

A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature

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ABSTRACT This paper consolidates the state of academic research on *innovation*. Based on a systematic review of literature published over the past 27 years, we synthesize various research perspectives into a comprehensive multi-dimensional framework of organizational innovation – linking leadership, innovation as a process, and innovation as an outcome. We also suggest measures of determinants of organizational innovation and present implications for both research and managerial practice.

INTRODUCTION

Innovation is widely regarded as a critical source of competitive advantage in an increasingly changing environment (Dess and Picken, 2000; Tushman and O'Reilly, 1996). According to management scholars, innovation capability is the most important determinant of firm performance (Mone et al., 1998). An unrestricted search of academic publications using the keyword *innovation* produces tens of thousands of articles, yet reviews and meta-analyses are rare and narrowly focused, either around the level of analysis (individual, group, firm, industry, consumer group, region, and nation) or the type of innovation (product, process, and business model). While this narrow focus helps deepen our understanding of specific facets of innovation, the resulting fragmentation of the field prevents us from seeing the relations between these facets and ultimately impedes consolidation of the field.

In the business world, innovation has similarly received widespread attention. However, while there have been an increasing number of practitioner-based measures, rankings, and indexes, they often remain disconnected from the academic research available.

Our intent in undertaking this study was to bring together all parts of the proverbial elephant by consolidating extant research, establishing connections in the disparate literature, and identifying gaps between different research streams. Thus, we conducted

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a systematic analysis of the innovation research to offer a comprehensive multi-dimensional framework of organizational innovation on which to build measures of firm innovation capability and outcomes.

An impediment to the systematic analysis was the loose application of the term 'innovation', which is often employed as a substitute for creativity, knowledge, or change. However, we were able to build on several reviews, which had attempted to capture the birth, evolution, and transformation of innovation research (Anderson et al., 2004; Camison-Zornoza et al., 2004; Garcia and Calantone, 2002; Gopalakrishnan and Damanpour, 1997; Hansen and Wakonen, 1997; Landry et al., 2002).

Definitions of innovation abound, each emphasizing a different aspect of the term. The first definition of innovation was coined by Schumpeter in the late 1920s (Hansen and Wakonen, 1997), who stressed the novelty aspect. According to Schumpeter, innovation is reflected in novel outputs: a new good or a new quality of a good; a new method of production; a new market; a new source of supply; or a new organizational structure, which can be summarized as 'doing things differently'. However, as Hansen and Wakonen state, 'it is practically impossible to do things identically' (Hansen and Wakonen, 1997, p. 350), which makes any change an innovation by definition. Although Schumpeter clearly positioned his definition of innovation within the domain of the firm and outlined its extent as product, process, and business model, there are continuing debates over various aspects of invention: its necessity and sufficiency (Pittaway et al., 2004), its intentionality (Lansisalmi et al., 2006), its beneficial nature (Camison-Zornoza et al., 2004), its successful implementation (Hobday, 2005; Klein and Knight, 2005), and its diffusion (Holland, 1997) to qualify as innovation.

We composed a comprehensive definition of innovation, which corresponds to the broad scope of our research objective. *Innovation is: production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome.*^[1] Innovation diffusion, which is the subject of many papers, has been excluded from our consideration as it refers to a process taking place after innovation, as we defined it, has already occurred.

This definition captures several important aspects of innovation: it includes both internally conceived and externally adopted innovation ('production or adoption'); it highlights innovation as more than a creative process, by including application ('exploitation'); it emphasizes intended benefits ('value-added') at one or more levels of analysis; it leaves open the possibility that innovation may refer to relative, as opposed to the absolute, novelty of an innovation (an innovation may be common practice in other organizations but it would still be considered as such if it is new to the unit under research); and it draws attention to the two roles of innovation (a process and an outcome).

Being aware of a wide range of meanings of our keyword, we have intentionally cast the net wide in order to fully understand all definitional nuances, associated constructs, and related models. Thus, the initial step of the project was a review and categorization of the findings. We then synthesized the revealed categories into a comprehensive multi-dimensional framework of organizational innovation, consisting of the three sequential components: innovation leadership, innovation as a process, and innovation

as an outcome. The role of leadership at all levels of an organization, although sometimes tacit, is paramount for spearheading innovation as a process and maintaining its momentum until innovation as an outcome ensues. Adoption of this sequential view helps bring to light the often missed causal interconnectedness between these three components of innovation.

Our focus on organizational innovation^[2] (firm, group, and individual levels of analysis) was driven by an intention to be practical in our orientation by focusing on elements that are arguably within control of the firm. Although higher level models might be more comprehensive, they would necessarily include industry, national, or global levels, which are arguably beyond the individual firm's control. By targeting the firm level, we can provide a practical basis on which managers can build structures and systems that would enable innovation within a firm. At the same time, it was important to isolate the leaders' influence from organizational level factors. Although leadership for innovation has been a subject of research, the mechanisms for its connection with the rest of the innovation process have not been explicit. Additionally, in line with our definition, we intend to delineate the difference between innovation processes and outcomes: the former clearly precedes the latter and should be separated to avoid circular arguments.

We begin by describing our research methodology, followed by the review and classification of the results. We then synthesize our findings into a comprehensive multi-dimensional framework of organizational innovation. Finally, we discuss the implications of our findings for both research and management, and propose avenues for future research.

METHODOLOGY

Choosing a Methodology

An analytical review scheme is necessary for systematically evaluating the contribution of a given body of literature (Ginsberg and Venkatraman, 1985). A systematic review uses an explicit algorithm, as opposed to a heuristic, to perform a search and critical appraisal of the literature. Systematic reviews improve the quality of the review process and outcome by employing a transparent and reproducible procedure (Tranfield et al., 2003). Although this methodology is not without challenges – such as difficulty of data synthesis from various disciplines, insufficient representation of books, and large amounts of material to review (Pittaway et al., 2004) – we felt it was important to have a methodology that could deal with the breadth of the innovation field. Generally, the review process consists of three parts: data collection, data analysis, and synthesis. The scientific rigueur in conducting each of these steps is paramount for a quality review.

Data collection. Data can be collected by the researchers in different ways: employing a panel of experts to identify relevant papers; using knowledge of the existing literature to select articles; and searching various databases using keywords. In contrast with these arguably subjective collection methodologies, a *systematic review* approach, as used in this paper, removes the subjectivity of data collection by using a predefined selection algorithm.

Data analysis. Once the articles are selected for a review, the data analysis may proceed in different ways depending on the objectives of the review. For example, a review aimed at consolidating the results of multiple empirical studies may rely on either qualitative or quantitative analysis of the results. The latter, in the form of meta-analysis, is considered to be superior to the former (Hunter and Schmidt, 1990).

Our goal in this review is a comprehensive overview and a *conceptual*, rather than an empirical, consolidation. Thus, we are methodologically limited to descriptive rather than statistical methods in our analysis of the results. In other words, we had to sacrifice depth for breadth. Since the nature of the collected data, beyond the descriptive categorization of the papers by types, is qualitative (types of theories used, ways constructs are conceptualized, and explanatory rationals offered), a corresponding method of data analysis was used in this study. Among available qualitative analysis techniques, pattern-matching and explanation building (Yin, 1994) were selected for this review. The pattern-matching is not a precise science and thus the researcher should look for gross matches and mismatches in which ‘even an “eyeballing” technique is sufficiently convincing to draw a conclusion’ (Yin, 1994, p. 110).

Data synthesis is the primary value-added product of a review as it produces new knowledge based on thorough data collection and careful analysis. Based on the data analysis method described above, we identified ten dimensions of innovation which appeared in the papers in our consideration set. These dimensions were then mapped onto a framework consisting of the two sequential components: innovation as a process (how?), and innovation as an outcome (what?). Additionally, we compiled the determinants of organizational innovation and their associated measures, and organized them around three theoretical lenses found in organizational research.

Overall, our methodology is that of a systematic review (Tranfield et al., 2003). Its aim is a conceptual consolidation across a fragmented field. It uses systematic data collection procedures, descriptive and qualitative data analysis techniques, and theoretically grounded synthesis.

Methodology Description

We followed Tranfield et al.’s (2003) three-stage procedure: planning, execution, and reporting.

During the planning stage, we defined the objectives of the research and identified the key data source. Our objective was intentionally broad and somewhat standard for such types of comprehensive reviews: to assess the range of definitional, conceptual, operational, and theoretical similarities and differences found in this research domain.

We chose to limit our sources to peer-reviewed journals because these can be considered validated knowledge and are likely to have the highest impact in the field (Podsakoff et al., 2005). The ISI Web of Knowledge’s Social Sciences Citation Index (SSCI) database was chosen as a database of record, as it is one of the most comprehensive databases of peer-reviewed journals in the social sciences. Its unique feature of citation counts allows a triage of a large pool of articles based on this objective measure of influence. We have used all years available in the SSCI database at the time of the research: from 1981 to 2008 (7 November).

The second stage of our systematic review process, execution, consists of five steps: (1) identifying initial selection criteria – keywords and search terms; (2) grouping publications; (3) compiling a consideration set; (4) classification and typology of the results; and (5) synthesis. The first three steps pertain to collection and organization of the data, and the last two steps involve data processing and analysis.

Identifying Initial Selection Criteria: Keywords and Search Terms

A comprehensive search differentiates a systematic review from a traditional narrative review (Tranfield et al., 2003). Given the plurality of meanings embedded in the term ‘innovation’ and taking into consideration that researchers may have used this term in a variety of ways, we employed a general selection requirement for our initial pool to maximize the inclusion of all relevant studies. Our initial search of the SSCI database was undertaken using the basic keywords: ‘innovation’ and its derivatives (i.e. TS = innovation*); document type ‘article’ and ‘review’ (but not ‘book review’); language ‘English’; subject area ‘business’, ‘management’, ‘economics’, and ‘finance’, without any additional selection restrictions.^[3] The keywords were used as a selection criterion for the *topic* (title, keywords, or abstract), resulting in an initial sample of 10,946 papers. This initial set was then fixed as the basis for all future analysis.

Grouping Publications

Since the main objective of our research was to understand the broad theoretical foundations of the area, our first group of interest (Group 1) consisted of reviews and meta-analyses. The second, and the largest, group (Group 2) in this study was obtained by applying citation-based selection criteria to the initial pool. Furthermore, considering citation biases and lags, we isolated the most recent publications (2006–08) (Group 3) to which we applied different selection criteria, as will be explained below. All three groups were checked for overlaps. The main entry was retained in the first group under consideration, while duplicating entries were eliminated from the subsequent groups. For example, a review was retained in Group 1, regardless of its citation rank; a highly cited paper was retained in Group 2 even if it was published recently.

Compiling the Consideration Set

Group 1: Reviews and meta-analyses. To identify reviews and meta-analyses, we restricted the search to papers with ‘innovation’ in the *title* and ‘review’ or ‘meta’ in the *topic* (title, keywords, or abstract) of the paper. This search yielded 120 papers. Only 34 were reviews or meta-analyses in a proper analytical sense, with the remainder being purely descriptive and/or narrowly focused articles (e.g. on libraries, healthcare, agriculture, manufacturing, biotechnology, State of Victoria, UK, small companies, etc). Seven more reviews published as books or book chapters were added on the recommendation of an anonymous reviewer, bringing the total number of papers in this group to 41.

Group 2: Highly cited papers. We then continued with the main body of 10,946 articles that had ‘innovation’ in the *topic*. Citation-based analysis is widely used as a measure of paper

quality, as paper citations serve as a *de facto* vote of its contribution towards knowledge accumulation and development (Saha et al., 2003). We identified 690 high impact papers, which had at least five citations per year (using 2009 as the base year). After reading the abstracts, this pool was narrowed down to 376 papers that contributed to either theory development or theory testing. We excluded: book reviews; non-business, purely descriptive, narrowly focused, and difficult to generalize papers; those focused only on innovation diffusion; and papers in which the term ‘innovation’ was used metaphorically as a substitute for creativity or strategic change. The exclusion criteria were discussed in advance, and tested on a set of 20 papers. The pool was split between two panellists, who used these exclusion criteria in a conservative fashion favouring inclusion rather than exclusion. Nine reviews and meta-analyses were excluded from Group 2 (since they were already associated with Group 1), resulting in a total of 367 papers in this group.

Group 3: Recent papers. Recognizing that the citation-based method may discriminate against recent publications (since newly published papers do not have the time to accumulate citations), we formed an additional group from the most recent papers (2006–08): 2929 (27 per cent) of the 10,946 papers were published during this period. As the citation-based criteria could not be used, we applied an alternative quality criterion for data reduction purposes. Based on the premise that top journals normally publish top quality papers, we used a combination of the ten most cited journals publishing innovation research and the top 40 *Financial Times* journals (Table I) to isolate 754 papers. Indirect support for our selection criteria was the fact that in spite of their recency, nine papers in this pool were cited more than five times. These papers, which were already included in our highly cited pool, together with formerly mentioned reviews and analyses, were excluded to avoid inter-group duplication. After reading the 745 remaining abstracts, we added 117 papers, which contributed to either theory development or theory testing, to our pool of 367 papers and 40 reviews, resulting in a total sample of 524 papers.

Table I. Top 10 journals publishing innovation research

<i>Source title</i>	<i>No. papers</i>	<i>% of most cited</i>
Research Policy	157	7.8%
<i>Strategic Management Journal</i>	105	5.2%
Journal of Product Innovation Management	77	3.9%
<i>Management Science</i>	69	3.5%
<i>Academy of Management Journal</i>	63	3.1%
<i>Organization Science</i>	58	2.9%
Regional Studies	37	1.8%
<i>Administrative Science Quarterly</i>	33	1.7%
<i>Academy of Management Review</i>	31	1.6%
<i>Rand Journal of Economics</i>	31	1.6%

Notes: These journals had the most articles covering innovation as a *topic*. Titles in italics are part of the top 40 *Financial Times* journals.

Table II. The number of papers in each group

<i>Group</i>	<i>Initial pool</i>	<i>Filtered</i>	<i>Abstract analysed</i>	<i>Less duplicates</i>
<i>Group 1: Reviews and meta-analyses</i>	120	120	34	41 ^a
<i>Group 2: Highly cited papers</i>	10,946	690	385	367
<i>Group 3: Recent papers</i>	2,929	754	126	117
Total				525

Notes: ^a Seven books and book chapters were added to this group on the recommendation of an anonymous reviewer. We did not provide totals for other columns because paper pools overlap.

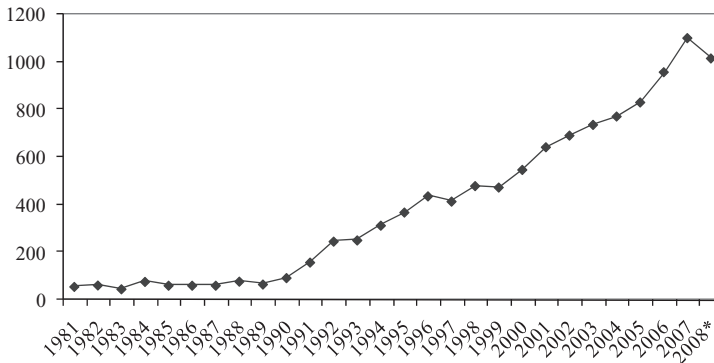


Figure 1. Growth of articles on innovation in business and economics journals

*Value for 2008 is estimated based on data until 11/07/2008.

The summary of our consideration set is presented in Table II.

RESULTS

In this section we provide a descriptive analysis of our initial sample and review the innovation dimensions captured in the highly cited papers. We conclude by scoping out the theoretical field and providing a preliminary conceptual map of the existing research.

Descriptive Analysis

Since 1981, the number of publications in the fields of Business, Finance Economics, and Management (as reported in SSCI’s Subject Category field) with innovation as the *topic* grew at an average 14 per cent per year from around 50 in 1981 to more than 1000 per year in 2008 (Figure 1). Among our consideration set, theoretical papers represented about one third. The largest share was captured by empirical papers, with a particular emphasis on theory testing (46 per cent) and less so on theory building (6 per cent).

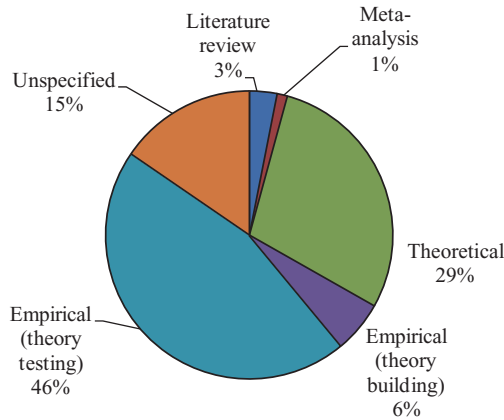


Figure 2. Breakdown of articles by paper type

Literature review and meta-analyses represented the smallest share (4 per cent), while 15 per cent of all papers were difficult to categorize (Figure 2).

The comprehensive nature of our definition allowed us to cast a wide net and it is therefore not surprising to find that the fragmented structure of the field revealed a multidimensional nature of the innovation domain. Gopalakrishnan and Damanpour (1997) propose the following dimensions of innovation: level of analysis (industry, organization, or subunit); stage of innovation process (ideation, project definition, problem solving, development, and commercialization); and type of innovation (product/process, incremental/radical, and administrative/technical) (Appendix A). However, these dimensions are neither exhaustive, nor systematic. Our comprehensive review was able to identify several additional dimensions discussed in the papers in our consideration set, which we will discuss in the Synthesis section.

The different dimensions were used with varying consistency in the literature. However, even the most commonly used (level of analysis) was not mentioned in 14 per cent of the papers, and the second most commonly used (innovation type) was not mentioned in 44 per cent of the papers. Therefore, we were able to provide descriptive classification along only the two most frequently used dimensions: the level of analysis and the type of innovation. Other dimensions were mentioned only in a few papers and thus could not be meaningfully graphed.

Our analysis of the results revealed that half of the papers dealt with the firm level of analysis, with other levels being almost equally represented (Figure 3). In half of the cases the type of innovation treated in the paper was unclear or not defined, while product innovation or technology innovation was the subject of about 20 per cent of articles each (Figure 4). Only 4 per cent of papers clearly specified a focus on the process. The dependent and independent variables were so diverse and numerous that their concise representation was not possible.

Identifying, and cataloguing the multitude of dimensions implicated in innovation research is an important first step towards seeing all the parts of the proverbial elephant

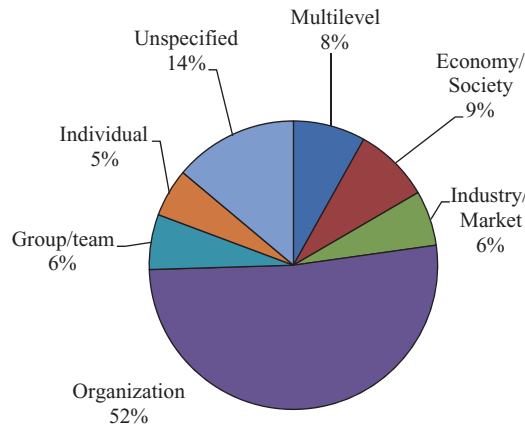


Figure 3. Breakdown of articles by level of analysis

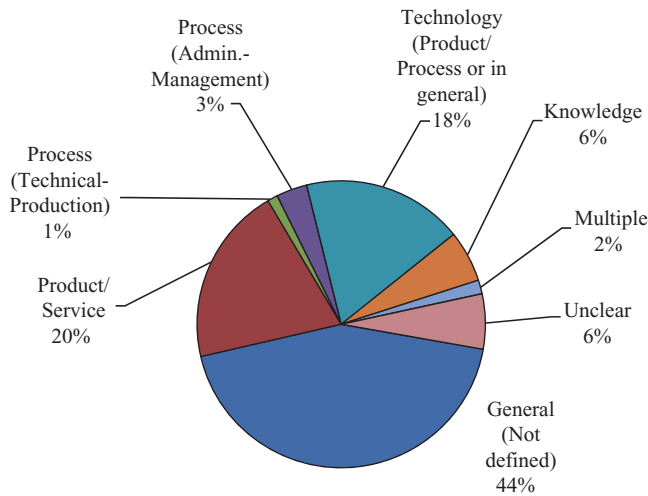


Figure 4. Breakdown of articles by innovation type

together. To understand how they fit together to form a whole, we reviewed the theories employed in our consideration set.

Scoping Out the Theoretical Field

Our analysis of the theoretical content of the field proceeded in three steps. First, we reviewed the spectrum of the theoretical lenses used in Group 2 (highly cited papers), organized them by level (individual, organization, macro, multilevel), and summarized the findings in Table III. We then collected the determinants of innovation found in our consideration set, and organized them by levels of analysis in Appendix B. We concluded by identifying inconsistencies, gaps, and tensions between levels, processes, and theories, which we discuss later.

Table III. Theories used in the highly cited papers by level

	<i>Multilevel</i>	<i>Macro (economy/industry/market)</i>	<i>Organization</i>	<i>Micro (group/team/individual)</i>
Institutional	Burns and Wholey (1993)	Cohen and Levin (1989) Haunschild and Miner (1997) Westphal et al. (1997)	Balachandra and Friar (1997) (contingency) Lam (2005)	
Economics and evolution	Berry and Berry (1992) Van de Ven and Poole (1995)	Coe and Helpman (1995) Feldman and Florida (1994) Pouder and St. John (1996)	Blundell et al. (1995) (path dependence) Brown and Eisenhardt (1997) Pl and Macduffie (1996)	
Network	Burns and Wholey (1993) Ibarra (1993)	Ahuja (2000) Hargadon and Sutton (1997) Porter (1998) Westphal et al. (1997)	Hansen (1999) Powell et al. (1996)	
Resource-based view and dynamic capabilities			Christmann (2000) Lei et al. (1996) Teece (1998) Tidd et al. (1997)	
Learning, knowledge management, adaptation, change	Brown and Duguid (1998) Von Krogh (1998)	Hargadon and Sutton (1997) (org memory) Haunschild and Miner (1997)	Cohen and Levinthal (1990) Denison et al. (1996) Edmondson et al. (2001) Eisenhardt and Tabrizi (1995) Grindley and Teece (1997) Lam (2005) McGrath (2001) Powell (1998)	Leonard and Sensiper (1998) Orlikowski & Gash (1994)
Other theories	Woodman et al. (1993) (interactionist)	Finnemore (1993) (constructivist)	Tushman and O'Reilly (1996) Sorensen and Stuart (2000) McGrath (1997) (real options)	Agarwal and Prasad (1999) Chatman et al. (1998) Harrison et al. (1997) Mick and Fournier (1998) Mintrom (1997)

Theories in highly cited papers. Surprisingly, most papers in Group 2 were purely descriptive. Empirical studies tended not to convey a strong theoretical base. Only 1/7 of the papers (n = 43) in Group 2 of the consideration set invoked a theory. Most commonly used were learning and knowledge management theories (17 papers), followed by network theories (10 papers), and economic theories (8 papers). Institutional theory, resource-based view (RBV), and adaptation theories were used in three papers each. Nine papers used various other theories (Table III).

Distribution of theories by level of analysis is also quite interesting. Network, learning, and knowledge theories are used across all levels. Economic theories are mostly used at the economy or societal level, but evolutionary economics is used evenly across macro levels. Resource-based view and adaptation theories are used at the organizational level, while psychological theories are quite appropriately applied at the individual level.

In summary, many studies in Group 2 did not invoke a strong underlying theory, and the theoretical perspectives that were employed tended to be quite disparate and generally operating at a single level.

Determinants of innovation. We found no overarching framework of innovation determinants in our consideration set. Even review papers that were attempting to consolidate existing research were covering somewhat different issues and levels of analysis: including geo-political territorial models (Moulaert and Sekia, 2003); market structure (Cohen and Levin, 1989), network (Pittaway et al., 2004), firm-level (Damanpour, 1991; Damanpour and Aravind, 2006) and process (Wolfe, 1994) models; implementation phase only (Klein and Knight, 2005); individual level of analysis (Anderson et al., 2004); and leadership (Mumford and Licuanan, 2004).

We have reflected the level-based split of our findings in Appendix B, where each level was represented by a separate rectangular area. Due to the relatively small number of studies covering the group level, they were consolidated with the individual level.

Issues, gaps, and tensions. Several issues emerged during our review. Although a few theories (resource-based view, knowledge-based view, organizational learning, and network theory) were used by several authors, the lack of a coherent and explicit theoretical base prevails. Hobday (2005) has reviewed five generations of innovation models developed from the 1950s to the 1990s (technology push, marketing pull, coupling models, integrated models, and networking models) and confirmed Mahdi's (2002) finding that even the latest innovation models failed to consistently explain findings across and even within sectors. The author argues that intra-sector differences are due to the path-dependent and iterative nature of the innovation process, thus a proper model should adopt an evolutionary approach and allow equifinality. These concerns were later addressed by Van de Ven et al. (2007), who proposed to view innovation as a non-linear dynamic system which consists of a cycle of divergent and convergent activities that may be repeated over time and at different organizational levels. Resource investments and organizational structure enable this innovation cycle, while external institutional rules and internal focus draw the boundaries of the journey. The authors suggest innovation managers 'go with the flow', because, while they can learn to manoeuvre through the innovation journey, they cannot control its flow.

Our review has identified several tensions that might not be obvious within the scope of an individual paper. For example, the tension between external and internal sources of innovation (e.g. market orientation vs. R&D) only becomes salient when both types of sources are explicitly recognized. Innovation scholars often focus on R&D effort alone, leaving out the influence of market orientation, which may not converge with that of R&D. In the early innovation studies, the innovation construct itself was operationalized as R&D intensity or as number of patents. These 'old' constructs have proven not to be generalizable for different organizational types and purposes (Adams et al., 2006), particularly as more and more firms move towards proactive market orientation.

From an organizational learning perspective, the known exploration–exploitation tension is exacerbated by the fact that both radical and incremental innovations are a part of exploration, inherently juxtaposed with exploitation. Finally, a major, often unrecognized, gap exists between adoption (decision to implement or use) of innovation and actual implementation. This issue is especially important because, as our definition stipulates, commercialization is an inherent part of innovation. If implementation is delayed, badly managed, or aborted, the innovation would fail to deliver the results an organization is expecting.

Our review has produced a clear picture of a fragmented field with several theoretical streams emerging. While learning and knowledge theories seem to be quite prominent, other management theories appear to be underutilized. The multiplicity of dimensions and their only sporadic recognition across the literature, as well as insufficient theorizing, have led to fragmentation and lack of interconnectedness. Our review identified an opportunity for synthesis which we describe in the next section.

SYNTHESIS

This section synthesizes the data obtained in this review into a comprehensive multi-dimensional framework of innovation. We begin with a discussion of the need to find a comprehensive approach to integrate the multiple dimensions of organizational innovation. Next, we organize the dimensions of innovation which emerged from the reviewed literature into those that pertain to innovation as a process and those related to innovation as an outcome. Then, we consolidate the determinants of innovation into three theoretically distinct meta-constructs (leadership, managerial levers, and business processes) and provide measures for these determinants collected from the reviewed literature. We conclude with a discussion of innovation as an outcome.

General Approach

Innovation is a broad term with multiple meanings; it draws on theories from a variety of disciplines and has been studied using a wide range of research methodologies. The synthesis is further complicated by multiple levels of analysis and dimensions, and inconsistent operationalization of the primary constructs, which in turn led to mixed empirical results. For example, the positive relationship between size and innovation was not always statistically significant in empirical studies (Camison-Zornoza et al., 2004). As Damanpour (1992) discovered and Camison-Zornoza et al. (2004) confirmed, it was due

to the fact that researchers operationalized size in a different way (log vs. raw data, personnel vs. non-personnel measures). Although complexity and fragmentation of innovation research may be seen as a challenge, it offers an opportunity to gain a more detailed understanding of the phenomenon within an overarching framework.

Our systematic literature review provides material for developing such a framework. Prior research has typically focused on only one dimension, of which the most prominent has been a vertical approach, focusing on level of analysis. Conversely, other studies have focused on innovation as a process, employing more of a horizontal approach to synthesis. However, as our review reveals, arguing on the basis of one and even several dimensions misses the larger picture. Thus, we seek an approach that allows a more comprehensive means to integrate the various dimensions of organizational innovation. We take as a starting point the objective of most theories: to describe, predict and/or explain the phenomena of interest in a field (Bunge, 1997; DiMaggio, 1995; Sutton and Staw, 1995; Weick, 1995) by establishing correlations and, if possible, causality between constructs. Although phenomena usually have multiple causes and complex feedback loops, the basic causal 'building block' is a sequential relationship. Thus, we adopt a sequential view for our framework whereby a set of determinants leads to our phenomenon of interest, innovation. Before delving into the determinants of innovation, we describe the dimensions of innovation as they relate to both process and outcome.

Dimensions of Innovation

The definition adopted in the paper provides the first obvious relationship: innovation as a process will always precede innovation as an outcome. Therefore, we separate these two roles of innovation.

During the process of our systematic review, we tagged each paper according to different categories as described in the Methodology section. One such category was dimensions of innovation. A total of ten dimensions of innovation surfaced from the literature.^[4] Upon reviewing the various dimensions it became apparent that they could be meaningfully organized into two categories: those pertaining to innovation as a process and those relating to innovation as an outcome. The former answered the question 'how' while the latter answered the question 'what'. The ten dimensions are depicted on the right hand side of Figure 5. We will discuss them in turn.

Innovation as a process. Dimensions pertaining to innovation as a process should answer the question 'how'.

Driver and *source* dimensions deal specifically with this question and both can be either internal or external. An internal *driver* of the innovation process can be available knowledge and resources, whereas an external driver would be a market opportunity or imposed regulations. An internal *source* of innovation is ideation, whereas an external source of innovation is adoption of innovation invented elsewhere.

The *locus* dimension defines the extent of an innovation process: firm only (closed process) or network (open process). The *view* dimension considers how the innovation process starts and develops; whether it is top-down or bottom-up. The *level* dimension delineates the split between individual, group, and firm processes.

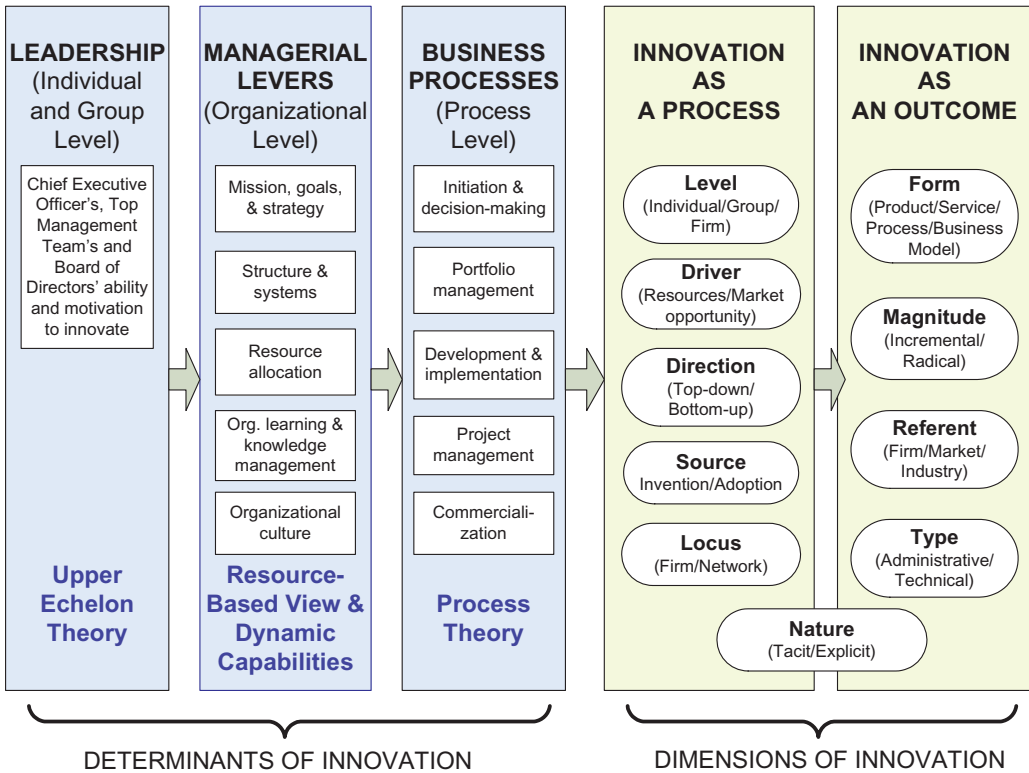


Figure 5. Multi-dimensional framework of organizational innovation

Overall, the view of innovation as a process is under developed in the literature. In contrast, the main focus of the scholars is on innovation as an outcome and we will discuss that next in more detail.

Innovation as an outcome. The distinction between innovation as a process and as an outcome is sometimes blurred. As Sood and Tellis (2005) point out, lack of clarity in separation of these two facets of innovation may be intrinsically problematic. This problem is compounded when innovation outcomes are confused with market performance (e.g. new entrants that displace incumbents with disruptive technologies) such that researchers risk asserting premises that are true by definition.

Dimensions pertaining to innovation as an outcome should answer the questions 'what' or 'what kind'. *Referent, form, magnitude, type,* and *nature* dimensions deal specifically with these questions.

The *referent* dimension establishes the benchmark which defines the newness of innovation as an outcome; it can be new to the firm, to the market it serves, or to the industry. The referent dimension is linked to several of the other dimensions. For example, the *referent* and *magnitude* dimensions are clearly related: while incremental innovation such as continuous improvement initiatives may be new to the firm, more radical innovation will be associated with the market and even industry.

In terms of *form*, scholars differentiate three: product or service innovation, process innovation, and business model innovation. Product/service innovation is 'the novelty and meaningfulness of new products introduced to the market in a timely fashion' (Wang and Ahmed, 2004, p. 304). Novelty can also vary depending on the referent dimension: a product or service can be new to the company (Davila et al., 2006), the customer (Wang and Ahmed, 2004), or the market (Lee and Tsai, 2005). Process innovation is the 'introduction of new production methods, new management approaches, and new technology that can be used to improve production and management processes' (Wang and Ahmed, 2004, p. 305). Process innovation is an internal phenomenon so the referent is essentially the firm itself. Business model innovation is 'how a company creates, sells, and delivers value to its customers' (Davila et al., 2006, p. 32), whether it be new to the firm, customer, or industry. Damanpour and Aravind (2006) have conducted an extensive meta-analysis of the empirical studies of the effects of organizational and environmental determinants on product and process innovation. They found that most determinants do not differentiate between these two types of innovation outcomes, which suggests that they are complementary and not distinct from one another.

Process as a *form* of innovation outcome should not be confused with innovation viewed as a process. As it will be shown later, organizational processes of ideation and problem solving may result in an outcome in the *form* of a new process of, for example, issuing credit cards, managing accounts receivable, or producing maple syrup.

The *magnitude* dimension indicates the degree of newness of the innovation outcome with respect to an appropriate referent. In terms of *magnitude*, scholars tend to distinguish between incremental and radical innovation (Gopalakrishnan and Damanpour, 1997). The latter is sometimes termed as 'revolutionary', 'disruptive', 'discontinuous', or 'break-through' (Freeman, 1974; Garcia and Calantone, 2002; Tushman and Anderson, 1986). Radical innovation induces fundamental changes and a clear departure from existing practices in the organization, while incremental innovation represents a variation in existing routines and practices (Damanpour, 1991; Dewar and Dutton, 1986; Ettlie et al., 1984). The absolute and relative magnitude of innovation outcomes have been a subject of debate. Academic researchers and practising managers tend to focus on the exploratory radical innovation, leaving exploitative incremental innovation in the backstage (Jansen et al., 2009). Our own recent empirical research suggests that incremental innovation might not even be perceived as 'innovation' by managers. Although the importance of ambidexterity in pursuing both types of innovation has been highlighted (Tushman and O'Reilly, 1996), firms seem to have difficulty implementing both to the same extent. The relationship between incremental and radical innovation has been an underdeveloped area of research that merits further attention.

Form and *magnitude* are closely related: incremental innovation is often associated with product or process innovation, while radical innovation is more often associated with business model innovation. However, there are product innovations that are considered radical in nature.

In terms of *type*, Gopalakrishnan and Damanpour (1997) distinguish technical (e.g. syrup production) and administrative (e.g. accounts receivable) innovations that reflect a more general distinction between social structure and technology. Technical innovations include products, processes, and technologies used to produce products or render ser-

vices directly related to the basic work activity of an organization. Conversely, administrative innovations are indirectly related to the basic work activity and more directly related to its managerial aspects such as organizational structure, administrative processes, and human resources.

Finally, *nature* (tacit or explicit) can be applied to both 'how' and 'what'. While innovation as a product is largely tacit, innovation in a service or process may remain unarticulated.

Innovation as a process and innovation as an outcome are not equally important. Recall that our definition of innovation includes the aspect of 'exploitation'. Thus the role of innovation as an outcome is both necessary and sufficient for a successful exploitation of an idea, whereas that of innovation as a process is only necessary but not sufficient. This is why innovation as an outcome is usually the key dependent variable in empirical studies related to innovation.

Numerous determinants of innovation have been proposed (Appendix B). In the next section we consolidate these determinants in a model of organizational innovation grounded in selected theoretical lenses that emerged from this review (Table III).

Determinants of Innovation

Table III summarizes various theoretical lenses used on different levels of analysis. Since our goal in this review is to identify actionable determinants which are within the realm of organizational and individual power, we cap our level of analysis at the firm level (the two right columns of the table). Among the theoretical lenses available in these columns, three were selected to succinctly consolidate our findings – upper echelon theory, dynamic capabilities theory, and process theory. Next we explain our rationale for this selection.

We propose a comprehensive framework of organizational innovation which provides an overarching structure that can link different theoretical units into a coherent whole (Tsoukas, 1994). We consolidate determinants of innovation which emerged from the existing literature into three distinct meta-theoretical constructs: innovation leadership, managerial levers, and business processes (the left portion of Figure 5). Each construct can be supported by a distinct theory: innovation leadership by the upper echelon theory, managerial levers by the dynamic capabilities theory, and business processes by process theory.

Upper echelon theory (Hambrick and Mason, 1984) has been traditionally used to connect agents' characteristics and behaviours with organizational outcomes; however, it cannot sufficiently cover managerial levers and business processes. On the other hand, dynamic capabilities research (Eisenhardt and Martin, 2000; Prahalad and Hamel, 1990; Teece et al., 1997) is concerned with organizational resources and capabilities but falls short of fully incorporating the role of the agent or investigating how organizational processes transform inputs into outputs, which is the realm of organizational process theory (Engestrom, 1993; Van de Ven and Poole, 1995). Therefore, each meta-construct of our conceptual framework requires a distinctly separate theoretical basis. Next, we present the theoretical development of each meta-construct and identify the determinants of innovation it consolidates.

To address our goal of providing a practical tool that can be used by both scholars and practitioners in analysing innovation, we provide a summary of the measures of the determinants of organizational innovation that emerged during our review. Our list extends the seminal work by Adams et al. (2006), which consolidated the inventory of innovation constructs by using academic references collected from 28 experts through a Delphi study. We contribute to this collection by providing additional measures identified by our review and by placing them within the comprehensive multi-dimensional framework developed in this study. Starting with innovation leadership, we follow the framework sequentially.

Innovation Leadership is a meta-construct consolidating individual and group level variables. Various studies have reported that executives explain about 5–20 per cent of variance in company profitability (Crossland and Hambrick, 2007). Their influence on innovation was captured in a special issue of *The Leadership Quarterly* (2004, Vol. 15, No. 1) dedicated to the subject of leadership for innovation. Mumford and Licuanan (2004) summarized the findings presented in this issue by confirming the multiple roles of leaders. Not only is their support and guidance vital in promoting innovative efforts at the initial creative stage, as it contributes to effective interactions among group members (West et al., 2003), but equally important is their ability to create conditions for the subsequent implementation of innovation (Mumford and Licuanan, 2004).

Upper echelon theory proposes that leaders' behaviours are a function of their values, experiences, and personalities (Hambrick and Mason, 1984). Mumford et al. (2002) argue that to lead creative efforts, leaders must possess substantial technical and professional expertise and creative skills, as well as the ability to process complex information. Moreover, they must have the motivation to exercise this ability. According to Sternberg et al. (2003), this motivation partially depends on leaders' perception of environmental threats and opportunities. We consolidate leaders' ability and motivation to innovate into two groups of factors: individual (CEO) and group (Top Management Team and Board Governance).

On the individual level, these factors include tolerance of ambiguity (Barron and Harrington, 1981; Patterson, 1999), self-confidence (Barron and Harrington, 1981), openness to experience (George and Zhou, 2001; Patterson, 1999; West, 1987), unconventionality (Frese et al., 1999; West and Wallace, 1991), originality (Patterson, 1999; West and Wallace, 1991), rule governess (Frese et al., 1999; Simonton, 1991), authoritarianism (Simonton, 1991), independence (Patterson, 1999; West, 1987), proactivity (Seibert et al., 2001), intrinsic (versus extrinsic) attribution bias (Frese et al., 1999; West, 1987), determination to succeed (Amabile, 1983), personal initiative (Frese and Zapf, 1994), and managerial tolerance of change (Damanpour, 1991).

Additional variables were identified at the group level. Upper echelon theory suggests that composition and characteristics of the top management team (TMT) yield a stronger explanation of organizational outcomes than a leader's characteristics alone, including amount of education and age (Bantel and Jackson, 1989; Hambrick and Mason, 1984), tenure (Bantel and Jackson, 1989; Finkelstein and Hambrick, 1990), diversity of background and experience (Bantel and Jackson, 1989), and extra-industry ties (Geletkanycz and Hambrick, 1997). Additional studies have examined board diversity

in terms of occupational background (Goodstein et al., 1994), institutional shareholding (Kochhar and David, 1996), and executive stock option (Sanders and Hambrick, 2005).

The Innovation Leadership construct is linked with organizational and contextual factors through *Managerial Levers* that play direct and indirect roles in enabling innovation. Leaders implement deductive innovation strategies (Regnér, 2003) through direct levers such as decisions and actions taken by leaders to deliver innovation. Senior executives exercise indirect leadership (Jansen et al., 2009) to guide innovation champions at the middle management level in their implementation of *Business Processes* that support innovation. In sum, Managerial Levers link individual or group determinants with organizational factors and provide the necessary (usually missed) connection between leadership intentions and organizational results.

Managerial Levers is a meta-construct consolidating firm-level variables supporting innovation. We begin with a discussion of the dynamic capabilities theory, which supports the managerial levers construct, and then go to describe the five sets of managerial levers.

The construct of managerial levers can be best conceptualized using the theory of dynamic capabilities (Eisenhardt and Martin, 2000; Prahalad and Hamel, 1990; Teece et al., 1997), a dynamic strain of the resource-based view (Barney, 2001) that draws on evolutionary economics (Nelson and Winter, 1982, 2002), according to which different resource bases among firms provide the source of 'variation' for innovations. The new products are then 'selected' by the marketplace. The firm's task is to combine exploitation of the existing resources while searching for new opportunities (exploration). However, continuous changes in the environment and competitive landscape may lead to 'creative destruction' (Schumpeter, 1934) of the currently valuable resources. Therefore, a firm should not only exploit existing resources, but also develop new and valuable resources and capabilities (Rumelt, 1984), which takes time, investment, and managerial effort (Dierickx and Cool, 1989).

Scholars argue that innovation is paramount in a modern environment characterized by hypercompetition (D'Aveni, 1994). Intense and rapid competitive moves require firms to continuously innovate to create new advantages (Dess and Picken, 2000; Tushman and O'Reilly, 1996). In other words, dynamic capabilities are a source of competitive advantage (Eisenhardt and Martin, 2000; Prahalad and Hamel, 1990; Teece et al., 1997), which must be commensurate with the dynamic nature of the environment.

Scholars have suggested that an organization's propensity to innovate or to adopt innovations is a type of dynamic capability which contributes to competitive advantage (Helfat et al., 2007). For example, dynamic innovation capabilities of continually preempting competitors by introducing new products and technologies helped Intel and Rubbermaid sustain their 'evolutionary fitness' in the market for many years (Helfat et al., 2007, pp. 12, 49). Some dynamic capabilities support incremental process innovation and lead to experience-related cost reduction (Sinclair et al., 2000). Others, such as drug related innovations, may create and expand new market segments (Bottazzi et al., 2001).

We propose that dynamic innovation capabilities reside in managerial levers that enable innovation (Elkins and Keller, 2003; Mumford et al., 2002). There are five types of managerial levers: missions/goals/strategies; structures and systems; resource allocation; organizational learning and knowledge management tools; and culture. Organiza-

tional mission and strategy (Adams et al., 2006) establish direction for the organization to follow. Physical and financial resources, organizational structure, and management and communication systems (Damanpour, 1991) all provide the necessary support for innovation practices. Organizational learning and knowledge management tools (Crossan et al., 1999) and organizational culture (Pinto and Prescott, 1988; West, 1990) help maintain innovation processes.

An explicit innovation strategy (Miller and Friesen, 1982) is a primary managerial lever and helps to match innovation goals with the strategic objectives of the firm (Tipping and Zeffren, 1995). 'Prospector' (Miles and Snow, 1978) and 'organic' (Nicholson et al., 1990) strategy types have been proposed as critical for innovation.

In terms of resource allocation, the factors include absolute and relative R&D intensity (Parthasarthy and Hammond, 2002), commitment to differentiated funding (White, 2002), annual turnover of resources (Mohr, 1969), and slack resources (Damanpour, 1991; Kanter, 1983; O'Brien, 2003).

Structure and systems factors comprise organizational complexity and administrative intensity (Damanpour, 1991), specialization and centralization (Damanpour, 1991; Zaltman et al., 1973), formalization (Damanpour, 1991; West et al., 1998), stratification (Kanter, 1983), matrix principles (Staw, 1990), fit between organizational design and type of innovation (Burns and Stalker, 1961), and number of employees (Rogers, 1983).

Leaders create a learning environment by providing support for experimentation (Damanpour, 1991; King et al., 1992; West and Anderson, 1992); by being tolerant of failed ideas (Madjar et al., 2002); by adopting risk-taking norms (King et al., 1992; West and Anderson, 1992); by supporting learning and development of employees; and by fostering the acceptance of diversity within the group (Crossan and Hulland, 2002). Knowledge management systems that enable innovation include the usage of formal idea generation tools (Cebon and Newton, 1999; Loch et al., 1996), external linkages with universities (Atuahene-Gima, 1995) and the quality of these linkages (Cebon and Newton, 1999), formal information gathering (Oliver et al., 1999), and customer contact time and frequency (Lee et al., 1996).

Another important factor which enables innovation as a process is organizational culture. Leaders create innovative culture by having a clearly stated, attainable, valuable shared vision (Pinto and Prescott, 1988; West, 1990), promoting autonomy (Amabile, 1998; Zien and Buckler, 1997), calculated risk taking (West, 1990), and motivation (Miller and Friesen, 1982). Organizational climate attractiveness can be assessed by using organizational climate scales (Amabile et al., 1996; Anderson and West, 1998), and evaluating job satisfaction and group cohesiveness (Keller, 1986), and proxied by number of applicants, and age of scientists and engineers (Geisler, 1995). Innovation culture should not be confused with learning environment. Innovation culture encompasses factors of motivation and managerial control, whereas the primary components of learning environment are organizational learning and knowledge management. Although organization learning involves institutionalized mechanisms that might be considered levers of managerial control that affect motivation, these relationships are rather peripheral.

Together, these five managerial levers (mission, goals, and strategy; structure and systems; resource allocation; organizational learning and knowledge management tools; and organizational culture) enable core innovation processes.

Business Processes supporting innovation is a meta-construct consolidating process-level variables. This meta-construct is arguably the most developed in the literature within the framework of process theory, and studies how organizational processes convert inputs into outputs.

The word 'process' has a wide range of meanings and thus we start by clarifying its application in this paper. According to Van de Ven and Poole (1995), the term 'process' is used in the management literature to refer to: (1) the underlying logic that explains a causal relationship between independent and dependent variables in a variance theory; (2) a category of concepts of organizational actions, such as rates of communications, work flows, decision making techniques, or methods for strategy creation; and (3) the progression (i.e. the order and sequence) of events in an organizational entity's existence over time. We use the second interpretation of the word when referring to Business Processes.

The process approach has a long history in several areas of social sciences: from Marx and Braveman's labour process theory (Knights and Willmott, 1990) to process theories of human behaviour (motivational theories: Adams, 1963, 1965; Kahler, 1975; Locke, 1968, 2001; Vroom, 1964) and cognition (information processing theory: Miller, 1956).

A typical process theory holds that similar inputs transformed by similar processes will lead to similar outcomes; that there are certain constant necessary conditions for the outcome to be reached. Thus a process level explanation identifies the generative mechanisms that cause observed events to happen in the real world, and the particular circumstances or contingencies when these causal mechanisms operate (Harré and Madden, 1975; Tsoukas, 1989).

In process theory typical patterns of events are core theoretical constructs (Van de Ven and Poole, 1995). In the context of innovation, these core processes include initiation, portfolio management, development and implementation, project management, and commercialization.

The initiation phase includes awareness and attitude towards new ideas (Ettlie, 1980; Harvey and Mills, 1970) and concept generation (Chiesa et al., 1996). According to Gopalakrishnan and Damanpour (1997), an innovation can be initiated in an organization either by generation or by adoption. The generation of innovation revolves around problem solving and decision-making related to the development of new products and processes (Saren, 1984; Wolfe, 1994). The adoption of innovation is a process of induction of organizational change from outside (Rogers, 1983; Wolfe, 1994). Organizations may engage in either one or both. As a result, an organization is said to have a portfolio of innovation projects.

The focus of portfolio management is on making strategic, technological, and resource choices that govern project selection and the future shape of the organization (Cooper et al., 1999). Portfolio management is important because of the rapidity at which resources are consumed in the innovation process (Cebon and Newton, 1999). The effectiveness with which an organization manages its R&D portfolio is often a key determinant of its competitive advantage (Bard et al., 1988). Portfolio management consists of considerations of risk–return balance such as ROI (Bard et al., 1988), constrained optimization to maximize output (Schmidt and Freeland, 1992), and economic and benefit models (Hall and Nauda, 1990); and the usage of optimization tools (Cooper

et al., 1999, 2001), formalized process of project selection (Cebon and Newton, 1999), project selection efficiency (Szakonyi, 1994) and evaluation of post-hoc project results (Lee et al., 1996).

Development and implementation of innovation sequentially follows innovation generation or an adoption decision (Wolfe, 1994). Implementation includes trials and production (Zaltman et al., 1973). Project management, problem-solving, and design and development occur in certain subunits within the organization (e.g. R&D, design, engineering). Project management is concerned with the processes that turn the inputs into a marketable innovation and comprise both sequential and concurrent activities. Adams et al.'s (2006) review found that the key success factors of an effective innovation project management are project efficiency, tools, communications, and collaboration. Project management involves utilization of formal project management tools, such as a problem finding solving cycle (Bessant, 2003); certified processes (Chiesa et al., 1996); post-launch evaluations (Atuahene-Gima, 1995); maintaining internal and external communications (Cebon and Newton, 1999; Damanpour, 1991); and collaboration within the team (Jassawalla and Sashittal, 1999), with customers (Von Hippel, 1986), and with suppliers (Bessant, 2003). Project efficiency is estimated by evaluating innovation speed (absolute, and relative to the schedule) (Chiesa and Masella, 1994; Hauser and Zettelmeyer, 1997), and project duration (Cebon and Newton, 1999).

Marketing and commercialization are the final innovation processes. They involve the management and administrative cores of the organization (Adams et al., 2006). Commercialization is concerned with making the innovative process or product a commercial success and it is important for the survival and growth of organizations. According to Adams et al. (2006), commercialization is the least developed area of innovation management as it is often considered the domain of other specialists, particularly marketers. However, we concur with Adams et al. (2006) that without including commercialization, the innovation cycle is not complete. Commercialization includes market research (Verhaeghe and Kfir, 2002), budget for market testing (Balachandra and Brockhoff, 1995), marketing proficiency such as number of product launches (Yoon and Lilien, 1985), launch proficiency (Song and Parry, 1996), personnel proficiency, post-launch reviews (Atuahene-Gima, 1995), and adherence to schedule (Griffin and Page, 1993).

The complete measurement model of the determinants of organizational innovation is presented in Figure 6.

DISCUSSION

Innovation might be one of a few lasting sources of competitive advantage (Dess and Picken, 2000; Tushman and O'Reilly, 1996). Both researchers and practitioners realize the importance of innovation as witnessed by thousands of academic papers and numerous business rankings and indices. However, as our review has demonstrated, innovation research is fragmented, poorly grounded theoretically, and not fully tested in all areas. Even the latest innovation models fail to consistently capture across and within sector factors (Hobday, 2005; Mahdi, 2002).

Our main contribution in this paper is the consolidation of a large body of knowledge on innovation into a parsimonious, theoretically grounded, multi-dimensional

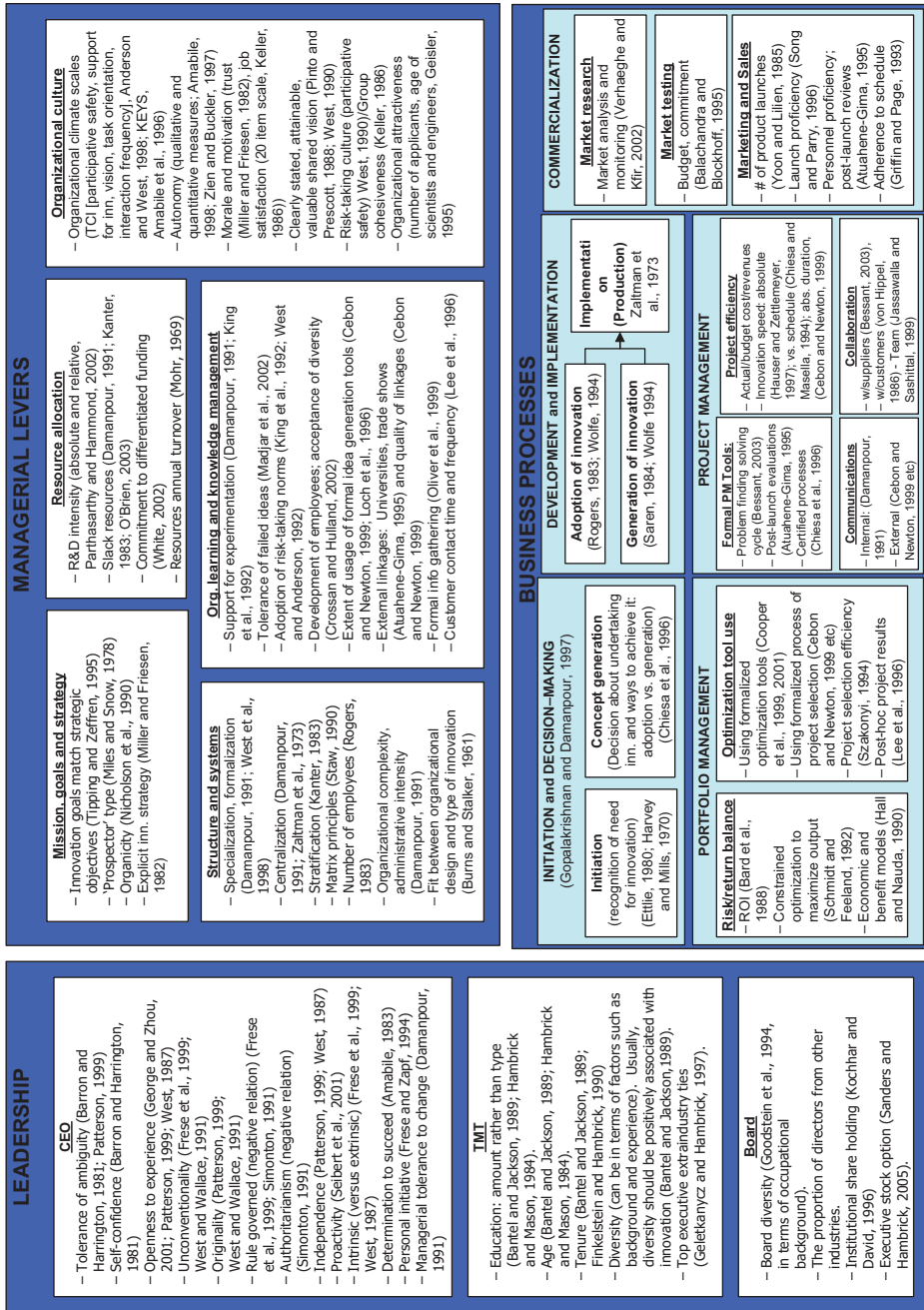


Figure 6. Measurement model of the determinants of organizational innovation

framework of organizational innovation, connecting three meta-constructs of innovation determinants – *Leadership*, *Managerial Levers*, and *Business Processes* – and viewing *Innovation as a Process* and an *Outcome*.

Our second contribution is the application of a rigorous and transparent review method followed by a synthesis. Systematic approach is still relatively rare in reviews. As Newbert (2007) argued, without a systematic framework, even extremely comprehensive reviews done by the academic experts in the field will not be immune from selection bias towards the literature known to the reviewers. Therefore, promoting a systematic approach to scholarly reviews helps to develop a higher standard of academic rigour.

Third, we identify several dimensions of the innovation domain, provide ranges for each of the dimensions thus defining the overall scope of the field, and map these dimensions onto innovation as a process and innovation as an outcome.

Fourth, we specify a measurement model of the determinants of organizational innovation sourced from the reviewed literature.

Fifth, we highlight the gaps in the literature that create opportunities for future research. Below, we discuss several key gaps, including the relationship between innovation outcomes and firm performance, innovation and entrepreneurship, and multi-level theorizing. We also touch on the managerial implications of our review.

Innovation and Firm Performance

For most researchers, innovation outcome is the endpoint of their intellectual quest. However, linking innovation outcomes with performance is critical in addressing whether and how innovation creates value. According to management scholars, innovation capability is the most important determinant of firm performance (Mone et al., 1998). Two books in our consideration set highlight this important linkage (Afuah, 2003; Kleinknecht and Mohnen, 2002). Indeed, this theoretical proposition has been empirically supported by several studies (Calantone et al., 2002; Cooper, 2000; Klomp and van Leeuwen, 2001; Li and Calantone, 1998). However, each group of authors has focused on different types of innovation and used different measures of performance, so generalization is difficult, if impossible. Calantone et al. (2002) found a positive relationship between firm innovativeness, conceptualized as a firm's ability to change and adopt innovations, and overall profitability and objective measures of performance (ROI, ROA, and ROS). Cooper (2000) investigated the relationship between new product strategies and new product performance. Using a feedback model, Klomp and van Leeuwen (2001) established a positive relationship between process innovation and performance measured as sales performance, sales per employee, and employment growth. Li and Calantone (1998) found support for the relationship between new product advantage and market performance (EBITDA, ROI, pre-tax margins, and market share). Interestingly, these studies connect innovation as a process or a capability with firm performance and bypass innovation outcomes altogether.

On the other hand, studies concerned with innovation outcomes treat them as a dependent variable and not as a mediator to performance. Understanding *how* innovation capability delivers innovation outcomes and ultimately firm performance is paramount to managing firm innovation. A possible way to advance this research is to test the

connection between identified innovation determinants, innovation outcomes, and firm performance. So far, the empirical studies have used either outcomes *or* performance as a dependent variable. Including both of them in a model would reveal the role of outcomes as a mediator between innovation determinants and firm performance.

One stream of research where the connection between innovation and performance seems to be more pronounced is in the entrepreneurship literature.^[5] For example, the short- and long-term consequences of corporate entrepreneurship on firm performance have been recently reviewed by Narayanan et al. (2009).

Innovation and Entrepreneurship

The study of entrepreneurship and entrepreneurs is a vast field in its own right. An unrestricted search of the Web of Knowledge using the keyword 'entrepreneur' yields almost 13,000 papers, of which 10 per cent are linked to innovation when it is added as a keyword. In a recent note on the promise of entrepreneurship as a field of research, Shane and Venkataraman (2000) define entrepreneurship scholarship as 'the scholarly examination of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited' (p. 218). Consequently, the scholars study the *sources* of opportunities and the *processes* of discovery, evaluation, and exploitation of opportunities and the *individuals* who conduct these processes.

Entrepreneurship and innovation are intrinsically related as both involve the processes of discovery, evaluation, and exploitation of opportunities (entrepreneurship) and novelties (innovation). In fact, both areas of research go back to Schumpeter's (1934) seminal work on economic development. However, the former stream of research places more emphasis on the role of an individual actor, or entrepreneur,^[6] whereas the latter, in our proposed conceptualization, seeks a balance between individual action and organizational determinants. Given the emphasis on individual agency in the entrepreneurship literature and the context in which it is employed, there is a substantial opportunity to employ findings from studies in entrepreneurship to the Innovation Leadership and Managerial Levers constructs that we advance.

Towards a Multi-Level Approach

Our review did not reveal a strong unifying theory of innovation which could operate across levels. Economic theories are mostly used at the economy or societal level, resource-based view and adaptation theories are used at the organizational level, while psychological theories are applied at the individual level. We propose a unifying theoretical approach on a meso level which could link managerial action with innovation as a process and outcome of organizational level. However, more theoretical development needs to be done to link those to higher, macro levels. In our review, some papers attempted such an approach using network, learning, and knowledge theories (see Table III); however, they stopped short of such an integration. Van de Ven et al.'s (2007) dynamic approach might be a good first step towards this goal within the stream of a Mintzbergian 'emerging' view of innovation, but it needs to be extended and tested in the field.

The level issue is indeed a thorny one. While knowledge- and capabilities-based researchers argue that the locus of new value and knowledge lies at the firm level (e.g. Barney, 2001), Felin and Hesterly (2007) challenge this conceptualization and propose a more individualist foundation of value creation. Felin and Foss (2005) argue that ‘to fully explicate organizational anything – whether identity, learning, knowledge, or capabilities – one must fundamentally begin with and understand the individuals that compose the whole, specifically their underlying nature, choices, abilities, propensities, heterogeneity, purposes, expectations and motivations’ (p. 441). Indeed, the individual level seems to be underrepresented in the consideration pool employed in this systematic review. Only 5 per cent of papers operate on the individual level vs. more than half on the organizational level (Figure 3). In their practical advice for scholars, Felin and Foss (2006) call for linking organizational level variables with their micro-foundations. We answer this call by offering a new theoretical approach described below.

A promising way of combining micro and macro levels of theorizing might be an application of a recently emerged practice-based view (PBV), which could combine the individual, firm, contextual, and process variables prevalent in the literature. It is a contemporary theoretical perspective which has been gathering momentum since the 1980s in an effort to overcome bifurcation of the field between ‘individualism’, favouring human action while ignoring macro-forces, and ‘societism’, focusing on large social forces while discounting individual action (Whittington, 2006). PBV considers the activities that organizational actors conduct (micro level), their consequences for organizational outcomes (macro level), and the feedback loop from contextual and organizational variables back to the actors. Johnson et al. (2003) argue that this approach does not replace traditional management theories, such as the resource-based view or institutional theory, but rather provides what Bunge (1997) calls a *mechanismic* explanation for them.

Based on Whittington (2006) theory of practice, three elements of innovation can be isolated: practice, praxis, and practitioners. *Practice* represents the ‘espoused theories’ that guide this activity, such as shared routines of behaviour, norms, and procedures that can be altered according to the activity in which they are used (Orlikowski, 1996; Seidl, 2007). *Praxis* refers to actual activities or, ‘theories-in-use’ (Argyris and Schon, 1974) that constitute the fabric of innovation. *Practitioners* – be they leaders, middle managers, or outside agents such as consultants or customers – are those who actually perform praxis, and what they actually do affects a company’s innovation. These three elements are integrated parts of a whole called innovation. In the context of the present thesis, a comprehensive innovation practice should include the totality of the academic knowledge unearthed in the process of the systematic review. *Practice* is what the practitioners *know* about innovation. However, *praxis* is what they actually *do*, and that requires totally different empirical methods than those found in existing research.

In fact, much of the research on innovation fits in the category of *practice*. The theories of effective innovation espoused in the academic literature represent conceptual abstractions rooted largely in other established theories and limited phenomenological research. The latter, in turn, is usually based on surveys and secondary data and, as such, represents espoused innovation theories of practising managers. The realm of espoused theories is usually referred to as a ‘macro level’ of theorizing. Only rarely have observation methodologies been employed which would enable researchers to access the

activity level theories-in-use enacted in the workplace. Yet, it is at this 'micro level' that the managerial reality enfolds every day, therefore a theory of innovation needs to connect the action (*praxis*) with the managerial and academic theories (*practice*) by understanding the role of agents (*practitioners*). Future research can fruitfully develop this avenue.

Other Avenues for Future Research

Future empirical studies might also pursue other opportunities unearthed in this paper by testing the construct measurements and proposed model across different industries, exploring the mechanisms that connect the constructs, the inherent tensions that exist between the various types of innovation outcomes, and the underlying processes. For example, Jansen et al. (2009) examine the misfits between leadership type and organizational outcomes. As well, future research could explore the possible moderators of the proposed relationships. For example, job context represented by managerial discretion (Hambrick and Finkelstein, 1987) and executive job demands (Hambrick et al., 2005) may moderate the relationship between innovation leadership and innovation processes. Managerial discretion exists when there is an absence of constraint combined with causal ambiguity. Several studies have shown that under the condition of high discretion, executives' characteristics are correlated with strategy and performance (Finkelstein and Hambrick, 1990; Crossland and Hambrick, 2007). Further studies might shed more light on the nature and strength of these relationships.

Managerial Implications

In addition to contributing to research, this study also contributes to practice. Books advocating various elements of innovation abound, but few are grounded in a sound theoretical perspective. Many of the 'how to' books focus on managing the innovative process, with little regard for business practices that support innovation. The shortcomings of this approach, as identified for researchers, exist for practitioners as well. There is a need to take a more holistic perspective on managing innovation.

Limitations

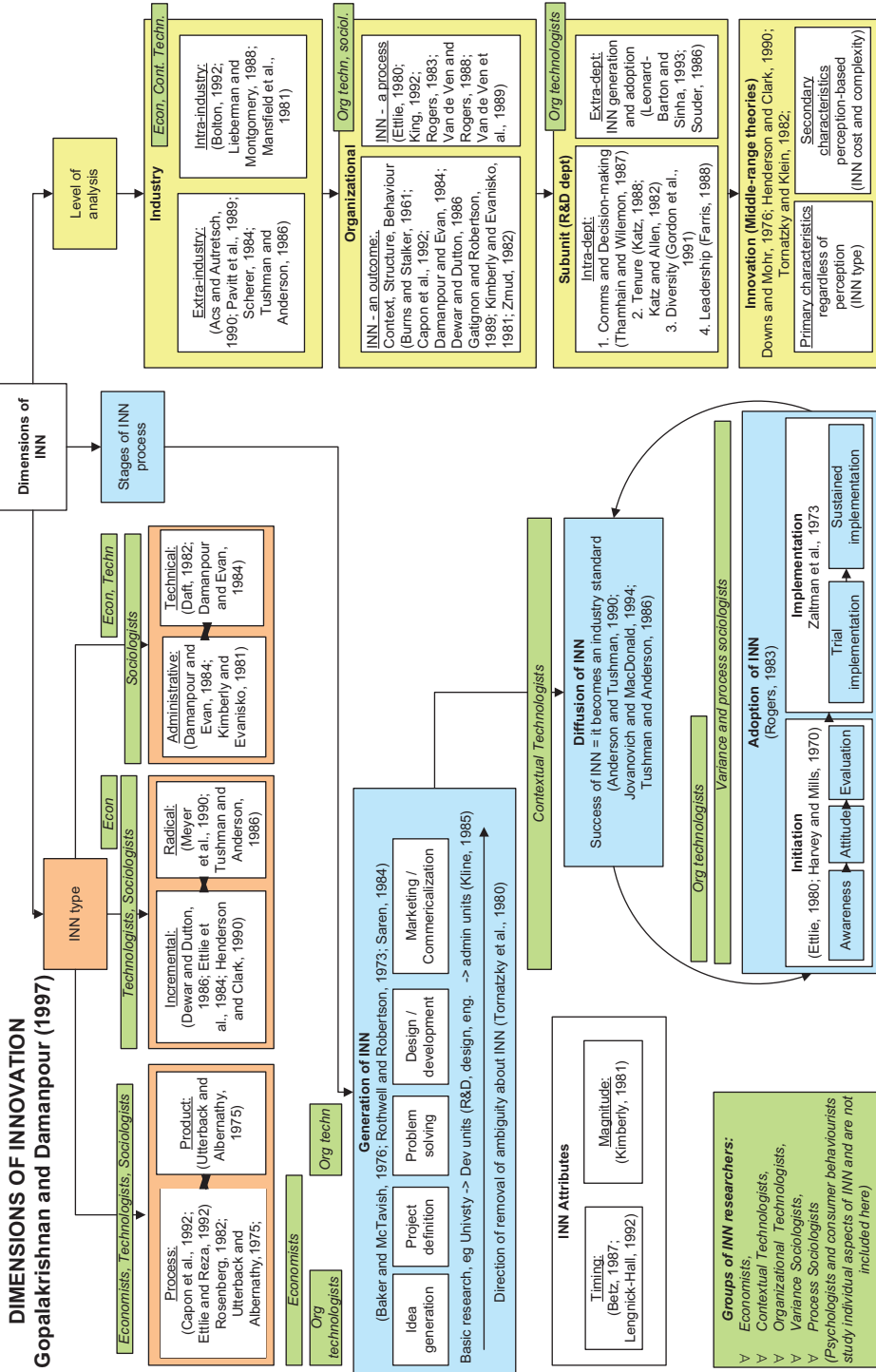
Our study has its recognized limitations. First, since our focus was to integrate prior research, we have not offered detailed propositions linking the elements, which would be a logical next step. Second, our review uses only one, albeit the most recognized, database of record, SSCI. This database may have omitted some relevant research. Third, the filtering process employed may have also omitted some relevant research, such as a large stream of the entrepreneurship literature. However, we believe that the rigorous procedure of our systematic review has reduced the probability that the omitted research would have contained information that would critically alter our conclusion. Fourth, using a high-level framework for such a complicated multi-dimensional phenomenon as innovation highlights some previously neglected connections while failing to

capture others. We are hopeful that this broad framework will provide a means to help integrate the wealth of research on innovation in order to advance both research and practice.

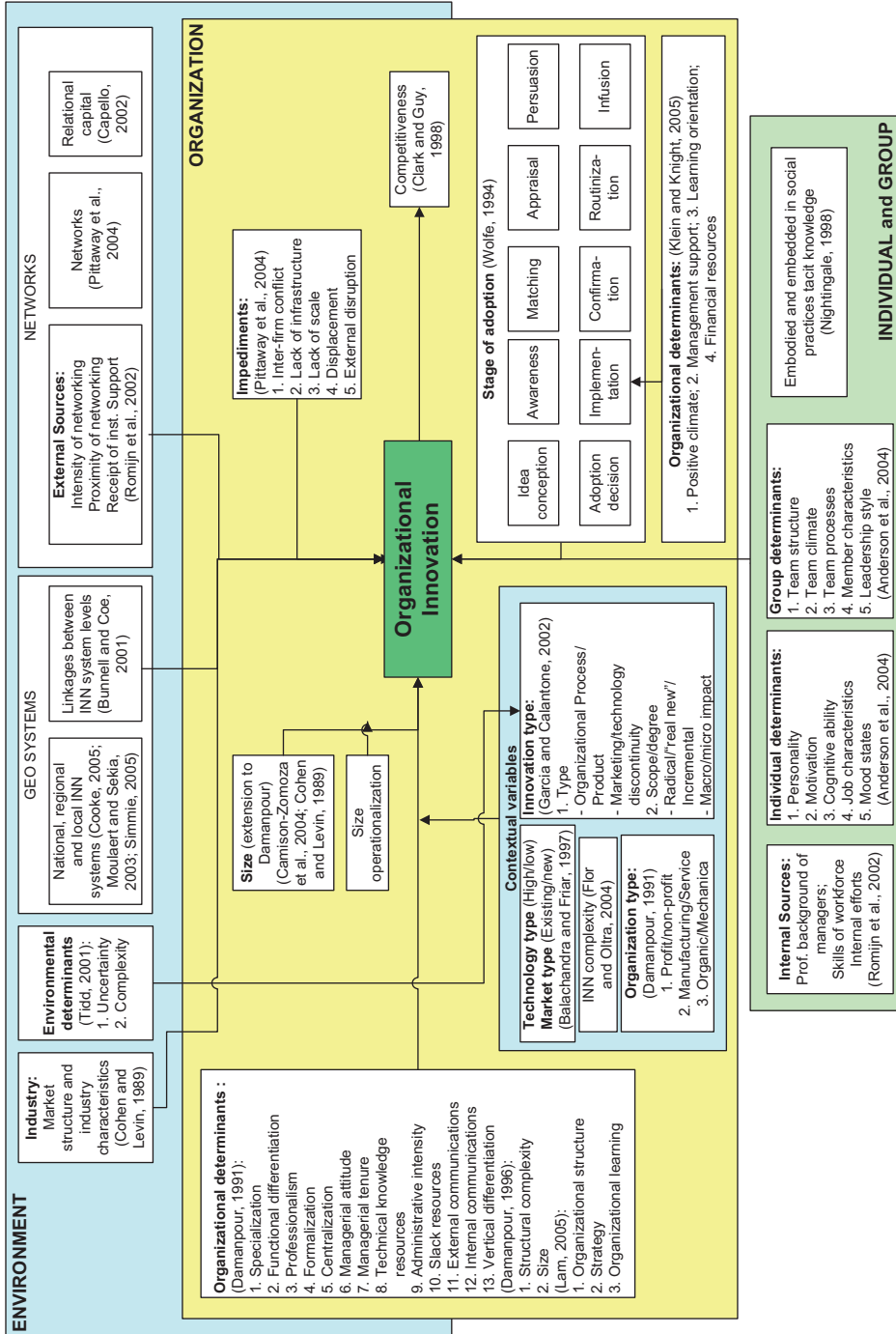
NOTES

- [1] This definition is an abridged version of the current and up-to-date understanding of the concept of innovation as described in the European Commission's *Green Paper of Innovation* (1995, pp. 1–2). The original modifier 'successful' present in the source was replaced with 'value-added' as it would have prevented us from defining innovation *ex-ante*, before its implementation.
- [2] 'Organizational innovation' has been understood in different ways (see Lam, 2005, for a detailed discussion). Our modifier 'organizational' demarcates the highest level of analysis contemplated in the selected literature.
- [3] We could have restricted our selection by excluding 'innovation diffusion' from the outset. However, doing so might eliminate papers which deal with diffusion *in addition* to innovation itself. So, we decided to eliminate purely diffusion papers during the abstract review.
- [4] Nine dimensions were identified by the initial review and one more (source) prompted by the feedback of the anonymous reviewer.
- [5] We thank an anonymous reviewer for pointing out this nuance.
- [6] Scott Shane, in his excellent book *A General Theory of Entrepreneurship* (Shane, 2003), specifically defines entrepreneurship in terms of an individual's response to an opportunity.

APPENDIX A



APPENDIX B: DETERMINANTS OF ORGANIZATIONAL INNOVATION IN THE EXISTING RESEARCH



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* Articles used in Table III.

** Articles used in Appendix A.

*** Articles used in Appendix B.

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