A Capital Theory Framework for Opportunity Recognition

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A key difficulty in the study of the entrepreneurial process converges on why some individuals and not others recognize opportunities (Venkatraman, 1997). This study seeks to determine whether the skills and abilities of opportunity recognition identified by previous research together can increase recognition of opportunities. A capital framework, built on capital theory and resource-based theory, provide a model for logistical regression analysis. The practical implications gleaned from the statistical analysis provide a basis for suggestions for a specific type of policy undertaking.

INTRODUCTION

Market participants' unequal access to information (Hayek, 1945) leads to the potential for entrepreneurship, particular opportunities, through the recognition of market disequilibrium (Kirzner, 1973) or innovation (Schumpeter, 1934). Previous entrepreneurship literature depicts individuals with different stocks of knowledge and these differences predict when individuals are more likely to recognize opportunities (Shane, 1999). In addition, there is some evidence confirming theoretical speculation that the way in which individuals' process information affects whether or not these opportunities are perceived (Baron, 1998; Busenitz & Barney, 1997; Forbes, 1999). Such research suggests that both the knowledge that individuals possess and the methods in which they use it provide some support to the question of why some individuals recognize opportunities while others do not (Venkataraman, 1997).

The discovery of opportunities is the first step in the entrepreneurial process. In fact, Kirzner (1997) posits the discovery of the opportunity as the essential element of entrepreneurship. However, such identification or discovery of an opportunity is not a trivial matter, especially if the value of the opportunity originally appears as an abstraction to the individual proposing the opportunity. It is precisely this abstract nature of the opportunity that makes identification such a multifaceted process (Ardichvili, Cardozo, & Ray, 2003). This study will help identify those abilities and skills necessary to identify those opportunities that will lead to venture creation and therefore highlight the not only the possibility but also the focus of entrepreneurial programs in the future.

Many studies have previously drawn attention to abilities and skills that lead to opportunity recognition but few have been able to investigate the abilities and skills together at the same time to see if the set actually led to opportunity recognition as a set. Two reasons for such difficulty are the isolation of the opportunity recognition event itself without retrospective bias (Davidsson & Honig, 2003) and getting all known abilities and skills studied at the same time (Ardichvili, Cardozo, & Ray, 2003). The Panel Study of Entrepreneurial Dynamics (PSED) provides a sample set of nascent entrepreneurs that is nationally representative (Reynolds, 2000), contains a comprehensive set of variables (Ronning, Conoley,

Glover, & Witt, 1987), and develops a sample group with a comparative group (Davidsson & Honig, 2003).

The next section collects the previously researched abilities and skills and collectively builds a testable model for statistical evaluation. The following section shows the results and the concluding section interpreting those results and the benefits of the study.

Abilities and Skills

Building from the insights of both capital theory (Becker, 1993; Coleman, 1988) and resource-based theory (Wernerfelt, 1984; Barney, 1991), individuals, like firms, develop different 'bundles' of capabilities (Black & Boal, 1994). These bundles of capabilities typically reflect an idiosyncratic and synergistic effect of a larger more important capability (Zahra, Sapienza, & Davidsson, 2006). Therefore, a resource-based conceptualization of the opportunity recognition helps our understanding because it reflects the individual's cognitive processes in a more cumulative, thorough, and multifaceted way. However, an understanding how these bundles of capabilities impact entrepreneurial outcomes is not a simple task owing not only to the numerous types of cognitive capital, but also the numerous interactions possible among those types (Black & Boal, 1994). Complicating these difficulties even further, influences on these factors not only change in intensity and nature over time but also within and across individuals (Schreyögg & Kliesch-Eberl, 2007).

A capital framework, however, provides a means of extension to the opportunity recognition process in two ways. First, a capital framework proposes a means for avoiding the bias associated with model underspecification (Schoonhoven, 1981) by facilitating a multivariate examination of cognitive factors, which originate from individual and social contexts. Such a multivariate type of examination also aids theory development by controlling for alternative interpretations of research findings. Consequently, a capital framework avoids some of the generalizability criticisms associated with previous studies (e.g. Singh, 2000).

Most importantly, perhaps, a capital framework offers a means of understanding how the influence of these cognitive factors change over time and even throughout the entrepreneurial process (Ardichvili et al., 2003; Lumpkin, Hills, & Shrader, 2001). For this reason, it is possible, that some of these capabilities are more important at certain times than others. It is, therefore, possible that meaningful interactions occur at certain times during the process but not others. It is, also, possible to assess the interactions during this process. Capital theory offers the advantage of looking at the interactions of both collectively and separately.

Following previous research efforts to model opportunity recognition (Ardichvili, et al., 2003; Davidsson, et al., 2001; Coleman, 1988), Figure 1 represents the conceptual model guiding this study. The model illustrates two different types of capital (individual human capital and individual social capital), as well as, the capability of creativity as supporting a more comprehensive understanding of the opportunity recognition phenomenon. Individual human capital in this model represents both the knowledge and the motivation to process new information. Individual social capital in this model embodies the characteristics of the social structures from which an individual uses to extract resources and other benefits. Creativity denotes the cognitive process of the individual to do things in a different way.

The central argument of this research study is that two types of factors systematically influence the development of opportunities. Even though the fundamental role for opportunity-seeking individuals is decision-making in ambiguous, complex, and uncertain economic environments (Casson, 2003), the cognitive infrastructure implicit in this process remains poorly understood (Krueger, 2003). However, this project by incorporating the full set of previously researched capabilities provides a theoretical foundation that posits that opportunity recognition develops from knowledge, both external and internal sources as well as motivation to process that information, and the characteristic to do things differently. This research study extends previous studies by examining the confluence of the systematic capabilities of this process.

FIGURE 1
CONCEPTUAL MODEL OF OPPURTUNITY RECOGNITION
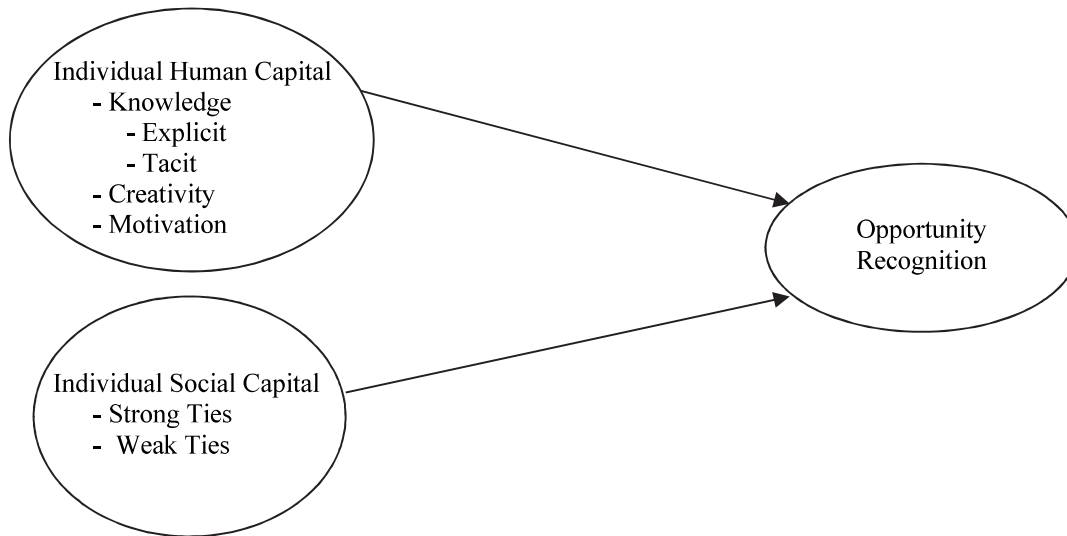
Research on human capital generally considers education and work experience as key characteristics (Cooper, Gimeno-Gascon, & Woo, 1994). Prior research suggests that human capital may comprise a range of components: the achieved attributes of the individual (Becker, 1975); cognitive characteristics (Alvarez & Busenitz, 2001); family background characteristics (Greene & Brown, 1997); attitudes and motivation (Birley & Westhead, 1990); gender and ethnic origin (Cooper et al., 1994); industry specific knowledge (Cooper et al., 1994; Shane, 1999); competencies and capabilities (Chandler & Jansen, 1992; Shane, 1999; Sigrist, 1999), and age (Bates, 1990). Many of these components develop over time and help to determine the extent to which the resources necessary for opportunity recognition are accessed and leveraged.

The overall level of human capital is an important input that affects opportunity outcomes, but an important distinction for this study is made between explicit and tacit knowledge (Becker, 1993). Explicit knowledge consists of a hierarchy of skills and knowledge with varying degrees of transferability across firms (Castanias & Helfat, 1992). Tacit knowledge leads towards knowledge that is not easily transferable or easily attainable between firms or even individuals (Shane, 1999). Explicit knowledge, generic to all types of economic activity, is transferable across industries and firms (Ucbasaren, Westhead, & Wright, 2003). This knowledge leads to specific knowledge or specific human capital (Ucbasaren et al., 2003).

Human capital theory posits that knowledge improves the cognitive capabilities of individuals (Miner, 1994). Thus, individuals with higher levels of absolute knowledge, both explicit and tacit, should be able to recognize more opportunity opportunities. Shane & Eckhardt (2003) argue that the relationship between knowledge and recognition may not be due to knowledge differences but simply the idiosyncratic nature of the opportunity. In such a situation, the extent to which an individual believes that she is capable of organizing and executing actions to produce favorable outcomes becomes important (Baron & Markman, 2005). Such a belief in oneself serves as motivation and directs adaptive functioning (Bandura, 1997). Self-efficacy serves therefore as the means by which knowledge moves from a reserve to a capability.

Schumpeter's work (1934) highlighted the importance of creativity within the domain of innovation. The concept of creative destruction came from his work. According to Schumpeter (1934), the individual is an entrepreneur during that time of creativity because creativity is not a characteristic but a process. Such an important distinction seems to have been lost in current entrepreneurial thinking. While creativity

and entrepreneurship have close ties, researchers using both methods miss this connection (Whiting, 1988). In fact, in the study of individual creativity, there are two parallel research streams: one focusing on the characteristics of individuals, and another focusing on the process of creativity from a cognitive perspective (Nyström, 1978). This study views creativity as a cognitive process or that creativity refers to the capabilities of generating ideas or products that are novel, useful, and appropriate (Sternberg & Lubart, 1995).

Some cognitive attempts by researchers have focused on personality traits in relation to business creation. Shaver & Scott (1991), in an attempt to summarize these studies, point out that psychometric tests searching for these types of distinctive traits have not been able to find differences in most traits between entrepreneurial individuals and the general public.

In subsequent research, however, researchers found support that two personality traits relate to successful opportunity recognition. First, there appears to be a connection between optimism and higher opportunity recognition. Studies show that entrepreneurial optimism relates to self-efficacy beliefs (Krueger & Dickson, 1994; Krueger & Brazeal, 1994). Self-efficacy (Bandura, 1977; 1997) is an individual's beliefs and expectancies that he or she is capable of meeting the requirements in a variety of situations. Individuals with a higher self-efficacy have more confidence in their abilities and other personal resources that help them to recognize opportunities more readily than those individuals with low self-efficacy. Individuals with positive beliefs about efficacy towards performance are more likely to attempt difficult tasks, to persist in overcoming obstacles, and to experience less anxiety when faced with adversity (Chen, Gully, Whiteman, Kilcullen, 2000).

Koller (1988) found that as many entrepreneurs recognized opportunities on their own as recognized opportunities through their social contacts. Similarly, Hills, Lumpkin, & Singh (1997) empirically tested just such a hypothesis and found individuals, with extended networks, recognize significantly more opportunities than individuals working alone do. Hills et al. (1997) also hypothesized that the quality of the network contacts affects characteristics such as alertness and creativity. The suggestion is that an individual's social network can facilitate the recognition of opportunities, in addition to and independent of, the unique personal human capital that she possesses. It also suggests that a comprehensive theory of entrepreneurial recognition must contain a social component.

Adler & Kwon (2003) define social capital as the goodwill available to individuals and the groups of which they are members. This social capital exists in the structures, networks, and memberships to groups or organizations of those individuals (Davidsson & Honig, 2003). The fundamental sources of social capital are in the content and structure of social relationships (Granovetter, 1973; Burt, 1992). Granovetter's (1973) classic article on social networks argues that weak ties, including casual acquaintances, can link individuals to information sources that are not contained with an individual's strong ties. The suggestion is that the casual acquaintance or weak tie possesses unique information than close friends do because most individuals have more weak ties than strong. Other theorists suggest that strong relationships lead to other important resources such as trust. These strong relationships develop a reciprocal relationship that an individual feels for another (Coleman, 1988; Gulati, Nohria, & Zaheer, 2000). Consequently, these strong relationships facilitate sharing of information resources and creative resources important to entrepreneurial recognition.

Secondly, social capital theory highlights the individual as the appropriate level of analysis to develop opportunity recognition, given that it is at this individual level that resources convert into new and useful information about opportunities (Coleman, 1988). Social capital, similar to other forms of capital, is both attributable, a single form can be used for multiple purposes, and convertible, a single form can be transformed into another (Adler & Kwon, 2003). Given that, cognitive processes drive individual's actions (Krueger, 2003), it is at the individual level that socially based resources are attributed and converted into knowledge about opportunities (Kirzner, 1999; Gaglio & Katz, 2001).

Researchers identified the difficulty in distinguishing between individual and social capital resource differences when studying organizations (Adler & Kwon, 2003). However, the capital theory framework provides the means to incorporate simultaneously human and socially based sources of influence in the development of the opportunity recognition theory. By identifying the influential cognitive factors from

both individual and social sources, understanding forms of the cognitive processes. Therefore, this study follows previous empirical studies (Davidsson & Honig, 2003) to examine individual indicators of social capital resulting from weak and strong ties.

RESULTS

The conceptual model of this study proposes that the cognitive factors of human and social capital are responsible for opportunity recognition. In order to test that conceptual model, a logistic regression analysis to determine whether each factor predicts significantly and independently an individuals' ability to recognize opportunities and therefore contributes to the set.

Before reviewing those results, two statistical issues related to the logistic regression technique deserve further discussion. The dichotomous properties of the dependent variable violate assumptions. Although logistic regression, similar to multiple regression techniques, is robust to many violations of assumptions (Nelder & Wadderburn, 1972; McCullagh & Nelder, 1989; Pardoe, 2006), it is sensitive to missing data. For this reason, the models of logistic regression are based only on cases where data on all variables are present (Hosmer & Lemeshow, 2000). Secondly, the assessment and interpretation of the significance of the logistic regression models require multiple statistical measures (Hosmer & Lemeshow, 2000; Stevens, 2002). This study considered three different measures from the logistic regression analyses that follow (Hair, Black, Babin, Anderson, & Tatham, 2006). The first measure is the Model Chi-square. This measure tests the null hypothesis that the coefficients of all the variables in the proposed model, with the exception of the constant, are zero. The Model Chi-square, similar to the f-test for regression, demonstrates whether the proposed model is a statistically significant improvement over a model containing the constant alone. The second measure is Hosmer & Lemeshow's Goodness-of-fit. This measure tests the null hypothesis that there is no difference between the theoretical model generated by the researcher and the data observed. In this case, a non-significant result posits that the estimates of the model fit the observed data at an acceptable level. The final measure considered in this study is Nagelkerke r-square. This measure is analogous to the r-square statistic reported in linear regression (Nagelkerke, 1991). The Nagelkerke r-square, for purposes of this study, measures the effect size of the variables and relates to the strengths of the relationships observed.

TABLE 1
RESULTS OF LOGISTIC REGRESSION AANALYSIS

	Model 1 (n = 673)	Model 2 (n = 1216)	Model 3 (n = 673)
Model Chi-square	264.394***	69.120***	305.072***
Goodness-of-fit index	7.846	14.344**	8.530
Nagelkerke R-Square	.449	.077	.495

$^\dagger p < .10$; $* p < .05$; $** p < .01$; $*** p < .001$

The study now turns to the determination of what dimensions of individual human and social capital are associated with the recognition of opportunities. The correlation analysis begins to show preliminary support for many of the variables hypothesized in this study. The recognition of opportunities appears to be significantly and positively related to having a higher level of formal education ($r = .097$, $p < .01$), taken more business courses ($r = .391$, $p < .01$), previous attempts to start a business ($r = .061$, $p < .01$) and more years of managerial experience ($r = .085$, $p < .01$). Additionally, opportunity recognition seems to be significantly and positively related to a preference for doing things differently ($r = .129$, $p < .01$) and recognizing effectiveness in partners that preferred doing things differently ($r = .058$, $p < .05$).

Interestingly, most variables were statistically significant related to participation in the gestation events related to the cognitive event of opportunity recognition.

The next question for this study is to determine whether entrepreneurs employ different types or subtypes of capital than non-entrepreneurs in recognizing opportunities. The logistic regression results for the model presented in Table 1 predicting nascent entrepreneur status suggest that the answer to this question is yes they do. Table 1 represents the specific assessment and interpretation of three different models. Model 1 is a logistic regression analysis of just the human capital factors prediction of leading to opportunity recognition. The highly significant Model Chi-Square value (β = 305.072, p < .001) supports the notion that the model of all variables is a significant improvement over a model containing the constant alone. The Hosmer-Lemeshow Goodness-of-fit index value (β = 7.846, p > .1) is very low and non-significant. Such a value suggests that the observed data reflect the proposed model very well. Finally, the observed Nagelkerke R-square value (r^2 = .449) strengthens the suggestion that the theoretical model as proposed does consist of factors yielding substantial effect sizes.

Model 2 is a logistic regression analysis predicting participation in opportunity recognition with only the social capital variables. The Model Chi-Square value (β = 69.120, p < .001) is highly significant suggesting that the proposed model is an improvement over a model of the constant alone. However, both the Goodness-of-fit statistic (β = 14.344, p < .01) and the Nagelkerke R-square value (r^2 = .077) suggest that the observed data does not reflect the proposed model and the factors are not substantial effect sizes.

Capital theory and this study posit that the interaction of human capital and social capital influence opportunity recognition. Anecdotal data also suggests that neither set of variables occur in isolation but rather act together. Therefore, Model 3 includes both sets of variables, human and social capital, in the proposed model for the final logistic regression analysis. The highly significant Model Chi-Square value (β = 305.072, p < .001) supports that the full regression model is a significant improvement over the model containing the constant alone.

TABLE 2
CONTIGENCY TABLE FOR HOSMER AND LEMESHOW TEST

	Non-participation in Opportunity Recognition		Participation in Opportunity Recognition		
	Observed	Expected	Observed	Expected	Total
Step					
1	54	54.040	13	12.960	67
2	48	45.788	19	21.212	67
3	37	41.452	30	25.548	67
4	46	37.780	21	29.220	67
5	30	34.003	37	32.997	67
6	25	28.674	42	38.326	67
7	16	14.794	51	52.206	67
8	1	.749	66	66.251	67
9	1	.471	66	66.529	67
10	0	.249	70	69.751	70

The Hosmer & Lemeshow Goodness-of-fit value (β = 8.530, p > .1) is very low and statistically non-significant. Such a value suggests that the observed data reflect the proposed model very well. Table 2 depicts the contingency table for the Hosmer-Lemeshow Test. The contingency table represents the statistical process that the Hosmer-Lemeshow Test performs to determine the difference between the observed data and the proposed model. The Nagelkerke R-Square value (r^2 = .495) advocates that Model 3 successfully predicts participation in opportunity recognition almost half of the time. However, the

Nagelkerke statistic attempts to imitate the R-square in ordinary least squares (OLS) but generally runs lower than the corresponding R-square from OLS (Nagelkerke, 1991).

TABLE 3
CLASSIFICATION TABLE

		Predicted		
		Participation in Opportunity Recognition		Percentage Correct
Observed		0	1	
Participated in	0	205	53	79.5
Opportunity Recognition	1	103	312	75.2
Overall Percentage				76.8

The cut value is .500

Therefore, Table 3 depicts the number of cases successfully predicted by the proposed model overall. Table 3 also shows the predictive ability of the proposed model to determine participation in opportunity recognition. Therefore, the proposed model correctly predicted the individuals' participation in opportunity recognition nearly 77% of the time.

CONCLUSIONS

This study and the results of the statistical analysis present several practical implications. First, the statistical results suggest that formal education and exposure to business techniques significantly contributes to opportunity recognition. Small business development centers should develop courses better suited to the entrepreneurial enterprise. While the content of the business courses was not surveyed, it is obvious, that exposure provides the explicit knowledge necessary for opportunity recognition. In addition, previous attempts to start a business were also significant, which suggests that those institutions should foster a safe haven for attempting, failing, or succeeding in an entrepreneurial activity. Perhaps this may entail some type of incubation space where exploration of different ideas determines the outcomes.

Similarly, the social capital context suggests that an infrastructure that fosters social interaction and development of social skills also increases the odds of opportunity recognition. This may mean that groups of entrepreneurs and prospective entrepreneurs should learn how to interact more effectively. It is not obvious exactly what types of interactions are the most effective, but the results of this study denote that social interaction is important. Again, this may entail an incubation space to encourage such interactions.

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