

A 2x2 Conceptual Foundation for Entrepreneurial Discovery Theory

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Patrick J. Murphy
Kellstadt GSB / DePaul University

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Theories about entrepreneurial discovery are important to entrepreneurship. However, the dominant conceptual foundation underlying such theories hinders their development. It assumes that opportunities form based on either deliberate search or serendipitous discovery. I examine this unidimensional logic and identify a gap in its informative content. Then, I reframe it into orthogonal dimensions. The multidimensional model describes the same cases as the unidimensional model but also describes what the unidimensional model cannot, including cases that are high or low on both dimensions. This extension yields a 2x2 conceptual foundation for entrepreneurial discovery theory that promotes the development and coordination of distinct theoretic streams.

Entrepreneurship research examines the process of how entrepreneurs pursue and undertake the introduction of new products, services, and other market offerings. The process begins with the formation of entrepreneurial opportunities, which are temporal and spatial convergences of various resources instrumental to introducing market offerings with potential for generating financial capital or other kinds of positive value (Casson, 1982; Drucker, 1985: 111; Murphy, Liao, & Welsch, 2006; Shane & Venkataraman, 2000). Although an organized venture is the most common means to undertake entrepreneurship and generate value from an opportunity, an opportunity requires neither the foundation of a new firm nor the involvement of the same individuals over time (Eckhardt & Shane, 2003).

Explaining the formation of opportunities is vital to entrepreneurship research (Alvarez & Barney, 2007; Baron, 2008; Venkataraman, 1997). Yet, there is ambiguity about the ontological status of opportunities in entrepreneurship theory and debate about their role in the entrepreneurial process (Alvarez & Barney, 2008; Ardichvili, Cardozo, & Ray, 2003; Corbett, 2007; Davidsson, 2003; de Koning, 2003; Eckhardt & Shane, 2003; Ireland, Reutzell, & Webb, 2005; Klein, 2008; McMullan & Shepherd, 2006). Despite an assumption among most studies that “to have entrepreneurship, you must first have opportunities” (Shane & Venkataraman, 2000), there is no distinct conceptual foundation - a substructure beneath the theories - that

effectively embeds this unique assumption into the diverse body of research that constitutes the entrepreneurship area.

Without a conceptual foundation, the findings of an area's theory-driven studies are hard-pressed to relate to one another (Sutton & Staw, 1995; Weick, 1999). Currently, most entrepreneurship theory relies on conceptual foundations from a mix of other areas, which does not promote a consistent literature that builds on itself. There have been multiple efforts to develop distinct entrepreneurship theory (Phan, 2004). Ireland et al. (2005) suggest that the literature reflects two theoretic categories pertaining to the explanation of either opportunities (Shane & Venkataraman, 2000) or market entry (Lumpkin & Dess, 1996). Yet, the literature is more fractured than these two categories suggest. Within either category, incongruencies among assumptions about entrepreneurial discovery preclude results that refute or reinforce one another (de Koning, 2003; Gartner, 2001; Shane, 2000). Whereas a wider array of theoretic streams offers a rich outlook on entrepreneurial discovery, a stronger conceptual foundation would promote relatable narratives and implications and help fulfill the area's need for a more integrated framework (Companys & McMullan, 2006).

In this paper, I introduce a conceptual foundation for entrepreneurial discovery theory. The principal contribution is a 2x2 framework that goes beyond current assumptions with a shift from unidimensional to multidimensional logic. The shift promotes a more flexible and distinct conceptualization that extends the current dominant view and increases coordination of entrepreneurial discovery research across disparate theoretic streams.

The Paradigmatic Nature of Conceptual Foundations

Established areas of research feature a tacit continuity across distinct lines of inquiry. The continuity derives from a conceptual foundation, which lends a holistic quality to a research

area's different constructs and vocabularies based on a system of standards (Lakatos, 1970: 132). Its paradigmatic nature helps program an array of theories into a coherent mosaic. The coherence derives from a simple rubric of premises that gives an area a distinct character. Special issues of journals and editorials confirm that coherence and distinctiveness are wanting in the entrepreneurship area with repeated suggestions that a stronger paradigm would provide a needed contribution (Alvarez & Barney, 2008; Davidsson, Low, & Wright, 2001; Herron, Sapienza, & Smith-Cook, 1991; Ireland et al., 2005; Phan, 2004). A paradigm pertains to basic conceptualizations that are deeper and more subtle than espoused rules or operationalizations of variables (Kuhn, 1962: 46). Instead, like the relation between a mainstem and its tributaries, it subsumes multiple theoretic streams that evolve over time and are distinct from one another.

Let us define a conceptual foundation as an underlying set of general assumptions and basic premises about researched phenomena in a given domain. Because it is general, it supports multiple lines of inquiry but channels them away from what is extraneous. Its basic premises influence the kinds of research questions that studies attempt to answer. A conceptual foundation is distinct because it applies to one research area or a few related ones. It is different from a theory; it does not articulate variables as manifestations of constructs, specify boundary conditions, or hypothesize relations between variables. A theory intends to explain how, why, and under what conditions variables are interrelated. Empirical studies provide the means to assess a theory with data, which provide evidence of how well a theory explains variance in outcomes of interest (Bacharach, 1989; Colquitt & Zapata-Phelan, 2007; Popper, 1957: 35).

A conceptual foundation leads to classes of theories. It allows the results of different theory-driven studies to relate to each other meaningfully despite differences in how they explain outcomes. For example, in strategic management, the industrial organization (IO) is a

conceptual foundation that has led to multiple theoretic streams. Its basic assumptions are that perfect competition - when long term profits are just enough to cover investments - underlies firm performance and that the best firm performance derives from monopoly power and barriers to competition (Bain, 1951). Theories deriving from IO do not usually explicitly state these assumptions but, despite theoretic differences across studies, the IO promotes a tacit continuity. Whereas one theoretic stream may examine what can be done to limit competition (Porter, 1981), another stream examines what can be done to promote it (Jacobson, 1992). The resource-based view (RBV) also carries assumptions about markets and competition but emphasizes resources rather than product or service offerings (Wernerfelt, 1984). Specifically, it emphasizes the value of firm resource endowments that are heterogeneous and the leveraging of resources via diversification (rather than sales or rents). The RBV accounts for a robust line of inquiry emphasizing inimitable strategies and intangible resources as underpinnings of sustained competitive advantage (Barney, 1991). It is also distinct to strategic management and underlies a plurality of distinct streams in the area. As the RBV became more foundational in the 1990s, studies began to specify their theoretic arguments as “resource-based” less frequently as its logic became assumed (Wernerfelt, 1995).

Theories in other areas of management research derive from different conceptual foundations. For example, the sociotechnical systems approach (Trist & Bamforth, 1951) emphasizes the interface of people and technology in organizations. Its assumptions and premises hold that internal production systems entail both social and technological elements. The social element pertains to the work structure that relates people to technology and to each other, whereas the technology element pertains to the equipment and operations that transform materials into products or services (Cummings, 1978; Emery & Trist, 1969). Operations

management studies do not explicitly state these assumptions. Yet, different theoretic streams in the operations area concerned with internal matches between employees and technology (production; scheduling; information systems; service operations) have long derived from this conceptual foundation by emphasizing different variables and boundaries reflecting its assumptions (Johnston, 1999; Smith & Robey, 1973).

Entrepreneurship's Need for a Conceptual Foundation

Entrepreneurship research is not lacking in theory, but the area does lack a distinct conceptual foundation. The application of theory is common practice, to be sure, but the literature reflects a discontinuous variety of assumptions rather than a few distinct ones (Davidsson et al., 2001; Ireland et. al, 2005). The differing assumptions stem from a mix of conceptual foundations from areas such as neoclassical equilibrium, psychology, and Austrian economics (Shane, 2000) and schools such as the economic, cultural cognitive, and sociopolitical (Companys & McMullan, 2006). As such, entrepreneurship studies have been regarded as generating incommensurable results that are internally consistent but do not speak to each other (Bull & Willard, 1993). The activity of entrepreneurship scholars has been likened to the fable of blind men and an elephant (Gartner, 2001) and in terms of unrelated agendas (Curran & Blackburn, 2001). The area has been described as housing a hodgepodge of studies (Shane & Venkataraman, 2000) and too many unrelated unidisciplinary perspectives instead of fewer multidisciplinary ones (Herron et al., 1991).

Notwithstanding the rich, textured illustrations of entrepreneurship research, the area's lack of coherence is sometimes mistaken as a struggle for theoretic legitimacy (Phan, 2004). The legitimacy issue is symptomatic of the lack of a developed conceptual foundation, not the lack of theory. The problem is that the different theoretic streams do not share some deeper assumptions

about entrepreneurship. Instead, they carry differing assumptions from conceptualizations of non-entrepreneurial phenomena in other areas and schools. Therefore, the studies do not always relate to one another and can miss some of entrepreneurship's most interesting and unique elements (Shane, 2003: 262).

When research on entrepreneurial discovery imports theory directly from other areas, it runs the risk of contributing to a labyrinth of assumptions. As de Koning (2003) shows, the research on opportunities reflects sharp underlying differences in research questions and conceptual turns that lead to different findings about the same phenomenon. Whereas some examinations utilize concepts from psychology and emphasize individual cognitive schemata and creative insight (Gaglio, 1997; Long & McMullan, 1984), others derive from microeconomic conceptualizations of the distribution of information in markets (Kirzner, 1997; Shane, 2000). Other research explains opportunities by emphasizing who entrepreneurs are and what they do based on assumptions from person-situation interactionism as a conceptual foundation.

Person-situation interactionism assumes that individual behavior is a function of the interaction between personal characteristics and the nature of external environments (Lewin, 1935). The model has become an influential conceptual foundation in social psychology. Most contemporary research streams that examine human performance in context assume its premises, but rarely cite Lewin's model directly. Its assumptions also underlie some theory about how entrepreneurs make creative discoveries based on individual differences, types of environments, and the interaction between them (Baron, 2008; Gaglio, 1997). Yet, as its premises stem from non-entrepreneurship settings, they do not always apply to unique entrepreneurship elements such as opportunities, which strain person-centric approaches by entailing episodic knowledge that complements itself across individuals (Dimov, 2004; Eckhardt & Shane, 2003). Moreover,

opportunities elude the levels of analysis germane to individuals and environments as they emerge privately from individuals, within firms, as well as publicly from market systems (Davidsson & Wiklund, 2001; Dew, Velamuri, & Venkataraman, 2004).

When it comes to opportunities, the assumptions of an area such as psychology are markedly different from those of sociology or economics, which leads each area to different kinds of questions (Herron et al., 1991). The resulting incommensurability impedes studies from informing one another despite the fact that they are examining the same phenomenon.

Conceptualizing Entrepreneurial Discovery

Studies of entrepreneurial discovery that emphasize opportunities fall into streams of research that do not always coordinate with one another. The assumptions about opportunity formation that underlie these streams reflect competing mechanisms of either deliberation or serendipity as dominant entrepreneurial discovery modes (Alvarez & Barney, 2007; Gaglio & Katz, 2001). When it comes to theory building, this deliberate search versus serendipitous discovery dichotomy lends itself to the logic of a unidimensional continuum corresponding to the subjective and objective aspects of opportunities (Alsos & Kaikkonen, 2005). In what follows, I review this research, delineate its conceptual foundation, and propose an alternative framework.

One stream of research on opportunities emphasizes deliberate search as the primary mode of entrepreneurial discovery (Fiet, 2002). Shaver and Scott (1991) posited that entrepreneurs discover opportunities based on search tactics, information processing abilities, and effective choices among detected opportunities. Kaish and Gilad (1991) showed that entrepreneurs search more than executive managers do and thus find more opportunities by deliberately scanning more potential ideas. Herron and Sapienza (1992) stressed the importance of motivation because deliberate search for an opportunity comes at the cost of innovation.

Similarly, Stiglitz (1979) offered a logic of search costs whereby entrepreneurs continue to seek opportunities as long as desired outcomes outweigh the costs associated with seeking them. Fiet (2007) explained that not all entrepreneurs search for opportunities systematically, but those who do discover more of them. In the main, this research stream assumes that the deliberations and actions of entrepreneurs are critically important to the formation of opportunities.

Another line of inquiry posits that entrepreneurs make discoveries serendipitously and are surprised by the resultant opportunities (Shane, 2000). The approach holds that entrepreneurs tend to recognize opportunities in a market system based on possessed knowledge, which challenges notions of enduring person-centric characteristics as the primary elements of entrepreneurial discovery (Dimov, 2004). Whereas much search-based research draws from psychology (Gaglio, 1997), this stream aligns more with the Austrian economic view that opportunities emerge from the market process and stochastic distributions of knowledge (Hayek, 1945). Possessing unique knowledge enables an entrepreneur to see opportunities that others cannot, even if those others are actively searching. Thus, differences in knowledge lead different entrepreneurs to discover different opportunities, and few entrepreneurs will discover any particular opportunity because the required knowledge is episodic (Murphy & Marvel, 2007). Using knowledge in this way makes alertness important for discovering opportunities when they emerge (Kirzner, 1973: 68). On these grounds, Kirzner (1997) explained that opportunities cannot be sought meaningfully. This line of inquiry largely assumes that entrepreneurs discover opportunities serendipitously and without the need to deliberately search for them.

Other research describes deliberate search and serendipitous discovery in combination. Long and McMullan (1984) explained that entrepreneurs identify opportunities in terms of both modes, which are influenced by a mix of uncontrolled (e.g., cultural, social) and controlled (e.g.,

preparation, lifestyle) factors. An opportunity is discovered with an initial serendipitous “aha” experience, which is followed by deliberate search for more information. Christensen, Madsen, and Peterson (1994) also described search-based and serendipitous discoveries among a confluence of factors in a process of opportunity recognition. Similarly, Lumpkin, Hills, and Shrader (2004) developed a model of opportunity recognition in which knowledge and experience lead to discoveries across stages of preparation, incubation, insight, evaluation, and elaboration, following Csikszentmihalyi’s (1996) creative process. As in other models, the process begins with either deliberate search or serendipitous discovery.

Bhave (1994) incorporated deliberate search and serendipitous discovery into a model of externally stimulated versus internally stimulated opportunity development. The former mode begins with the decision to start a venture before discovering an opportunity to do so, and it involves deliberate activities of procuring, filtering, and elaborating external information prior to a serendipitous discovery. By contrast, internally stimulated opportunity development occurs when a serendipitous discovery precedes the decision to start a venture. In this case, sensemaking follows the serendipitous discovery and involves finding ways to develop the opportunity into a venture. The model illustrates that opportunities can derive from two different modes that begin with either deliberate search or serendipitous discovery. Each mode is internally consistent but the difference between them is ambiguous (Singh, 2000: 34).

Alvarez and Barney (2007) explained that opportunities form by either creation or discovery, which are two internally consistent but complementary modes. Their approach describes opportunities forming in a teleological setting where behaviors serving an entrepreneur’s purpose are more likely to occur than behaviors that do not. The creation mode assumes that an opportunity is subjective and constructed socially, via deliberate action amidst

uncertainty, and does not exist independently of the entrepreneur. By contrast, the discovery mode assumes that opportunities are objective elements that emerge from changes in the environment and are “out there” whether multiple entrepreneurs discover them or not. The model thus describes two modes reflecting either the deliberateness of creation or the serendipity of discovery. However, the difference between the two modes is ambiguous because either mode can describe any instance of entrepreneurial discovery (Alvarez & Barney, 2007). Reducing this ambiguity requires a reconceptualization of these two theoretic perspectives on opportunities that deals with the disparity between them (Davidsson, 2003: 337).

The Nature of Opportunities

To address the gap in the dominant conceptual foundation of entrepreneurial discovery theory, it is necessary to define opportunities in relation to their subjective and objective aspects (Alsos & Kaikkonen, 2005; McMullan & Shepherd, 2006). An opportunity entails the expansion of an entrepreneur’s own knowledge based on learning about the external world (Corbett, 2007). Thus, entrepreneurial discovery theory must formally articulate a logical integration of internal conceptions and emergent external data (Gavetti & Levinthal, 2000). A three-part categorization rooted in classical pluralistic approaches to body-mind dualism (Popper, 1979: 153-190) is germane to this articulation, and I use its ontology to characterize the nature of opportunities.

The first category consists of material objects. These elements include physical resources and other material things. They are autonomous because their existence is independent of any individual who perceives them. They are objective, to be sure, as multiple individuals can perceive or utilize them in similar ways. In entrepreneurship contexts, this category includes equipment, space, financial capital, and similar elements. The second category, by contrast, includes personal states of being such as affect, attitudes, or individual perceptions. The

existence of these elements necessarily derives from an individual's own unique cognitive structures. These elements are not autonomous, because their existence requires the attendance of mental processes. They are subjective because different individuals characterize them in different ways. In entrepreneurship contexts, this category refers to personal attitudes, emotions, and similar elements.

The elements of the first and second categories touch upon the realist (objective existence) and evolutionary realist (existence based on beliefs or social arrangements) ontologies, respectively. This categorization is explicit in theories about opportunities and the debate over whether they are discovered or created (Alvarez & Barney, 2007; Davidsson, 2003; McMullen & Shepherd, 2006). The two categories reflect assumptions about the serendipitous discovery of an opportunity that was already there versus deliberate creation of an opportunity via individual action. However, singly or in combination, these two categories are not adequate because opportunities reflect some aspects of both categories simultaneously.

The third category describes elements outside the boundaries of the first two categories. It includes languages, theories, developed technologies, published works, software programs, formulated arguments, systems of meaning, and similar items. What makes these elements different is that human thought and action create them but they yield emergent outcomes that can be discovered. These elements have subjective aspects, unlike the elements of the first category. They also have objective aspects, unlike the elements of the second category. Individuals put these elements forth as rational constructions that affect the environment. Then, the same individuals as well as other individuals can utilize, criticize, or refute them, as their viability is unproven. Indeed, they may turn out to prove unviable. These holistic elements can also depose and relate to one another, and their interactions and inefficiencies open the way for the formation

of new elements yielding the same kind of autonomy.¹ This characterization effectively defines opportunities *sui generis* (Murphy & Marvel, 2007). Its single underlying logic subsumes third-person and first-person opportunities (McMullan & Shepherd, 2006). It promotes a distinct framework by shedding light on the nature of the opportunity construct (Companys & McMullan, 2006).

The trichotomy in this section illustrates why current research streams (Davidsson, 2003) and models from other content areas (Venkataraman, 1997) do not explain opportunities very well. Instead of emphasizing the third category, most studies tacitly assume that opportunities fit into either the first or the second category or they join those two categories with a forced tradeoff. Shane (2008: 69-70) explains that unidimensional approaches do not apply to opportunities because they form via serendipitous moments and deliberate searches. Davidsson (2003: 337) similarly illustrates the ambiguousness inherent to examinations of objective versus subjective opportunities. The misapplication and ambiguity derive from the deficiencies of unidimensional logic, which treats deliberation and serendipity as two alternative modes of opportunity formation.

Moving Away from Unidimensional Logic

A unidimensional approach oversimplifies the nature of opportunities because it assumes the functional equivalence of the two entrepreneurial discovery modes. Thus, moderate instances of opportunities fall conceptually along its middle range. These realistic middle-range opportunities frustrate the logic of a continuum because they admit the coincidence of deliberate

¹Shane and Venkataraman (2000) also illustrate this logic with an example of the invention of the telephone as opening the way to ancillary discoveries. The natural number system offers a more specific delineation of the mechanism (Popper, 1979: 160). Although created subjectively by humankind, the natural number system has led to objective discoveries unintended by its creators (e.g., the concept of infinity, the sequence of prime numbers, the existence of twin primes). Moreover, unintended inefficiencies in the natural number system (e.g., not being able to solve certain equations) have led to new discoveries (e.g., imaginary or complex numbers). Alternatively, by wholly ignoring this distinct mechanism, contributions such as Klein (2008) cannot articulate the nature of opportunities in a formal way that subsumes both their subjective and objective aspects.

search and serendipitous discovery just as clearly as they admit neither mode to be relevant. In other words, the continuum does not differentiate conceptually between cases that are high-high and cases that are low-low because both types of cases fall into the middle range. This ambiguity stunts theoretic development because, as Figure 1 depicts, it defies formal description.

Insert Figure 1 about here

The conceptual gap exists because deliberate search is not the opposite of serendipitous discovery. High deliberation does not equal low serendipity, and high serendipity does not equal low deliberation. Even though the idea of deliberation entails purposeful creation and serendipity reflects accidental discovery, one mode's presence does not equate to the other's absence in entrepreneurial contexts. Many opportunities entail both modes. Therefore, an explanation is tenuous if it assumes categorical separation or mutual opposition. This shortcoming is epitomized in arguments that "entrepreneurs expect to be surprised" (Kirzner, 1997) and "entrepreneurs construct second-order probability distributions because they know circumstances will change" (Yates, 2000). Such arguments implicate the ambiguity of the middle range, even though they refer to opportunities forming out of a covariation framework that allows deliberate search and serendipitous discovery to be high simultaneously.

Opportunities can entail high levels of deliberation and serendipity based on the emergence of new information during search activity. In other cases, opportunities can entail low levels of deliberation and serendipity, as in some family business contexts. Whereas the current unidimensional conceptual foundation does not distinguish effectively between such middle-range cases, a multidimensional one helps articulate the difference between them and promotes their integration into a framework.

A Multidimensional Model

Figure 2 presents a framework of two orthogonal dimensions. The deliberation dimension reflects the degree to which purposeful activity, research, and inquest lead to the discovery of an opportunity. The serendipity dimension reflects the degree to which the opportunity's discovery is unanticipated and surprising. Covariation between the two dimensions yields four quadrants, which I refer to as eureka, deliberate search, legacy, and serendipitous discovery. The quadrants define formed opportunities as rational constructions of unproven viability, as presented above, whereas the two orthogonal dimensions define the entrepreneurial discovery mode that brings them about. In what follows, I discuss the 2x2 framework as a conceptual foundation with reference to the coordination of theoretic streams.

 Insert Figure 2 about here

Eureka (high serendipity/high deliberation)

In entrepreneurial discovery contexts, high serendipity means that the formation of the opportunity is accidental and unanticipated. Yet, the unprogrammed nature of such a serendipitous event does not necessarily preclude deliberate action (including intense search activity) from contributing to its formation. Even when an exceptionally careful search leads to an opportunity, uncertainty around the process and outcome can remain high in turbulent environments. As such, the opportunity reflects joint aspects of luck and purpose whereas its future viability is unproven. Its prospects and potential may far exceed its discoverer's original expectations prior to the future performance of any venture based on it. Quadrant I represents this kind of opportunity, which I refer to as *eureka* to reflect its surprising scope and the level of deliberate activity that led to its formation.

Although it is impossible to search wholly meaningfully for a specific opportunity that is not yet discovered, the eureka quadrant reflects that deliberate action can contribute to an opportunity and yet leave a substantial portion of it undetermined. Quadrant I thus includes instances of effectuation, in which means are given (and frequently limited) and outcomes are uncertain (Sarasvathy, 2001). Deliberation is high because of resource constraints and serendipity is attendant to opportunity outcomes because of entrepreneurial contingencies. As the potential of these opportunities can turn out much larger than expected, they may seem *ex post* rational but *ex ante* uncertain. They can “break the mold” of what is familiar, even to the extent that they are astounding to the entrepreneurs who discovered them through their own efforts. A multidimensional model distinguishes such settings, where deliberation is high and the entrepreneurial discovery is regarded as highly serendipitous. With logic that goes beyond a unidimensional model, the 2x2 framework differentiates such opportunities from ones that are not serendipitous but still entail high deliberate search.

Deliberate Search (low serendipity/high deliberation)

Quadrant II includes opportunities that form based on deliberation and without a high level of anticipation. I call an opportunity of this quadrant *deliberate search* to reflect that its serendipitous aspects are small or negligible. It may stem from a class of applications based on a technology or the needs of a well-defined constituency in a social entrepreneurship context. The deliberate search quadrant includes settings in which a firm develops and considers multiple potential opportunities that are related and fit into a specific industry sector. It also reflects the theoretic stream that regards opportunity formation as a function of systematic search (Fiet, 2002). These opportunities align with what is expected with degrees of divergence that are conceptually scalable. The deliberate actions undertaken to form them may be intense and

proactive in order to find a way to meet the specific requirements of a complex market, tough financiers or stakeholders, or strict legal and regulatory guidelines. Such deliberation can entail forward-looking cognitive searches that generate a wider array of alternatives than experiential searches of the environment (Gavetti & Levinthal, 2000).

Opportunities derive from deliberate search when it is not appropriate to rely on luck or chance because of costly downside risks. In corporate contexts, for instance, whole organizations may be founded to acquire knowledge on market opportunities related to an existing stock of knowledge, which may derive from a technological innovation or technical platform. Corporate action is liable to halt these institutionalized routines if they admit serendipity because they are designed to minimize risk. Similarly, experienced entrepreneurs in technology sectors are known to reduce risk with deliberate searches that create a “choice set” of multiple opportunities before selecting one (Gruber, MacMillan, & Thompson, 2008).

Legacy (low serendipity/low deliberation)

Anticipated opportunities can also form without much deliberation. When resources and circumstances that constitute an opportunity derive from the purposeful will of others instead of the entrepreneur, it can create an opportunity for which the entrepreneur may not need to deliberately search. For instance, the rights or properties that account for opportunities in some family business contexts are not usually surprising to the entrepreneur who procures them. I refer to quadrant III as *legacy* to reflect that the opportunities have been, to an extent, provided to their discoverers. Consistent with the notion of a legacy, an entrepreneur may have substantial ties to the opportunity despite not having incurred it via deliberation or serendipity. Such opportunities are thought to account for the genesis of 37-47% of the companies in the Fortune 500 index (Astrachan & Shankar, 2003). When an entrepreneur is earmarked to take over such a

business, it forms an opportunity that can be anticipated years in advance and without deliberate search.

An opportunity of the legacy quadrant also forms when scheduled amendments to public policy regulations or legal guidelines signal a known future shift in a market environment. For instance, policy changes that affect industry sectors and jurisdictions are usually enacted in ways that allow market actors to anticipate them. As such, responding to the future shift may entail an adjustment to a going concern that does not require a high level of deliberation. Unlike a unidimensional model, the 2x2 framework distinguishes quadrant III opportunities from ones that also form with low levels of deliberation but involve high levels of serendipity.

Serendipitous Discovery (high serendipity/low deliberation)

Sometimes opportunities form based on prior knowledge and the stochastic distribution of knowledge in a market system without entrepreneurs deliberately searching for them (Kirzner, 1997; Venkataraman, 1997). These opportunities fall into quadrant IV, which I call *serendipitous discovery*. It largely reflects the important notion that opportunities do not stem from person-centric differences in ability or propensity (Shane, 2000). Instead, many types of people can discover opportunities based on unique prior knowledge and alertness. The notion holds that any given opportunity exists objectively in the environment but can be discovered only by the few entrepreneurs or firms who possess the knowledge required for alertness to it. Such discoveries are not based on stable individual differences across people, but on procuring the knowledge that is necessary (Hayek, 1945). The serendipitous discovery quadrant is germane to research streams that utilize the Austrian economic concept of alertness (Kirzner, 1973; Shane, 2000). Quadrant IV opportunities can also stem from inefficiencies in other opportunities that were discovered by other individuals or firms.

The serendipitous discovery quadrant also admits approaches that regard overall circumstances as instrumental to opportunities. For instance, an opportunity may emerge serendipitously when one's entire situation changes dramatically. When such change is unexpected, it may force an entrepreneur to resort to a hobby or moonlighting activity as a principal occupation in response to displacement. Thus, the serendipity derives from the circumstantial change that recast the hobby or activity. In other words, the serendipity did not derive from the emergence of resources instrumental to introducing a market offering with potential for the generation of value. Those elements were already present in the hobby or activity and could have been put forth if circumstances did not change. By contrast, if the dramatic circumstantial change were anticipated, as in retirement from a career or a case of a person's vocation, the opportunity would fit better in quadrant III.

Theorizing along these lines shows that the 2x2 framework offers greater coordination and flexibility for multiple streams than the current entrepreneurial discovery paradigm. In the final section, I briefly discuss some additional ideas for future work and summarize the contribution of this paper.

Implications and Limits

The current dominant conceptual foundation of entrepreneurial discovery theory leads to applications of "either-or" categorizations and a continuum to explain entrepreneurial opportunities. The underlying unidimensional logic has led to conceptual ambiguity and confusion about opportunities, which are more nuanced than unidimensional logic admits. This paper introduces a multidimensional model that reduces this shortcoming. The 2x2 conceptual framework is intended to support and promote multiple theoretic lines of inquiry that are distinct but commensurable despite their differences. It is concerned with the formation of opportunities

rather than their eventual viability or venture performance outcomes. It can therefore coexist with other possible conceptual foundations that are applicable to other stages of the entrepreneurial process.

The informative content of the 2x2 framework goes beyond the forced tradeoff and ambiguous middle ground that are inherent to the debate over whether opportunities form via creation or discovery (Alvarez & Barney, 2007; 2008). It conceptually reframes the underlying mechanisms of deliberation and serendipity into orthogonal dimensions and a simple rubric of premises. The multidimensional model yields four distinct permutations based on high and low levels of each dimension (high-high; high-low; low-low; low-high) to allow clearer delineation of moderate cases. The quadrants correspond to the nature of the opportunities that form prior to the undertaking of ventures. By emphasizing opportunities, the 2x2 framework helps integrate the entrepreneurship area's distinct approaches and streams that assume entrepreneurship begins with opportunities. It can thus support a rich plurality of views as a conceptual foundation for entrepreneurial discovery theory.

This paper's contribution is merely an initial strike at a larger sculpture. Similar to Eckhardt and Shane (2003), it supports the notion that opportunity-based theories, not person-centric ones, are particularly important to entrepreneurship because they rest on a conceptual foundation that is distinct to the area. Because a conceptual foundation underlies theory, future studies based on the 2x2 framework can contribute to advancement by examining variables and relations already of current interest to multiple theoretic streams. For instance, one way to conduct such research is to explain variance in opportunities with outcomes that acknowledge the framework's four categories. Another way is to conceptualize antecedents from existing streams via factorial combinations based on the two orthogonal dimensions of deliberation and

serendipity. Future review articles can frame summaries of the entrepreneurial discovery literature in terms of the conceptual differences that demarcate the four quadrants. Studies can also elaborate and refine the definitions of eureka, deliberate search, legacy, and serendipitous discovery in order to reflect more precise covariation in the underlying dimensions.

An obvious limitation of the 2x2 framework is that it confines itself to the earliest stages of the entrepreneurship process. As noted above, it does not apply directly to later stages of the process that subsume the operations of a growing business, entrepreneurial management, firm performance, or venture strategy. Those aspects are important to the entrepreneurship area in general, but theory-driven studies of them rest on other conceptual foundations that are distinct from the one in this paper. By contrast, this 2x2 framework is a conceptual foundation for the coordination of distinct theoretic streams that emphasize opportunities and entrepreneurial discovery.

References

- Alsos, G. A. & Kaikkonen, V. 2005. Opportunities and prior knowledge: A study of experienced entrepreneurs. In *Frontiers of Entrepreneurship 2004*, 301-314.
- Alvarez, S. A. & Barney, J. B. 2007. Discovery and creation: Alternative theories of entrepreneurial action. *Strategic Entrepreneurship Journal*, 1, 11-26.
- Alvarez, S. A. & Barney, J. B. 2008. Opportunities, organizations, and entrepreneurship. *Strategic Entrepreneurship Journal*, 2, 171-173.
- Ardichvili, A., Cardozo, R., & Ray, S. 2003. A theory of entrepreneurial opportunity identification and development. *Journal of Business Venturing*, 18(1), 105-123.
- Astrachan, J. H. & Shankar, M. C. 2003. Family businesses' contribution to the U.S. economy: A closer look. *Family Business Review*, 16(3), 211-219.
- Bacharach, S. B. 1989. Organizational theories: Some criteria for evaluation. *Academy of Management Review*, 14(4), 496-515.
- Bain, J. 1951. Relation of profit rate to industry concentration: American manufacturing, 1936–1940. *Quarterly Journal of Economics* 65, 293–324
- Barney, J. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Baron, R. A. 2008. The role of affect in the entrepreneurial process. *Academy of Management Review*, 33(2), 328-340.
- Bhave, M.P. 1994. A process model of entrepreneurial venture creation. *Journal of Business Venturing*, 9(3), 223– 242.
- Bull, I. & Willard, G. E. 1993. Towards a theory of entrepreneurship. *Journal of Business Venturing*, 8, 183-195.
- Casson, M. 1982. *The entrepreneur: An economic theory* (2nd ed.). Edward Elgar: Oxford.
- Christensen, P. S., Madsen, O. O., & Peterson, R. 1994. Conceptualizing entrepreneurial opportunity recognition. In G. E. Hills (ed.) *Marketing and entrepreneurship: Research ideas and opportunities*, 61-75. Westport, CT: Quorum Books.
- Colquitt, J. A. & Zapata-Phelan, C. P. 2007. Trends in theory building and theory testing: A five-decade study of the *Academy of Management Journal*. *Academy of Management Journal*, 50(6), 1281-1303.

- Companys, Y. E. & McMullan, J. S. 2006. Strategic entrepreneurs at work: The nature, discovery, and exploitation of entrepreneurial opportunities. *Small Business Economics*, 28, 301-322.
- Corbett, A. C. 2007. Learning asymmetries and the discovery of entrepreneurial opportunities. *Journal of Business Venturing*, 22(1), 97-118.
- Csikszentmihalyi, M. 1996. *Creativity*. HarperCollins, New York.
- Cummings, T. G. 1978. Self-regulating workgroups: A socio-technical synthesis. *Academy of Management Review*, 3(3), 623-634.
- Curran, J. & Blackburn, R. 2001. *Researching the small enterprise*. Sage: London.
- Davidsson, P. 2003. The domain of entrepreneurship research: Some suggestions. In J. Katz & D. Shepherd (Eds.), *Cognitive approaches to entrepreneurship research*, 6, 315-372. Oxford, UK: Elsevier/JAI Press.
- Davidsson, P. Low, M. & Wright, M. 2001. Low and MacMillan ten years on: Achievements and future directions for entrepreneurship research. *Entrepreneurship Theory and Practice*, 25(4), 5-15.
- Davidsson, P. & Wiklund, J. 2001. Levels of analysis in entrepreneurship research: Current research practice and suggestions for the future. *Entrepreneurship Theory and Practice*, 25(4), 81-99.
- de Koning, A. 2003. Opportunity development: a socio-cognitive perspective. In J. Katz & D. Shepherd (Eds.), *Advances in entrepreneurship, firm emergence and growth: Cognitive approaches to entrepreneurship research*, 6, 265-314. Oxford, UK: Elsevier/JAI Press
- Dew, N., Velamuri, S. R., & Venkataraman, S. 2004. Dispersed knowledge and an entrepreneurial theory of the firm. *Journal of Business Venturing*, 19, 659-679.
- Dimov, D. P. 2004. The individuality of opportunity recognition: A critical review and extension. In J. E. Butler (Ed.), *Opportunity identification and entrepreneurial behavior*, 135-162. Greenwich, CT.: IAP.
- Drucker, P. F. 1985. *Entrepreneurship and innovation*. New York, NY: HarperCollins.
- Eckhardt, J. T. & Shane, S. A. 2003. Opportunities and entrepreneurship. *Journal of Management*, 29(3), 333-349.
- Emery, F. E. & Trist, E. L. 1969. Socio-technical systems. In F. E. Emery (Ed.), *Systems thinking*, 281-296. London: Penguin Books.

- Fiet, J. O. 2002. *The systematic search for entrepreneurial discoveries*. Westport, CN: Quorum Books.
- Fiet, J. O. 2007. A prescriptive analysis of search and discovery. *Journal of Management Studies*, 44(4), 592-611.
- Gaglio, C. M. 1997. Opportunity identification: Review, critique and suggested research directions. In J. Katz & J. Brockhaus (Eds.), *Advances in Entrepreneurship, Firm Emergence, and Growth*, 3, 139-202. Greenwich, CT: JAI Press.
- Gaglio, C. M., & Katz, J. A. 2001. The psychological basis of opportunity identification: Entrepreneurial alertness. *Journal of Small Business Economics*, 16, 95-111.
- Gartner, W. B. 2001. Is there an elephant in entrepreneurship? *Entrepreneurship Theory and Practice*, 25(4), 27-39.
- Gavetti, G. & Levinthal, D. 2000. Looking forward and looking backward: Cognitive and experiential search. *Administrative Science Quarterly*, 45(1), 113-137.
- Gruber, M., MacMillan, I. C., & Thompson, J. D. 2008. Look before you leap: Market opportunity identification in emerging technology firms. *Management Science*, 54(9), 1652-1665.
- Hayek, F. 1945. The use of knowledge in society. *American Economic Review*, 35(4), 519-530.
- Herron, L. & Sapienza, H. J. 1992. The entrepreneur and the initiation of new venture launch activities. *Entrepreneurship Theory and Practice*, 17(1), 49-55.
- Herron, L. Sapienza, H. J., & Smith-Cook, D. 1991. Entrepreneurship from an interdisciplinary perspective: Volume I. *Entrepreneurship Theory and Practice*, 16(2), 7-12.
- Ireland, R. D., Reutzell, C. R., & Webb, J. W. 2005. Entrepreneurship research at AMJ: What has been published, and what might the future hold? *Academy of Management Journal*, 48(4), 556-564.
- Jacobson, R. 1992. The "Austrian" school of strategy. *Academy of Management Review*, 17(4), 782-807.
- Johnston, R. 1999. Service operations management: Return to roots. *International Journal of Operations and Production Management*, 19(2), 104-124.
- Kaish, S. & Gilad, B. 1991. Characteristics of opportunities search of entrepreneurs versus executives: Resources, interest, and general alertness. *Journal of Business Venturing*, 6, 45-61.
- Kirzner, I. 1973. *Competition and entrepreneurship*. University of Chicago Press, Chicago.

- Kirzner, I. 1997. Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of Economic Literature*, 35(1), 60-85.
- Klein, P. G. 2008. Opportunity discovery, entrepreneurial action, and economic organization. *Strategic Entrepreneurship Journal*, 2, 175-190.
- Kuhn, T. S. 1962. *The structure of scientific revolutions*. Chicago, IL: University of Chicago Press.
- Lakatos, I. 1970. Falsification and the methodology of scientific research programmes. In I. Lakatos & A. Musgrave (Eds.), *Criticism and the growth of knowledge*, 91-197. Cambridge University Press: London.
- Lewin, K. 1935. *A dynamic theory of personality*. New York, NY: Harper & Row.
- Long, W. & McMullan, W. E. 1984. Mapping the new venture opportunity identification process. In *Frontiers of Entrepreneurship Research*. Babson College: Wellesley, MA.
- Lumpkin, G. T. & Dess, G. G. 1996. Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21, 135-172.
- Lumpkin, G.T., Hills, G.E., & Shrader, R.C. 2004. Opportunity recognition. In H. P. Welsch, (Ed.), *Entrepreneurship: The way ahead*, 73-90. Routledge, London.
- McMullan, J. S. & D. A. Shepherd 2006. Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review*, 31(1), 132-152.
- Murphy, P. J., Liao, J., & Welsch, H. P. 2006. A conceptual history of entrepreneurial thought. *Journal of Management History*, 12(1), 12-35.
- Murphy, P. J. & Marvel, M. R. 2007. The opportunity-based approach to entrepreneurial discovery research. In Rahim, M. A. (Ed.), *Current topics in management*, 12, 169-192. Transaction Publishers: London.
- Phan, P. H. 2004. Entrepreneurship theory: Possibilities and future directions. *Journal of Business Venturing*, 19(5), 617-620.
- Popper, K. R. 1957. *The poverty of historicism*. George Routledge and Sons: London.
- Popper, K. R. 1979. *Objective knowledge* (revised edition). Clarendon Press: Oxford.
- Porter, M. E. 1981. The contributions of industrial organization to strategic management. *Academy of Management Review*, 6(4), 609-620.

- Sarasvathy, S. D. 2001. Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2), 243-263.
- Shane, S. 2000. Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science*, 11(4), 448-469.
- Shane, S. 2003. *A general theory of entrepreneurship: The individual-opportunity nexus*. Cheltenham, UK: Edward Elgar.
- Shane, S. 2008. *The illusions of entrepreneurship: The costly myths that entrepreneurs, investors, and policy makers live by*. New Haven, CT: Yale University Press.
- Shane, S. & Venkataraman, S. 2000. The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25(1), 217-226.
- Shaver, K. G. & Scott, L. R. 1991. Person, process, and choice: The psychology of new venture creation. *Entrepreneurship Theory and Practice*, 16(2), 23-42.
- Singh, R. P. 2000. *Entrepreneurial opportunity recognition through social networks*. New York: Garland.
- Smith, R. D. & Robey, D. 1973. Research and applications in operations management: Discussion of a paradox. *Academy of Management Journal*, 16(4), 647-657.
- Stiglitz, J. E. 1979. Equilibrium in product markets with imperfect information. *American Economic Review*, 69(2), 339-345.
- Sutton, R. I. & Staw, B. M. 1995. What theory is not. *Administrative Science Quarterly*, 40, 371-384.
- Trist, E. L. & Bamforth, K. W. 1951. Some social and psychological consequences of the longwall method of coal getting. *Human Relations*, 4, 3-38.
- Venkataraman, S. 1997. The distinctive domain of entrepreneurship research: An editor's perspective. In J. Katz & R. Brockhaus (Eds.), *Advances in entrepreneurship, firm, emergence and growth*, 119-138. JAI Press: Greenwich, CT.
- Weick, K. E. 1999. Conclusion: Theory construction as disciplined reflexivity: Tradeoffs in the 90s. *Academy of Management Review*, 24(4), 797-806.
- Wernerfelt, B. 1984. The resource-based view of the firm. *Strategic Management Journal* 5(2), 171-180.
- Wernerfelt, B. 1995. The resource-based view of the firm: Ten years after. *Strategic Management Journal*, 16, 171-174.

Yates, A. J. 2000. The knowledge problem, entrepreneurial discovery, and Austrian market process theory. *Journal of Economic Theory*, 91(1), 59-85.

Figure 1. A Unidimensional Model of Entrepreneurial Discovery

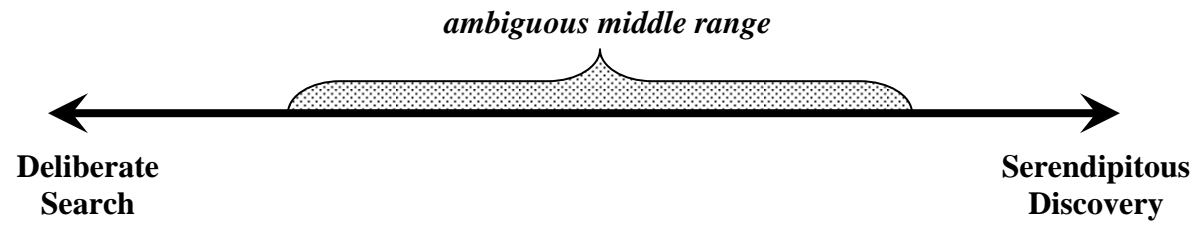
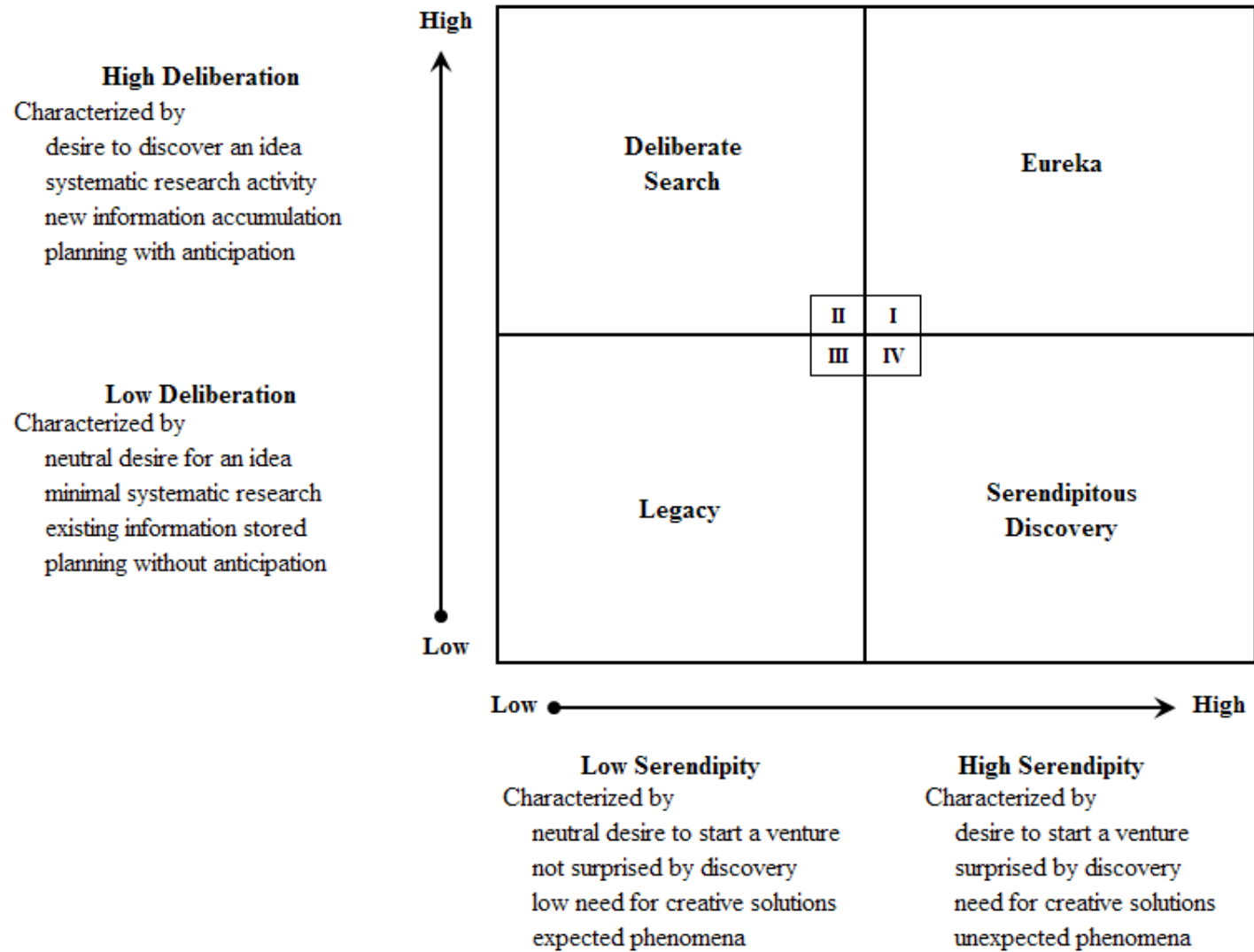


Figure 2. A Multidimensional Model of Entrepreneurial Discovery



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Bio Statement

Patrick J. Murphy is Assistant Professor of Management in the Kellstadt Graduate School of Business at DePaul University.