

Opportunity Identification and Pursuit: Does an Entrepreneur's Human Capital Matter?

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ABSTRACT. Extending human capital approaches to entrepreneurship, an entrepreneur's "inputs" relating to their general (i.e. education and work experience) and entrepreneurship-specific human capital profile (i.e. business ownership experience, managerial capabilities, entrepreneurial capabilities and technical capabilities) are presumed to be related to entrepreneurial "outputs" in the form of business opportunity identification and pursuit. Valid and reliable independent variables were gathered from a stratified random sample of 588 owners of private firms. Ordered logit analysis was used to test several theoretically derived hypotheses. With regard to the number of business opportunities identified and pursued, entrepreneurship-specific rather than general human capital variables "explained" more of the variance. Entrepreneurs reporting higher information search intensity identified significantly more business opportunities, but they did not pursue markedly more or less opportunities. The use of publications as a source of information was positively associated with the probability of identifying more opportunities, while information emanating from personal, professional and business networks was not. Implications for practitioners and researchers are discussed.

KEY WORDS: entrepreneurship-specific human capital, general human capital, information search, opportunity identification and pursuit

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1. Introduction

The human capital of individuals can shape their prospects (Becker, 1975, 1993). Links between entrepreneurs' human capital profiles and outcomes relating to firm entry/exit and performance have been identified (Jovanovic, 1982;

Bates, 1990; Cressy, 1996; Gimeno et al., 1997; Bosma et al., 2004). Currently, opportunity oriented conceptualisations of entrepreneurship are attracting attention (Shane and Venkataraman, 2000; Shane, 2003) but the human capital profiles of entrepreneurs who identify and pursue more business opportunities are not well understood (Busenitz et al., 2003). Shane (2003) argues that venture performance is determined by how effectively the entrepreneur deals with entrepreneurial process activities relating to opportunity identification, evaluation and exploitation (Ardichvili et al., 2003). By solely focusing on venture performance, the effects of the various activities that lead to that performance may be confounded. There is, therefore, a need to disentangle the activities involved in the entrepreneurial process that can subsequently impact venture performance. Unfortunately, there is no conclusive evidence that suggests opportunity identification and pursuit influence venture outcomes. However, entrepreneurs who identify more opportunities may select to pursue better quality opportunities with greater wealth creating potential because they have more opportunities to choose from. Shepherd and DeTienne (2005) have detected a strong link between the number of opportunities identified and the innovativeness of those opportunities. The innovativeness of an opportunity may provide an indication of its "quality" (Fiet, 2002; Shane, 2000). Studies that focus solely on traditional firm performance outcomes do not provide an understanding of the relationship between entrepreneur's human capital and the identification of opportunities that can create future venture wealth.

Echoing the views of Venkataraman (1997), Gaglio and Katz (2001) argue that understanding the opportunity identification process

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represents a core question for the domain of entrepreneurship research. Understanding the relationship between an entrepreneur's human capital profile and the opportunity identification process is, therefore, an important theme that warrants additional research attention. Recently, several studies have empirically explored the links between aspects of human capital and opportunity identification (Davidsson and Honig, 2003; Arenius and DeClercq, 2005; Arenius and Minnitti, 2005; Shepherd and DeTienne, 2005). These studies have enhanced our understanding of opportunity identification and human capital but have focused on a narrow array of human capital variables. They have also generally solely explored responses from students or nascent entrepreneurs, rather than practising entrepreneurs who in turn are heterogeneous regarding their experience of the entrepreneurial process (Westhead et al., 2005). Further, a number of these studies have failed to operationalise the actual extent of opportunity identification. Consequently, there is scant empirical evidence relating to the links between practicing entrepreneurs' human capital profiles and their actual opportunity identification and pursuit activities. This research gap is the focus of this study, which seeks to make the following contributions.

First, a broader conceptualisation of an entrepreneur's human capital is discussed. Previous studies have focused mainly on education, work experience, industry-specific experience and self-employment experience (Bates, 1990; Brüderl et al., 1992; Gimeno et al., 1997; Bosma et al., 2004). Growing interest in the psychological aspects of economics (Tversky and Kahneman, 1974; Witt, 1998) suggests an entrepreneur's cognitive characteristics also need to be considered (Alvarez and Busenitz, 2001; Ferrante, 2005; Markman et al., 2002). An entrepreneur's human capital relating to perceived capabilities (i.e. self-efficacy) are, therefore, considered in addition to the widely used human capital indicators. Entrepreneurs can consciously invest in human capital. We also recognise that human capital may be accumulated (e.g. work experience and entrepreneurial experience) without any investment decision being made. Learning-by-doing and experientially acquired human capital is widely

recognised, and it is assumed that individuals actually learn from experience (Arrow, 1962; Jovanovic, 1982). Cognitive theorists, however, suggest this learning is not automatic. We extend the existing literature by suggesting that the way in which human capital is acquired may be linked to opportunity identification and pursuit.

Second, a distinction is made between an entrepreneur's general (i.e. education and work experience) and entrepreneurship-specific human capital profile (i.e. managerial capabilities, entrepreneurial capabilities, technical capabilities and business ownership experience). While the distinction between general and specific human capital is not new, we seek to provide insights into the relative importance of both general and specific human capital with regard to the context of opportunity identification and pursuit.

Third, two outcomes from the entrepreneurial process are considered. Previous studies have generally focused on a single outcome. We recognise that the human capital profiles leveraged to identify business opportunities may not be the same as those required to pursue business opportunities. The elements of an entrepreneur's human capital associated with opportunity identification intensity (i.e. the number of opportunities identified) are identified as well as those associated with opportunity pursuit intensity (i.e. the number of identified opportunities pursued). In this study, opportunity pursuit is defined as the commitment of time and resources into an opportunity for creating or purchasing a business. Since, entrepreneurs may decide to pursue only a subset of the opportunities they identify, this selection decision implies that pursued opportunities are perceived to be of greater quality.

Fourth, we explore whether entrepreneurs who search for more information and utilize particular types of information, identify and pursue more business opportunities. This evidence will provide additional insights to the debate surrounding whether opportunities are identified as a result of information search, or the alertness of the entrepreneur (Kaish and Gilad, 1991; Fiet, 1996, 2002; Kirzner, 1997; Fiet et al., 2005). Human capital based considerations of opportunity identification and pursuit emphasize the knowledge embodied within

the entrepreneurs. In contrast, the information search perspective suggests that opportunity identification and pursuit may be enhanced by acquiring external information.

This article is structured as follows. In the next section, a conceptual framework following human capital theory is presented. A distinction is made between general and entrepreneurship-specific human capital. Several hypotheses are then derived. In the following section, the data and research methodology are discussed. Results are then reported. Finally, conclusions and implications for policy-makers, practitioners and researchers are discussed.

2. Conceptual underpinnings

2.1. Context

Human capital relates to a hierarchy of skills and knowledge with varying degrees of transferability (Castanias and Helfat, 1992). Scholars have explored human capital "inputs" accumulated by entrepreneurs in relation to "outputs" such as the decision to become self-employed, the size of the firm in which they have an equity stake (Bates, 1990; Otani, 1996), the survival of the firm (Gimeno et al., 1997; Brüderl et al., 1992) and the performance of the firm (Bosma et al., 2004). Entrepreneurs with more (or higher quality) human capital "inputs" should report superior "outputs" (Becker, 1975; Davidsson and Honig, 2003). In the context of entrepreneurship, these "outputs" also relate to the identification, pursuit and exploitation of opportunities (Shane, 2003).

Debate still surrounds "if", "how" and "why" human capital leads to monitored benefits. Empirical evidence relating to several contexts, particularly education, supports the view that human capital is positively associated with favourable outcomes such as higher earnings (Boylan, 1993) and productivity (Becker, 1975; Mincer, 1974). Education can be viewed as a type of credential that indicates a greater innate productivity (Arrow, 1973; Spence, 1974). A more sceptical view surrounding the value of education has, however, been raised. Education may help an employer gauge an applicant's intelligence, motivation and discipline, without

it directly affecting his/her actual productivity. Dore (1976) argues that education matters because it confers status rather than the skills it imparts. This "dark side" of human capital¹ is also alluded to in relation to other aspects of human capital. If human capital is acquired through learning-by-doing, cognitive theorists suggest biases in thinking may result. Experienced decision-makers can fall into mental ruts (Fiske and Taylor, 1991), and may fail to notice and adapt to changes in the environment (Tversky and Kahneman, 1974). Decision-makers may, therefore, not leverage their experience and knowledge into superior performance. Consequently, the relationships between human capital and entrepreneurial "outputs" (i.e. opportunity identification and pursuit) may not be as obvious as initially assumed.

Becker (1993) has made a distinction between general and specific human capital. General human capital relates to skills and knowledge that are easily transferable across a variety of economic settings. Conversely, specific human capital relates to skills and knowledge that are less transferable and have a narrower scope of applicability (Gimeno et al., 1997). A number of studies have considered the general and specific human capital profiles of entrepreneurs (Bosma et al., 2004; Brüderl et al., 1992; Gimeno et al., 1997; Wiklund and Shepherd, 2003). As earlier intimated, while cognitive dimensions of entrepreneurship are receiving increased attention, the cognitive characteristics of entrepreneurs have not been explicitly explored within a human capital framework, with notable recent exceptions (e.g. Arenius and Minnitti, 2005; Ferrante, 2005). In this study, a broad conceptualisation of human capital is presented to include widely used dimensions of human capital as well as cognitive dimensions.

In this study, an entrepreneur's education and work experience are regarded as surrogate measures of general human capital. Variables relating to prior business ownership experience and self-perceived capabilities are considered as surrogate measures of entrepreneurship-specific human capital. The various human capital variables under consideration are discussed, in turn, below.

2.2. General human capital

2.2.1. Education

Education is one of the most frequently examined components of human capital. Formal education is seen as providing the necessary cognitive skills to adapt to environmental changes (Hatch and Dyer, 2004). Education is a source of knowledge, skills, discipline, motivation and self-confidence (Cooper et al., 1994). Highly educated entrepreneurs may be better able to deal with complex problems. They may also leverage their knowledge and the social contacts generated through the education system to acquire resources to identify and exploit business opportunities (Shane, 2003; Arenius and DeClercq, 2005). On the other hand, formal education may inculcate attitudes that are antithetical to entrepreneurship (Casson, 2003). Some studies suggest that highly educated individuals are more likely to establish new firms (Bates, 1990), whilst other studies detect an inverse relationship between educational attainment and firm formation (Storey, 1994). There is considerable debate as to the returns to entrepreneurship from being more or less highly educated (see Parker (2006) for a review). Recent evidence suggests that entrepreneurs who are more highly educated obtain a higher return to education than do employees (Parker and van Praag, 2004; Van der Sluis et al., 2004). This would suggest that either more highly educated entrepreneurs are more adept at identifying opportunities and/or are better at realizing the returns from those opportunities. Currently, there is scant empirical evidence directly relating to the links between an entrepreneur's education attainment and their ability to identify and pursue business opportunities. Davidsson and Honig (2003), however, detected that nascent entrepreneurs with higher levels of education were more likely to identify opportunities, but they were not more likely to pursue identified opportunities. Arenius and DeClercq (2005) also found a positive relationship between education levels and the likelihood of recognising opportunities. The latter findings need to be explored with reference to practicing entrepreneurs.

2.2.2. Work experience

Work experience is viewed as a key indicator of general human capital (Castanias and Helfat, 2001). It can assist in the integration and accumulation of new knowledge. Further, it can enable individuals to adapt to new situations (Davidsson and Honig, 2003) and become more productive (Parker, 2006). Work experience is associated with the ability to become self-employed and to start new firms (Bates, 1990; Gimeno et al., 1997). Several indicators of work experience have been operationalised, which makes comparison between studies difficult. Work experience has frequently been operationalised in terms of the number of years of work experience (Evans and Leighton, 1989; Brüderl et al., 1992). The latter indicator provides limited information about the nature of the skills and knowledge acquired. Two alternative indicators of work experience have been considered (Gimeno et al., 1997). First, the number of prior full-time jobs held measures the breadth of different experiences. Individuals with more than one job setting exposure may acquire a diverse range of knowledge and skills. However, this may be subject to diminishing returns (Mincer, 1974). Frequent job setting exposure may signal an individual with poor knowledge and skills. Second, the achievement level highlights the quality (or the nature) of the work experience acquired. Individuals who have held a managerial position (or were previously self-employed) may be endowed with superior levels of general human capital (Bates, 1990), which can be leveraged to identify and pursue business opportunities.

2.3. Entrepreneurship-specific human capital

2.3.1. Business ownership experience

Business ownership has been long recognised as an important dimension of entrepreneurship (Hawley, 1907). Fama and Jensen (1983) argue that classic entrepreneurial firms are those that combine residual risk bearers and decision-makers in the same individuals. Episodic knowledge of entrepreneurship can be acquired through direct business ownership experience

(Spender, 1996). This knowledge, which includes managerial experience, enhanced reputation and broader social and business networks (Shane and Khurana, 2003) can be leveraged to innovate new productive resource combinations (Parker, 2006), and to identify and pursue business opportunities. The latter behaviour may be a function of an individual's capacity to handle complex information and their prior knowledge (Shane, 2000). Westhead et al. (2005) detected that more experienced entrepreneurs, particularly portfolio entrepreneurs (i.e. those experienced entrepreneurs who own businesses simultaneously), had more diverse experiences and more resources than inexperienced entrepreneurs. Experienced entrepreneurs may have the ability to identify more opportunities and leverage the resources required to pursue opportunities. Prior business ownership experience is viewed as an element of entrepreneurship-specific human capital (Gimeno et al., 1997; Chandler and Hanks, 1998).

2.3.2. *Capabilities*

To ensure competitive advantage, firms may need to acquire, create and integrate resources into dynamic capabilities (Teece et al., 1997). Some people have the ability to acquire, combine and co-ordinate the resources essential for entrepreneurial activity (Erikson, 2002). An individual's cognition can be explored with regard to self-assessed capabilities because they represent the core of an individual's self-efficacy belief (Delmar, 2000). The latter belief relates to the cognitive resources and courses of action required to exercise control over events. Self-efficacy influences our courses of action, level of effort, how long we persevere, our resilience in the face of obstacles, adversity, or failure, and whether our thoughts are self-hindering or self-aiding (Wood and Bandura, 1989; Markman et al., 2002). Highly talented individuals often fail to leverage their skills because of deficits in their self-efficacy (Wanberg et al., 1999).

Self-assessed capabilities are strongly associated with more objective measures of capabilities (Gist, 1987). Individuals with more diverse capabilities may have the power to act in a broader

range of current and future circumstances (Loasby, 1998). Lazear (2004) suggests that entrepreneurs need to be multi-skilled. Entrepreneurs need to develop capabilities with regard to entrepreneurial, managerial and technical functional roles (Penrose, 1959).

3. Derivation of hypotheses

In this section, six hypotheses are derived with reference to the human capital perspective discussed above.

3.1. *Human capital and opportunity identification*

An entrepreneur's human capital profile, particularly prior knowledge (Shane, 2000; Shepherd and DeTienne, 2005) can be associated with opportunity identification (Davidsson and Honig, 2003). From an inductive viewpoint, business opportunities are available in the environment and are waiting to be discovered. Kirzner's (1973) "entrepreneurial alertness" perspective suggests that some individuals have the ability to see where products (or services) do not currently exist, or where they have unexpectedly emerged as being valuable. Conversely, from a deductive viewpoint, imaginative entrepreneurs can leverage their experience, subjective understanding and current information to identify or create business opportunities (Witt, 1998). Irrespective of which viewpoint is taken, information and knowledge in some format is necessary, but not sufficient, for the identification of a business opportunity. Entrepreneurs with diverse human capital profiles may leverage their wider knowledge and skills to identify a greater number of opportunities. If opportunities are indeed circulating in the environment waiting to be discovered, individuals with superior human capital may have greater cognitive ability to be alert to opportunities, knowledge of where to look for an opportunity, and/or knowledge of what an opportunity "looks like". Alternatively, if opportunities are imagined or created, entrepreneurs with greater levels of human capital may have more "ingredients" to work with to

identify/create an opportunity. This discussion suggests the following hypothesis:

H₁ Entrepreneurs reporting higher levels of human capital (i.e., general and entrepreneurship-specific human capital) will identify more business opportunities, in a given time period.

3.2. Human capital and opportunity pursuit

Entrepreneurs do not exploit all the opportunities they identify (Witt, 1998; Shane and Venkataraman, 2000). After identifying a business opportunity, an entrepreneur usually expends time and resources evaluating the costs and benefits associated with exploiting the identified opportunity. Opportunity pursuit relates to the evaluation stage following the identification of an opportunity that is reported prior to potential exploitation. To the extent that entrepreneurs pursue fewer opportunities than they identify, this suggests that they perceive the former to be of higher quality. An entrepreneur's human capital may be leveraged to screen opportunities and select which opportunities should be pursued. Entrepreneurs with superior human capital may draw upon their knowledge to reject less viable opportunities. Conversely, entrepreneurs with higher levels of human capital may leverage their knowledge to pursue perceived attractive opportunities (Davidsson and Honig, 2003).

An entrepreneur is only likely to pursue an opportunity, if the expected value of the return from exploiting the identified opportunity exceeds the opportunity cost of alternative activities. Individuals with more diverse human capital profiles may have higher expectations and thresholds for economic activity (Gimeno et al., 1997). Human capital may increase the expected value from exploiting an opportunity. Further, individuals with superior levels of human capital are likely to face less uncertainty surrounding the value to be gained from exploiting an opportunity (Shane and Khurana, 2003) since they have the skills and knowledge to effectively exploit the opportunity. Consequently, they may pursue a larger number of identified opportunities com-

pared with individuals with lower levels of human capital. This discussion suggests the following hypothesis:

H₂ Entrepreneurs reporting higher levels of human capital (i.e. general and entrepreneurship-specific) will pursue more identified business opportunities, in a given time period.

3.3. Distinguishing between general and entrepreneurship-specific human capital

Entrepreneurship-specific human capital may be more important than general human capital with regard to opportunity identification and opportunity pursuit. An individual's specific human capital can be associated with superior economic rents (Castanias and Helfat, 1992, 2001; Hatch and Dyer, 2004). Entrepreneurship-specific human capital may represent a better "guide" for entrepreneurs to identify opportunities than general human capital alone. Entrepreneurship-specific human capital can provide an entrepreneur with the knowledge of where to look for opportunities, as well as the ability to identify an opportunity that might be ignored by entrepreneurs relying solely on their general human capital.

With respect to opportunity pursuit, entrepreneurs with high levels of entrepreneurship-specific human capital may only be able to leverage this knowledge with regard to the entrepreneurial process. The opportunity costs associated with pursuing an opportunity are, therefore, likely to be lower for entrepreneurs with higher levels of entrepreneurship-specific human capital than those with higher levels of general human capital. This discussion suggests the following hypotheses:

H_{3a} Entrepreneurship-specific human capital will "explain" more of the variance in the number of business opportunities identified, in a given time period, than general human capital.

H_{3b} Entrepreneurship-specific human capital will "explain" more of the variance in the number of business opportunities pursued, in a given time period, than general human capital.

3.4. Information search intensity

Why some people identify opportunities and others do not may be related to the information (Kaish and Gilad, 1991; Fiet, 1996; Shane, 2000; Casson, 2003) and knowledge (i.e. the human capital relating to prior information already possessed) they possess (Venkataraman, 1997). If information facilitates the identification of an opportunity, individuals may choose to increase their access to opportunities by searching for new/current information (Fiet, 1996; Shane, 2003). In some instances, opportunities can be identified when an entrepreneur combines prior information with new information. Entrepreneurs differ with regard to their stocks of prior information (Shane, 2003). Prior information can direct attention, expectations and interpretations of market stimuli as well as the generation of ideas (Gaglio, 1997). Experienced entrepreneurs with specialist knowledge may restrict their scanning and concentrate their information search within a more specific domain based on routines (and information sources) that worked well in the past (Cooper et al., 1994; Fiet, 2002). Some entrepreneurs with greater levels of human capital may be associated with higher levels of alertness (Kirzner, 1997) and may not need to gather large amounts of information to identify business opportunities. By focusing on a smaller number of diagnostic items of information, experienced entrepreneurs can avoid information overload, which can degrade their decision-making capabilities (Jacoby et al., 2001). Nevertheless, for a given level of prior information (i.e. specific human capital), entrepreneurs may be able to access opportunities by searching for up-to-date information. This discussion suggests the following hypothesis:

H_{4a} Entrepreneurs reporting higher levels of information search intensity will identify more business opportunities, in a given time period.

Some entrepreneurs collect and process information to make calculated judgements surrounding the feasibility and risks associated with the pursuit of an identified opportunity (Casson, 2003). The strengths, weaknesses,

opportunities and threats associated with pursuing the identified business ideas may be ascertained by additional information collection and processing. Further, the identified business opportunity may only be pursued if the information suggests the opportunity is viable and/or valuable, that is, of higher quality than other identified opportunities that are not pursued. Some entrepreneurs may choose not to search for additional information. Entrepreneurs rely more extensively on a number of decision-making short-cuts (i.e. heuristics) to a greater extent than non-entrepreneurs (Baron, 1998). In particular, entrepreneurs are associated more strongly with the representativeness heuristic (Busenitz and Barney, 1997), which relates to the willingness to generalize from small samples that do not represent a population (Tversky and Kahneman, 1974). Entrepreneurs exhibiting this heuristic may be less likely to search for information. Despite the biased decision-making that may result from limited information search, the representativeness heuristic can encourage an entrepreneur to pursue an opportunity (Busenitz and Barney, 1997). However, if too much time is spent acquiring information, the brief window of opportunity for pursuing a venture idea may close. Extensive information search may prevent some entrepreneurs from pursuing a business opportunity. This may be desirable if the identified business opportunity has a high probability of failure. The above discussion suggests the following hypothesis:

H_{4b} Entrepreneurs reporting higher levels of information search intensity will pursue fewer identified business opportunities, in a given time period.

4. Data and research methodology

4.1. Sample, data collection and respondents

The sampling frame was constructed by obtaining sampling quotas for four broad industrial categories (i.e. agriculture, forestry and fishing, production, construction and

services) and the eleven Government Official Regions from summary tables detailing the population of businesses registered for Value-Added-Tax in Great Britain in 1999 (Office for National Statistics, 1999). After excluding non-independent businesses, industry and standard region sampling proportions were identified for a stratified random sample of private firms.

A stratified random sample of 4,324 independent private firms was drawn from a cleaned list of business names purchased from Dun and Bradstreet. A structured questionnaire was mailed during September 2000 to a founder and/or principal owner. They were the key decision-maker and actively involved in the business as well as knowledgeable about the firms activities (Campbell, 1955). The questionnaire survey validated the status of each respondent. After a three-wave mailing (i.e. two reminders), 767 valid questionnaires were obtained from a valid sample of 4,307 private firms. The 18% valid response rate compares favourably with similar studies (Storey, 1994), which generally have much shorter and less detailed research instruments.

Respondents reported they were not the founder and/or the principal owner, they had only inherited (an) established business(es) or who filed missing information returns to any of the selected variables were excluded from any further analysis. In total, 588 respondents provided complete data for the selected variables explored.

Data were not gathered from multiple respondents in each firm. However, strong positive correlations were detected between the information gathered by the questionnaire and the archival data provided by Dun and Bradstreet relating to business age, employment size and legal status (i.e. Pearson correlation coefficients ranged from 0.77 to 0.88). This evidence suggests that the data collected from the key informants was reliable.

4.2. Sample representation

Chi-square and Mann–Whitney “U” tests did not detect any significant response bias between the valid respondents ($n = 588$) and non-respondents with regard to industry, standard

region, legal form, age of the business and employment size at the 0.05 level. On these criteria, we have no cause to suspect that the sample of firms was not a representative sample of the population of independent private firms.

4.3. Measures

The following measures relating to the dependent, independent and control variables were operationalised.

4.3.1. Dependent variables

Consistent with previous literature (Amabile, 1990; Hills et al., 1997; Shepherd and DeTienne, 2005), opportunity identification was operationalised in terms of the *number of opportunities identified*. A conservative definition of business opportunities was selected. Respondents were presented with a statement asking them, “how many opportunities for creating or purchasing a business have you *identified* (‘spotted’) within the last five years”. They were presented with eight opportunity identification outcomes (i.e. 0, 1, 2, 3, 4, 5, 6 to 10, or more than 10 opportunities). We detected that some categories had few respondents. The eight opportunity identification outcomes were collapsed into three broader categories. The resulting categorization ensured that an acceptable number of respondents belonged to each category. Respondents who reported that they had failed to identify an opportunity were allocated a value of “1”, those who reported that they had identified one or two opportunities were allocated a value of “2”, whilst those who had identified three or more opportunities were allocated a value of “3”.

The *number of opportunities pursued* was ascertained. Respondents were presented with a statement asking “how many opportunities for creating and purchasing a business have you *pursued* (i.e. committed time and resources to) within the last five years” (Hills et al., 1997). As earlier intimated, this dependent variable does not relate to the exploitation of an opportunity, and it solely relates to the evaluation stage of the entrepreneurial process (Ardichvili et al., 2003; Shane, 2003). The perceived quality of an opportunity may be exhibited if an entrepreneur commits time and resources to evaluating only a

subset of identified opportunities. Respondents were presented with eight opportunity pursuit outcomes (i.e. 0, 1, 2, 3, 4, 5, 6 to 10, or more than 10 opportunities). Some categories had few respondents. Consistent with the opportunity identification variable, the eight opportunity pursuit outcomes were collapsed into three categories. Respondents who reported that they had failed to pursue an identified opportunity were allocated a value of "1", those who reported that they had pursued one or two opportunities were allocated a value of "2", whilst those who had pursued three or more opportunities were allocated a value of "3".

4.3.2. Independent variables

Two sets of general human capital variables were collected with regard to education and work experience. Consistent with previous studies (Bates, 1990; Brüderl et al., 1992; Honig, 2001; Van der Sluis et al., 2004), our education measure relates to the *years of education* reported by the respondents. Four dummy variables relating to the respondents' highest level of education were also created for sensitivity analysis: (pre-university) *technical qualification*; *undergraduate degree*; *post-undergraduate professional qualification*; and *postgraduate degree*. The compulsory school education variable was selected as the reference category.

The amount of work experience and the level of attainment are important when constructing a measure of work experience (Gimeno et al., 1997). The number of previous full-time jobs held was considered as a proxy for work experience. This variable was named *number of organizations worked for*. To account for possible diminishing returns (Mincer, 1974), the *number of organizations worked for squared* was also operationalised. The level of managerial attainment was ascertained. Three dummy variables were calculated on the basis of responses to the question "what was your job status before starting your first business?": "*Manager or self-employed*"; "*professional*" and "*supervised others*". The "supervised no-one" variable was selected as the reference category.

Six entrepreneurship-specific human capital variables were collected. The level of *business ownership experience* was measured. Respon-

dents were asked to indicate the total number of businesses in which they had prior minority or majority business ownership, either as a business founder or a purchaser.

Respondents were presented with eight statements relating to their perceived *capabilities* (Chandler and Hanks, 1998). An R-mode varimax rotated principal components analysis (PCA) identified three components.² Component 1 highlights the "*entrepreneurial capability*" and relates to five statements focusing upon the identification of opportunities. Further, component 2 highlights the "*managerial capability*". It relates to four statements focusing upon the ability to manage and organize people and resources. Component 3 highlights the "*technical capability*" and relates to two statements focusing upon technical expertise. The standardized and *ortho*-normalized component scores relating to each of the three components were utilized as independent variables.

Cooper et al.'s (1995) *information search intensity* measure was operationalised. Each respondent was presented with 14 sources of information. Respondents were asked to rate each information source on a six point scale ranging from "did not use" which was allocated a value of "0" to "very useful" which was allocated a value of "5". In contrast, the Cooper et al., study only operationalised a four-point scale. Consistent with Cooper et al., only sources of information that were used by at least 60% of the respondents were considered. Accordingly, eight out of the 14 sources were monitored (i.e. suppliers, employees, customers, friends, family, magazines/newspapers, trade publications and other business owners). Following Cooper et al., a broad measure of information search intensity was derived by summing the ratings for all eight information sources. This measure reflects the number of information sources used as well as their relative usefulness.

While the latter measure provides a useful indication of the level of information search, it does not distinguish between different types of information sought. To provide a more robust analysis of the role of information, two alternative measures of information search were considered. An R-mode PCA was used to transform and *ortho*-normalize the original

data relating to the 14 information sources.³ The PCA model is reported in Table II. Previous studies (Cooper et al., 1995) have identified two sources of information (i.e. professional/formal information versus personal/informal information), which may be too broad. The PCA identified the following four distinct types of information sources: “*professional network*” (i.e. consultants, banks, patents, national and local government sources), “*publications*” (i.e. magazines and newspapers, trade publications and technical literature), “*business network*” (i.e. suppliers, employees and customers) and “*personal network*” (i.e. other business owners, friends and family). The standardized and *orthonormalized* component scores relating to each of the four components were utilized as independent variables. Second, the *number of information sources* used was also selected as an indicator of information search.

4.3.3. Control variables

Ten control variables were considered. An entrepreneur’s age and gender have been considered as dimensions of human capital (Cooper et al., 1994). To account for possible non-linearity and to avoid multicollinearity, the *age* of the respondent was measured in terms of the deviation from the mean age in years (i.e. 49), and the age of the owner² was measured in terms of the deviation from the mean age² (Aiken and West, 1991). A dummy variable was created to capture the *gender* of respondents. Female entrepreneurs were allocated a value of “0”, whilst male entrepreneurs were allocated a value of “1”.

The entrepreneurial process may be shaped by external environmental conditions and the industry entered may be a source of opportunities (Shane, 2003). Six dichotomous variables relating to industry categories were measured. Each respondent was allocated to one of the following broad six Standard Industrial Classification (SIC) categories: agriculture, forestry, fishing, and mining and quarrying (SIC 0 & 2); manufacturing (SIC 3 & 4); distribution, hotels, catering and repairs (SIC 6); transport, storage and communication (SIC 7); financial intermediaries, real estate, renting and business activi-

ties (SIC 8); and other services (SIC 9). Construction (SIC 5) was selected as the reference category.

Opportunity identification and pursuit may be shaped by the human capital of surrounding the entrepreneur. There is increasing recognition that some entrepreneurs operate as part of a team, with the team members representing an important source of human capital (Ucbasaran et al., 2003). The human capital external to the entrepreneur was controlled for by the “*number of equity partners*” in the surveyed business.

4.4. Validity

Convergent and discriminant validity was considered by exploring the PCA component loadings. The loadings ranged from 0.63 to 0.88 for the “managerial capability”, “entrepreneurial capability” and “technical capability” components. Moreover, they ranged from 0.50 to 0.84 for the “professional network”, “publications”, “business network” and “personal network” components. All component loadings were statistically significant. Convergent validity was apparent with regard to all the constructs. Also, the constructs appeared to exhibit discriminant validity insofar as each statement loading significantly on only one of the seven components.

4.5. Reliability

The Cronbach alphas for the “entrepreneurial capability”, “managerial capability” and “technical capability” scales were 0.79, 0.85 and 0.67, respectively. The “professional network”, “publications”, “business network” and “personal network” scales had Cronbach’s alpha scores of 0.78, 0.78, 0.67 and 0.70, respectively. The scales meet the recommended reliability level (Hair et al., 1995).

4.6. Endogeneity

The endogeneity issue needs to be considered in empirical research in the human capital area and has received considerable attention where education is being considered. Biased regression coefficient estimates may be reported if endogeneity is not considered. These biases result

from omitted variables that affect both human capital decisions and the outcome variable in question. Van der Sluis et al. (2004) highlight two potential sources of bias in the context of education and entrepreneurial performance. First, unobserved individual characteristics such as ability and motivation may influence both the level of education obtained and subsequent entrepreneurial performance. Indeed, the theory of signalling in education (Spence, 1974) rests on the notion that educational investment is more attractive to those with innate ability; a proposition which is understood by employers who thereby value it as a means of revealing asymmetric information. Second, as individuals may base their decision to invest in education on their expected payoffs from the investment, education may be endogenous in a performance/outcome equation.

A number of solutions to alleviate endogeneity problems have been presented (Hamilton and Nickerson, 2003; Van der Sluis et al., 2004). Attempts are generally made to proxy for unobserved ability. Further, two-stage regression procedures are selected that use instrumental variables to make the endogeneity exogenous. Here, we attempt to control for the role of ability with reference to the selected capability measures (i.e. managerial, entrepreneurial and technical capability). We acknowledge that the latter capability measures are based on perceptions of capability, and the potential problem of endogeneity may remain. Gist (1987), however, found a strong positive correlation between perceived and actual capabilities. To assess the extent to which endogeneity might still be a problem, a Hausman test for exogeneity (Hausman, 1978) was conducted. This test compares the coefficients from the original regression with the coefficients from a two stage least squares (2SLS) regression, which instruments the endogenous variables. A parent's background has been regarded as a suitable instrument for education (Blackburn and Neumark, 1993; Van der Sluis et al., 2004). Information was not collected relating to the education level of the parents. However, information relating to the occupation of entrepreneurs' parent (i.e. main income earner) had been gathered. Iyigun and Owen (1998) argue

that professionals (as opposed to entrepreneurs) accumulate their skills primarily by investing in education. Following this logic, we would expect entrepreneurs' parents who had a professional background to report higher levels of education. To be an appropriate instrument we would want the parents' background to be correlated with the entrepreneurs' education but uncorrelated with the dependent variables. The parental background variable met these criteria. Accordingly, we instrumented years of education with whether the parent of the entrepreneur was a professional in both the opportunity identification and opportunity pursuit equations. With reference to the Hausman test we found no significant difference between the OLS based and instrumental variable based coefficients⁴ of education at the 0.1, 0.05, 0.01 levels. On this basis, we failed to reject exogeneity for the instruments used. We concluded that education was exogenous in the opportunity identification and opportunity pursuit equations.

The validity of the above analysis is based, among other factors, on the remaining independent and control variables being exogenous. It is possible that other human capital variables may suffer from endogeneity. The business ownership experience variable, for example, might suffer from endogeneity. The latter variable poses a different endogeneity problem because it could have been acquired simultaneously with the identification of business opportunities. To explore the extent to which the business ownership experience variable was endogenous; we sought to identify an appropriate instrument. Guided by the literature on habitual (experienced) entrepreneurs (Westhead and Wright, 1998) we considered an entrepreneur's parental background. Evidence suggests that parental business ownership can have a strong impact on the decision to become an entrepreneur (Evans and Leighton, 1989; Brüderl et al., 1992), and this impact is particularly strong for habitual entrepreneurs (Ucbasaran et al., 2006). A significant positive correlation between the respondent's business ownership experience and whether one of their parents had been a business owner was detected. It was, therefore, possible to instrument entrepreneur's business ownership experience with whether their

parents had been business owners. With reference to the Hausman test, no significant difference was detected between the OLS based and instrumental variable based coefficients for business ownership experience at the 0.1, 0.05, 0.01 levels. Moreover, the Hausman test relating to instrumenting education and business ownership together indicated that the instrumented coefficients of education and business ownership experience (as described above) were not significantly different from the OLS coefficients at the 0.1, 0.05 and 0.01 levels.

The Hausman tests suggest that the reported analyses relating to opportunity identification and pursuit would not be seriously biased by endogeneity. For this reason, the following analysis relates to the earlier outlined ordered logit procedure rather than the 2SLS. On a note of caution, we acknowledge, that the detected finding that education and business ownership experience were exogenous, could have been influenced by the quality of the instruments used. We have, however, sought to select instruments that have been guided by theory as well as prior empirical evidence. A second potential concern is that we assumed that the remaining human capital variables were exogenous, and we considered instrumenting the remaining human capital variables. In addition, we do not know whether the information search took place before the 5 year opportunity identification/pursuit window or during the 5 year window. This may also cause an endogeneity problem similar to that of business ownership experience discussed above. Unfortunately, we confronted the same problem as Bosma et al. (2004) in their study of human capital and entrepreneurship. That is, we could not identify suitable exogenous instrumental variables.

5. Results

Given the nature of the dependent variables, ordered logit and probit analysis were selected in favour of ordinary least squares regression analysis to test the hypotheses relating to the two dependent variables measured on ordinal scales (Greene, 1997). Because there was virtually no difference between the results relating to the ordered probit and logit analyses, only the

logit models are discussed. An analysis of the correlation matrix and the VIF scores suggest that multicollinearity would not be a problem within the regression models (Hair et al., 1995). It should be noted that our data is cross-sectional in nature. Therefore, we are unable to draw causal inferences from the results discussed below.

5.1. *Hypotheses relating to opportunity identification*

Five ordered logit models were computed to test the hypotheses relating to the three categories of opportunity identification (i.e. failed to identify an opportunity, one or two opportunities identified, and three or more opportunities identified). Model 1 in Table I is the “control model” and relates solely to the control variables. Model 2 includes the general human capital (GHK) and the control variables. Model 3 includes the entrepreneurship-specific human capital (ESHK) variables and the control variables. Model 4 includes the GHK, ESHK and the control variables. Model 5 is the full model, which includes the GHK, ESHK and control variables as well as the information search variables. All models were statistically significant at the 0.001 level.

Hypothesis H₁ was tested in relation to Model 5. Entrepreneurs with higher levels of education, work experience, business ownership experience, managerial capability and entrepreneurial capability were significantly associated with an increased probability of identifying more opportunities (Table I). Though not reported in Table I, sensitivity analysis was conducted with reference to the education variable, to establish if the type of education mattered. The latter analysis revealed that those respondents who reported a postgraduate degree as their highest level of education were weakly associated with an increased probability of identifying more opportunities relative to those who had only received compulsory school education ($P < 0.089$). The other “types” of education were not found to be significantly associated with opportunity identification. The inclusion of the human capital variables (i.e. GHK and ESHK) made a significant contribution over and above the control model ($\Delta R^2 = 0.09$, $P < 0.001$). Hypothesis H₁ that

TABLE I
Ordered logit estimates for opportunity identification (0 opportunities = 1; 1 or 2 opportunities = 2; and 3 or more opportunities = 3) ($n = 588$)

	Control Model 1 Coefficients	GHK Model 2 Coefficients	ESHK Model 3 Coefficients	GHK + ESHK Model 4 Coefficients	Full Model 5 Coefficients
<i>Control variables</i>					
Age of owner	-0.05 (0.01) ***	-0.06 (0.01) ***	-0.07 (0.01) ***	-0.07 (0.01) ***	-0.07 (0.01) ***
Age of owner squared	-0.01 (0.00)	-0.01 (0.00)	-0.01 (0.00) †	-0.01 (0.00)	-0.01 (0.00)
Gender	1.00 (0.26) ***	0.99 (0.26) ***	0.87 (0.27) ***	0.87 (0.27) ***	0.89 (0.27) ***
SIC 0&2	0.24 (0.43)	0.44 (0.44)	0.21 (0.47)	0.36 (0.47)	0.46 (0.48)
SIC 3&4	0.23 (0.37)	0.23 (0.38)	0.46 (0.39)	0.45 (0.40)	0.40 (0.41)
SIC 6	0.49 (0.32)	0.50 (0.32)	0.73 (0.34) *	0.73 (0.34) *	0.70 (0.35) *
SIC 7	1.19 (0.53) *	1.32 (0.55) *	1.16 (0.57) *	1.28 (0.60) *	1.27 (0.60) *
SIC 8	0.62 (0.33) †	0.52 (0.34)	0.83 (0.35) *	0.71 (0.36) *	0.73 (0.36) *
SIC 9	0.62 (0.36) †	0.56 (0.37)	0.82 (0.38) *	0.71 (0.39) †	0.74 (0.40) †
Number of equity partners	0.18 (0.08) *	0.16 (0.08) *	0.17 (0.08) *	0.14 (0.08) †	0.15 (0.08) †
<i>Independent variables</i>					
GHK					
Education		0.07 (0.04) †		0.08 (0.04) †	0.08 (0.04) †
Org.s worked for		0.08 (0.04) *		0.07 (0.04)	0.07 (0.04)
Org.s worked for squared		0.00 (0.00)		0.00 (0.00)	0.00 (0.00)
Manager/self-employed		0.42 (0.22) †		0.26 (0.23)	0.29 (0.23)
Professional		0.20 (0.26)		0.16 (0.27)	0.15 (0.27)
Supervisor		0.20 (0.35)		-0.02 (0.38)	-0.07 (0.38)
ESHK					
Ownership experience			0.55 (0.07) ***	0.54 (0.07) ***	0.57 (0.07) ***
Managerial capability			0.25 (0.09) **	0.26 (0.09) **	0.26 (0.09) **
Technical capability			0.08 (0.09)	0.07 (0.09)	0.08 (0.09)
Entrepreneurial capability			0.21 (0.09) *	0.21 (0.09) †	0.16 (0.09) †
Info search					
Professional network					-0.07 (0.09)
Publications					0.22 (0.09) **
Business network					0.10 (0.09)
Personal network					0.11 (0.09)
Cut point 1	1.59 (0.41)	2.95 (0.66)	2.73 (0.45)	4.14 (0.71)	4.12 (0.72)
Cut point 2	2.81 (0.42)	4.20 (0.67)	4.15 (0.47)	5.59 (0.73)	5.59 (0.74)
Log-likelihood	-578.57	-571.84	-527.26	-521.81	-517.14
Pseudo- R^2	0.05	0.06	0.13	0.14	0.15
% correctly classified	53.2%	53.4%	57.4%	57.8%	59.9%
Chi-squared	56.51 ***	69.98 ***	159.14 ***	170.04 ***	179.37 ***

Standard errors in parentheses; † $P \leq 0.10$; * $P \leq 0.05$; ** $P \leq 0.01$; *** $P \leq 0.001$.

suggested entrepreneurs reporting higher levels of human capital would identify more opportunities was, therefore, supported.

5.2. Hypotheses relating to opportunity pursuit

Five ordered logit models were computed to test the hypotheses relating to the three categories of

opportunity pursuit (i.e. failed to pursue any opportunities, one or two opportunities pursued, and three or more opportunities pursued). All models in Table III were statistically significant at the 0.05 level.

Hypothesis H₂ was tested with regard to Model 10, which is the full model. Entrepreneurs with higher levels of business ownership experience

and managerial, technical and entrepreneurial capabilities were associated with an increased probability of pursuing more opportunities. Only four out of the ten human capital variables were significant. The inclusion of the human capital variables (i.e. GHK and ESHK) made a significant contribution over and above the control model ($\Delta R^2 = 0.06$, $P < 0.001$). Hypothesis H_2 is, therefore, supported.

5.3. Hypotheses relating to general versus specific human capital

To test hypothesis H_{3a} , we compared the contribution of the ESHK variables and then GHK variables over and above that “explained” by the sum of the control variables. Further, we examined the magnitude of the relationship between the respective human capital variables and the dependent variable by exploring the probability effects. The inclusion of the GHK variables made a significant contribution above and above the control model ($\Delta R^2 = 0.01$, $P < 0.001$). The GHK variables also made a significant contribution above and above the control and ESHK variables ($\Delta R^2 = 0.01$, $P < 0.001$). The inclusion of the GHK variables enhanced the model. However, a larger improvement in model fit was associated with the inclusion of the ESHK variables. The inclusion of the ESHK variables made a significant contribution above and above the control variables ($\Delta R^2 = 0.08$, $P < 0.001$), and above and beyond the control and GHK variables ($\Delta R^2 = 0.08$, $P < 0.001$). These findings support hypothesis H_{3a} .

Examination of the probability effects of the GHK and ESHK variables also provides support for hypothesis H_{3a} . ESHK variables had stronger relationships with the number of opportunities identified than the GHK variables. Panel A in Table II shows that a one unit increase in each of the GHK variables together, was associated with an increased probability of an entrepreneur identifying one or more opportunities by 12.9%. However, one unit increase in each of the ESHK variables together, was associated with an increased probability of an entrepreneur identifying one or more opportunities by 26.7%. This

evidence provides additional support for hypothesis H_{3a} .

The methodology employed to test hypothesis H_{3a} was used to test hypothesis H_{3b} . The inclusion of the GHK variables did not make a significant contribution over and above the control model ($\Delta R^2 = 0.01$). Conversely, the inclusion of the ESHK variables made a significant contribution over and above the control variables ($\Delta R^2 = 0.05$, $P < 0.001$). These findings support hypothesis H_{3b} .

The probability effects of the GHK and ESHK variables were also examined. Though none of the GHK variables were significant, Panel B in Table II shows that a one unit increase in each of the GHK variables jointly was associated with an increased probability of an entrepreneur pursuing one or more opportunities by only 11.7%. However, a one unit increase in each of the ESHK variables jointly was associated with an increased probability of an entrepreneur pursuing one or more opportunities by 12.4%. Although the difference in the probability effects of the joint GHK and ESHK variables does not seem great, in conjunction with the earlier evidence relating to changes in model fit and the significance of individual variables, there is some support for hypothesis H_{3b} .

5.4. Hypotheses relating to information search

Hypothesis H_{4a} was tested using multiple information search variables. The model producing the best overall fit is reported in Model 5 of Table I. Although not reported in Table III, entrepreneurs who reported higher levels of information search intensity (i.e. based on Cooper et al.’s (1995) measure) and those who used more information sources were significantly associated with an increased probability of identifying more business opportunities. Model 5 shows that only publication-based information search was significantly associated with opportunity identification. Information search based on personal, professional and business networks were not significantly associated with increased opportunity identification. Panel A in Table II illustrates that a one unit increase

TABLE II

Total probability effects of independent and control variables for the full opportunity identification model and full opportunity pursuit model

<i>Panel A: opportunity identification</i>	
Change in probability of identifying one or more opportunities for a one unit increase in all <i>general human capital (GHK)</i> variables	12.9%
Change in probability of identifying one or more opportunities for a one unit increase in all <i>specific human capital (ESHK)</i> variables	26.7%
Change in probability of identifying one or more opportunities for a one unit increase in <i>information search intensity</i>	0.5%
Change in probability of identifying one or more opportunities for a one unit increase in <i>all types of information search</i> (professional network, personal network, business network and publications)	9%
Change in probability of identifying one or more opportunities if the entrepreneur is currently operating in an <i>industry other than construction</i>	103%
Change in probability of identifying one or more opportunities for a 1 year increase in the <i>age</i> of the entrepreneur	-1.7%
Change in probability of identifying one or more opportunities if entrepreneur is <i>male</i>	21.3%
<i>Panel B: opportunity pursuit</i>	
Change in probability of pursuing one or more opportunities for a one unit increase in all <i>general human capital (GHK)</i> variables	11.7%
Change in probability of pursuing one or more opportunities for a one unit increase in all <i>specific human capital (ESHK)</i> variables	12.4%
Change in probability of pursuing one or more opportunities for a one unit increase in <i>information search intensity</i>	0.2%
Change in probability of pursuing one or more opportunities for a one unit increase in <i>all types of information search</i> (professional network, personal network, business network and publications)	3%
Change in probability of pursuing one or more opportunities if entrepreneur is currently operating in an <i>industry other than construction</i>	-55.1%
Change in probability of pursuing one or more opportunities for a 1 year increase in the <i>age</i> of the entrepreneur	0.02%
Change in probability of pursuing one or more opportunities if entrepreneur is <i>male</i>	5.5%

in all types of information search (professional network, business network, personal network and publication based search) was associated with an increased probability of identifying one or more opportunities by 9%. More specifically, one unit increase in the use of publication-based search was associated with a 5.5% increase in the probability of identifying one or more opportunities. The positive and significant association between the information search intensity, the number of information sources used and the publication based search variables and the dependent variable (i.e. opportunity identification), therefore, supports hypothesis H_{4a}. It appears, however, that certain types of information are more useful for opportunity identification than others.

Hypothesis H_{4b} was tested with regard to the three information search variables: information

search intensity, number of information sources used and the types of information. Model fit was superior when the four types of information were included vis-à-vis the other information search variables. Model 10 in Table III relates to the model where the former variables were used. However, a significant relationship between information search, irrespective of the measure used, and opportunity pursuit was not detected. Consequently, hypothesis H_{4b} was not supported.

6. Conclusions and implications

Shane and Venkataraman (2000: 220) have asserted that "to have entrepreneurship, you must first have entrepreneurial opportunities". Irrespective of whether these opportunities exist in the environment or emerge as a creative act, individuals are needed to identify and exploit

TABLE III

Ordered logit estimates for opportunity pursuit (0 opportunities = 1; 1 or 2 opportunities = 2; and 3 or more opportunities = 3) ($n = 288$)

	Control Model 6 Coefficients	GHK Model 7 Coefficients	ESHK Model 8 Coefficients	GHK + ESHK Model 9 Coefficients	Full Model 10 Coefficients
<i>Control variables</i>					
Age of owner	0.01 (0.01)	0.01 (0.01)	0.00 (0.02)	0.00 (0.02)	0.00 (0.02)
Age of owner squared	0.00 (0.00) *	0.00 (0.00) *	0.00 (0.00) *	0.00 (0.00) *	0.00 (0.00) *
Gender	0.65 (0.42)	0.63 (0.43)	0.50 (0.44)	0.45 (0.44)	0.43 (0.45)
SIC 0&2	-0.64 (0.69)	-0.61 (0.70)	-0.96 (0.71)	-0.93 (0.72)	-0.94 (0.73)
SIC 3&4	-1.24 (0.59) *	-1.11 (0.60) †	-1.23 (0.60) *	-1.16 (0.61) †	-1.10 (0.62) †
SIC 6	-0.78 (0.50)	-0.69 (0.51)	-0.64 (0.51)	-0.58 (0.52)	-0.57 (0.53)
SIC 7	-0.55 (0.73)	-0.37 (0.75)	-0.43 (0.76)	-0.26 (0.78)	-0.31 (0.80)
SIC 8	-0.22 (0.50)	0.08 (0.51)	-0.07 (0.52)	0.00 (0.53)	0.04 (0.54)
SIC 9	-1.08 (0.56) †	-0.87 (0.58)	-1.06 (0.58) †	-0.94 (0.59)	-0.96 (0.60)
Number of equity partners	-0.02 (0.11)	-0.02 (0.11)	-0.01 (0.11)	-0.02 (0.11)	-0.02 (0.12)
<i>Independent variables</i>					
GHK					
Education		0.01 (0.06)		0.00 (0.06)	0.00 (0.06)
Org.s worked for		-0.08 (0.06)		-0.09 (0.06)	-0.09 (0.06)
Org.s worked for squared		0.00 (0.00)		0.00 (0.00)	0.00 (0.00)
Manager/self-employed		0.41 (0.35)		0.34 (0.36)	0.39 (0.36)
Professional		0.04 (0.41)		0.20 (0.43)	0.21 (0.43)
Supervisor		0.92 (0.56) †		0.67 (0.57)	0.68 (0.57)
ESHK					
Ownership experience			0.25 (0.08) **	0.24 (0.08) **	0.24 (0.08) **
Managerial capability			0.27 (0.14) *	0.27 (0.14) †	0.26 (0.14) †
Technical capability			0.22 (0.13) †	0.24 (0.13) †	0.28 (0.14) *
Entrepreneurial capability			0.36 (0.14) **	0.35 (0.14) *	0.33 (0.14) *
Info search					
Professional network					0.03 (0.13)
Publications					0.03 (0.12)
Business network					0.02 (0.13)
Personal network					0.19 (0.13)
Cut point 1	-1.61 (0.66)	-1.39 (1.04)	-1.05 (0.71)	-1.15 (1.09)	-1.16 (1.09)
Cut point 2	1.70 (0.66)	1.97 (1.04)	2.51 (0.72)	2.45 (1.10)	2.46 (1.11)
Log-likelihood	-245.55	-242.62	-232.18	-230.29	-228.99
Pseudo- R^2	0.04	0.05	0.09	0.10	0.10
% correctly classified	64.9%	65.3%	64.9%	65.6%	66.3%
Chi-squared	19.10 *	24.96 *	45.85 ***	49.63 ***	52.21 ***

Standard errors in parentheses; † $P \leq 0.10$; * $P \leq 0.05$; ** $P \leq 0.01$; *** $P \leq 0.001$.

them. While opportunity identification distinguishes entrepreneurs from non-entrepreneurs, we know little about why some entrepreneurs identify and pursue more opportunities than other entrepreneurs. In this study, this research gap has been explored with reference to human capital theory. Previous studies have explored the relationships between an entrepreneur's human capital profile and the likelihood of firm

survival and/or venture performance. In contrast, this study has keyed into emerging debates relating to other outcomes associated with the entrepreneurial process, namely, the identification and pursuit of opportunities for creating or purchasing businesses. A novel contribution of this study was the exploration of the relative importance of an entrepreneur's entrepreneurialship-specific human capital (ESHK) and general

human capital (GHK) profile in understanding the extent of opportunity identification and pursuit, especially with respect to the incorporation of prior business ownership experience. The study also explored whether the human capital profile “inputs” associated with more opportunity identification “outputs” were different to those associated with more opportunity pursuit “outputs”. Finally, the study has sought to contribute to the emerging debate on the role of information search in opportunity identification. Below, we reflect on our findings and discuss their implications for researchers and practitioners.

Relative to the ESHK variables, the GHK variables had lower “explanatory” power with regard to both opportunity identification and pursuit. In fact, none of the GHK variables were significantly associated with opportunity pursuit, while only one GHK variable was associated with opportunity identification. Entrepreneurs reporting higher levels of education reported a higher probability of identifying more opportunities. Education can act as a source of both knowledge and motivation (Cooper et al., 1994), the two essential ingredients for opportunity identification (Shane, 2003). It is important to note that education is often endogenous in models of entrepreneurial performance (Van der Sluis et al., 2004). Tests suggested that the presented results were not biased by endogeneity. This may be because the study did not focus on the traditional measures of entrepreneurial performance relating to venture performance outcomes. It may, however, be because weak instruments influenced the endogeneity tests conducted. The limitations associated with the presented cross-sectional data and the potential endogeneity problems resulting from this are acknowledged.

Several ESHK variables were significantly associated with both a higher probability of identifying more opportunities and pursuing more opportunities. These were business ownership experience and managerial and entrepreneurial capabilities. It appears that many of the skills needed to identify opportunities are also those needed for later stages in the entrepreneurial process. These latter dimensions of hu-

man capital may be important in terms of providing access to knowledge and they may heighten the confidence of the entrepreneur. The perceived capabilities of entrepreneurs are an element of their self-efficacy (Delmar, 2000). This self-efficacy has a strong impact on willingness to act and overcome obstacles (Wood and Bandura, 1989) and exploit opportunities (Markman et al., 2002).

Managerial capabilities were significantly associated with a higher probability of both identifying and pursuing more opportunities. These capabilities may also allow entrepreneurs to see means-ends relationships (Gaglio and Katz, 2001) more clearly than those without them. Ardichvili et al. (2003) made an important distinction between an idea and an opportunity. Entrepreneurs with higher levels of managerial capability may be better able to convert an idea into an opportunity.

Despite the above similarities between the human capital profiles needed for opportunity identification and pursuit, there were a number of differences. Most notably, technical capabilities were not significantly associated with opportunity identification but they were associated with more pursued opportunities. Technical knowledge may reduce the risks and costs associated with the exploitation of an opportunity. This may encourage entrepreneurs with greater technical skills to pursue an opportunity.

Entrepreneurial, managerial and technical capabilities (Penrose, 1959) are needed in the entrepreneurial process though to varying degrees. To address barriers to opportunity identification and pursuit, some entrepreneurs may circumvent their own human capital deficiencies by attracting entrepreneurial team members with complementary human capital profiles. Indeed, entrepreneurs operating as part of a larger entrepreneurial team were associated with a higher probability of identifying more opportunities.

This study provides novel findings relating to the relationships between an entrepreneur's information search behaviour and their opportunity identification behaviour. A distinction was made between an entrepreneur's prior information (i.e. knowledge) as embodied in their human capital profile compared with their

current information exhibited by reported information search behaviour. Entrepreneurs reporting higher levels of information search intensity (based on Cooper et al., 1995 measure) and those who utilized more information sources were significantly more likely to identify more opportunities. The literature distinguishes between different types of information (Kaish and Gilad, 1991). Further, certain types of information may be more useful in the opportunity identification process than other types (Fiet, 2002). This study highlighted that entrepreneurs used the following four broad sources of information; their professional network, their business network, their personal network and publications. Fiet (2002) theorised that specific information would be more valuable than general information in the public domain. It is interesting to note, therefore, that while information emanating from the entrepreneur's personal, professional and business networks was not significantly associated with opportunity identification, information from publications was. Interviewing repeat entrepreneurs, Fiet et al. (2004) show that these entrepreneurs do indeed use general information (e.g. publications). However, they argue that it is the interaction between specific and general information that is likely to yield the most beneficial results in terms of identifying valuable opportunities. Our evidence suggests that certain types of information (i.e. publications-based) was positively associated with more opportunities identified, in a given period. Additional research is warranted to explore the relationship between the type of information used and the nature of the opportunity identified (e.g. wealth creating potential, innovativeness etc.). Future studies may also consider whether entrepreneurs scan the informational environment with no particular opportunity in mind (Kaish and Gilad, 1991), or whether they systematically search for information and/or opportunities (Fiet, 2002).

The quality of the opportunities identified and subsequently rejected or pursued by entrepreneurs were not explored (Chandler and Hanks, 1994; Fiet, 2002), representing a limitation of this study. We focus on the quantity rather than quality of opportunities identified and pursued. Future research might usefully

explore the relationships between entrepreneurs' GHK and ESHK profiles and their propensity to identify and pursue opportunities with significant wealth creating potential. A related useful exercise may be to explore the relationship between opportunity identification/pursuit strategies and venture performance, although linking the two aspects directly may pose operational issues. A case for focusing upon the opportunity rather than the firm or the entrepreneur as the unit of academic analysis may bear some theoretical as well as empirical fruit to guide future research.

Two key factors have been singled out as important drivers of entrepreneurial activity (Reynolds et al., 2002); the existence of entrepreneurial opportunities and individuals who are able to recognise and act on these opportunities. This study focused on the latter. External environmental conditions may also be associated with the identification of opportunities. The availability of entrepreneurial opportunities can be influenced by the industry context, often resulting from technological, industrial and societal changes (Eckhardt and Shane, 2003). Further, the various components of human capital may have differential effects under various industry conditions (Bosma et al., 2004; Honig, 2001). In this study, external environmental conditions were controlled for with regard to the main industrial sector where the entrepreneur had positioned the surveyed firm. While the evidence presented in Tables I and III suggest that industry conditions matter, additional studies are warranted that utilize more sophisticated measures relating to external environmental conditions.

Our findings provide insights to assist calls to consider the entrepreneur (or the entrepreneurial team) rather than solely the firm as the unit of analysis through all stages of the entrepreneurial process (Westhead et al., 2005). This study suggests a need to recognise that some human capital skills required for opportunity identification differ from those required for opportunity pursuit. Presented evidence suggests that entrepreneurs leverage their ESHK to a greater extent than their GHK to identify and pursue opportunities. Policy to address attitudinal, resource and operational barriers to the

creation of new ventures may need to provide assistance that enhances the ESHK of individuals. Practitioners seeking to increase the pool of entrepreneurs may consider introducing initiatives that encourage nascent and practising entrepreneurs to hone their managerial capabilities. Rather than providing “blanket support” encouraging individuals to consider new business creation, more targeted assistance may be needed to address barriers to the pursuit of opportunities identified. Initiatives that hone the technical and entrepreneurial capabilities of entrepreneurs may increase the proportion of identified opportunities converted into pursued opportunities. The pursuit of more identified opportunities may lead to the creation of more wealth and jobs.

Notes

¹ We thank a referee for this term.

² KMO measure of sampling adequacy = 0.81; Bartlett's test of sphericity significant at 0.001 level; cumulative % of variance explained is 63.10%. Further details available from authors upon request.

³ KMO measure of sampling adequacy = 0.87; Bartlett's test of sphericity significant at 0.001 level; cumulative % of variance explained is 62.11%. Further details available from authors upon request.

⁴ The reader may wonder why we used OLS and not ordered logit as reported in this paper. The statistics package we used (i.e. STATA) did not have a 2SLS procedure based on ordered logit. A robustness check was run with reference to both the OLS and ordered logit techniques. The results were not found to markedly differ (i.e. the directions and strengths of association for each variable were comparable) with reference to the technique used. We were confident that running the Hausman test based on the OLS would not bias the results.

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