

# Entrepreneurial Venture Creation: The Application of Pattern Identification Theory to the Entrepreneurial Opportunity-Identification Process

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## Abstract

In this paper, the author argues that pattern identification plays a pivotal role in the entrepreneurial opportunity-identification process. He structures the paper into eight sections. First, the author introduces the reader to a brief review of historical studies into entrepreneurial opportunity identification. Second, he provides the theoretical underpinning of the paper. Third, the author outlines major factors that influence the opportunity identification. Fourth, he assesses the link between entrepreneurial behavior and perceived technological changes. Fifth, the author puts forth a brief review of alternative models of opportunity identification. Sixth, he analyzes the pattern identification models and their applications to the opportunity identification. Seventh, the author briefly discusses some key issues in the paper. Eighth, he draws three implications for entrepreneurial practice. The author concludes the paper with an emphasis on the importance of the pattern identification perspectives to the short-term survival and long-term success of entrepreneurship, and offers suggestions for further research.

**Keywords:** Entrepreneurship, Pattern identification, Opportunity identification, Venture creation

## 1. Introduction

In recent years, substantial progress has been made in conceptualizing the opportunity-identification phenomenon. Empirical studies have been conducted to generate new knowledge and validate the conceptual framework (see, for example, Kaish and Gilad, 1991; Shane, 2000). The above studies each make an important contribution, by identifying specific factors in opportunity-identification process. For example, Hill et al (1997) point out the importance of networking as a prerequisite for an ability to identify more opportunities, and stress the importance of entrepreneurial alertness. Shane (1998) uses Kirzner's (1979) information asymmetry theory to explain the opportunity-identification process; Kaish and Gilad (1991) maintain that entrepreneurs are opportunistic learners and combine search for information with opportunistic reactions to chance events.

Following successive shifts and movements in entrepreneurship enquiry in which research attention has highlighted the traits, personalities, orientations, motivations, structures, policies, mechanisms, processes and cultures that shape entrepreneurial practice, there is now general accord that the process of opportunity discovery is distinctive or unique to entrepreneurship. Studies investigate how opportunities are discovered, for example, at the individual-opportunity nexus (Shane, 2003) in relation to peoples' special cognitive skills (Shane and Venkataraman, 2000), organizational learning processes (Lumpkin and Lichtensten, 2005), networking skills (Arenius and Clercq, 2005) or career choices (Lee and Venkataraman, 2006). These frameworks (including Shane, 2000; Shane and Venkataraman, 2000; Lumpkin et al., 2003) collectively offer a range of concepts that characterize the opportunity-identification process (i.e., networks, experience, ideas sharing, prior knowledge of markets, entrepreneurial alertness). The aim of such models is to identify how (in varying degrees) these conceptual categories are central to the incubation, evaluation, recognition, discovery and formation of entrepreneurial opportunities. However, the above opportunity-identification frameworks are limited in their ability to account for why people enact opportunities in the way (and at the time) that they do in relation to broader societal, economic and political processes. This limitation arises for three reasons. The first relates to the assumption that opportunities, having been generated by certain market disequilibria, sit 'out there' in the market place waiting to be seen and realized by certain alert individuals. The second problem related to this is that too much agency tends to be attributed to individual people who make judgments about where there are gaps in the market on the basis of their market knowledge, perceptual abilities or special skills in 'seeing', identifying and selecting from a range of opportunities. The third problem is that, beyond the inclusion of networks and personal background experiences, there is little attention to the wider societal, economic or cultural structures or patterns that shape entrepreneurial practice.

The study of entrepreneurial networks informs the field of entrepreneurship by highlighting the role of individual entrepreneurial action on the discovery of opportunities and mobilization of resources (Shane and Venkataraman, 2000). Study of entrepreneurial networks at the individual level focuses on the relationships or ties of entrepreneurs—as agents of the firm—with other individuals and organizations (Anderson and Miller, 2003). The network ties of an emerging firm can provide the conduits, bridges and pathways through which the firm can find and access external opportunities and resources. Thus an entrepreneurial firm's network ties can facilitate successful firm emergence, growth and performance. However, the characteristics of these network ties can influence the extent to which opportunities and resources can be identified, accessed, mobilized and exploited. When a network tie is embedded within the social relationship and influences the firm's economic decision making, the tie is called relationally embedded (Granovetter, 1985).

## **2. Purpose of the Paper**

As mentioned above, a number of research propositions have been advanced based on the analysis of the current literature, and then validated by analysis of in-depth cases of opportunity identification that led to the creation of successful entrepreneurial ventures. Despite the importance of above studies and their individual contributions, we are still far from a model of opportunity-identification process that integrates multiple variables such as technology, social, economic, and cultural changes. The pattern-identification perspective fills this gap. Therefore, the purpose of this paper is to offer the pattern identification perspective of opportunity-identification process. The author argues that pattern identification plays an important role in the entrepreneurial opportunity-identification process.

## **3. Operating Definitions**

While many definitions of the term opportunity have been proposed (Bhave, 1994; Herron and Sapienza, 1992; Kirzner, 1979), most include references to three central characteristics: potential economic value (i.e., the capacity to generate profit), newness (i.e., some product, service, or technology that did not exist previously), and perceived desirability (e.g., moral or legal acceptability of the new product or service in society). For the purpose of this paper, the author defines opportunity as a perceived means of generating economic value (i.e., profit) that previously has not been exploited and is not currently being exploited by others. If opportunity is defined as such, then opportunity identification can, in turn, be defined as the cognitive process or processes through which individuals conclude that they have identified an opportunity. It is important to note, as stated by other authors, (Ardichvilli, Cardozo, and Ray, 2003) that opportunity identification is only the initial step in a continuing process, and is distinct both from detailed evaluation of the feasibility and potential economic value of identified opportunities and from active steps to develop them through new ventures. It should also be said that the focus is on innovative opportunities—ones that truly break new ground rather than merely expand or repeat existing business models, such as, for instance, opening a new Italian restaurant in a neighborhood that does not currently have one (Gaglio and Katz, 2001).

## **4. Theoretical Basis of the Paper**

The theoretical framework of this paper is the theory of pattern identification. The theory of pattern identification suggests that cognitive frameworks serve as template (patterns or guides), assisting specific persons to recognize connections between apparently independent events and trends and to detect meaningful patterns in these connections. This aspect of pattern identification theory suggests an intriguing explanation of the fact that particular business opportunities are recognized by specific persons but not by others. Briefly the persons who recognize specific opportunities may do so because they possess relevant cognitive framework that help them accomplish this task—frameworks that enable them to perceive the emergent patterns (i.e., technological, economic, social, cultural, etc.) that underlie many new business opportunities. An aspect of the theory of pattern identification with important implications for understanding opportunity identification is the suggestion that cognitive frameworks, developed through individuals' unique life experiences, play a crucial role in pattern identification.

## **5. Factors That Influence Opportunity Identification**

The author's literature review indicates that researchers have hypothesized about a number of factors that influence the way opportunities are identified by entrepreneurs. Among the major factors include a) entrepreneurial awareness and alertness; b) information asymmetry and prior knowledge; c) discovery versus purposeful search; d) networking versus solo entrepreneurship; and e) creativity. These concepts are discussed in order.

### *5.1 Entrepreneurial Awareness and Alertness*

Kirzner (1973) was the first to use the term "alertness" to explain entrepreneurial identification of opportunities. Ray and Cardozo (1994) argue that any identification of opportunity by a prospective entrepreneur is preceded by a state of heightened awareness of information. They called this state entrepreneurial awareness (EA), and define EA

as “a propensity to notice and be sensitive to information about objects, incidents, and patterns of behavior in the environment, with special sensitivity to maker and user problems, unmet needs and interests, and novel combinations of resources” (p. 10). Furthermore, in keeping with several authors, they claimed that personality characteristics and the environment interact to create conditions which foster higher EA (Gaglio and Taub, 1992). Imbedded in this line of thought is the notion that higher EA increases the likelihood of an opportunity being identified. There are, however, reports of studies that testify to the contrary. For example, Busenitz and Arthurs (2006) conducted an empirical test of Kaish and Gilad’s (1991) proposition that entrepreneurs are more alert to new opportunities and use information differently than managers do. Busenitz and Arthurs found little empirical support exists for the Kaish and Gilad theoretical framework, but indicated that the measures of entrepreneurial alertness need further development.

### 5.2 Information Asymmetry and Prior Knowledge

People tend to notice information that is related to information they already know (Von Hippel, 1988). Based on this reasoning, Shane (2000) postulated that entrepreneurs will discover opportunities because prior knowledge triggers identification of the value of new information. Drawing on the Austrian economics argument that entrepreneurship exists because of information asymmetry between different actors (Hayek, 1945), Shane maintain that any given entrepreneur will discover only those opportunities related to his or her prior knowledge. In his three-stage study of opportunity-identification processes, Shane tested and confirmed two hypotheses, which are summarized as follows:

- (1) Any given entrepreneurial opportunity is not obvious to all potential entrepreneurs (the rationale being that all people do not possess the same information at the same time (Kirzner, 1997)).
- (2) Each person’s idiosyncratic prior knowledge creates a “knowledge corridor” which allows them to recognize certain opportunities, but not others (Hayek, 1945; Ronstadt, 1988). According to Shane (2000), three major dimensions of prior knowledge are important to the process of entrepreneurial discovery: prior knowledge of markets, prior knowledge of ways to serve markets, and prior knowledge of customer problems. In this paper, the author will use the first part of this definition, and discuss only opportunities for creating a new business.

### 5.3 Accidental Discovery Versus Systematic Search

A large part of the erstwhile literature on entrepreneurship implicitly assumed that identification of opportunity is preceded by a systematic search for available opportunities. Some researchers have challenged this approach, arguing that people do not search for opportunities, but, rather, happen to recognize the new value of new information which they happen to receive. Kirzner (1997) explains that: “What distinguishes discovery (relevant to hitherto unknown profit opportunities) from successful search (relevant to the deliberate production of information which one knew one had lacked) is that the former (unlike the latter) involves the surprise that accompanies the realization that one had overlooked something in fact readily available” (pp. 71-72). Shane (2000) reported that most entrepreneurs recognized, rather than sought the opportunities for their firms. Teach, Schwartz, and Tarpley (1989) found that firms founded on “accidentally” discovery venture ideas and which had not been subjected to formal screening achieved break-even sales faster than those firms that had undergone more formal search. Teach et al (1989) also found different styles of opportunity identification among the software firm presidents studied: only about half favored systematic approaches to searching for opportunities.

### 5.4 Networking

Hills et al (1997) indicate that entrepreneurs’ network are important to opportunity identification. They base their argument on Granovetter’s (1973) classic paper on the strength of weak ties, which argues that weak ties (including casual acquaintances) are “bridges” to information sources not necessarily contained within an individual’s strong-tie network (including friends and family). Granovetter (1973) argues that the casual acquaintance is more likely to provide unique information because most people have more weak ties than they have strong ties. A test of this hypothesis in a survey-based study allowed Hill et al (1997) to assert that entrepreneurs who have extended networks identify significantly more opportunities than do entrepreneurs who lack such networks. Hill et al also hypothesize that the quality of network contacts can affect other characteristics, such as alertness and creativity, which in turn lead to increased identification of opportunities.

### 5.5 Creativity

Schumpeter (1934) was the first to introduce the notion that successful entrepreneurs discover opportunities that others do not see due to a special attribute: creativity. Dimov (2003) seems to take for granted that creativity and entrepreneurship are similar if not the same. Argyis (1990) concluded that creative factors play a great role in entrepreneurial decision making. Hill et al (1997) report that 90 percent of those surveyed by them find creativity very important for the opportunity- identification process. There are numerous definitions of creativity; several researchers have made attempts to define entrepreneurial creativity. For the purpose of this article, the author uses

a definition provided by Ray and Cardozo (1996): “entrepreneurial creativity is an ability to rapidly recognize the associations between problems and their purported solutions by identification of non-obvious associations and/or by reshaping or reforming available resources in a non-obvious way” (p. 12).

## 6. Entrepreneurial Behavior and Technological Opportunities

Entrepreneurial behavior is spawned when environmental shifts create information asymmetries or gaps in an industry (Aldrich and Cliff, 2003). The ability to identify and exploit opportunities created by environmental shifts is therefore important to entrepreneurship (Covin and Selvin, 1997; Wiklund and Shepherd, 2003). Indeed firms that are able to spot opportunities have been found to be the most entrepreneurial (Salvato, 2004). A change in technology is a common trigger that spurs such environmental shifts (Aldrich and Cliff, 2003; Shane and Venkataraman, 2000). Accordingly, technological opportunities are often considered an important driver of entrepreneurship (Shane and Venkataraman, 2000) and therefore a firm’s ability to perceive technological opportunities in its environment may be a key factor that distinguishes the most entrepreneurial firms.

Technological opportunity refers to the degree to which firms perceive their industry to be rich in opportunities for innovation and breakthrough technologies (Zahra, 1996). Perceived technological opportunities refer to a firm’s ability to see opportunities for innovation and research and development within one’s industry. Being able to spot such technological opportunities is then expected to promote entrepreneurship. For example, in a study by Blake and Saleh (1995) it was suggested that firms operating in uncertain environments rich in opportunity had greater innovative activity than firms in more stable environments. When firms perceive their environment as opportunity rich, they should invest in building new capabilities and be proactive (Dess and Lumpkin, 2005). The ability to identify technological opportunities should therefore encourage a firm to more vigorously pursue entrepreneurial activities. Indeed, it has been shown that firms operating in environments perceived as being rich in technological opportunities are more likely to invest in entrepreneurship (Zahra, 1996; Zahra, et al., 2000).

In contrast, a lack of adaptation to environmental changes will transform core competencies into core rigidities (Leonard-Barton, 1992). Firms that are unable to see beyond their current customers and markets (Hamel and Prahalad, 1991) may fail to see the importance of entrepreneurship. Indeed, research has suggested that the opportunities present in an environment are important in predicting entrepreneurial activities (Shane and Venkataraman, 2000; Venkataraman, 1997). Without a mindset that can identify technological opportunities, the competitive exploitation and adaptation to one’s environment through entrepreneurship is unlikely. In the sections that follow, the author presents the different models of entrepreneurial opportunity identification.

## 7. Models of Opportunity Identification

### 7.1 Organizational Learning and Opportunity Identification

A quote from the organizational learning literature (e.g., Garvin, 1993) suggests the close link between opportunity identification and organizational learning: “New ideas are essential if learning is to take place. Sometimes they are created through flashes of insight or creativity; at other times they arrive from outside the organization or are communicated by knowledgeable insiders. Whatever their source, they are a trigger for organizational improvement” (Garvin, 1993, p. 81). Garvin’s statement is one of many that demonstrate how the qualities valued by learning organizations are similar to the elements of the opportunity-identification process. In particular, opportunity-identification involves the conversion of information into knowledge: ideas are generated and evaluated for their quality and viability in the same way that information is analyzed and combined to create knowledge (Nonaka, 1994). Framed in this way, the opportunity-identification process may be viewed as an example or type of organizational learning. In a formal sense, organizational learning is the ongoing process of acquiring and interpreting information that leads to the creation of new knowledge and ventures (Brown and Duguid, 1998; David and Botkin, 1994; Galunic and Rodan, 1998; Huber, 1991).

Similarly, the activity of acquiring and interpreting information is at the heart of the opportunity-identification process, and the result of both endeavors is an increase in knowledge and value to the firm. Just as the creative process involves the generation of new knowledge and new forms of expression, entrepreneurial opportunity identification is a learning process that initiates the creation of new wealth (Corbett, 2002; Dimov, 2003). The author concurs that the principles and practices of organizational learning can strengthen the opportunity-identification process. Given this assumption, the author now shows how the three related approaches to learning (behavioral, cognitive, and action) link to the two phases of opportunity identification (discovery and formation) (Lumpkin et al., 2004). Specifically, the shifts in mental constructs that occur in cognitive learning are indicative of the discovery phase of opportunity identification; behavioral learning is expressed in the evaluation and elaboration aspects of formation in opportunity identification; and action learning, in its ability to challenge underlying assumptions in a recursive way, creates a contextual openness that supports both the discovery and

formation phase of opportunity identification. Based on the three categorization of organizational learning, the author now shows how each of the categories of learning can increase innovation, creativity, and the identification of new venture opportunity:

#### 7.1.1 Opportunity Recognition through Cognitive Learning

As mentioned earlier, cognitive learning involves changes in individual and/or organizational patterns of cognition, and shifts in the way knowledge is transferred within the organizational system (Glynn et al., 1994). To the extent that these changes generate new products or open up new markets, cognitive learning is a source of opportunity identification for new ventures creation. In most cases, cognitive learning in entrepreneurial companies occurs as a type of transformational capacity (Garud and Nayyar, 1994), that is, the ability to redefine the meaning and value of currently existing ideas or resources into a new economic opportunity for the firm. This redefinition can occur in at least two ways: through a transformation of currently existing resources into new products, or through a reinterpretation of internal processes such that more information and knowledge can be generated. For example, cognitive learning is exemplified by two employees at Patterson Fan Company who created an unusual-looking grill out of spare parts from the industrial fans being manufactured in the South Carolina plant (Rosenwein, 2001). By cognitively reframing the use (meaning) of the flared fan parts, these industrious employees developed a unique design that allowed for greater heat circulation while maintaining cooler unit temperatures than standard grills. CEO Vance Patterson patented the grill in his name and the names of the two inventors, and the spin-off company—Down South, Inc.—represents a new opportunity in the form of a unique product in a new market for the corporation. In this way, cognitive learning in product design and the creation of a new organization led to new opportunity for the venture.

#### 7.1.2 Behavioral Learning and Opportunity Identification

Behavioral learning is primarily adaptive, focusing on the modification of routines and structures in the face of experience. “The classic prediction is that success yields stability in routine functioning, while failure produces change” (Glynn et al., 1994, p. 46). Yet as Feldman (2000) shows, routine may be more mutable than previously thought. Similarly, one of the benefits of newness is flexibility, the capacity to change direction by altering even core properties of the organization (Lichtenstein, 2000). In this sense, behavioral learning can spark new opportunities for new ventures in at least two ways—through modifications of routines that create unexpected extensions to a firm’s offerings, and through an ongoing stream of organization-wide adaptations that can lead to unexpected synergies and marketable solutions.

The story of Philadelphia Pharmacy exemplifies how a serendipitous change in routines can generate unexpected strategic opportunity (Petzinger, 1999). One day, its founder, Leon Ost, found an assistant writing out a prescription by hand, rather than using the computer-generated labeling system. To his surprise, Ost found that the assistant was writing the personalized label in Spanish, as she often did for the neighborhood’s Hispanic population. Rather than berating her for circumventing standard operating procedures, Ost leveraged this knowledge into a change in routines by translating every computer-generated prescription into Spanish, thus opening up the market for a huge local clientele. Then following a rapid influx of Vietnamese residents into the neighborhood, he added a third language to the computer program. These adaptive actions brought him even more recognition, and within a few years, Philadelphia Pharmacy was doing four times more business per square foot than the average American drugstore (Petzinger, 1999). In this way, incremental adaptations can result in the creation of new opportunities through expanded markets and more valuable product offerings.

#### 7.1.3 Action Learning and Opportunity Identification

The third mode of change, action learning, creates the potential for new opportunities by transforming the context within which new ideas can emerge. By focusing on the underlying norms of the organization and questioning whether the rules of engagement are appropriate, action learning can create a culture of openness, effectiveness, and creativity (Argyris, 1990). This broadening awareness can increase individuals’ connection between espoused theory and theory-in-use (Schon, 1983), setting up conditions for increased discovery and more refined evaluation and enactment of ideas. The first outcome of action learning—agreeing to new rules of engagement that free individuals to speak honestly and act with fewer defenses—can transform an organization’s ability to innovate and excel. Such a second-order transformation was enacted in The Natural Step, an entrepreneurial organization that has significantly advanced the movement toward environmental sustainability in Sweden and the United States (Bradbury and Clair, 1999). The organization’s CEO wanted to develop scientific guidelines for sustainability that could be understood by non-scientists and applied in business. However, given the prevailing industrial-age assumption the environmental and economic gains are mutually exclusive (Shrivastava, 1995), he recognized that conventional decision-making approaches would be inappropriate. Instead he enacted a double-loop action

learning model; a form of thinking that goes beyond solution-seeking to reconceive the very foundation of one's problem, such that entirely new solutions may emerge (Hawken, 1993).

Through a highly iterative process of collaborative dialogue, a consensus document emerged that was endorsed by 50 of the top scientists in Sweden, and, at the same time, was clearly understandable to public firms in education, politics, and business. Soon a network of business leaders and others, encouraged by the king of Sweden, provided funding to disseminate the colorful booklet and audiotape to the entire population of Sweden. In addition, several of the supporting businesses including IKEA, Scandic Hotels, and Electrolux have led the country in developing highly innovative products that are ecologically sustainable and commercially successful. By shifting the rules of engagement, a learning-based context was generated that secured the organizational success of The Natural Step and, at the same time, transformed the society in which the organization exists (Bradbury and Clair, 1999). In sum, each of these categories of learning—cognitive, behavioral, and action—has been successfully utilized to create new and unexpected opportunities with great success.

### *7.2 Social Capital Model of Opportunity Identification*

Although there is much interest in and research on the concept of social capital, the concept is still in an emerging phase, comprising different uses and connotations from various scholarly perspectives (Alder and Kwon, 2002; Hirsch and Levin, 1999). Consequently, it is important for researchers to clarify their approach to and definition of social capital. Social scientists have described two forms of social capital: bonding and bridging. The bonding social capital perspective explores the impact of a collective's internal ties and the substance of the network relationships within that collective (Alder and Kwon, 2002). For example, Coleman (1988) suggests that dense connections between parties within a group facilitate the development of self-enforcing norms and trust within a collective allowing the group to more easily attain communal goals.

Alternatively, bridging social capital, sometimes referred to as the private-goods model of social capital, focuses on individuals and their network relationship (Alder and Kwon, 2002; Burt, 1997). Compared with the bonding social capital approach, the bridging social capital's focus is on an individual's external social ties and how the social capital, as a resource within this network, is used for the individual's private benefit. Social capital assists in the explanation of individuals' success as they can utilize their contacts and connections and the resources that they bring for personal gain (Alder and Kwon, 2002; Leanna and Van Buaren, 1999). For example, Burt (1992) characterizes social capital as a resource that brings a higher rate of return on investments. He suggests that social capital creates an advantage in the way in which social structure renders competition imperfect by creating entrepreneurial opportunities for certain players and not for others. Indeed, both the entrepreneurship (Uzzi, 1996; Walker, Kogut, and Shan, 1997) and social capital literature (Alder and Kwon, 2002; Nahapiet and Ghoshal, 1998) have emphasized the importance of connections and networks to the establishment of new ventures and innovation in general.

Consistent with the literature on how entrepreneurs use network connections for competitive advantage (Aldrich and Zimmer, 1986), this author takes the bridging approach to social capital, that is, social capital manifested through the individual's external connections. In doing so, the author suggests that in the context of entrepreneurship, social capital is the goodwill and resources that emanate from an individual's network of social relationships, and its effects flow from the information, influence, and solidarity available to the entrepreneur (Alder and Kwon, 2002). Two direct benefits of this type of social capital are relevant to entrepreneurs: information and influence. Social capital may facilitate access to information, which is a critical component of entrepreneurial opportunities (Shane and Venkataraman, 2000). Social capital enhances the timing, relevance, and quality of information (Alder and Kwon, 2002; Burt, 1992). For example, entrepreneurs with access to university professors either directly or through association may find out about an emerging technology before others. Thus, they may be poised to act upon this before it becomes public knowledge. Another benefit of social capital consists of influence. Individuals accumulate obligations from others in the network and leverage these commitments at a later time. Burt (1992) has discussed the influence and power that entrepreneurs who span disconnected networks have. These entrepreneurs determine who will gain from the disconnection, locating them in a favorable position during negotiation.

#### *7.2.1 The Dimensions of Social Capital*

While traditionally, scholars have studied social capital as a uni-dimensional concept (e.g., Burt, 1992; Coleman, 1988; Walker et al., 1997), increasingly, researchers are adopting a multi-dimensional perspective of social capital (e.g., Lesser, 2000; Nahapiet and Ghoshal, 1998). In this paper, the author adopts Nahapiet and Ghoshal's (1998) three dimensions of social capital: structural dimension, relationship dimension, and cognitive dimension.

**Structural Dimension.** The structural dimension refers to the network structure's overall pattern of connection between actors (Nahapiet and Ghoshal, 1998). Most notably, network structure includes such factors as the

existence or absence of direct connections between a focal actor and others, and the pattern and number of indirect ties between a focal actor and others (Burt, 1992). For instance, Burt (1992) suggests that a structural hole is said to exist when different clusters of interconnected actors are only sparsely connected to one another. Consequently, any individual who holds the only or one of the few connecting position(s) between the two clusters is able to capitalize on information that exists in one cluster but not in another by acting as a broker for nonredundant information. Burt (1992, 1997) suggests that entrepreneurs will act as *tertius gaudens*—the third who benefits through leveraging the nonredundant information for profit.

**Relational Dimension.** While the structural dimension refers to the overall pattern of network connections, the relationship dimension refers to the nature of the personal relationship that develops between specific people (Nahapiet and Ghoshal, 1998) as manifested in strong versus weak ties. The strength of a tie is a reflection of the combination of the amount of time, emotional intensity, intimacy, and reciprocal services that characterize that tie (Granovetter, 1985). Strong ties are typically associated with trust and facilitate the flow of fine-grained information (Gulati, 1998; Rowley, Behrens, and Krackhardt, 2000) and the transfer of tacit knowledge (Uzzi, 1996). While many factors make a tie weak or strong, trust plays a pivotal role (Granovetter, 1985; Uzzi, 1999). Trust has been conceptualized as a willingness to be vulnerable—placing one's welfare in the hands of others—and a feeling of positive expectations—an individual's confident beliefs that another will behave in a beneficial manner (Rousseau, Sitkin, Burt, and Camerer, 1998). Being embedded in a network gives rise to a form of trust known as relational trust (Nahapiet and Ghoshal, 1998). Relational trust refers to a trustor's confident beliefs that the trustee will act beneficially because the trustee cares about the trustor's welfare (Rousseau et al., 1998) which emerges from repeated interactions between individuals over time that yield feelings of reliability and positive expectations. Relational trust is based on continual reciprocity—the notion that "I'll do this for you now, but you will do something for me later" (Adler and Kwon, 2002; Lesser, 2000).

**Cognitive Dimension.** The cognitive dimension of social capital refers to "shared representations, interpretations, and systems of meaning among parties" (Nahapiet and Ghoshal, 1998, p. 244) that enable individuals within a network to make sense of information and to classify it into categories (Augoustinos and Walker, 1995). Shared systems of meanings and language facilitate the exchange of information, learning and knowledge creation that allows individuals to share each other's thinking processes. These common ways of looking at the world help individuals to make sense of new information and knowledge (Grant, 1996; Nonaka, 1994).

### *7.3 Creativity-Based Model of Entrepreneurial Opportunity Identification*

Opportunity identification—one of the central ideas of entrepreneurship—is the ability to identify a good idea and transform it into a business concept that adds value and generates revenues. Bygrave and Hofer (1991) define an entrepreneur as one who recognizes an opportunity and creates an organization to pursue it. Shane and Venkataraman (2000) argued that the discovery, evaluation, and exploitation of opportunities is a defining feature of the field of entrepreneurship. Recently, a model of the opportunity-identification process has been proposed that builds on the idea of discovery and evaluation (Lumpkin, Hills, and Shrader, 2004). Based on a classic psychological theory of creativity (Csikszentmihalyi, 1996), the model depicts opportunity identification as a staged process that involves a discovery phase consisting of preparation, incubation, and insight, and a formation phase consisting of evaluation and elaboration. A key feature of this general model of opportunity identification is its recursive nature. Opportunity identification is not limited to a singular "aha" experience; it is an iterative process through which insights are contemplated, new information is collected and considered, and knowledge is created over time. In this way an idea for a business must be formed into an opportunity that adds value to the firm (Timmons, 1994).

Proponents of this perspective argue that a creativity-based model of opportunity identification is well suited for entrepreneur opportunity identification for several reasons. First, entrepreneurship is an emergent process especially at its earliest stages. The recursive nature of creativity parallels the back-and-forth activities that entrepreneurs often engage in when trying to grasp an emerging business concept (Sarasvathy, 2001). Second, the model is distinguished from other models of creativity in the organization literature because it is used principally to describe an individual-level activity whereas other creativity-based approaches typically address the use of group-level creativity techniques in the context of established organization (Woodman, Sawyer, and Griffin, 1993). Based on the analysis of the above models, researchers have derived five stages of the opportunity-identification process. The author presents these stages in order.

## **8. The Five Stages of Opportunity Identification**

Several scholars have endeavored to characterize the opportunity-identification process (e.g., Fiet, 2002; Shane, 2003). Some opportunity models depict opportunity identification as a staged process (e.g., Bhawe, 1994) where

the outcome of the process is defined as “recognition” (Christensen, Masden, and Peterson, 1989). Most scholarly attempts to model opportunity identification have characterized it as the confluence of many factors such as the background of the entrepreneur and the influence of the business and general environment (Gaglio and Taub, 1992). In a synthesis of these perspectives, Hill et al. (1997) and Lumpkin et al. (2004) proposed a model suggesting that a “stages of creativity” framework (Csikszentmihalyi, 1996) provides the necessary elements for modeling opportunity identification. These stages include: (1) preparation; (2) incubation; (3) insight, which form the discovery phase; (4) evaluation; and (5) elaboration, which constitute the formation phase. In the subsections that follow, each of these five elements is discussed in terms of how it relates to the opportunity-identification process.

### 8.1 Preparation

Previous research suggests that preparation and prior knowledge are essential to the opportunity-identification process (e.g., Shane, 2000). Preparation refers to the experience and knowledge that precedes the opportunity-discovery process (Kao, 1989). Such preparation is typically a conscious effort to develop expertise in a domain and develop a sensitivity to the issues and problems in a field of interest (Csikszentmihalyi, 1996). But preparation also includes knowledge and experience that is gathered unintentionally, that is, without aiming to discover opportunities. In an organizational setting, the ideas that result in successful venturing often emerge incrementally from the firm’s background, current line of product or services, or technological knowledge. However, individuals may bring new ideas and skills to a firm that result in new ventures.

### 8.2 Incubation

Incubation refers to the part of the opportunity-identification process in which entrepreneurs or an entrepreneurial team contemplates an idea or a specific problem. It does not, however, refer to conscious problem-solving or systematic analysis. Rather, Csikszentmihalyi argues that during incubation, “ideas churn around below the threshold of consciousness” (1996, p. 79). Thus, incubation is typically an intuitive, non-directional style of considering various possibilities or options. Gaglio and Taub (1992) described incubation as the period when the “pre-identification stew” is “simmering.” It is the part of the opportunity-identification process in which the new combinations that Schumpeter (1934) envisioned might emerge (Ward, 2004).

### 8.3 Insight

Insight refers to the “eureka” moment or “aha” experience. Whereas incubation refers to an ongoing process, insight refers to a moment of identification (Csikszentmihalyi, 1996). In many cases, it is the point at which a whole answer or core solution springs into awareness suddenly and unexpectedly. This sudden convergence is the result of a cognitive shift that existing means-ends relationship (Gaglio and Katz, 2001). Insights may provide sweeping catalysts to new venture creation or uncover incremental knowledge that advances an ongoing discovery process. It is unlikely that an insight is a singular “event”; insights often occur recursively throughout the opportunity-identification process (de Koning, 1999). Entrepreneurial insights typically consist of either the sudden recognition of a business opportunity, the solution to a well-considered problem, or the acquisition of an idea from colleagues, friends, or other associate.

### 8.4 Evaluation

Evaluation signals the start of the second phase of the opportunity-identification process---formation. It involves analyzing whether concepts developed in the discovery phase are workable, whether the entrepreneur has the necessary skills to accomplish it, and whether it is truly a novel enough idea to pursue. In the context of entrepreneurial opportunity-identification, evaluation may involve feasibility analysis wherein ideas are put to the test via various forms of investigation such as preliminary market testing, financial viability analysis and/or feedback from business associates and others in one’s social network (Bhave, 1994; Singh et al., 1999). Evaluation also involves an internal process in which the entrepreneur(s) must question the prospects for the new insight and risk, “Is the business concept sufficiently valuable and worthwhile to pursue?” (Csikszentmihalyi, 1996).

### 8.5 Elaboration

In the context of entrepreneurial creativity, elaboration involves “capturing value from the creative act” (Kao, 1989, p. 17). In contrast to the confidence- seeking aspects of evaluation, elaboration involves legitimacy seeking: forming the business into a viable opportunity by subjecting it to external scrutiny and building its support system. Elaboration is typically the most time-consuming part of the process since it represents the relatively more tedious work of selecting options, finalizing choices, and organizing resources (Csikszentmihalyi, 1996). Assuming the business idea is still considered viable after the evaluation process, elaboration may involve detailed planning activities to reduce uncertainty. The elaboration process itself, however, often reveals aspects of the business concept that need attention or more careful analysis and thus may result in further evaluation (Aldrich, 1999). The



author now turns to the pattern identification perspective of opportunity identification and its application to the entrepreneurial opportunity-identification process.

### **9. Pattern Identification Model and the Opportunity Identification Process**

One topic long investigated by cognitive science that may be closely related to the identification of new business opportunities, and to the cognitive events and processes that lead to such identification, is pattern identification—the process through which individuals identify meaningful patterns in complex arrays of events or trends (Matlin, 2005). Applying pattern identification to the identification of business opportunities, it seems possible that specific persons identify opportunities for new ventures because they perceive connections between apparently independent events (e.g., advances in technology, changes in markets, shifts in government policies, to mention a few possibilities), and then detect meaningful patterns in these connections—patterns that point to new business opportunities.

An aspect of the theory of pattern identification with important implications for understanding opportunity identification is the suggestion that cognitive frameworks, developed through individuals' unique life experiences, play a crucial role in pattern identification. Theory of pattern identification suggests that these cognitive frameworks serve as template (patterns or guides), assisting specific persons to identify connections between apparently independent events and trends and to detect meaningful patterns in these connections. This aspect of pattern identification theory suggests an intriguing explanation of the fact that particular business opportunities are identified by specific persons but not by others. Briefly the persons who recognize specific opportunities may do so because they possess relevant cognitive framework that help them accomplish this task—frameworks that enable them to perceive the emergent patterns in technological, economic, and social changes that underlie many new business opportunities. In the sections that follow, the author put forth an analysis of two types of pattern identification perspectives and their application to the opportunity-identification process. He begins the prototype model.

#### *9.1 Prototype Theory: A cognitive Model of Pattern Identification*

While several different theories of pattern exist, one that is supported by a large body of evidence (e.g., Hahn and Chatter 1997) and that appears to offer important insights into the nature of opportunity identification, is known prototype theory (e.g., Whittlesea, 1997). This theory suggests that through experience, individuals acquire prototypes, cognitive frameworks representing the most typical member of a category—the instance of that category best capturing its essential meaning or nature. Prototype model of pattern identification further suggests that as individuals encounter new events or objects, their existing prototypes play an important role in the perception of these events or objects and in the detection of connections between them. In essence, prototypes serve as templates, assisting the persons who possess them to notice links between diverse events or trends and perceive identifiable, meaningful patterns in these connections. In part, this process involves comparison of new events or objects with existing prototypes. If the match is not close, these events or objects are identified as fitting within the prototype. If, instead, the match is not close, the events or objects are not perceived as fitting within this cognitive framework. For example, consider the prototype for “car,” one cognitive framework most persons possess. This framework is broad enough so that everything from a huge limousine or sports utility vehicle (SUV) to a small sports car can be recognized as a “car,” while other objects used for transportation not match this prototype will (e.g., motorcycles, scooters, bicycles) be excluded.

Applying prototype model to opportunity identification, research suggests that entrepreneurs engage in an analogous process with respect to identifying new business opportunities. Specifically, they compare ideas for new products, services, means of production, or markets with their existing prototype for “business opportunity” (Shane, 2003). The closer the match, the more likely they are to conclude that they have identified a potential business opportunities. The theory of pattern identification further suggests that the cognitive frameworks (i.e., prototypes) playing a role in this process change in several respects with increasing experience (Knowlton, 1997; Nosofsky and Palmeri, 1998). Among these changes, however, are three that have received considerable emphasis—shifts in clarity, richness of content, and degree of focus on key attributes of the content domain. It can be reasoned that changes in these respects would be visible in the business opportunity prototype of novice and experienced entrepreneurs.

In other words, reflecting differences in their experience as entrepreneurs, the “business opportunity” prototypes of the two groups would differ in several respects. It can also be reasoned that to the extent such differences were found to exist, this would provide evidence for the role of pattern identification in the identification of new business opportunities. With respect to clarity, previous research on prototype (Matlin, 2005) indicates that these cognitive frameworks become more clearly defined with increasing experiences. One index of such clarity is the degree to which the prototypes of different individuals converge on the same set of basic dimensions—in other words, the

extent to which the prototypes possessed by different persons agree on basic attributes. For example, when automobiles were a new product, different individuals might well have included different attributes in their prototypes for this new method of transportation. As experience with automobile increased, however, these prototypes would be expected to show increasing agreement on basic attributes (e.g., all automobiles are self-propelled, have a system for steering, a separate system for stopping, etc.) Agreement with respect to basic dimensions is generally interpreted as one indicator of increased prototype clarity (Knowlton, 1997).

Similarly, applying prototype models to opportunity identification, entrepreneurs may use prototypes as a means for identifying patterns among seemingly unrelated events or trends. For instance, consider a physician engaged in medical research. Because of extensive on-the-job experience, this individual has a clearly developed prototype for “effective treatment” of various diseases (e.g., the treatment is safe, it can be used ethically with patients, it enhances recovery from the illness, etc). Furthermore, this prototype may be especially clear for illness in which the physician specializes—ones which she or he has had considerable experience. Now, imagine that this physician reads an article about a new advance in scientific knowledge concerning some basic physiological process—a process that is suspected to play a role in certain diseases. In addition, the physician knows from actual experience that existing treatments for these diseases have major side effects. Using her prototypes of “effective treatment” and perhaps other prototypes as well (e.g., prototypes concerning the nature of a given disease and how it develops), she now recognizes potential links between the new scientific advance and potential treatments for a specific illness. In other words, her prototypes help her to perceive an emergent pattern in these perceived links are confirmed, this will suggest ways of developing new drugs effective in treating this illness. In short, she has noticed this possibility (this opportunity) because prototypes she possesses have helped her to do so—to notice an emergent pattern among seemingly diverse and independent events. Much evidence suggests that individuals do indeed form prototype and that once they exist, these cognitive frameworks are employed in many ways. For instance, individuals often use them for perceiving patterns in diverse and seemingly unrelated events or trend. (Whitesea, 1997). Used in this manner, prototypes may well play an important role in opportunity identification.

### *9.2 Exemplar Model*

Another model of pattern identification emphasizes the importance of specific knowledge rather than idealized prototypes. Such exemplar models suggest that an individual encounter new events or stimuli, they compare them with specific examples (exemplars) (Hahn and Chater, 1997). For instance, physician’s concept of effective treatment for a given disease would not consist solely of an idealized representation of the most typical effective treatment she or he can imagine (a prototype); rather, it would also include numerous examples of effective treatments the physician has actually encountered, exemplars that vary in many respects (e.g., exemplars of excellent treatments with few negative side effects and exemplars of very poor ones that are not highly effective and that do involve negative side effects). Exemplar models seem especially relevant to opportunity identification because they do not require the construction of prototypes. Rather, individuals simply compare newly encounter events or stimuli with examples of a given concept already present in memory. This fits well with entrepreneurs’ reports that they just know a good opportunity when they see it, and do not have to engage in complex processing to reach this conclusion (as would be required for the development of prototypes). Moreover, exemplar models fit with recent findings indicating that experienced, repeated entrepreneurs generally search for opportunities in areas or industries where they are already knowledgeable—where, in short, they have many exemplars stored in memory (Feit et al, 2004).

Overall, research in cognitive science suggests that both prototype and exemplar models may be necessary to fully understand how individuals notice emergent patterns in diverse and apparently unrelated events or changes (Nosofsky and Palmeri, 1998). For example, some findings suggest that initially, before they gain expertise in a specific area, individuals may rely on prototypes and on comparing newly encountered stimuli and events with these idealized representations. As they gain experience in a given domain, however, they may shift to greater reliance on exemplars, which allows them to perform the process of identifying complex patterns (Johnson and Mervis, 1997). Furthermore and perhaps even more intriguing, it appears that prototypes and exemplars may be represented (and processed) in different regions of the brain. Specifically, prototypes appear to be stored and processed in the left cerebral hemisphere while exemplars are stored and processed in the right cerebral hemisphere (Gazzaniga, Ivry, and Mangun, 1998). Together, these findings suggest that opportunity identification may well involve both prototype and exemplars. In addition, other cognitive frameworks may also be involved (e.g., schemas) (Gaglio and Katz, 2001).

### *9.3 Opportunity Identification and the Search for Patterns*

Thus far, the analysis seems to suggest that opportunity identification occurs in a single step: entrepreneurs observe various events or changes, and upon examining them, recognize links or connections between them that then suggest

new business opportunities. While this may be true in some stances, basic research on pattern recognition suggests that often the process is one involving many steps and repeated efforts to identify emergent patterns (Gaglio and Katz, 2001). Initially, individuals may notice that two or more variables are related, but this in itself does not yield a clear-cut pattern. Rather, it may only suggest that there is “something there,” and that additional information is required to examine it more closely. As this input is obtained, the overall pattern may begin to take shape, and the possibility of a new business opportunity to emerge. For instance, consider how Expedia.com and other online travel services were developed. A number of changes and events paved the way for this opportunity: a huge increase in the number of individuals who owned personal computers; development of software that could track literally thousands of flights and provide information on thousands of hotel; plus techniques for conducting secure financial transactions over the Internet. Did the founders of companies such as Expedia.com notice, in a single step, that these events and trends formed a pattern suggestive of a new business opportunity? Not at all. Rather, this idea took shape in a more gradual manner, the entrepreneurs recognizing first one portion of the overall pattern and then another. For instance, early on, they recognized that people were dissatisfied with making airline reservations by phone and that this could be handled faster and more efficiently online. They also noted that many people were unhappy about huge variations in ticket prices; for instance, the person sitting next to them on a given flight might have paid much less than they did. This suggested the possibility of offering customers the lowest possible prices when they made reservation online. Later, the entrepreneurs realized that many travelers needed hotel and car reservations, too, so they expanded the scope of their business to include the aspects of travel. It is probably reasonable to say that they did not, during early stages, have a fully-formed vision of the business they actually developed. Rather, it unfolded one step at a time as they gradually perceived more connections between the relevant factors and ways in which these could be used to develop a profitable business.

In many cases, this is precisely how new ventures take form; their founders do not initially identify all aspects of an opportunity. Rather, they notice some aspects and proceed with these. Then, they obtain experience and information, their view of the opportunity is expanded and refined. In a sense, the process is never completed; rather it evolves just as growing business do. The idea that opportunity identification often develops in a gradual manner is consistent with the fact that venture capitalist rarely expect new ventures to take precisely the form presented in business plans. On the contrary, they realize that opportunities—even very good ones—will almost certainly develop in new and initially unforeseen ways. Reflecting this fact, venture capitalists value very highly founders’ abilities to adapt and change, and often seek entrepreneurs who demonstrate these characteristics.

Overall, then, it should be emphasized that the process of opportunity identification is not a simple one in which entrepreneurs perceive all links between relevant variables at once and start with a fully-formed idea of the opportunities they will ultimately pursue. Rather, during early stages, (and perhaps later ones, too), opportunity identification involves repeated steps in which entrepreneurs perceive the opportunities they are developing with increasing clarity, and adjust their business models and goals to reflect these changes. That said, it is important to note that the process of searching for connections between various changes and trends in the external world, identifying emergent patterns in these connections, and then using such patterns as the basis for identifying new business opportunities, remains essentially the same. In short, while opportunity identification does indeed often involve repeated efforts to identify patterns in seemingly independent events or trends, the search for these patterns remains an essential part of the process well beyond the point at which new ventures are actually launched.

Furthermore, several lines of evidence suggest that pattern identification may indeed play a key role in opportunity identification. First, it is clear that many opportunities exist for years before they are noticed and developed. For instance, consider wheeled luggage of the type that is now in used by a large majority of all air travelers. Such luggage was used for decades by air flight crews before it was introduced into the market for general sale. Why? Perhaps because no one spots the patterns between several pertinent trends: a large increase in the number of passengers, growing problems with checked luggage, expansion in the size of airports, and so on. Once these trends were seen as connected, the benefits of wheeled luggage become apparent, and this product soon came to dominate the market. Second, there is a large body of evidence in cognitive science suggesting that pattern identification is a basic aspect of our efforts to understand the world around us. That is, we do indeed expend considerable effort searching for patterns among various events or trends in the extended world (Matlin and Foley, 1997). To the extent that opportunity identification also involves perceiving links or connections between seemingly independent events or trends, it may be closely related to this basic perceptual process.

Finally, research points to the conclusion that pattern identification is indeed closely related to opportunity recognition by entrepreneurs. For instance, in one revealing study, experienced entrepreneurs were asked to describe the process involved in the identification of the opportunities they pursued (Fiet, Clouse, and Norton, 2004). Findings indicate that these highly experienced entrepreneurs uniformly mentioned engaging in an active search,

and also in restricting these searches for opportunities to areas in which they already possessed considerable knowledge. In other words, they reported engaging in a process very similar to that involved in pattern identification—a process in which they employed their existing cognitive frameworks and knowledge to notice connections between diverse events and trends. Indeed, many stated explicitly that they had identified opportunities by combining a number of external factors into a meaningful pattern. Finding such as these suggest that pattern identification may indeed play an important role in the identification of new business opportunities.

## **10. Discussion**

At this point, it should be noted that three factors—search for opportunities, alertness, and prior knowledge—may be interrelated. For instance, it appears that when alertness is very high, active searches for opportunities may not be necessary; entrepreneurs are so sensitive to them that they do not have to engage in formal, systematic search processes. Similarly, high levels of prior knowledge may reduce the necessity for active searches. A cognitive perspective can readily explain these relationships. Within this perspective, high alertness implies well-developed cognitive frameworks useful for perceiving meaningful patterns in diverse events or trends. To the extent these frameworks exist, an active search for opportunities may not be necessary because such frameworks permit highly efficient interpretation and processing of new information. Similarly, a large store of prior knowledge may contribute to the formation of broad and richly-connected cognitive frameworks, again, rendering participation in formal search activities less crucial. In short, yet another advantage of a pattern recognition perspective is that it can help explain interrelationships between searches, alertness, and prior knowledge, thus clarifying the effects of these three important factors.

Two additional points are also worth noting. First, in addition to search, alertness, and prior knowledge, another factor—the breadth of entrepreneurs' social networks—has recently received growing attention, and also appears to play an important role in opportunity identification. Specifically, the findings by (Hills, Lumpkin, and Singh, 1997) indicate that the broader entrepreneurs' social networks (the more people they know and with whom they have relationships), the more opportunities they identify. This finding, too, is consistent with a pattern identification perspective. Social networks are an important source of information for entrepreneurs, information that may contribute to the richness of their store of knowledge and the development of their cognitive frameworks. Further, social networks may be especially helpful to entrepreneurs in terms of honing or refining these frameworks (prototypes). For instance, by discussing opportunities they have identified with family, friends, and others, entrepreneurs may form more accurate and useful prototypes for identifying opportunities—cognitive frameworks helpful in determining whether ideas for new products or services are practical and potentially valuable rather than merely interesting or novel. In short, the benefits of an extended social network, too, can be understood within a pattern-identification framework.

However, not all patterns connecting diverse events, changes, or trends perceived by entrepreneurs serve as the basis for founding new ventures. Such patterns lead to new ventures only when they suggest new products or services that seem, on initial examination, to be feasible. If emergent patterns do not point to products or services that appear to be feasible, they will often be discarded by current or potential entrepreneurs.

In sum, the factors that have been found to play important roles in opportunity recognition by entrepreneurs are searches, alertness, and prior knowledge. These factors and others can all be understood within the context of pattern identification. Integrating them in this manner provides increased insight into the basic nature of opportunity identification. Moreover, understanding the effects of these variables within a single framework suggests practical steps for enhancing entrepreneurs' ability to identify opportunities. Since assisting entrepreneurs in every way possible is a key goal of entrepreneurship, this appears to be a very beneficial outcome.

## **11. Implications for Entrepreneurial Practice**

Three entrepreneurial implications are drawn from the analysis of the role of pattern identification in the opportunity-identification process in this paper. First, the pattern identification perspective offered here suggests that individuals can be trained to be more proficient at identifying opportunities by teaching them not merely to be alert to opportunities or to search actively for them, but rather, to search in the best places and in the best ways. Specifically, they should focus their efforts on identifying changes in technology, demographics, markets, and other pertinent factors that play an important role in the success of almost any business. Second, while engaging in such searches, they should also focus on actively seeking to identify ways in which these trends and changes are linked or connected; in other words, they should search for emergent patterns. The framework offered here suggests that identifying such patterns is often a key initial step in the process of identifying new business opportunities. Can individuals really learn to notice such patterns? Research on pattern identification and recent research in the field of entrepreneurship suggests they can (Fiet and Migliore, 2001). When individuals focus their attention on pertinent

factors and also attempt to perceive ways in which these may be related, the likelihood that they will perceive emergent pattern is increased.

This, in turn, suggests that the likelihood that current or would-be entrepreneurs will identify opportunities in specific domains (industries, markets, etc.) can be increased by training them to focus on the most relevant factors and to search for connection between these variables or changes. Consider an entrepreneur with strong interests in the restaurant business. The individual might be encouraged to focus on such factors as changing technology (e.g., technology that assist in food preparation or storage), changing demographics (which might indicate that certain kinds of restaurants serving specific kinds of food will be more likely to thrive than others), and shift in government policies concerning safety and working conditions. Through careful attention to these and other relevant sources of information, the would-be entrepreneur might realize that opportunities for certain kinds of restaurants are now emerging—for instance, restaurants that cater to the needs and preferences of senior citizens or those growing ethnic minorities. In the absence of careful attention to relevant changes and trends, these opportunities might not be readily discernable.

Third, a pattern recognition perspective also suggests that opportunity identification can be enhanced by providing potential entrepreneurs with a very broad range of experience. The broader this experience (e.g., the wider the range of positions held, the greater the number of different industries) the richer will be the prototypes at their disposal, and hence, the more likely the entrepreneurs will be to perceive connections between seemingly unrelated events or trends—especially connections that are not immediately apparent to any casual observer. Research findings offer support for this possibility: entrepreneurs with greater experience and knowledge have been found to be more effective at identifying opportunities than those with less experience and knowledge (Shepherd and De Tienne, 2001).

## 12. Concluding Remarks

New ventures offer fertile ground for the best practices that are emerging from pattern identification and opportunity-identification research to take root and grow. Chances for both short-term survival and long-term success, the author believes, will be enhanced if entrepreneurs adopt pattern identification practices. The ability to identify patterns may provide a key advantage by which entrepreneurs can remain viable and competitive in today's ever-changing environments. Future research should expand on these insights and endeavor to empirically test how pattern identification methods might best be integrated into venture creation and growth processes so that pattern identification and other opportunity identification processes become essential elements of an entrepreneur's strategy and culture. It is therefore the hope of the author that by providing these perceptions, entrepreneurs will be supported in generating more opportunities and enact them in ways that expand the capabilities of their firms and themselves. The author also hopes that this paper will spur a program of research that will enrich the conceptual foundations of opportunity identification and evaluation based on a pattern-identification approach. The end goal, of course, would be that entrepreneurs have a better-developed body of knowledge from which to draw in order to effectively and efficiently make decisions.

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