.83
Operational Competency	Item 18-22	0.84
Human Competency	Item 23-27	0.84
Strategic Competency	Item 28-36	0.82
Commitment Competency	Item 38-40	0.85

Table 4.10 shows that there are significant correlations among the competency variables. This can be explained by the fact that these 7 competency variables are all sub-constructs of a higher level construct-the entrepreneurial competency.

Table 4.10 Correlation of the Competency Variables

	Opportunity	Relationship	Conceptual	Operating	Human	Strategic	Commitment
Opportunity	1						
Relationship	0.5237*	1					
Conceptual	0.4751*	0.3618*	1				
Operating	0.3294*	0.4368*	0.4380*	1			
Human	0.3391*	0.5106*	0.4715*	0.6463*	1		
Strategic	0.5521*	0.4932*	0.6599*	0.5231*	0.5374*	1	
Commitment	0.4044*	0.3548*	0.5059*	0.3524*	0.4023*	0.4523*	1

* Significant at 0.01 level

4.3 Examination of Our Research Question

Firstly, comparison of the 7 entrepreneurial competency variables is made between the business owner group and the manager group, the results of which are shown in Table 4.11. In Table 4.11, we provide mean and standard deviation of the 7 entrepreneurial competency variables by different groups. More importantly, we conduct t-test to examine whether there is significant difference between the business owner group and the manager group in these 7 entrepreneurial competency areas. The t-test results are shown in the last column of Table 4.11 (for details, see Appendix 6).

Table 4.11 Comparisons of the Competency Variables

Competency Variable	Managers		Business Owners		T-Test
	Mean	S.D	Mean	S.D	
Opportunity	5.86	0.86	6.20	0.74	p<0.05
Relationship	5.89	0.87	6.04	0.83	Non Significant
Conceptual	5.72	0.93	6.07	0.76	p<0.05
Operational	5.76	0.92	5.82	0.91	Non Significant
Human	5.80	0.78	5.77	0.82	Non Significant
Strategic	5.47	1.01	5.86	0.80	p<0.05
Commitment	5.53	0.87	6.25	0.62	p<0.01

In general, the average ratings of the business owners on the 7 entrepreneurial competency areas are higher than that of the managers, except for the human competency area. Further, the t-test results show that in 4 out of 7 entrepreneurial competency areas, the ratings of the business owners are significantly higher than that of the managers, while the ratings on the rest 3 entrepreneurial competency areas do not show any significant difference between the business owner group and the manager group. Therefore, when taking the 7 entrepreneurial competency areas as a whole, we may draw the conclusion that the business owners generally possess higher level of entrepreneurial competencies than the managers. As the business owner and the manager are the proxies of the entrepreneur and the non-entrepreneur respectively in our research, this means the first part of our hypothesis is supported by the empirical results, i.e. the entrepreneurs generally possess higher level of entrepreneurial competencies than the non-entrepreneurs.

Further, a discriminant analysis was conducted to directly examine the possibility of classifying the subjects into the business owner group and the manager group, based on their ratings of the 7 entrepreneurial competency areas (the details of the discriminate analysis are shown in Appendix 7). As shown in Table 4.12, one discriminant function has emerged in this analysis, and the F test ($F=6.0644$, $p<0.01$) shows that this discriminant function has significant discriminating power between the business owners and the managers.

Table 4.12 Test of the Discriminant Function

Fcn	Variance				Likelihood Ratio	F	df1	df2	Prob>F
	Canon. Corr.	Eigenvalue	Prop.	Cumul.					
1	0.499	0.331646	1	1	0.751	6.0644	7	128	0.0000 e

Ho: this and smaller canon. corr. are zero; e = exact F

Table 4.13 shows the coefficients of the discriminant function. It is evident from the standardized coefficients that the most distinguishing variable between the business owners and the managers is the commitment variable. The business owners have a higher rating (mean=6.25) on the commitment competency than the managers (mean=5.53), which means that comparing to the managers, the business owners tend to have a stronger competency in totally committing, determining and dedicating, as well as taking proactive actions towards their responsibilities and duties.

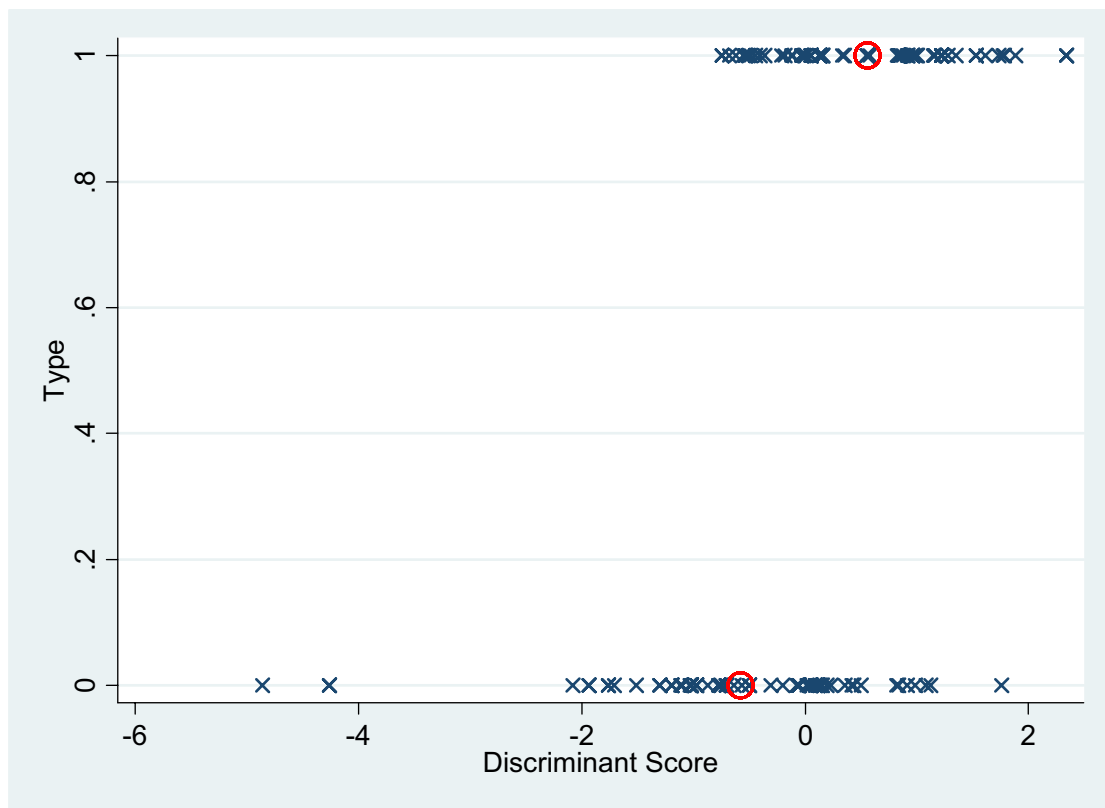
Table 4.13 Discriminant Function Coefficients

	Un-Standardized Coefficients	Standardized Coefficients
Opportunity	0.1258	0.1010
Relationship	-0.0860	-0.0731
Conceptual	0.0153	0.0130
Operational	-0.0971	-0.0888
Human	-0.7386	-0.5910
Strategic	0.2952	0.2678
Commitment	1.3520	1.0181

With the un-standardized coefficients in Table 4.13, we are able to calculate the discriminant score for every individual in our sample, the results of which are shown in Figure 4.1. In Figure 4.1, type=1 indicates the subject is a business owner, while the subject is a manager if type=0. The red hollow circles in the graph represent the group means of the business owners and the managers. It is evident from Figure 4.1 that the discriminant scores of the managers are generally smaller than that of the business owner.

Figure 4.1

Discriminant Score of the Subjects



Lastly, Table 4.14 provides the classification summary. In the classification procedure of the 136 subjects in our sample, 95 (70%) were classified correctly, i.e. the overall predictive accuracy is 70%. Specifically, of the 67 subjects that are in the manager group, 42 (62.69%) are classified correctly by the analysis as belonging to the manager group, while 53 out of 69 (76.81%) business owners are classified correctly as belonging to the business owner group. This classification is higher than the probability of a random classification of subjects into two categories (50%), which implies that we can better discriminate the entrepreneurs and the non-entrepreneurs by examining their entrepreneurial competency level.

Table 4.14 Resubstitution Classification Summary

True Type	Classified		Total
	Manager	Business Owner	
Manager	42	25	67
	62.69%	37.31%	100%
Business Owner	16	53	69
	23.19%	76.81%	100%
Total	60	76	136
	42.65%	53.75%	100%

In summary, the hypothesis we developed in chapter 2 is supported by the empirical results, i.e. we find empirical evidence that the entrepreneurs generally possess higher level of entrepreneurial competencies than the non-entrepreneurs, and the entrepreneurs and the non-entrepreneurs can be discriminated based on their entrepreneurial competency level.

4.4 Implication of Our Findings

Our research aims to empirically examine whether entrepreneurial competency has discriminating power between entrepreneurs and non-entrepreneurs, which is of critical importance when applying the competency approach in the field of entrepreneurship. Our findings confirm that the entrepreneurs generally possess higher level of entrepreneurial competencies than the non-entrepreneurs, and the entrepreneurs and the non-entrepreneurs can be discriminated based on their entrepreneurial competency level. These findings imply that researchers get a solid foundation when adopting competency approach in the field of entrepreneurship.

Policy makers and instructors may also get inspiration from our research. We find

empirical evidence that entrepreneurs are more competent than non-entrepreneurs in certain competency areas. Given the importance of entrepreneurship to economic growth and new job creation, policy makers and instructors may consider developing certain competency-based training and education programs to enhance the competency of non-entrepreneurs to make them entrepreneurs, as well as to improve the competency of entrepreneurs to better fulfill their entrepreneurial role. As research has shown that the entrepreneurial competencies of university students and small business owners can be enhanced through proper training and education programs (Bergevoet et al., 2005; Izquierdo and Buyens, 2007; Greet and Anita, 2007), our findings call for more such training and education programs to be introduced.

Chapter 5 CONCLUSIONS

5.1 Summary of the Study

The entrepreneur has long been the core of entrepreneurship research. In recent years, the competency approach has become an increasingly popular means of studying entrepreneurial characteristics, and significant relationship between entrepreneurial competencies and firm performance is reported in empirical studies. When applying the competency approach, researchers always presumes that entrepreneurs are different from non-entrepreneurs in terms of the competencies they possess. However, no one has empirically examined whether or not entrepreneurial competencies can discriminate between entrepreneurs and non-entrepreneurs. Our research aims to address this gap.

Based on a thorough literature review regarding the components, antecedents and performance outcomes of the entrepreneurial competency, we propose the following hypothesis: the entrepreneurs generally possess higher level of entrepreneurial competencies than the non-entrepreneurs, and the entrepreneurs and the non-entrepreneurs can be discriminated based on their entrepreneurial competency level.

Large sample survey is conducted among the business owners and the managers to collect data. After the data is collected, we have conducted the factor analysis, reliability analysis and most importantly, the discriminant analysis. We find empirical evidence that the business owners generally possess higher level of entrepreneurial competencies than the managers, and the business owners and the managers can be

discriminated based on their entrepreneurial competency level, which supports our hypothesis.

5.2 Limitation and Direction for Future Research

The main limitation of this study is the relatively small number of response we get, although our response rates are comparatively high (17.8% for the business owner and 17% for the manager). This is partly because the population size in our research is too small to achieve large number of response.

In literature, most of the classifications of the entrepreneurs have been made with reference to their personal characteristics like personality, motivation, behavior, work experience, and educational attainment. As entrepreneurial competencies are seen as a higher level characteristics which are closely linked to SME performance, it will be of interest to know what entrepreneurial typology will emerge if they are used as the basis of classification. Moreover, by classifying the entrepreneurs into different categories, it is possible to offer them more focused training and assistance.

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Appendices

Appendix 1 Cover Letter for Survey



Dear Sir/Madam,

Study of Innovation and Entrepreneurial Behavior

I am writing to request your assistance with a study we are conducting on innovation and entrepreneurial behavior in Singapore. I hope you will agree to assist us by completing this questionnaire.

*I hence included **TWO** questionnaires with this letter: one for you as the business owner entitled '**Survey of Business Owner**', and the other for one of your managers to complete called '**Survey of Business Manager**'. You will see that the survey contains questions about the activities you and your manager normally engage in, your company and a little personal information.*

*It will only take you about 20 minutes to complete this survey. Your views are highly valuable and your responses will be kept confidential. They will only be used for the purpose of academic research. Please kindly return the completed questionnaire using the addressed reply envelope provided (**no postage is required**).*

Please be informed that participation in this research is voluntary. Refusal to participate will involve no penalty or loss of benefits. By completing and returning the questionnaires, you have consented to be part of this study. If you have any queries regarding participation, please contact the IRB Secretariat Ms Stephanie Tan at irb@smu.edu.sg or telephone 65-6828-1925.

Thank you in advance for your time and cooperation. If you need any clarification on the survey or this research, please feel free to contact me via my research assistant Li Xiang (65-9130-6608) or email at lixiang.2007@mm.smu.edu.sg.

Yours faithfully

TAN Wee Liang
Associate Professor
Lee Kong Chian School of Business
SINGAPORE MANAGEMENT UNIVERSITY

Appendix 2 Survey of Business Owners

Thank you for participating in our survey of business owner. This survey seeks information on contents of your work, performance of your firm, and personal background information.

Part A Your Job Activities

Please circle one number to indicate your agreement or disagreement on each statement:

As the owner of this business, I am able to...	Strongly Disagree		Neither agree or disagree			Strongly Agree	
1. Identify goods or services customers want.	1	2	3	4	5	6	7
2. Perceive unmet consumer needs.	1	2	3	4	5	6	7
3. Actively look for products or services that provide real benefit to customers.	1	2	3	4	5	6	7
4. Seize high-quality business opportunities.	1	2	3	4	5	6	7
5. Develop long-term trusting relationships with others.	1	2	3	4	5	6	7
6. Negotiate with others.	1	2	3	4	5	6	7
7. Interact with others.	1	2	3	4	5	6	7
8. Maintain a personal network of work contacts.	1	2	3	4	5	6	7
9. Understand what others mean by their words and actions.	1	2	3	4	5	6	7
10. Communicate with others effectively.	1	2	3	4	5	6	7
11. Apply ideas, issues, and observations to alternative contexts.	1	2	3	4	5	6	7
12. Integrate ideas, issues, and observations into more general contexts.	1	2	3	4	5	6	7
13. Take reasonable job-related risks.	1	2	3	4	5	6	7
14. Monitor progress toward objectives in risky actions.	1	2	3	4	5	6	7
15. Look at old problems in new ways.	1	2	3	4	5	6	7
16. Explore new ideas.	1	2	3	4	5	6	7
17. Treat new problems as opportunities.	1	2	3	4	5	6	7
18. Plan the operations of the business.	1	2	3	4	5	6	7
19. Plan the organization of different resources.	1	2	3	4	5	6	7
20. Keep organization running smoothly.	1	2	3	4	5	6	7
21. Organize resources.	1	2	3	4	5	6	7
22. Coordinate tasks.	1	2	3	4	5	6	7
23. Supervise subordinates.	1	2	3	4	5	6	7
24. Lead subordinates.	1	2	3	4	5	6	7
25. Organize people.	1	2	3	4	5	6	7
26. Motivate people.	1	2	3	4	5	6	7
27. Delegate effectively.	1	2	3	4	5	6	7
28. Determine long-term issues, problems, or opportunities.	1	2	3	4	5	6	7
29. Aware of the projected directions of the industry and how changes might impact the firm.	1	2	3	4	5	6	7
30. Prioritize work in alignment with business goals.	1	2	3	4	5	6	7
31. Redesign the department and/or organization to better meet long-term objectives and changes.	1	2	3	4	5	6	7
32. Align current actions with strategic goals.	1	2	3	4	5	6	7

33. Assess and link short-term, day-to-day tasks in the context of long-term direction.	1	2	3	4	5	6	7
34. Monitor progress toward strategic goals.	1	2	3	4	5	6	7
35. Evaluate results against strategic goals.	1	2	3	4	5	6	7
36. Determine strategic actions by weighing costs and benefits.	1	2	3	4	5	6	7
37. Dedicate to make the venture work whenever possible.	1	2	3	4	5	6	7
38. Refuse to let the venture fail whenever appropriate.	1	2	3	4	5	6	7
39. Possess an extremely strong internal drive.	1	2	3	4	5	6	7
40. Commit to long-term business goals.	1	2	3	4	5	6	7
41. Learn from a variety of means.	1	2	3	4	5	6	7
42. Learn proactively.	1	2	3	4	5	6	7
43. Learn as much as I can in my field.	1	2	3	4	5	6	7
44. Keep up to date in my field.	1	2	3	4	5	6	7
45. Apply learned skills and knowledge into actual practices.	1	2	3	4	5	6	7
46. Maintain a high energy level.	1	2	3	4	5	6	7
47. Motivate self to function at optimum level of performance.	1	2	3	4	5	6	7
48. Respond to constructive criticism	1	2	3	4	5	6	7
49. Maintain a positive attitude.	1	2	3	4	5	6	7
50. Prioritize tasks to manage my time.	1	2	3	4	5	6	7
51. Identify my own strengths and weaknesses and match them with opportunities and threats.	1	2	3	4	5	6	7
52. Manage my own career development.	1	2	3	4	5	6	7
53. Recognize and work on my own shortcomings.	1	2	3	4	5	6	7
54. We favor a strong emphasis on research and development, technical leadership, and innovations.	1	2	3	4	5	6	7
55. We have marketed very many new lines of products or services in the past 3 years.	1	2	3	4	5	6	7
56. Changes in our products/service lines have usually been quite dramatic in the past 3 years.	1	2	3	4	5	6	7
57. In dealing with our competitors, we typically initiate actions, which competitors then responded to.	1	2	3	4	5	6	7
58. In dealing with our competitors, we are very often the first to introduce new products/services.	1	2	3	4	5	6	7
59. In dealing with our competitors, we typically adopt a very competitive, undo-the competitors' posture.	1	2	3	4	5	6	7
60. In general, we have a strong proclivity for high-risk projects (with changes of very high returns).	1	2	3	4	5	6	7
61. In general, we believe that owing to the nature of the environment bold, wide-ranging acts are necessary to achieve the firm's objectives.	1	2	3	4	5	6	7
62. When confronted with decision-making situations involving uncertainty, we typically adopt a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities.	1	2	3	4	5	6	7

Part C Personal Background Information

Please circle one best answer to the question, or provide your own answer.

1. Your current age: _____
2. Number of years of this business: _____
3. Number of full-time employee: _____
4. Sex: A. Male B. Female
5. Your ethnic group:
A. Chinese B. Indian C. Malay D. Others: _____
6. Highest educational qualification:
A. Primary B. Secondary C. Post-secondary or Diploma
D. Bachelor's degree E. Master's degree F. Ph.D.
7. Does/did your father/mother own a business? A. Yes B. No
8. Did you receive any formal training? (You may choose more than one option)
A. Management training *before* starting this business
B. Technical training *before* starting this business
C. Management training *after* starting this business
D. Technical training *after* starting this business
E. None
9. Before starting up this business, did you have any relevant work experience?
A. Yes B. No
- 10 Do you have business start-up experience prior to this business?
A. Yes B. No
11. On average, hours per week spent on this business: _____
12. Apart from this business, do you also own other businesses? A. Yes B. No
If yes, how many other businesses do you own? _____
If yes, are any of them related to this business? A. Yes B. No

Once you complete it, please return it with the reply envelopes attached.
Thank you for your participation!

Appendix 3 Survey of Managers

Thank you for participating in our survey of manager. This survey seeks information on contents of your work, performance of your firm, and personal background information.

Part A Your Job Activities

Please circle one number to indicate your agreement or disagreement on each statement:

As the manager of this business, I am able to...	Strongly Disagree		Neither agree or disagree			Strongly Agree	
1. Identify goods or services customers want.	1	2	3	4	5	6	7
2. Perceive unmet consumer needs.	1	2	3	4	5	6	7
3. Actively look for products or services that provide real benefit to customers.	1	2	3	4	5	6	7
4. Seize high-quality business opportunities.	1	2	3	4	5	6	7
5. Develop long-term trusting relationships with others.	1	2	3	4	5	6	7
6. Negotiate with others.	1	2	3	4	5	6	7
7. Interact with others.	1	2	3	4	5	6	7
8. Maintain a personal network of work contacts.	1	2	3	4	5	6	7
9. Understand what others mean by their words and actions.	1	2	3	4	5	6	7
10. Communicate with others effectively.	1	2	3	4	5	6	7
11. Apply ideas, issues, and observations to alternative contexts.	1	2	3	4	5	6	7
12. Integrate ideas, issues, and observations into more general contexts.	1	2	3	4	5	6	7
13. Take reasonable job-related risks.	1	2	3	4	5	6	7
14. Monitor progress toward objectives in risky actions.	1	2	3	4	5	6	7
15. Look at old problems in new ways.	1	2	3	4	5	6	7
16. Explore new ideas.	1	2	3	4	5	6	7
17. Treat new problems as opportunities.	1	2	3	4	5	6	7
18. Plan the operations of the business.	1	2	3	4	5	6	7
19. Plan the organization of different resources.	1	2	3	4	5	6	7
20. Keep organization running smoothly.	1	2	3	4	5	6	7
21. Organize resources.	1	2	3	4	5	6	7
22. Coordinate tasks.	1	2	3	4	5	6	7
23. Supervise subordinates.	1	2	3	4	5	6	7
24. Lead subordinates.	1	2	3	4	5	6	7
25. Organize people.	1	2	3	4	5	6	7
26. Motivate people.	1	2	3	4	5	6	7
27. Delegate effectively.	1	2	3	4	5	6	7
28. Determine long-term issues, problems, or opportunities.	1	2	3	4	5	6	7
29. Aware of the projected directions of the industry and how changes might impact the firm.	1	2	3	4	5	6	7
30. Prioritize work in alignment with business goals.	1	2	3	4	5	6	7
31. Redesign the department and/or organization to better meet long-term objectives and changes.	1	2	3	4	5	6	7
32. Align current actions with strategic goals.	1	2	3	4	5	6	7

33. Assess and link short-term, day-to-day tasks in the context of long-term direction.	1	2	3	4	5	6	7
34. Monitor progress toward strategic goals.	1	2	3	4	5	6	7
35. Evaluate results against strategic goals.	1	2	3	4	5	6	7
36. Determine strategic actions by weighing costs and benefits.	1	2	3	4	5	6	7
37. Dedicate to make the venture work whenever possible.	1	2	3	4	5	6	7
38. Refuse to let the venture fail whenever appropriate.	1	2	3	4	5	6	7
39. Possess an extremely strong internal drive.	1	2	3	4	5	6	7
40. Commit to long-term business goals.	1	2	3	4	5	6	7
41. Learn from a variety of means.	1	2	3	4	5	6	7
42. Learn proactively.	1	2	3	4	5	6	7
43. Learn as much as I can in my field.	1	2	3	4	5	6	7
44. Keep up to date in my field.	1	2	3	4	5	6	7
45. Apply learned skills and knowledge into actual practices.	1	2	3	4	5	6	7
46. Maintain a high energy level.	1	2	3	4	5	6	7
47. Motivate self to function at optimum level of performance.	1	2	3	4	5	6	7
48. Respond to constructive criticism	1	2	3	4	5	6	7
49. Maintain a positive attitude.	1	2	3	4	5	6	7
50. Prioritize tasks to manage my time.	1	2	3	4	5	6	7
51. Identify my own strengths and weaknesses and match them with opportunities and threats.	1	2	3	4	5	6	7
52. Manage my own career development.	1	2	3	4	5	6	7
53. Recognize and work on my own shortcomings.	1	2	3	4	5	6	7
54. We favor a strong emphasis on research and development, technical leadership, and innovations.	1	2	3	4	5	6	7
55. We have marketed very many new lines of products or services in the past 3 years.	1	2	3	4	5	6	7
56. Changes in our products/service lines have usually been quite dramatic in the past 3 years.	1	2	3	4	5	6	7
57. In dealing with our competitors, we typically initiate actions, which competitors then responded to.	1	2	3	4	5	6	7
58. In dealing with our competitors, we are very often the first to introduce new products/services.	1	2	3	4	5	6	7
59. In dealing with our competitors, we typically adopt a very competitive, undo-the competitors' posture.	1	2	3	4	5	6	7
60. In general, we have a strong proclivity for high-risk projects (with changes of very high returns).	1	2	3	4	5	6	7
61. In general, we believe that owing to the nature of the environment bold, wide-ranging acts are necessary to achieve the firm's objectives.	1	2	3	4	5	6	7
62. When confronted with decision-making situations involving uncertainty, we typically adopt a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities.	1	2	3	4	5	6	7

Part C Personal Background Information

Please circle one best answer to the question, or provide your own answer.

1. Your current age: _____
2. Number of years for being the manager of this business: _____
3. Sex: A. Male B. Female
4. Your ethnic group:
A. Chinese B. Indian C. Malay D. Others: _____
5. Highest educational qualification:
A. Primary B. Secondary C. Post-secondary or Diploma
D. Bachelor's degree E. Master's degree F. Ph.D.
6. Does/did your father/mother own a business? A. Yes B. No
7. Did you receive any formal training? (You may choose more than one option)
A. Management training *before* managing this business
B. Technical training *before* managing this business
C. Management training *after* managing this business
D. Technical training *after* managing this business
E. None
8. Before being the manager of this business, did you have other work experience?
A. Yes B. No
9. On average, hours per week spent on work: _____
10. Will you start your own business some day? (Please circle one number below. 1 indicates no intention to start your own business, while 10 indicates the highest intention to do so)
1 2 3 4 5 6 7 8 9 10

Once you complete it, please return it with the reply envelopes attached.
Thank you for your participation!

Appendix 4 Comparative Statistics between Business Owners and Managers

. ttest age, by(type)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	65	37.73846	1.343839	10.83437	35.05384	40.42309
Entrepre	69	39.84058	1.216998	10.10914	37.4121	42.26906
combined	134	38.8209	.9054041	10.48081	37.03004	40.61175
diff		-2.102118	1.809237		-5.680967	1.476731

diff = mean(Manager) - mean(Entrepre) t = -1.1619
 Ho: diff = 0 degrees of freedom = 132

Ha: diff < 0 Pr(T < t) = 0.1237
 Ha: diff != 0 Pr(|T| > |t|) = 0.2474
 Ha: diff > 0 Pr(T > t) = 0.8763

. ttest gender, by(type)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	65	.5076923	.0624926	.5038315	.382849	.6325356
Entrepre	68	.7352941	.0538983	.4444566	.6277127	.8428755
combined	133	.6240602	.0421585	.4861959	.5406664	.7074539
diff		-.2276018	.0822912		-.3903935	-.0648102

diff = mean(Manager) - mean(Entrepre) t = -2.7658
 Ho: diff = 0 degrees of freedom = 131

Ha: diff < 0 Pr(T < t) = 0.0032
 Ha: diff != 0 Pr(|T| > |t|) = 0.0065
 Ha: diff > 0 Pr(T > t) = 0.9968

. ttest education, by(type)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	65	3.507692	.133595	1.077078	3.240806	3.774579
Entrepre	69	3.898551	.1206422	1.002129	3.657813	4.139288
combined	134	3.708955	.0910201	1.053634	3.528921	3.888989
diff		-.3908584	.1796166		-.7461578	-.035559

diff = mean(Manager) - mean(Entrepre) t = -2.1761
 Ho: diff = 0 degrees of freedom = 132

Ha: diff < 0 Pr(T < t) = 0.0157
 Ha: diff != 0 Pr(|T| > |t|) = 0.0313
 Ha: diff > 0 Pr(T > t) = 0.9843

. ttest mgmtb4, by(type)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	65	.2153846	.0513861	.4142881	.1127291	.3180402
Entrepre	69	.2898551	.0550186	.4570188	.1800672	.399643
combined	134	.2537313	.0377319	.4367785	.1790991	.3283636
diff		-.0744705	.0755052		-.2238272	.0748863

diff = mean(Manager) - mean(Entrepre) t = -0.9863
 Ho: diff = 0 degrees of freedom = 132

Ha: diff < 0 Pr(T < t) = 0.1629
 Ha: diff != 0 Pr(|T| > |t|) = 0.3258
 Ha: diff > 0 Pr(T > t) = 0.8371

. ttest techb4, by(type)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	65	.2307692	.0526656	.4246039	.1255575	.3359809
Entrepre	69	.2318841	.0511793	.4251272	.1297573	.3340108
combined	134	.2313433	.0365653	.4232737	.1590186	.303668
diff		-.0011148	.0734397		-.1463858	.1441562

diff = mean(Manager) - mean(Entrepre) t = -0.0152
 Ho: diff = 0 degrees of freedom = 132

Ha: diff < 0 Pr(T < t) = 0.4940
 Ha: diff != 0 Pr(|T| > |t|) = 0.9879
 Ha: diff > 0 Pr(T > t) = 0.5060

. ttest mgmtafter, by(type)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	65	.2769231	.0559348	.4509605	.1651805	.3886656
Entrepre	69	.1884058	.0474201	.3939006	.0937805	.2830311
combined	134	.2313433	.0365653	.4232737	.1590186	.303668
diff		.0885173	.0730345		-.0559522	.2329868

diff = mean(Manager) - mean(Entrepre) t = 1.2120
 Ho: diff = 0 degrees of freedom = 132

Ha: diff < 0 Pr(T < t) = 0.8862
 Ha: diff != 0 Pr(|T| > |t|) = 0.2277
 Ha: diff > 0 Pr(T > t) = 0.1138

Appendix 5 Factor Analysis Results

. factor item1-item40, pcf
(obs=128)

Factor analysis/correlation Number of obs = 128
Method: principal-component factors Retained factors = 7
Rotation: (unrotated) Number of params = 259

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	16.94093	13.46323	0.4235	0.4235
Factor2	3.47770	0.91645	0.0869	0.5105
Factor3	2.56125	0.44084	0.0640	0.5745
Factor4	2.12041	0.36065	0.0530	0.6275
Factor5	1.75976	0.22904	0.0440	0.6715
Factor6	1.53072	0.43166	0.0383	0.7098
Factor7	1.09906	0.17491	0.0275	0.7372
Factor8	0.92415	0.09336	0.0231	0.7603
Factor9	0.83079	0.02623	0.0208	0.7811
Factor10	0.80455	0.07802	0.0201	0.8012
Factor11	0.72653	0.06677	0.0182	0.8194
Factor12	0.65976	0.04316	0.0165	0.8359
Factor13	0.61660	0.03603	0.0154	0.8513
Factor14	0.58058	0.07845	0.0145	0.8658
Factor15	0.50213	0.02957	0.0126	0.8784
Factor16	0.47255	0.02598	0.0118	0.8902
Factor17	0.44657	0.04446	0.0112	0.9014
Factor18	0.40211	0.02865	0.0101	0.9114
Factor19	0.37345	0.05476	0.0093	0.9207
Factor20	0.31870	0.02690	0.0080	0.9287
Factor21	0.29180	0.02340	0.0073	0.9360
Factor22	0.26840	0.02412	0.0067	0.9427
Factor23	0.24428	0.00787	0.0061	0.9488
Factor24	0.23641	0.00762	0.0059	0.9547
Factor25	0.22879	0.03681	0.0057	0.9604
Factor26	0.19198	0.00270	0.0048	0.9652
Factor27	0.18929	0.02192	0.0047	0.9700
Factor28	0.16736	0.01499	0.0042	0.9742
Factor29	0.15237	0.01420	0.0038	0.9780
Factor30	0.13817	0.02024	0.0035	0.9814
Factor31	0.11793	0.00630	0.0029	0.9844
Factor32	0.11164	0.01494	0.0028	0.9872
Factor33	0.09669	0.01631	0.0024	0.9896
Factor34	0.08038	0.00192	0.0020	0.9916
Factor35	0.07846	0.00959	0.0020	0.9936
Factor36	0.06887	0.00484	0.0017	0.9953
Factor37	0.06403	0.00951	0.0016	0.9969
Factor38	0.05452	0.01159	0.0014	0.9982
Factor39	0.04293	0.01555	0.0011	0.9993
Factor40	0.02738	.	0.0007	1.0000

LR test: independent vs. saturated: $\chi^2(780) = 4931.65$ Prob> $\chi^2 = 0.0000$

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Uniqueness
item1	0.5652	-0.1392	0.3234	0.0857	0.4342	0.0704	0.4173	0.1816
item2	0.5907	-0.3699	0.1992	-0.1709	0.2200	0.2797	0.3850	0.1705
item3	0.5238	-0.1006	0.1768	0.0030	0.5949	-0.0012	0.1467	0.3088
item4	0.5927	-0.2001	0.2788	-0.1204	0.3109	-0.1226	-0.2120	0.3598
item5	0.5426	0.1811	0.3381	-0.1580	0.2565	-0.2030	-0.1284	0.4101
item6	0.5712	0.1821	0.2495	-0.2175	0.1691	0.4047	-0.2951	0.2516
item7	0.4769	-0.0159	0.5966	-0.1686	0.2025	0.2368	-0.1801	0.2584
item8	0.6441	0.1599	0.2619	-0.2868	-0.0362	0.2031	-0.2851	0.2848
item9	0.6477	0.1552	0.4078	-0.0887	-0.1568	-0.1697	-0.0290	0.3279
item10	0.6859	0.2173	0.2791	-0.1078	-0.0975	-0.2048	0.1875	0.3062
item11	0.5780	-0.0788	0.4116	0.0152	-0.3488	-0.1819	0.0688	0.3306
item12	0.6536	-0.1388	0.0985	0.0684	-0.3533	0.3075	-0.0142	0.3196
item13	0.6689	-0.4856	-0.1057	-0.0198	-0.1817	0.0179	0.0527	0.2690
item14	0.7534	-0.2911	-0.1719	-0.1347	-0.1589	-0.0688	0.1494	0.2476
item15	0.7125	-0.3091	-0.0626	0.2322	0.0095	-0.2873	-0.1199	0.2420
item16	0.6043	-0.0514	-0.0035	0.4776	0.0763	-0.1728	-0.3058	0.2748
item17	0.6590	-0.1937	-0.0805	0.3631	0.2248	-0.2721	-0.1472	0.2436
item18	0.6207	0.2811	-0.4251	0.2239	0.2841	0.0358	0.0938	0.2141
item19	0.5909	0.5012	-0.3423	0.2622	0.0194	0.2055	0.0281	0.1702
item20	0.6087	0.5271	-0.1869	-0.0002	0.2101	0.1371	0.0605	0.2501
item21	0.6190	0.4365	-0.3528	0.0598	-0.0301	0.3264	-0.0512	0.1882
item22	0.5863	0.5500	-0.2450	-0.2693	0.0642	0.1436	0.0395	0.1949
item23	0.6243	0.4186	0.0023	-0.2690	-0.2587	-0.2159	0.2073	0.2061
item24	0.6773	0.4493	0.2016	0.0638	-0.1579	-0.1998	-0.0536	0.2269
item25	0.5904	0.6155	-0.0996	-0.1255	-0.0096	-0.1741	0.0414	0.2148
item26	0.6415	0.3236	0.1943	0.1407	-0.0160	-0.2490	0.0522	0.3612
item27	0.6699	0.2294	-0.0185	0.0204	-0.0163	-0.3209	0.0761	0.3888
item28	0.7428	-0.2935	-0.2424	0.1138	0.0766	0.0059	-0.0666	0.2800
item29	0.7642	-0.1371	-0.2097	0.1911	0.0357	0.0336	-0.0263	0.3137
item30	0.7862	-0.1540	-0.2792	-0.1855	0.0530	-0.1040	-0.1700	0.2032
item31	0.6493	-0.2339	-0.2670	-0.0876	0.0145	0.0998	-0.2818	0.3552
item32	0.7675	-0.2648	-0.1805	-0.0732	0.0669	0.0369	-0.0732	0.2918
item33	0.7116	-0.0774	-0.3009	-0.3385	-0.0640	0.0757	0.0965	0.2634
item34	0.7892	-0.2783	-0.1614	-0.2993	-0.0475	-0.1417	0.0154	0.1615
item35	0.7577	-0.3506	-0.2125	-0.2271	-0.0948	-0.0628	0.1727	0.1634
item36	0.7596	-0.3677	-0.1695	-0.0953	-0.0535	-0.0147	0.0306	0.2459
item37	0.7030	-0.0614	0.1697	-0.0698	-0.4453	0.1698	-0.1354	0.2229
item38	0.5193	-0.1008	0.2422	0.2126	-0.2029	0.3748	0.1440	0.4140
item39	0.5608	0.0534	0.1532	0.6263	-0.2042	0.1504	0.1598	0.1771
item40	0.6307	-0.0152	0.2016	0.5641	-0.0584	0.1546	0.0084	0.2158

Appendix 6 Comparison of the Competency Variables

```
. tabstat Opportunity Relationship Conceptual Operating Human Strategic Commitment,
> by(type) stat(n mean sd min max)
```

Summary statistics: N, mean, sd, min, max
by categories of: type (Type)

type	Opport~y	Relati~p	Concep~l	Operat~g	Human	Strate~c	Commit~t
Manager	67 5.860697 .8648568 3 7	67 5.890547 .8749951 2.666667 7	67 5.716418 .9342955 2.333333 7	67 5.758955 .917586 3.6 7	67 5.8 .7839295 4 7	67 5.470564 1.007618 1.111111 7	67 5.532338 .8724355 3 7
Entrepreneur	70 6.195238 .7388306 3.333333 7	70 6.042857 .8280926 3.666667 7	69 6.067633 .7574892 4 7	69 5.821014 .9121083 3 7	69 5.771014 .8154936 4 7	70 5.856151 .8042775 3.444444 7	70 6.247619 .6208552 4.666667 7
Total	137 6.03163 .8173798 3 7	137 5.96837 .8516451 2.666667 7	136 5.894608 .8641961 2.333333 7	136 5.790441 .9119477 3 7	136 5.785294 .7972666 4 7	137 5.667579 .92646 1.111111 7	137 5.89781 .8329038 3 7

```
. ttest Opportunity, by(type)
```

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	67	5.860697	.1056591	.8648568	5.649741	6.071652
Entrepre	70	6.195238	.0883072	.7388306	6.01907	6.371406
combined	137	6.03163	.0698335	.8173798	5.89353	6.16973
diff		-.3345416	.1372288		-.605938	-.0631451

diff = mean(Manager) - mean(Entrepre) t = -2.4378
Ho: diff = 0 degrees of freedom = 135

Ha: diff < 0 Pr(T < t) = 0.0080
Ha: diff != 0 Pr(|T| > |t|) = 0.0161
Ha: diff > 0 Pr(T > t) = 0.9920

```
. ttest Relationship, by(type)
```

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	67	5.890547	.1068977	.8749951	5.677119	6.103975
Entrepre	70	6.042857	.098976	.8280926	5.845405	6.240309
combined	137	5.96837	.072761	.8516451	5.824481	6.112259
diff		-.1523099	.1455056		-.4400752	.1354554

diff = mean(Manager) - mean(Entrepre) t = -1.0468
Ho: diff = 0 degrees of freedom = 135

Ha: diff < 0 Pr(T < t) = 0.1485
Ha: diff != 0 Pr(|T| > |t|) = 0.2971
Ha: diff > 0 Pr(T > t) = 0.8515

```
. ttest Conceptual, by(type)
```

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	67	5.716418	.1141424	.9342955	5.488525	5.94431
Entrepre	69	6.067633	.091191	.7574892	5.885664	6.249602
combined	136	5.894608	.0741042	.8641961	5.748053	6.041163
diff		-.351215	.1456499		-.6392852	-.0631448

diff = mean(Manager) - mean(Entrepre) t = -2.4114
Ho: diff = 0 degrees of freedom = 134

Ha: diff < 0 Pr(T < t) = 0.0086
Ha: diff != 0 Pr(|T| > |t|) = 0.0172
Ha: diff > 0 Pr(T > t) = 0.9914

. ttest Operating, by(type)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	67	5.758955	.112101	.917586	5.535138	5.982772
Entrepre	69	5.821014	.1098049	.9121083	5.601902	6.040127
combined	136	5.790441	.0781989	.9119477	5.635788	5.945094
diff		-.0620593	.1569057		-.3723913	.2482728

diff = mean(Manager) - mean(Entrepre) t = -0.3955
 Ho: diff = 0 degrees of freedom = 134

Ha: diff < 0 Pr(T < t) = 0.3465
 Ha: diff != 0 Pr(|T| > |t|) = 0.6931
 Ha: diff > 0 Pr(T > t) = 0.6535

. ttest Human, by(type)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	67	5.8	.0957722	.7839295	5.608785	5.991215
Entrepre	69	5.771014	.0981739	.8154936	5.575112	5.966917
combined	136	5.785294	.068365	.7972666	5.650089	5.920499
diff		.0289856	.1372313		-.2424341	.3004052

diff = mean(Manager) - mean(Entrepre) t = 0.2112
 Ho: diff = 0 degrees of freedom = 134

Ha: diff < 0 Pr(T < t) = 0.5835
 Ha: diff != 0 Pr(|T| > |t|) = 0.8330
 Ha: diff > 0 Pr(T > t) = 0.4165

. ttest Strategic, by(type)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	67	5.470564	.1231001	1.007618	5.224787	5.716341
Entrepre	70	5.856151	.0961296	.8042775	5.664378	6.047924
combined	137	5.667579	.0791528	.92646	5.51105	5.824109
diff		-.3855869	.1554256		-.6929709	-.078203

diff = mean(Manager) - mean(Entrepre) t = -2.4808
 Ho: diff = 0 degrees of freedom = 135

Ha: diff < 0 Pr(T < t) = 0.0072
 Ha: diff != 0 Pr(|T| > |t|) = 0.0143
 Ha: diff > 0 Pr(T > t) = 0.9928

. ttest Commitment, by(type)

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Manager	67	5.532338	.106585	.8724355	5.319535	5.745142
Entrepre	70	6.247619	.0742064	.6208552	6.099581	6.395657
combined	137	5.89781	.0711598	.8329038	5.757087	6.038533
diff		-.7152807	.1289374		-.9702792	-.4602822

diff = mean(Manager) - mean(Entrepre) t = -5.5475
 Ho: diff = 0 degrees of freedom = 135

Ha: diff < 0 Pr(T < t) = 0.0000
 Ha: diff != 0 Pr(|T| > |t|) = 0.0000
 Ha: diff > 0 Pr(T > t) = 1.0000

Appendix 7 Discriminant Analysis Results

```
. daoneway Opportunity Relationship Conceptual Operating Human Strategic Commitment
> , by(type)
```

One-way Discriminant Function Analysis

```
Observations = 136
Variables     = 7
Groups       = 2
```

	Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	wilks' Lambda	Chi-square	df	P-value
1	0.3316	100.00	100.00	0.4990	0	0.75095	37.377	7	0.0000	

Unstandardized canonical discriminant function coefficients

	func1
Opportunity	0.1258
Relationship	-0.0860
Conceptual	0.0153
Operating	-0.0971
Human	-0.7386
Strategic	0.2952
Commitment	1.3520
_cons	-5.1504

Standardized canonical discriminant function coefficients

	func1
Opportunity	0.1010
Relationship	-0.0731
Conceptual	0.0130
Operating	-0.0888
Human	-0.5910
Strategic	0.2678
Commitment	1.0181

Canonical discriminant structure matrix

	func1
Opportunity	0.3517
Relationship	0.1424
Conceptual	0.3617
Operating	0.0593
Human	-0.0317
Strategic	0.3557
Commitment	0.8461

Group means on canonical discriminant functions

	func1
type-1	-0.5801
type-2	0.5633

. candisc Opportunity Relationship Conceptual Operating Human Strategic Commitment,
 > group(type) priors(.49, .51)

Canonical linear discriminant analysis

Fcn	Canon. Corr.	Eigen-value	Variance Prop.	Cumul.	Like-lihood Ratio	F	df1	df2	Prob>F
1	0.4990	.331646	1.0000	1.0000	0.7510	6.0644	7	128	0.0000 e

Ho: this and smaller canon. corr. are zero; e = exact F

Standardized canonical discriminant function coefficients

	function1
Opportunity	.1009967
Relationship	-.0731075
Conceptual	.0130279
Operating	-.0887846
Human	-.5909621
Strategic	.2678217
Commitment	1.0181

Canonical structure

	function1
Opportunity	.3517235
Relationship	.1423676
Conceptual	.3617205
Operating	.0593306
Human	-.0316839
Strategic	.3556923
Commitment	.8461389

Group means on canonical variables

type	function1
Manager	-.5801058
Entrepreneur	.5632912

Resubstitution classification summary

True type	Classified		Total
	Manager	Entrepreneur	
Manager	42 62.69	25 37.31	67 100.00
Entrepreneur	16 23.19	53 76.81	69 100.00
Total	58 42.65	78 57.35	136 100.00
Priors	0.4900	0.5100	