HARMONIZING THE CONCEPT OF ENTREPRENEURIAL CAPACITY

Everarda Cunningham: Swinburne University Of Technology, Lilydale, Australia
Peter Moroz: Swinburne Institute Of Technology, Melbourne, Australia

~

Contact: Peter Moroz, Swinburne Institute of Technology, Cnr Wakefield and William Streets, Hawthorn, 3122 Melbourne, Australia, Email: pwmoroz@swin.edu.au

DISTINGUISHING THE CONCEPT OF ENTREPRENEURIAL CAPACITY FROM ABSORPTIVE CAPACITY

ABSTRACT

This paper presents a comparative analysis of two potentially overlapping concepts: entrepreneurial capacity and absorptive capacity. Consideration is given to the complex task of distinguishing a nascent theoretical concept from a mature, empirically tested concept without including the presumptions and bias that accompany the nature of comparisons between two potentially competing scientific paradigms. The approach used to analyse the concepts is developed using literature on theory development and results in providing two overarching categories for examination: relevance and utility. The findings provide evidence to support initial observations as to the relative proximity of both concepts with respect to innovation, but ultimately lend ground to our argument that entrepreneurial capacity is highly distinguishable from absorptive capacity, and that the concepts may actually be complimentary. The implications of these findings are significant to the establishment of entrepreneurial capacity as a distinct concept, but also provide an interesting basis for further exploration of how the opportunity school and emergence school that are prevalent within the field may be ultimately streamlined into an alloyed theory of entrepreneurship and innovation.

INTRODUCTION

This paper seeks to formally distinguish the emerging concept of *entrepreneurial capacity* (Hindle, 2007) from Cohen and Levinthal’s (1989, 1990, and 1994) well established work on *absorptive capacity*. The latter has been well received and utilized by management scholars interested in better understanding the potential for creating competitive advantages through the research and development efforts engaged by technology based firms. Absorptive capacity has been defined as a model used to evaluate a firm’s ability to value, assimilate, and apply new knowledge based on multiple levels of analysis (individual, firm, national). Its antecedents are prior-based knowledge that consists of knowledge stocks and flows as well as routines for communication. The outcomes of AC are measured through a firm’s innovation performance, aspiration level, and organizational learning infrastructure. Since its inception, the absorptive capacity (AC) construct has evolved from its original modelling through a progression of several decades of empirical testing and theoretical development to become a widely used tool for measuring R & D related activities of the firm. The former has evolved from research on innovation and it’s inchoate but widely accepted relationship with entrepreneurship. Entrepreneurial capacity is defined as the ability of individual or grouped human actors (entrepreneurial protagonists) to evaluate the economic potential latent in a selected item of new knowledge, and to design ways to transform that potential into realizable economic value for intended stakeholders (Hindle, 2007). Introduced as a potential tool for generating and testing a wide range of questions directed at modelling innovation, entrepreneurial capacity (EC) has recently been defined and formalized through the merging of the ‘value creation school’ (Rogers, 1962; Sundbo 1998: 19) with the ‘opportunity perspective school’ of entrepreneurship study.
(Shane and Venkataraman, 2000). This article will present a comprehensive comparative analysis of these two concepts.

As with all new paradigms, they are subject to comparison with those that have come before them, and suffer from the weaknesses inherent of their novelty (Kuhn, 1962). This frailty is often predicated on the assumption that existing theory is already capable of describing the phenomenon we observe. The ongoing crystallization and elaboration of the EC model is no different. Any potentially derived relationship it may have with an established and seemingly related concept such as AC must be confronted and its substance examined. To this end, new theories are often suppressed as a matter of academic tradition, or are viewed as subversive in nature to what has come before it. Debates are raised as to the validity or necessity of new concepts and struggles for theoretical dominance pit one paradigm against the other. Yet theory must ultimately be considered, not as a dichotomy, but as a continuum (Runkel and Runkel 1984; Edmondson and McManus 2007), advancing the frontiers of knowledge where possible. Our task is not to undermine the usefulness of the AC concept, but to pursue the true purpose of scholarly research and attempt to explain phenomenon in a way that best addresses its conceptual essence and enriches the explanatory power of theory. Development of the concept of EC, like all new assumptions about the world, requires a comprehensive re evaluation of prior knowledge (Kuhn, 1962) to differentiate it as something that expertly and novelly coalesces thinking on how we understand an observed phenomenon or accommodates an entirely different approach to how we might understand a phenomenon.

This study is intended to bring clarity to the relationship between absorptive capacity and entrepreneurial capacity, while establishing the latter as an eminent concept for understanding and modelling value creation in the innovation process. Beyond the obvious need to address their similarities in title, each of these concepts has evolved from the scholarly exploration of innovation and thus on the surface, also appear to share common theoretical space. In order to properly confirm the distinct nature of EC, the scope and breadth of this ‘common space’ is tested by performing an exhaustive literature review on a selection of academic works that involve the AC concept and constructs, and then providing a detailed comparative analysis of EC and AC. This analysis is performed using a matrix that breaks down each of the concepts into a series of well defined areas of examination (Glaser and Strauss, 1967). The resulting data is then used to compare and contrast EC and AC with a secondary objective of generating further theoretical insight for both concepts.

In accordance with the purpose of this article, we propose three underlying assumptions that may serve to differentiate EC from AC. The first assesses the emphasis placed by each upon the individual. Although AC is built upon the cognitive framework of individual learning (Marshall, 1995; Piaget, 1952), it is a construct that is better aligned with organizational theory and suited to represent the knowledge management element of a firm (Bartunek, 1984; Labianca, Gray, & Brass, 2000; Zollo & Winter, 2002). In contrast, the individual capacity to evaluate, or ‘conceive of what to do’ with a potentially valuable opportunity is the quintessential component of EC (Hindle, 2007). It does not matter if the individual is starting a new firm based upon the opportunity evaluated, pursuing opportunity within an already established firm, or creating value within almost any other context that can be identified as resulting in a new means-ends relationship. This leads to the second assumption that focuses on the nature of innovation. New knowledge creation, discovery, evaluation and exploitation may be commonalities regarded in both concepts, but the focus on value creation is functionally and clearly instilled within the concept of EC, while AC is focused on using the learning processes of a firm to create competitive advantages and is thus more ambiguous in scope. One of the later iterations of the concept identifies and distinguishes commercial knowledge outputs (products, services and IP) from general knowledge outputs (basic science, technical and organizational), but still fails to clearly identify how the entrepreneurial process fits into these outputs (Lane, et al., 2005). Finally, we posit that the routines and structures that encompass a firm’s ability to respond to change by using its AC weakly mimics the entrepreneurial process at best, and is more aligned with knowledge management than the actual capacity of acting entrepreneurially. It is hoped that if supported, this study can be used to refine the concept of EC by concentrating it on the individual power distance.
to an entrepreneurial opportunity (Hofstede, 1980; Hofstede, 1983) and monitoring directly by the agent (Shane, 1996). This paper is structured as follows. First, the authors review the literature on AC to outline the many ways that it has been defined, used and portrayed over the last two decades, including discussion that examines its theoretical roots and the historical advancement of the construct. Next, ambiguities and structural issues regarding the construct are highlighted. Antecedents and contextual interpretations are then considered, revealing the complex nature of the concept and its limitations. Second, we recap the concept of entrepreneurial capacity, and briefly re-iterate its functional aspects. It’s potential for enriching the complex elements of innovation is reviewed and the role of new knowledge, entrepreneurship and innovation clearly established. Third, we outline the methodologies used for performing the comparative analysis and fourth present our data in table format for examination and analysis. Fifth, we analyse the data and present findings for discussion and summarize with our interpretation and further theoretical consideration. Last, we offer some implications and potential limitations to our findings and finish the article with a brief summary of future research and conclusion.

CONTEXTUAL PREDICATES TO OUR ANALYSIS

What is Absorptive Capacity?

Cohen and Levinthal (1989, 1990) developed the concept of absorptive capacity (AC) to help understand the learning processes involved with knowledge acquisition, assimilation and application that were significant to the sustainability of innovative business firms. Like many other scholars, they were concerned with the dynamics of capitalism, technology and change (Schumpeter, 1911/1934). Not satisfied with the traditional economic views of research and development (R&D) that relegated this activity to simply just knowledge creation, Cohen and Levinthal were interested in examining the organizational processes and effects of firm investment in R&D on a multi dimensional level. Using work from other researchers that had observed the phenomenon of knowledge spill over effects and the consequent activities of firms attempting to harness and utilize this knowledge (Tilton, 1971, Allen, 1977, Mowery, 1983), they developed the concept of AC to not just reflect the generation of new knowledge from investment in R&D, but to also deal with the cumulative effects of knowledge upon an organization. Thus, knowledge could be created internally within the firm through strategic investments. It could also exist external to the firm, and thus required search and appropriation mechanisms. The function (and examination) of R&D was expanded to encompass both internal generation of knowledge and the collection of external knowledge through subsequent advantages derived from how knowledge was created, identified, structured and applied within a firm to better scan, value and acquire external knowledge. The end result was the creation of an organizational capability, based in Industrial Organization (IO) and economics based explanations that gave the firm competitive advantages with respect to innovation, and ultimately firm survival and performance.

Figure 1. Absorptive Capacity model (Cohen and Levinthal)
The original unalloyed definition of AC put forth by Cohen and Levinthal (1990) is simply stated as: “the firm’s ability to value, assimilate, and apply new knowledge”. Over the years, this definition has been modified and re-conceptualized, but most of the basic tenets still hold.

Usage, Portrayal and History of Absorptive Capacity

The literature on AC has grown considerably over the last two decades, generating new theoretical insight, with several constructs for qualitative and quantitative testing proposed and considerable expansion of the original concept. There have been over 286 citations of the seminal work done by Cohen and Levinthal published across a wide variety of management science journals (Lane, Balaji et al. 2006) with many more since. The constructs used for measuring AC within an organization have varied somewhat, but have not strayed far from the original association with investments made by a firm in R&D. Researchers have used patents, publication and citations as potential measures of AC (Nicholls.-Nixon, 1993; Mowery, et al., 1996; Cockburn and Henderson, 1998), while others have used other technological related indicators such as total staff dedicated to technology, the level and quality of the staff working in R&D, and the presence of an R&D department or links with basic research in universities (Veugelers, 1997; Mangematin and Nesta, 1999; Becker and Peters, 2000). Later studies have attempted to tunnel deeper into the construct using both qualitative and quantitative methods to help tease out some of the factors of how firms acquire knowledge and why. These studies have measured a firm’s AC as a construct built around technological skills and practices, shared vision, uniformity in communication structures, and alignment in research skills, best practices, how long units take to ‘ramp up’ in how they effectively manage and use new knowledge, culture and social integration (Matusik and Heeley, 2005, Nieto and Quevedo, 2005; Shih-Wei, 2005; Cuellar and Gallivan, 2006; Williander, 2007).

Constructs for measuring AC have been built to measure several levels of analysis, expanding from the firm to regions and nations using total factor productivity, human capital, total regional/national R&D spending (Roper and Love, 2006; Knellar and Stevens, 2006; Grunfeld, 2006) down to a sundry of variables, characteristics, education and motivation of individual employees and managers (Azagra-Caro, et al., 2006; Jones, 2006; Jong-Hun, et al.; Shu-hsien et al., 2007).

Several theoretical reconfigurations, adaptations or contributions have been made to the original concept of AC. Most important of these are Szulanski’s (1996) conceptualization of “internal stickiness” as a measure of AC, Lane and Lubatkin’s (1998) mentor student interpretation of how firms learn from other firms, Zahra and George’s (2002) casting of AC in the role of a ‘dynamic capability’ through segmentation of the construct into PAC (potential AC) and RAC (realized AC), Lane et al.’s (2006) exploration of the potential reification of the concept and re-conceptualization that includes the addition of both commercial and knowledge outputs, and Todorova and Durisen’s (2007) adaptation that advances the importance of social integration methods (SIM), power relationships, value identification, as well as re ordering Zahra and George’s contribution by insisting on the dichotomy between assimilating and transforming new knowledge. The result of this research is a complex, often ambiguous and potentially contradictory set of models that measure a variety of unassociated variables on a wide spectrum of levels (Lane, et al., 2006; Tsang and Kwan, 1999).

Potential Limiting Factors of Absorptive Capacity

There are several limiting factors born from recent theoretical evaluations of the concept. First, AC is relevant only to R&D-related contexts. As a result, few have examined the role of AC in the acquisition, assimilation, and commercial application of other types of business-related knowledge, including managerial techniques, marketing expertise, and manufacturing know-how. Second, firms develop AC in response to the existence of valuable external knowledge. Firms must weigh these incentives and disincentives, along with the potential value of the external knowledge when deciding how much to invest in developing AC and what types of knowledge on which to focus. Third, relevant prior knowledge equals AC. This assumption ignores two-thirds of Cohen and Levinthal’s definition of the construct and overlooks the process/capability aspect of
AC discussed in their 1990 paper. Fourth, a firm’s competitive advantage is based on Ricardian 
rents (scarcity) rather than efficiency rents. Competitive advantage is viewed as a function of how 
resources (including knowledge) are combined with other resources to develop new competencies. 
Indeed, one longitudinal AC study found that the capability to disseminate and apply acquired 
knowledge explained far more variance in firm performance than did the amount of external 
knowledge acquired (Lane et al., 2001).

Perhaps most importantly, AC has been cast as a capability residing in the firm alone (Helfat, et 
al., 2007)). From a practical perspective, omitting individuals from AC models suggests that they 
are not significant to organizational knowledge processing. From a theoretical perspective, it 
overlooks the role of individuals as a key component of Cohen and Levinthal’s (1990) logic but 
suggests that AC is fundamentally an algorithmic matching process: develop X amount of AC in 
Y, and then your firm can learn Z. But what creates competitive advantage out of knowledge is 
the unique and valuable ways in which it is combined and applied. This uniqueness arises from the 
personal knowledge and cognitive schemata of the individuals within the firm, who scan the 
knowledge environment, bring the knowledge into the firm, and exploit the knowledge in 
products, processes, and services.

In short, it is the firm’s individual members who add the creativity needed to help the firm 
uniquely create value from new knowledge. One consequence of ignoring the individual is that 
prior research has failed to recognize that AC may be viewed as a multilevel construct. A firm’s 
AC is not just a function of industry and corporate characteristics. It also is a function of the 
individual capacity of its members, as well as the structures and processes of the organizational 
subunits to which they belong. This brings us to the final limitation uncovered: the individual 
power relationships that are inherent of the gatekeepers and managers who hold access to 
resources available for investing in AC. Understanding these relationships and interactions might 
shed new light on how a firm develops and uses its AC.

What is Entrepreneurial Capacity?

Until its recent formalization by Hindle (2007), the term ‘entrepreneurial capacity’ has been 
loosely and imprecisely used across the literatures of management, economics, strategy and 
entrepreneurship research to explain or represent the inherent capacity believed to reside within 
individuals, firms or nations to ‘act entrepreneurially’ (Collins et al., 2006). Its various iterations 
have included but are not limited to: ‘an innate and exogenous talent that is heterogeneous 
amongst individuals’ (Lucas, 1978), ‘operational effectiveness’ (Merli, 1996), ‘creative human 
action’ (De Soto, 1999), ‘the knowledge, skill and experience to start a new business’ (Bygrave, et 
al.), ‘learning factors relevant to preparing an individual for venturing’ (Edwards and Muir, 2005), 
or to ‘identify, acquire and deploy resources needed to pursue opportunity’ (Kuratko, et al.). Even 
with a widely disseminated usage of the term, no where could there be found a definitive attempt 
to specialize the term as a unique concept, or produce a framework model incisive enough to 
inform upon theoretical or empirical studies. Thus the term was both appropriable and practical 
for use in a justified definition of a concept to concisely and powerfully illustrate the inherent 
dimensions of how individuals conceive of acting entrepreneurially.

Innovation and Entrepreneurial Capacity

To fully understand the concept of EC, there are several predicate perspectives that must be 
considered. First, the concept of EC is formally and functionally related to the knowledge 
transforming and value creating process of innovation. Without delving too deeply into the 
expansive literature on innovation, a scan of the economics and management research engrossed 
with the study of the phenomenon suggests that it can be abstracted to a very broad level. 
Innovation can be generally and capably represented as being a value creation process that 
consists of the combination of two inputs: new knowledge (ideas, inventions, intellectual property, 
etc) and the capacity to transform the latent economic value that is inherent within the identified 
dimensions of opportunity provided through application of new knowledge. This relationship
between innovation and the combination of new knowledge with transformational (entrepreneurial) capacity is illustrated in a simple yet powerful mathematical model below:

**EQUATION 1: THE INNOVATION PROCESS FUNCTION.**

\[ V = k \sum_{n=1}^{f} (\Omega_n E_n) \]

Where:
- ‘\(V\)’ is the net present value of a completed, multi-period, innovation process.
- ‘\(n\)’ is the number of periods in the entrepreneurial opportunity cycle.
- ‘\(f\)’ is the number of the final period of the entrepreneurial opportunity cycle.
- ‘\(k\)’ is the estimated net present value of the total productive potential of the new knowledge (invention, intellectual property, etc, as discussed above).
- ‘\(\Omega_n\)’ is the proportion of all the productive opportunity available to the entrepreneurial protagonist(s) that is potentially realisable in period \(n\).
- ‘\(E_n\)’ is an estimate of the proportion the firm can actually achieve of all the entrepreneurial capacity required for full realisation of \(\Omega_n\) in period \(n\).

A second foundational element of EC resides in the opportunity perspective introduced by Shane and Venkataraman (2000), distinguishing it from the emergence school of entrepreneurial research (Gartner, 1985, 1989, 1990, 1993); the former expanding on the work of Casson (1982) that identifies the essence of entrepreneurship with the act of how we engage entrepreneurial opportunities as opposed to reliance upon organizational creation (a potential outcome). The ‘opportunity’ becomes the focus of entrepreneurial action, and the resulting dimensions of that activity are capably represented by discovery, evaluation and exploitation. What is perhaps the most important aspect of the ‘entrepreneurial’ opportunity is that it must satisfy the condition of creating new means ends relationships (Eckhardt and Shane, 2003:4, Kirzner, 1997, Shane and Venkataraman, 2000). Value created from the optimal combination or improvement of existing means ends relationships, either through new ventures or within established firms is not viewed as or can be considered entrepreneurship. In other words, the act of entrepreneurship requires an innovation oriented value producing outcome (Klyver, 2005). This is clarified within a two by two matrix in figure 1.

**Figure 1. Distinguishing between entrepreneurial and non-entrepreneurial relationships**

<table>
<thead>
<tr>
<th>Organisational Context</th>
<th>Principal Action Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Organisations</td>
<td>(A) Innovation oriented venture creation</td>
</tr>
<tr>
<td>Existing Settings</td>
<td>(B) Non-innovation oriented venture creation</td>
</tr>
<tr>
<td></td>
<td>(C) Innovation oriented venturing in existing contexts (e.g. corporate venturing; licensing via markets etc)</td>
</tr>
<tr>
<td></td>
<td>(D) Traditional Management</td>
</tr>
</tbody>
</table>

The Essence of What Entrepreneurs Do

Building on the foundations expounded upon above, the concept of EC will now be duly broken down and defined. The term “entrepreneurial” is derived from Shane and Venkataraman’s (2000) summation that involves “how, by whom and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited”, while the term ‘capacity’ draws upon Little et al. (1973) to mark it as “present possession of future potential to act”. The notion conveyed in the term ‘capacity’ emphasizes both ability and potential, as it focuses attention on two very important aspects: the inherent attributes and skills of an individual agent and the potential to do something in the future. This thinking runs contrary to assessment of the actual details that encompass the doing of something in the present and places emphasis squarely upon human actors. With this in mind, we proceed to the following definition:
Entrepreneurial capacity is the ability of individual or grouped human actors (entrepreneurial protagonists) to evaluate the economic potential latent in a selected item of new knowledge, and to design ways to transform that potential into realizable economic value for intended stakeholders.

Moving beyond the definition, we present a linear flow model (figure 2.) that outlines the general system of value creation in the innovation process. This model features EC as the main driver of the transformational process. The application of EC possessed by an individual or team thus converts new knowledge into economic value for intended stakeholders. The flow model illustrates the three generic process capacities (elaborated at length earlier) – discovery, evaluation and exploitation – and four specific constraints that impact upon these processes:

1) **Resources** - any and all resources necessary to ensure successful transformation of new knowledge into realized economic value.
2) **Conviction** – no matter how well an opportunity is evaluated, it will be useless unless there is desirability or feasibility to do so.
3) **Alignment** – the fit between skills and resources of the entrepreneur or team with the specific nature of the task so evaluated
4) **Contextual issues** - specific to certain circumstances, such as political constraints, infrastructure constraints, environmental constraints and so on.

Of note, the dotted arrow represents the possibility for direct linkage between the existence of productive opportunity and new knowledge itself, or a more typical indirect association with demand (or its application) when the potential value of knowledge exists in latent form.

Figure 2. A linear flow model of value creation occurring from the innovation process

Potential Impacts and Foreseeable Limitations of the Concept

The motivation for the development of the EC concept stemmed from a desire to provide the opportunity perspective school of entrepreneurship research with a parsimonious equivalent to the emergence perspective school’s interpretation of what entrepreneurs do: they create new ventures. This parallel is now clearly illustrated in the opportunity school: entrepreneurs transform new knowledge into economic value. That this concept can be neatly tied into the process of innovation through both a linear flow model and a mathematical formula only adds to the clarity of the understanding of innovation, entrepreneurship and new knowledge creation necessary for good theory (Klein and Zedeck, 2004) It also provides a logically powerful lens for observing this
phenomenon across a diverse set of contexts. By concentrating on the ‘capacity to do’ rather than in ‘the doing,’ new insights into how both specific and general skills can be developed within the individual to better understand, foster and evaluate an entrepreneur’s ‘potential’ is realized.

As ‘evaluation’ is touted as the core entrepreneurial skill, the constructs that require proper testing are numerous. Perhaps overlooked is the potential of the various factors involved with business planning, and the current sedentary nature of how it is taught. Understanding the general skills used for discovering, evaluating and exploiting opportunities must also be compared and contrasted with how individuals solve basic problems, and balanced with both type and intensity of specific skills necessary. Further exploration into elements of entrepreneurial expertise (Baron 2004) and self-efficacy (Krueger, 1993; Zhao, 2005) may help to round out the development of valid and reliable constructs for the evaluation and further testing of the concept. Although these should be considered more as challenges than limitations, the black box that is the cognitive mind of the entrepreneur is fully heterogeneous and unique, offering new pathways for research. The establishment of patterns and a renewed vigor for qualitative explorations that are both novel and unique are thusly warranted (Hindle, 2004).

A COMPARATIVE ANALYSIS OF ABSORPTIVE CAPACITY AND ENTREPRENEURIAL CAPACITY

Methods

A standard title search on ‘absorptive capacity’ was utilized to populate a sample of 68 journal articles. These articles were then analysed and categorized within a custom designed classification matrix (Forbes, 1999). Of the 68 articles examined, only 6 could be considered as making a direct theoretical contribution, modification or re-conceptualization of AC. A similar but more comprehensive literature search using the term ‘entrepreneurial capacity’ was conducted, populating a sample of 78 articles, 11 of which were systematically scrutinized as providing a direct definition of the term, or inferred a clear enough definition within its contents based on the depth and scope of the discussion. These articles served as confirmation of the appropriability of the term and provided theoretical justification and support for the consequent formalization of the EC concept that is presented in the seminal article by Hindle (2007).

Conducting a comparative analysis of a nascent theoretical concept that has not yet been empirically tested against a well established and highly tested concept is limited in many respects. Yet the argument that theories benefiting from empirical observation are superior to those that have not, is highly presumptuous. It is naïve to think that the prevalence of data is unaffected by methods (Leifer, 1992) and that falsifiability trumps intuition and scientific speculation (Popper, 1959). Therefore, this analysis is not framed in methods that belabour upon the superiority of one over the other so that a successive transition from one paradigm to the next can be facilitated, but to construct a better understanding of the two so that progress in science can be further pursued (Kuhn, 1962). The impetus of this study is to enhance our understanding of the utility of each concept, through determining the avenues of inquiry, the types of questions that each concept poses, the methods that can be used to test these questions that define their subsequent areas of relevance, and how each may establish meaning. Kuhn states that this comparison and contrast of potentially competing concepts is essential to scientific inquiry:

No natural history can be interpreted in the absence of at least some implicit body of intertwined theoretical and methodological belief that permits selection, evaluation, and criticism (16-17).
A second table for the purpose of comparison, contrast and utility is thus constructed using a multiple selection of methods and direction for theoretical evaluation (Simon 1985; Bacharach 1989; Whetten 1989; Weick 1995; Weick 1999; Sarasvathy 2004; Cornelius, Landström et al. 2006; Zahra 2007). The majority of the categories are questions or inquiries into the nature, relevance, and content that each of the concepts may be analysed to exhibit. The prime focus is to ask the questions that define the essence of each concept, identify their usefulness and offer some insight into their utility.

Importing data from both classification matrixes and drawing heavily on the identified literatures that focus specifically on theory, we analyse the two concepts (see Table 1. below). Several categories are unrepresented by the EC concept, most noticeably the sections on validity and reliability. This is explained by the obvious nature of the concept’s newness and lack of empirical testing.

### Table 1. Contrasting and Comparing Absorptive Capacity and Entrepreneurial Capacity

<table>
<thead>
<tr>
<th>Level of Analysis</th>
<th>EC</th>
<th>AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process(es)</td>
<td>Discovering, evaluating and exploiting opportunity inherent in new knowledge</td>
<td>Acquiring, assimilating &amp; exploiting knowledge within a firm to gain competitive advantage.</td>
</tr>
<tr>
<td>Specific Relevance</td>
<td>Entrepreneurial cognition</td>
<td>Knowledge management, dynamic capabilities</td>
</tr>
<tr>
<td>Explanatory Power</td>
<td>Potential theoretical strength resulting from functional aspect of valuation and parsimony of constructs.</td>
<td>Significant but varied results from empirical tests with respect to AC constructs and performance.</td>
</tr>
<tr>
<td>Utility of Construct</td>
<td>- constructs abstract and generalized. - complex cognitive level constructs - construct for opportunity evaluation - business planning, general and specific problem solving skills - construct scope is relevant to all value creation contexts - construct provides functional and mathematical formula for estimating and evaluating value creation - constructs clearly defined</td>
<td>- Complex multilevel constructs - Multiple constructs have been used to measure AC - The specificity of construct assumptions has been related to a ‘capability’, ‘resource’ or both - The construct scope is relevant to only R&amp;D contexts, - The construct cannot measure performance directly (investing in AC may yield + or – results) - high usage of proxy variables - potential dichotomy with respect to realization of ‘rents’ (resources that provide competitive advantages vs. how resource is used within firm) - Construct omits the role of the individual, although based upon cognitive theoretical elements.</td>
</tr>
<tr>
<td>Falsifiability of Constructs</td>
<td>yes</td>
<td>- no</td>
</tr>
<tr>
<td>What variables or constructs is part of the theory?</td>
<td>Prior knowledge, general and specific problem solving skills related to discovery, evaluation and exploitation of opportunity</td>
<td>Cognitive model of firm, firm structure, firm resources, firm strategies, R&amp;D department or not, level of R&amp;D investment, firm (prior)knowledge base, market orientation, education level of researchers, publishing in research journals, strategic alliances w/other firms, use of contractors, public research partnerships, social networks, learning triggers</td>
</tr>
<tr>
<td>What are the external constraints that impact upon the theory (antecedents)</td>
<td>Resources, alignment, conviction and contextual.</td>
<td>Scope of technological opportunities, amount of knowledge available, ease of learning external knowledge (similar language, symbols), relevance of knowledge to firm, complexity of knowledge, propensity for knowledge spillovers in industry, appropriability (weak or strong IP protection regimes), potential marginal improvement of new technology to performance, path dependency</td>
</tr>
<tr>
<td>What are the potential outputs?</td>
<td>New means ends relationships resulting in economic value, new firms.</td>
<td>Internal knowledge (basic science, applied science, new technical and organizational processes, market awareness, vision, need for change), commercial outputs (Products, services, IP, and other realized value related to processes of firm), Public Good Outputs (The value derived from outputs that are not translatable into dollars but have social value, either positive or negative).</td>
</tr>
<tr>
<td>Where and when is the General. Applicable to all instances</td>
<td>Specific: Applicable to instances of the generation or...</td>
<td></td>
</tr>
</tbody>
</table>
Theory applicable? where there is an existence of productive opportunity arising from new knowledge with economic potential discovery of new knowledge through R&D related activities within a firm or organization.

<table>
<thead>
<tr>
<th>Resource or capability</th>
<th>Why is selection of the variables and their relationships justified?</th>
<th>How are the variables related?</th>
<th>Validity of constructs</th>
<th>Reliability of construct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neither</td>
<td>Applicable and observable to the entrepreneurial process. Evaluation is considered key entrepreneurial skill as discovery or exploitation can be done by someone other than entrepreneur.</td>
<td>Linear (discovery – evaluation – exploitation)</td>
<td>-Not tested.</td>
<td>-Not tested.</td>
</tr>
<tr>
<td>Both</td>
<td>Based upon researched and applied techniques of learning and cumulative knowledge developed through individual cognitive examination. Extended to the firm through application of individualistic tendencies, skills and attributes</td>
<td>Linear (acquire, assimilate, apply)</td>
<td>-Construct validity problems relating to internal validity problems that include measures used as both dependent and independent variables -high propensity for reification -external validity conflicts arise from different definitions and measures of AC indicators have been used means that it is very difficult to compare and evaluate different studies</td>
<td>-Similar tests have produced different results with different sets of data.</td>
</tr>
</tbody>
</table>

Findings/Results

The categorization conducted above provides a systematic and comprehensive examination of the two concepts that distils the essence of each into qualitative dimensions for comparison. We will attempt to simplify the findings in this section, and further sort them under sectional headings of ‘relevance’ and ‘utility’ for ease of understanding.

Overall Relevance

This analysis finds that both EC and AC are designed to understand, explain and practically apply causally tested theories relevant to the process of innovation. Beyond this very general similarity, the questions posed, areas of substantive exploration, scope and explanatory depth that each uses to explore innovation are very different. While EC is defined as a functional and conditional component of innovation, its application is much more direct in nature. Without EC, the potential economic value of the opportunities inherent in new knowledge is zero, and thus innovation cannot take place. This differs from AC, as its application to innovation is indirect; resulting in outcomes that are more aligned with a dynamic capability (Zahra, Sapienza et al. 2006; Helfat, Finkelstein et al. 2007). Flexibility to change to external market conditions, potential competitive advantages derived from knowledge generation and greater accumulation of knowledge of all types, productive or unproductive are typical outputs of a firm’s AC. These capabilities may lead to innovation, and success, or they may not (Lane et al., 2006). Simply put, innovation may or may not happen within a firm regardless of it having a well developed AC.

Perhaps the most significant dimension that distinguishes these two concepts is the emphasis on the individual. The original concept of AC developed by Cohen and Levinthal (1990) build upon the individual cognitive learning processes of knowledge acquisition and then expands this construct to the firm level to simulate the organizational processes of acquiring, assimilating and applying new knowledge. This process is thus linked to organizational theory and represents the intensity, focus and structure of research and development departments within large firms. It is also dependent upon its relationship with other structural elements of the firm that are necessary for the creation of competitive advantages within an industry. This fact places the conceptual roots of AC squarely within the emergence school. Further evidence to this can be extrapolated from the routines, policies, structures and resources of the firm that govern the learning processes and the consequent usage of knowledge available for innovation. The path dependencies and capabilities developed by AC within the firm cannot properly mimic the actual individual learning processes that these constructs are based on, leading to breakdowns in abstraction and confusion. Several studies confirm this, both theoretically, and empirically, applying the AC concept through
individual based constructs (Shih-Wei 2005; Azagra-Caro, Fragiskos et al. 2006; Jones 2006; Jong-Hun, Hyun-Ju et al. 2007; Shu-hsien, Wu-Chen et al. 2007; Todorova and Boris 2007). Many of these authors note that the main focus of AC has been on structure rather than agency, and that the measure of aggregate individual capacity (gatekeepers, leaders, power relationships) will provide higher levels of validity and open paths to operationalization and practical usage of theory in the every day workings of the firm.

What these authors may be grasping at using the AC concept is more akin to the theoretical underpinnings of EC. The framework of EC is specifically built around the individual. The essence of EC is the inherent skills of the individual, both generic and specific, that embodies a reservoir of transformational energy to be utilized through its processes: to discover, evaluate and exploit opportunity. That these processes bear resemblance to the ‘acquire, assimilate and apply’ processes of a firm’s AC, are not surprising, as they are based on what individual entrepreneurs do. As the explanatory power of the concept of EC resonates closely with the individual, it does not break down through additional abstraction. The entrepreneur is intimately related to the opportunity, and within the definition of EC, is assumed to have power to engage the opportunity with the full force of his or her transformational capacity, identified constraints aside. Complexities spring from the internal cognitive abstraction that represents the measure of the potential capacity put forth, and the total realizable productive value of the opportunity. The crux being, ceteris paribus, the greater the entrepreneurial capacity, the greater the realizable value from the opportunity, and thus greater levels of value accruing to stakeholders from this transformational action.

In summation, the relevance of AC is concentrated at the firm level and the indirect processes that impact upon innovation from the learning processes, prior knowledge, and application of three functional dimensions: the acquisition, assimilation and application of new knowledge. It resides within the domain of the emergence school and is linked to organizational theory. In contrast, EC is concentrated firmly at the individual level, and is a direct and integral component of the value creation process of innovation, highlighted by the actions of discovery, evaluation and exploitation. It represents the opportunity school of thought.

Utility

There are also apparent differences in utility between the two concepts. One of the main strengths of EC is its parsimonious nature and simple to understand functional relationships. Both the linear flow model and the mathematical formula demonstrate its utility as a tool for generating intuitive and precise questions and it is much less unwieldy than AC. Both the scope and breadth of the operational constructs are fluidly constructed and well grounded in observable phenomenon. As well, the concept is perfectly falsifiable through its mathematical modelling. As EC is generalized to the value creation process, it is amenable to testing a wide spectrum of hypotheses across a variety of disciplines, schools of thought, and contextual circumstances. The variables, constructs and constraints are also highly generalized, allowing for flexibility of its application. It should be noted that the many strengths in utility accrued to EC emanate from its novelty and that it is not encumbered by decades of empirical testing and re-conceptualization. Both validity and reliability of the variables and constructs housed within the concept are therefore not available for evaluation and comparison.

Unlike the generalized concept of EC, AC is specific to the R & D functions of the firm. While this substantive focus may be translated into greater explanatory depth and practical application of theory, it is also limiting with respect to not having a direct theoretical significance to innovation. First, innovation is not confined to the R & D departments of a large firm. Many small firms and individual innovators cannot or do not use the routines, structures and policies that drive the innovation process within larger firms. Several studies have concluded that the bureaucratic processes and routines that are found within larger corporations do not at all resemble the organic structures of smaller firms. Innovation has been defined as a heterogeneous and non-linear process that is often stultified within hierarchical organizational structures. Nevertheless, these oft laborious routines and structures have been found as empirically significant to AC; and the
resulting ability of a firm to innovate. One clear interpretation of these findings is that path dependent routines do work! The question that logically follows is if they work, how well do they work, compared to what?

There is also potential theoretical and practical utility lost within the complexity of AC and the multiple levels of study that it has been applied towards. Analysis of the literature finds that a variety of proxy variables have been used and within many studies, are often related to innovation, even though performance cannot be measured directly. Due to the wide diversity of definitions, measures and indicators in many studies that use AC, external validity conflicts can result, making it extremely difficult to compare across studies. Internal validity problems have also been demonstrated in studies that include measures used as both dependent and independent variables. An investigation into the possible reification of the concept reported that AC may suffer from its usage across a wide variety of substantive areas, too far extrapolated from its intended theoretical application, and thus weakening its utility even further (Lane, et al., 2006).

Once again summarizing our findings, the AC concept is well endowed with explanatory antecedents, variables, constructs and constraints, but is thus made overly complex, limiting its utility for understanding and testing innovation on a broader scope. Inconsistencies in validity and reliability extending from the non-systematic and diverse use of constructs and variables further weaken its utility. In comparison, the EC concept if both functional and clearly stated, and its generalization lends to its robustness for exploring innovation across many areas of inquiry. Internal abstraction of cognitive elements requires further clarity.

DISCUSSION

Our comparative analysis of AC and EC has provided ample evidence from the literature to systematically and categorically distinguish these concepts using pre-selected methods for the evaluation of theory. In terms of direct relevance to innovation, EC has been demonstrated as a suitable framework for investigating the value creation process. Consisting of general yet clearly stated assumptions that seek to delineate the functional relationship between the productive opportunity of new knowledge, entrepreneurship and value creation, EC is both a parsimonious and practical theoretical vehicle for investigating innovation across a wide spectrum of testable questions. In contrast, AC is designed to reflect a capability possessed by the firm that specifically examines the learning processes that contribute to competitive advantage. It is specific in scope to R & D and indirect in its relevance to innovation, as the investment in AC is not a direct reflection of a firm’s ability to innovate, but to acquire, assimilate and apply knowledge towards achievement of innovative ends. Empirical testing does show that development of AC is usually significant for performance, but uncertainty extending from problems of construct validity or proxy measurements limits the potential significance of these findings. Ultimately, the results of AC may produce flexibility to changing environments but cannot reliably predict performance based upon the capabilities so developed.

Although both are founded upon the cognitive elements of the individual, they are separated by two different theoretical perspectives: the emergence school of thought (AC) that embodies the value creation process within the boundaries of a firm’s activities, and the opportunity school (EC) that is prototypically interested in the individual – opportunity nexus that casts the entrepreneur as the driving force in the value creation process. In effect, the emphasis on the opportunity in EC provides better insight into how new knowledge may be discovered, evaluated and exploited to create new means end relationships, theoretically grounding these actions to innovation at a highly generic level through its conceptual framework. The strengths of EC thus become the weaknesses of AC, as the firm level organizational mimicry of cognitive level functions are attenuated and diluted from that of the individual. Organizational theory is thus used to reconfigure these functions through the addition of routines, policies and structures that emulate the entrepreneurial activity of transformation, but lose integrity and efficacy through the protraction of individual power distance from the intimate details and dimensions surrounding the monitoring of the productive opportunity. Several studies have looked at this vertical power distance issue and have
found that it isolates the ability of the entrepreneur (who has limited time), forcing he or she to resort to less effective organizational controls (Beckmann 1960; Shane 1996; Earl 2003; Audretsch and Lehmann 2006). Thus it is logical to hypothesize that firms with high levels of AC might possibly have low levels of EC. This is perhaps why Todorova (2007) places emphasis upon social integration methods and the separation of the assimilation – transformation functions within AC. Until now, EC has not been available to properly test these assumptions.

These findings pose an interesting argument for the complementariness of AC and EC. Because of its wide and varied usage across multiple levels of analysis and substantive areas, and owing to several attempts at re-conceptualization and modification, AC has evolved into an exceedingly complex concept. Returning to Cohen and Levinthal’s original work and then historically following the evolution of the concept over time, it appears that through successive usage and expansion of AC, theoretical clarity has been traded for a voluminous mapping of the variables and constructs that inform and impact upon a firm’s ability to innovate. This study suggests a growing portion of this research may have exceeded the capacity of the concept to deliver in areas outside of its original purview, placing excessive strain upon an otherwise useful tool for understanding how firms systematically acquire, assimilate and apply knowledge towards competitive advantages. This may be a signal that other paradigms may be needed that better fit the exploration of hypotheses outside of the scope and depth of what AC can offer. Researchers striving to better understand the processes of transformation that create value within a firm may be better served by using EC rather than AC.

The complimentary aspects of these two concepts can be identified through their relationships to innovation: AC dealing with knowledge creation and acquisition at the firm level, and EC focusing on the transformational processes necessary for value creation at the individual level. They also differ greatly in their utility for studying specific industry R & D contexts, as AC is substantively interested in the process of innovation at a firm based level, while EC is designed to examine innovation and value creation at a general and individual level. Although both concepts are unique and highly distinguishable from each other in relevance and utility, they are tied together by their cognitive roots in cognition. This argument is evidenced by the striking similarities found when conducting a perfunctory review of both concepts, as the EC process of discovery, evaluation and exploitation are very much aligned with the AC processes of acquire, assimilate and apply.

Limitations

One of the obvious limitations of this study is the problems inherent in comparing a newly emerging concept with a well established and highly propagated concept. The progressive nature of science realizes both fit and fault as concepts are tested and modified by a diverse set of researchers exploring different questions within a substantive field of study (Edmondson and McManus 2007). It is obvious that AC has both suffered and benefited from the application of rigorous scientific methods and analysis. As a newly birthed concept (although having existed and utilized in the literature as a theoretically ungrounded term for almost a century), EC provides stimulating new avenues of inquiry and offers a mathematically pure definition of innovation that is generalized in such a way that through its application, researchers may explore a near limitless expanse of questions, ranging from those previously explored to those of vistas yet unknown. While its general theoretical framework can be noted as an asset, the abstraction of the cognitive level and the individuals “capacity to do” is a current weakness that requires further edification and expansion. Further examination of the extant literature on entrepreneurial cognition is tantamount to its readiness for empirical testing. This study will be predicated upon the cognitive association of how entrepreneurs balance the use of both general problem solving skills and specific skills used in divining the opportunities that lay hidden within new knowledge.

Second, the findings of this study that put forth the notion of potential areas of complementariness between the two concepts are subject to further theoretical, quantitative and qualitative testing. Consequent outside analysis may raise objections to the perceived minor overlap of these concepts, to surface polemics against the distinguished nature of both. As each concept is explicit
Implications

Considering the above limitations, it is to this end referred to above that the complementariness of AC and EC delivered through the work in this article may be pivotal to the advancement of further clarity within the entrepreneurship field, leading to a ‘theory of the entrepreneur’ that may stand opposite but conjoined to the ‘theory of the firm’ through an overarching ‘theory of innovation’. As the field now stands, the relationship between innovation and entrepreneurship is fragmented, confused and highly non-uniform in its application by researchers. It is obviously not the fluid and precise tango that most of us imagine it should be, but a hectic and convulsing modern dance that is driven by individual emotion, culture and competitive energies.

Scholars such as Birch, Romer and Schumpeter that have pronounced the importance of entrepreneurship, defined its role and tested its relevance, still fail to decisively link the individual act of transforming new knowledge, its subsequent advancement through the creation of new businesses and the ultimate realization of economic growth. This clue to endogeneity has eluded the best of economists. Bound by reductionist shackles they are unable to quantify the transformational energies requisite within the entrepreneur. It is hoped through the advancement of the concept of EC that endogenous growth can be better grasped through the positivistic search for how we determine and foster the capacity of individuals to ‘conceive of what to do’ with a productive opportunity that is laden with inherent market value.

Future research

There are several pathways for advancing research that revolves around these two concepts. The study of the complimentary nature of AC and EC may yield a multitude of research questions and hypothesis to explore that may be potentially beneficial to both concepts. For instance, what are the impacts of increased entrepreneurial capacity within an R&D environment with respect to discovery, evaluation and exploitation of both current internal stocks of knowledge within the firm? What is the relationship between the processes and routines that exist within a firm that help to scan, appropriate and disseminate knowledge with the individual entrepreneurial capacity of key individuals or teams? Is it possible to have a high absorptive capacity within a firm or a department, but yet have low entrepreneurial capacity? What may be the implications? Finally, how may past constructs used to measure individual absorptive capacity be refined to measure entrepreneurial capacity instead? Can a separation of the two domains provide greater analytical power with respect to the research questions currently being explored?

Before moving forward, this research must first be predicated upon a deeper exploration and understanding of the entrepreneurial capacity concept so that it may first encompass work already progressed within the field in order to underpin construct development and testing. For instance, how may the concept of entrepreneurial capacity be harmonized with work published on entrepreneurial orientation, self-efficacy, effectuation, and expertise? How may the valuation construct with regards to innovation be extended within the model to encompass a diversity of stakeholders in a uniform manner? What are the methods most appropriate for testing the constructs and how does this extend to the firm level analysis of entrepreneurial capacity?
If the focus within the field of entrepreneurship can be effectively shifted from the processes involved with entrepreneurship to concentrate more on the individual’s capacity ‘to do’ sometime in the future, what are the possible implications for entrepreneurship education? If evaluation is the key entrepreneurial skill, what is the relationship between the entrepreneur, the opportunity and the business plan and how we teach the specific skill of solving general problems? And finally, who should we be educating to become entrepreneurs: those that are already endowed with entrepreneurial capacity that has potential for release, or those who require greater fostering of the capacity ‘to do’ when it comes to discovering, evaluating and exploiting opportunity?

CONCLUSION

Using selected theory evaluation methods, the findings distilled from this study point to substantial differences in relevance and utility of the two concepts compared. While entrepreneurial capacity emerges from this study as a distinct concept that can be readily distinguished from absorptive capacity, there is also a case to be made for their complementariness. Each concept examines the question of how innovation is created through different approaches; entrepreneurial capacity focuses on the individual’s ‘ability to conceive of what to do’ with a productive opportunity, while absorptive capacity examines the processes used by the firm that collect, store and utilize knowledge to induce a variety of outcomes. When interpreted through the opportunity and emergence perspectives found within the entrepreneurship literature, these two approaches fit well into two separate but highly intertwined levels of analysis in the study of innovation.

It appears that individual usage of each concept will have definite usages and utilities moving forward in the area of innovation research. As the concept of entrepreneurial capacity is fleshed out through further theoretical and empirical testing, the better understanding of absorptive capacity and the relationship of the two concepts yielded through this paper will further strengthen the developmental frameworks of each and serve to advance the pursuit of management science in both domains.
REFERENCES


