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**The Architecture of Dynamic Capability Research:
Identifying the Building Blocks of a Configurational Approach**

^aRalf Wilden, ralf.wilden@newcastle.edu.au

^bTimothy M. Devinney, t.devinney@leeds.ac.uk

^cGrahame R. Dowling, grahame.dowling@uts.edu.au

^aNewcastle Business School
University of Newcastle
55 Elizabeth St, Sydney
NSW 2000, Australia

^bLeeds University Business School
University of Leeds
Leeds LS2 9JT, UK

^cUTS Business School
University of Technology Sydney
PO Box 123, Broadway
NSW 2007, Australia

The Architecture of Dynamic Capability Research:

Identifying the Building Blocks of a Configurational Approach

ABSTRACT

The dynamic capability view (DCV) of the firm has become one of the leading frameworks aimed at identifying drivers of long-term firm survival and growth. Yet, despite considerable academic interest, there are many questions about what dynamic capabilities are, how they relate to other organizational operations, and how they relate to firm performance. In this art, we provide a unique and comprehensive examination of the DCV literature that goes beyond past reviews by combining text based analysis with surveys of, and interviews with, researchers in the field. With this approach, we are able to examine the evolution of the DCV in written literature and identify missing research themes. Based on this review, we argue that future research will benefit from integrating the DCV with configuration theory and recent microfoundational thinking. We encapsulate this discussion via an architectural model of the DCV (entitled ‘House of Dynamic Capabilities’) that combines microfoundations underlying DCs at the varying levels of analysis (individual, business unit, and organizational) while also accounting for important enablers of DCs and firm strategic orientation. We also show how this logic requires a completely different set of methodological approaches to those currently in use.

Keywords: Dynamic capability; review; content analysis; Leximancer; Delphi; configuration theory; microfoundations; performance

INTRODUCTION

Modern strategy research has its origins in seeking answers to three fundamental business questions: (1) Why, and how, do firms form? (2) How do firms prosper and survive (and what causes them to fail)? (3) Can some firms persist in outperforming their rivals? Multiple frameworks have emerged to provide answers to these questions. For example, market-based frameworks (Porter, 1985, 1996) were developed to explain how firms prosper by achieving competitive advantage, focusing on how external factors influence firm strategies and performance. As a response to the criticism that relying on external factors alone to achieve competitive advantage may render strategies reactive and short-term, the resource-based view (RBV) of the firm emerged (Barney, 1991; Collis, 1994; Penrose, 1959; Wernerfelt, 1984). According to the RBV, firms can create long-term competitive advantage and superior performance based on their idiosyncratic resources and capabilities that are valuable, rare, non-substitutable and non-imitable. However, this perspective on strategy has been criticized for being static and not taking the dynamics of changing environments into account.

Over the last two decades the dynamic capability view (DCV) of the firm arose to identify “the sources of enterprise-level competitive advantage over time” (Teece, 2007a, p. 1320). It attempts to explain why some firms prosper and survive in turbulent operating environments and aims to identify the underlying drivers of long-term firm survival and success. The DCV, as it is generally espoused in the literature, is aimed at understanding processes relating to sensing, shaping and seizing opportunities and reconfiguring the firm’s resource bases to achieve organizational survival and growth; something that has been coined ‘evolutionary fitness’. Work in the field has moved from the early conceptual work of Teece et al. (1997), Eisenhardt and Martin (2000), and Winter (2003) to more structured empirical modeling and testing (e.g.,

Danneels, 2008; Protogerou et al., 2011; Wilden & Gudergan, 2015).

However, despite the theoretical and empirical progress made to date, the dynamic capabilities (DCs) field of scholarship has been constrained by inconsistencies in the definitions and measurement of key constructs and highly varied theorized relationships amongst these constructs. Our goal in this article is to provide both an updated discussion of the extant research that allows us to examine the evolution of the constructs used in the DCV, and to provide a broader and more comprehensive theoretical structure that integrates the DCV with configuration theory (e.g., Bertalanffy, 1968; Boulding, 1956; Meyer et al., 1993) and recent thinking on the microfoundations of DCs (e.g., Eisenhardt et al., 2010; Felin et al., 2012; Felin et al., 2015; Teece, 2007a). This integration enables us to develop an architectural model of the DCV (which we entitle the ‘House of Dynamic Capabilities’) that combines the micro-foundations and cognitive processes underlying DCs on the varying levels of analysis (individual, business unit, and organizational), while also accounting for important antecedents and enablers of DCs.

In examining the evolution of the DCV, we adopt a systematic and novel approach to evaluating what scholars have written and where they believe the field is stagnating and advancing and do so via a comprehensive and technical examination of the literature (articles published between 1997 and 2015 in 12 leading management journals). We go beyond existing reviews of the field (e.g., Barreto, 2010b; Di Stefano et al., 2010) by not only looking at previous research, but by also looking forward in a collaborative fashion by surveying and querying authors in collaborative group discussions. We utilize this information to better assess the evolution and future direction of the field. Analytically, our approach involves three unique and inter-related stages:

- (1) First, we systematically reviewed all the major articles published using machine-based

text analysis, revealing which themes and contradictions pervade the field of scholarship based on what is actually written.

- (2) Second, we surveyed authors of these articles directly to capture the evolution of the concept, missing and emerging research areas, and their definition and meaning of a DC.
- (3) Third, we held structured discussions of (1) and (2) with authors who attended two leading management conferences.

In utilizing this approach, we focus not on authors and articles in the first instance (as one would normally do with co-citation analysis), but rather on concepts and themes that emerge from the text. Nor, as is the case in narrative reviews, do we allow our own reading of the articles to influence what we derived conceptually (thus reducing bias). Our approach is one that permits the text to reveal itself via the inter-relationships found amongst the words themselves. Our aim in using this approach is to address the following questions: (a) What are the dominant concepts within the DCV field? (b) Which emerging themes are gaining traction with DC scholars? (c) How have DCV related concepts and themes evolved? (d) Which of these concepts have proven more susceptible to measurement, and thus have been used in empirical research? And, (e) how can we move towards finding a mutually agreed structural definition of DCs to advance empirical assessment?

Besides the detailed and novel approach to conducting a review and evaluation of the literature, our 'House of DCs' framework contributes to DC thinking by integrating the DCV with configuration theory. This has two very distinct benefits. First, it links the individual level microfoundational stream of DCs research with work at the organizational level relating DC utilization and performance. This has both theoretical and empirical benefits as this approach explicitly accounts for the various DC process categories (sensing, seizing and reconfiguring)

across various levels of analysis, the firm's existing resource base and its environmental attributes. Second, integrating configuration theory with the DCV will expand the methodological toolkit needed to advance the empirical assessment of DCs. Configuration theories – as an alternative to variance and process theories – are better suited to capture holistic systemic effects, accounting for the interplay between system variables, such as DCs, strategic orientation, culture, operational capabilities and environmental conditions (Ackoff, 1994). The nature of configuration theories connects the idea of mutual causality of system elements to their context, making them appropriate to middle-range, context-sensitive (rather than universal) theories – which is appropriate for DC thinking (Rihoux & Ragin, 2009).

We structure the article as follows. First, we contextualize our contribution by providing an overview of previous published studies that reflect on the current and future state of DC research. We then introduce the data and method used and describe the nature of information generated by our approach. We present our analysis and findings, leading to the identification of building blocks for future development of a configurational approach to DCs. We conclude with a discussion of an agenda for the design of future empirical studies.

PREVIOUS REVIEWS ON THE DYNAMIC CAPABILITY VIEW

Our work is not the first to attempt to review and synthesize the DCs literature (see Table 1 for an overview of previous review studies). Early reviews by Newbert (2007) and Wang and Ahmed (2007) concentrated on the empirical findings and definitional characteristics of DCs, respectively. Newbert concluded that, as of 2007, the DCV was the least empirically investigated stream within the RBV stable, with the first empirical studies dating from 2001. The conclusions that could be drawn from those works were also unclear, as fewer than 40% of studies found a relationship between DCs and any form of performance. Wang and Ahmed (2007) were

concerned with coming up with a definition of the construct and a research agenda. Their definition of DCs as “A firm’s behavioral orientation constantly to integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core capabilities in response to the changing environment to attain and sustain competitive advantage (p. 35)” highlighted that DCs may be more than just another type of organizational process. For them, DCs operate on three dimensions, namely: (a) adaptive capability, (b) absorptive capability, and (c) innovative capability. Adaptive capability refers to the organizational capacity to identify and seize opportunities. Absorptive capability is the organization’s skill to identify, assimilate and apply new information. Innovative capability represents the organizational capacity to create new products and/or markets. Underlying these dimensions are processes relating to integration, reconfiguration, renewal, and recreation. From their perspective, DCs influence firm performance via firm strategies and capability development in an environment where market dynamism is a required antecedent.

Insert Table 1 About Here

Arend and Bromiley (2009) and Baretto (2010a) provide two of the more critical reviews of both the basic conception of a DC and the literature behind it. Arend and Bromiley identified four key problem areas that limit the potential contribution of DC research to strategy and management scholarship: (1) it is unclear what additional value is created when compared to existing theories; (2) there is a lack of coherent theoretical foundations; (3) there is a lack of strong empirical support for the positive effects on organizational performance; and (4) the managerial and strategic implications are unclear. Baretto (2010a) argued that the various conceptualizations of DCs often differed in terms of their nature, specific role, relevant context, heterogeneity assumptions, and purpose, implying that there was no consistent definition of what

a DC was or was not. Based on his synthesis of the literature he suggests that “[a] dynamic capability is the firm’s potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and market-oriented decisions, and to change its resource base (p. 271).” This definition stresses the multidimensional nature of the construct based on solving problems, sensing, making decisions, and altering the firm’s resource base. In terms of performance outcomes of DCs, Baretto identified three ways that scholars have, and might, hypothesize such a relationship. First, DCs may have a direct effect on performance outcomes (e.g., Teece et al., 1997; Zollo & Winter, 2002). Second, DCs may not necessarily lead to superior performance outcomes, but rather the performance implications of DCs are dependent on the resulting resource base configurations and on managerial decision making (Eisenhardt & Martin, 2000; Helfat et al., 2007). Third, DCs operate indirectly, via a mediation of the effect of DCs on firm performance through the firm’s resource base (for example, Protojerou et al., 2011; Zahra et al., 2006b; Zott, 2003). Finally, Baretto identifies two central ongoing debates with respect to the boundary and contingency conditions relating to DCs that imply a lack of coherence around what a DC is and when it is valuable; i.e., whether DCs have value only in turbulent environments and if their value accrues only to certain firms in specific contexts.

Di Stefano et al. (2010), Giudici and Reinmoeller (2012), and Peteraf et al. (2013b) take a more analytic approach to the literature via citation analysis. Focusing on the 40 most influential contributions in the field of management (as determined by their citations¹), Di Stefano et al. (2010) investigated the origins and development of the DCs research stream. They identify two primary ‘invisible colleges’ of scholarship. The major college deals with *Foundations and Applications* – i.e., “defining the construct, articulating the processes by which it evolves and is

¹ Each of the articles included in their final analysis has received more than the average number of citations within their panel (20 citations).

deployed, and exploring its application and effects (p. 1195).” Included in this first college are the most heavily cited articles – e.g., Teece et al. (1997), Eisenhardt and Martin (2000), Zollo and Winter (2002), as well as Helfat (1997), Makadok (2001) and Winter (2003). A second, smaller, college addresses the *Interrelationships with other Theoretical Perspectives* – i.e., a concern with connecting the DCs view of firm strategy with theoretical perspectives such as the resource-based view, transaction cost economics, learning theory, social theory and social psychology. This body of work stresses the importance of learning and knowledge, management and decision-making, corporate strategy, multinational and global strategy.

In light of Di Stefano et al. (2010) treating Teece et al.’s (1997) and Eisenhardt and Martin’s (2000) as comparable by combining them into one ‘college’, Peteraf et al.’s (2013b), results are interesting and concerning. They conclude that Teece et al.’s (1997) and Eisenhardt and Martin’s (2000) contributions represent contradictory conceptualizations of the DC construct and, hence, represent two entirely different schools of thought. To overcome this the authors then develop a contingency-based framework to unify the DC field. They conclude that DCs can support organizations to achieve sustainable competitive advantage regardless of the degree of environmental turbulence and the nature of specific DCs *in certain conditional cases*. For them, DCs are simple rules and processes employed by organizations in high-velocity markets and as best practices in moderately dynamic markets.

Giudici and Reinmoeller (2012) argue that “dynamic capabilities are at the crossroads between establishing itself as a robust strategic management theory and being abandoned (p. 444)”; a viewpoint not inconsistent with Di Stefano et al.’s (2010) *Interrelationships with other Theoretical Perspectives* college. For them, the DCV is an emerging area of scholarship that is still searching to find its intellectual roots. They suggest that in order to progress research in this

field, researchers need to: (1) strive for clarity in their definition(s); (2) engage with the foundational core of the DC construct; and (3) engage in empirical research.

In conclusion, these reviews suggest that the DCV needs further refinement if it is going to be a meaningful part of management scholarship. Despite this limitation, there is consensus in most of the reviews that the DCV is a potentially useful organizing structure in understanding how organizations change existing resource portfolios and that it deserves the additional research effort necessary to address its limitations to date (Giudici & Reinmoeller, 2012; Peteraf et al., 2013a). In this vein, Helfat and Martin (2015) propose a dynamic managerial capabilities construct, defined as those capabilities that managers deploy to create, extend, and modify the ways in which firms make a living. Based on their review of empirical studies they find that managers vary in their influence on organizational change and overall organizational performance due to variances in managerial cognition, social capital, and human capital. We build on this work by integrating the discussion on dynamic managerial capabilities into a broader framework that addresses the need for accounting for various levels of DCs. we also address the DC-performance relationship (Baretto, (2010a) in that we argue it is the configuration of DCs with other organizational and external factors that affects the strategic posture of the firm and, hence, its subsequent performance.

METHODOLOGY

To complement existing reviews, we adopt a systematic approach to evaluating what has been written about in this field. We are more comprehensive in terms of the literature we examine and are purposely more descriptive in terms of what we find – leaving it to the articles and authors to reveal what they consider to be the core concepts they are defining and investigating. Hence, the focus of our analysis is not authors and articles in the first instance, but rather concepts and

themes that emerge from the text of the published articles. As noted, we will investigate the DCV in three ways, namely 1) textual analysis and data mining, (2) author surveys, and (3) author discussions.

Textual Analysis/Data Mining

To better understand existing research on DCs we examine 133 articles published in leading management journals using the text analysis tool Leximancer 4.0, a powerful algorithm for deciphering and visualizing complex text data (Campbell et al., 2011). Leximancer conducts both conceptual (thematic) and relational (semantic) analyses of text data and then provides visual depictions of these analyses. It allows the researcher to examine concepts (common text elements) and themes and contradictions (groupings of uncovered concepts) used by other scholars (Mathies & Burford, 2011). To do so, a Bayesian machine-learning algorithm is applied to uncover the main concepts in text and how they relate to each other (Campbell et al., 2011). The process applied can rely on strong or weak priors (i.e., the seed words). As noted by Campbell et al. (2011, p. 92), as “evidence accumulates, the degree of belief in a relationship or hypothesis changes. ... The tool automatically and efficiently learns that words predict which concepts. ... A very important characteristic of these concepts is that they are defined in advance using only a small number of seed words, often as few as one word.” Leximancer derived concept identification has exhibited high face validity (Rooney, 2005), high reliability and reproducibility of concept extractions, and thematic clustering without facing the problems of expectation biases inherent in manually coded text analyses techniques (Baldauf Jr & Kaplan, 2011; Dann, 2010; Smith & Humphreys, 2006).

Our primary interest is to uncover the links between constructs used in the DC research domain. Here the co-occurrence of words within their textual contexts provides important

insights for the narrative inquiry of a research area (Clandinin & Connelly, 2000; Sowa, 2000; Stubbs, 1996). The idea is that a word is defined by the context within which it occurs (Courtial, 1989; Smith & Humphreys, 2006) and words that co-occur reflect categories (i.e., concepts) with specific meaning (Leydesdorff & Hellsten, 2006; Osgood et al., 1957). The Leximancer algorithm has been used successfully in previous research to scientometrically describe and analyze text – for example, in corporate risk management (Martin & Rice, 2007), innovation (Randhawa et al., 2016), tourism (Scott & Smith, 2005), project governance (Biesenthal & Wilden, 2014), and behavioral research (Smith & Humphreys, 2006) – and in previous analyses of the history of journals based on the articles published therein – e.g., Liesch et al. (2011) in international business (*Journal of International Business Studies*) and Cretchley et al. (2010) in cross-cultural studies (*Journal of Cross-Cultural Psychology*).

Data Sources

We identified 12 leading management journals based on their high citation impact factor in strategy research or because they have published special issues on DCs.² We assembled all articles that included the term ‘dynamic capability’ and/or ‘dynamic capabilities’ in their title, keywords and/or abstract that were published between January 1997 and May 2015. The Appendix presents a list of the articles used in the analysis along with descriptions and categorizations used in subsequent analyses.

We deleted all bibliographies from the articles to make sure that the references would not form part of the analysis and then converted the articles into machine-readable format. All text

² The selected articles used in this analysis were drawn from the following journals: Strategic Management Journal (42 articles), Academy of Management Review (6), Academy of Management Journal (5), Organization Science (14), Organization Studies (3), Administrative Science Quarterly (0), Industrial and Corporate Change (17), British Journal of Management (19), Journal of Management (6), Journal of Management Studies (13), Management Science (2), and Strategic Organization (6). Industrial and Corporate Change and the British Journal of Management were selected due to having published special issues on DCs; the remaining journals were selected based on their high impact factor scores.

was then used as input into the analysis and concept seeds were generated via the software. This is the equivalent of assuming a ‘diffuse prior’ of theoretical concepts as the starting point for the analysis. Finally, the software identifies and aggregates patterns between the concepts into themes. The relationship between the concepts and themes is illustrated through concept maps.

We structured our analysis in four parts. First, we conducted analyses on the entire dataset including name-like concepts (i.e., those that start with a capital letter). We then deleted words that had nothing to do with the subject under investigation (e.g., ‘Copyright’ and ‘Spring’) from the name-like concept list. We then allowed the algorithm to identify authors’ names and investigated how the authors in the field are related to one another.³ Third, using the publication of key articles by Teece (2007a; 1997) as delineators, we split the dataset into articles published between 1997 and 2006 (45 articles) and 2007 to 2011 (62 articles). As our survey and roundtables with contributors to the field (see next section) was based only on articles published between 1997 and 2011, we expanded our data set to include articles published between 2012 and 2015 (May) (26 articles) so as to bring the final analysis up to date. Finally, we compared conceptual articles with empirical articles and within the empirical articles we examined the concept structure based on the methods employed by the authors.

In the ‘maps of meaning’ discussed below and presented hereafter, circles represent themes derived from the articles and relevant concepts are located within each theme. The color and size of the circles reflect the importance of themes (darker and bigger circles being more important). The distance between concepts on the map indicates how closely related they are; that is, concepts that are only weakly semantically linked will appear far apart on the concept map (Campbell et al., 2011; Rooney, 2005).

³ The author analysis faces one limitation. Leximancer can only pick up the actual mentioned authors. Hence when only the first author is mentioned (for example, Teece et al.) the co-authors will be ‘discounted’ and not included the analysis.

Survey of Contributors to the Field and Roundtable Discussions

Following our first retrospective textual analysis (1997-2011), we contacted scholars active in the field. The aim of both the survey and the roundtable discussions was to confirm or disconfirm concepts identified through the textual analysis and to create an inclusive discussion on required future research topics. First, we prepared an online survey and sent it to the 154 authors of the articles published between 1997 and 2011 (see the Appendix for a copy of the survey). Subsequently we sent out a broader email invitation to Academy of Management members. In the survey, we first presented the respondents with the ‘All Articles 1997-2011’ and ‘Authors 1997-2011’ maps (see Appendix 2). In line with our findings from the textual analysis, we then asked respondents to rate the themes presented in ‘All Articles 1997-2011’ map based on both their centrality and their prevalence to DC research. Subsequently, we challenged respondents to provide a free form definition of DCs. Finally, we asked respondents to provide us with their view regarding which theories, research contexts and/or aspects of DCs have been under-researched or even been excluded from existing discussions. Both definitions and missing themes were content-analyzed and commonalities were identified and aligned with published literature. Altogether, we received 101 responses to our survey.

Second, following the online survey we organized roundtable discussions at the 2013 Academy of Management and the Strategic Management Society conferences. The AOM roundtable comprised 13 participants and SMS roundtable 8 participants. The participants were a mix of authors of the studied articles and researchers interested in DCs. In these roundtables, we first presented our findings of both the textual analysis and the survey, followed by an open discussion of the results and their meaning as interpreted by the participants. The remainder of the sessions focused on discussing the future of DC research.

FINDINGS

Textmining: All Articles 1997-2015

We began by analyzing all 133 articles in our database published between 1997 and 2015. Figure 1 shows the result of this analysis and reveals that while the DCV research stream covers many topics we can identify two distinct areas of research that appear at the core of the DCV. The first research stream comprises *process level investigations* (*process* theme), which are closely related semantically to the concepts of *routines*, *learning*, *experience* and *knowledge* and reflected in the cluster of themes designated in the map as Area A. The second research stream is focused on the *performance implications* of DCs (*performance* theme), designated in the figure as Area B.

Based on the color of the themes, the role of DCs in affecting *performance* has gained significant research attention (red color). The final mixture of themes is designated as Area C and reflects the *different contexts* in which DC research has concentrated, picking up industry type (e.g., technology, services, manufacturing, etc.), levels of analysis (e.g., team, group, business), and other contingencies (e.g., information transfer, systems, etc.). Unlike the themes represented by Areas A and B, these themes are ancillary to the core aspects of DCs and simply reflect the areas that have been most represented in terms of domains and levels of analysis.

Insert Figure 1 About Here

The analysis of the ‘All Articles’ map reveals that the DC construct has been used to investigate a wide range of research problems but with two core foci – *Performance* and *Process*. It aligns well with Giudici and Reinmoeller’s (2012) finding that the field is built on a strong and recognized core containing several central articles and challenges Arend and Bromiley’s (2009) assertion that the DC view should be abandoned due to its weak theoretical foundations.

Textmining: Influential Authors

To examine the process-performance dichotomy more systematically, we identify the scholars that dominate DCs research as a means of uncovering the source of the DCV's theoretical foundations.⁴

The author map reveals that the most influential (i.e., most mentioned) authors are also the ones that are seen to have written some of the foundational articles of this research stream, namely Peteraf (mentioned 1,419 times), Eisenhardt (1,328), Zollo (1,226), Winter (1,166), Helfat (1,144), Pisano (1,128) and Teece (1,121). Teece, Pisano and Eisenhardt are also frequently mentioned together. We call this theme the *Core Dynamic Capability (CDC)* theme, to distinguish it from the dynamic capability concept given in Figure 1. This theme also comprises a number of key RBV authors, such as Barney (921), Penrose (665) and Peteraf, who help bridge the *CDC* theme with the *Economics* theme (Williamson, 310). Looking more closely inside the *CDC* theme, we see that Peteraf and Helfat appear to play the role of 'theme spanners', linking the *CDC* theme with core RBV authors, while Eisenhardt appears to be the vector linking this theme with the *Routines* theme (Zollo, Winter and Brown (252)). Zollo and Winter provide a further conduit to other areas of work, including those emphasizing (A) *Knowledge – Zahra* (379) and Kogut (319); (B) *Learning – March* (434) and Levinthal (877); and (C) *Innovation – Henderson* (596), Tushman (653) and Smith (153).

Insert Figure 2 About Here

This analysis confirms the split in the DCV identified by Peteraf et al. (2013b). We see a clear distinction between those authors building on an economics based foundation and those focusing more on the sociological foundation. Confirmation of Peteraf et al.'s (2013b) logic is

⁴ Note that this analysis does not just count the frequency with which the authors appear in articles but examines which authors are likely to be mentioned in conjunction with which other authors.

the almost complete lack of linkage between the authors on the right hand side of Figure 2 and those on the left.

Textmining: The Evolution of Concepts and Authors

In Figures 3 and 4 we present the results just discussed in the prior two sections but divided into three time periods, 1997-2006 (45 articles), 2007-2011 (62) and 2012-2015 (26). Our motivation is to determine whether Giudici and Reinmoeller (2012) are correct in their conclusion that since 2007 a retrenchment in the DCV has occurred, which began to offset the negative effects of ‘reification’ – the process of stopping to specify the assumptions underlying the DC construct and treating it as a general-purpose answer to an increasing range of research questions (Lane et al., 2006). We chose 1997 and 2007 as the initial break points because they are when Teece’s two seminal articles appeared (Teece et al. 1997 and Teece 2007). The last breakpoint is related to the articles published after the period covered in our roundtable discussions and survey.

We start by analyzing whether a difference in the underlying author maps exists. When comparing the first two time periods we see that the core authors – Teece, Pisano, Eisenhardt, and Helfat – have moved closer together over time, solidifying their position as the conceptual core of the DCV. One interpretation of this fact, as articulated by Helfat, et al. (2013b), is that work published in the early period viewed Teece and Eisenhardt as representing separate conceptualizations, whereas more recent research groups them together, seeing their contributions as more complementary than competing. An expanded set of the RBV authors – now including Penrose, Wernerfelt and Mahoney – rise in importance in later articles (the red bubble compared to green bubble in Figure 4), while those representing the *Competitive Advantage* (CA), including Porter, and the *Innovation* and *Learning* themes, including Tushman, Hendersen, March and Levinthal, are becoming less relevant and drifting away from the core.

Insert Figures 3, 4 & 5 About Here

It appears that in 1997-2006, authors were searching for a definition of DCs, as evident by all cited authors being very close to each other and no clear camps of scholarship being distinctly separate (Figure 3). However, by 2007-2011 (Figure 4), we can see the cited authors are more fragmented, with individual camps of scholars having developed more tightly. The core of the original DC authors now included Winter. In the post 2011 period (Figure 5) we see that a larger corpus of DC researchers has developed – pulling in scholars such as Danneels, Zahra, and Nelson – moving Barney more to the periphery and adding in those doing more contextual applied DC work– e.g., Singh, Kale and Schilke in the case of alliances.

If the solidification of paradigmatic camps were in fact occurring, we would expect to also see a solidification of research concepts over time; and this is exactly what we see. Figure 6 (1997-2006) presents a picture of a very unstructured set of concepts. 2007-2011 (Figure 7) sees more of a coalescence are *technology-related* themes (manufacturing, product, technology and R&D), *development*, *processes* and *management* themes, and the *deployment and implications of DCs* (performance effects, resources and assets).

Insert Figures 6, 7 & 8 About Here

Examined in more detail we see some interesting evolutions. Work done in the 1997-2006 window was more likely to emphasize performance explicitly (red color of the theme), as evidenced by DCs being linked directly to performance in the map in Figure 6. DCs were also more likely to have been discussed in terms of firm strategy (note that the *strategy* theme only occurs in Figure 6). The 2007-2011 period (Figure 7) saw more emphasis on the importance and centrality of processes related to DCs (red color). This may be related wholly, or in part to

Teece's (2007a), overview of the capacities underlying DCs – sensing and shaping opportunities and threats; seizing opportunities; and reconfiguring the organizational resource base – and his focus on the nature and underlying processes (microfoundations) of these three capacities. This also explains why Winter became part of the core DCV group of authors as well.

There are also some subtleties in how performance is applied over time. We see that the performance effects of DCs play a less central role after 2007 (green color of the *performance* theme). The discussion appears to have shifted from whether DCs relate to performance to how they relate to performance. This is evident in the fact that, after 2007 the *DCs* theme is not directly related to *performance*, but is linked via the *resource* theme. This reveals that researchers are concentrating on the idea that DCs are not directly related to firm performance, but that the effects are dependent on the resulting resource base reconfigurations. A good example of this sort of work is Protopogerou et al. (2011), who find no direct effect between DCs and performance once the mediating variable 'operational capabilities' is included, while those operational capabilities have a significant direct effect on performance.

In the 2012-2015 period (Figure 8) we can see that focus has returned on investigating the relationship between performance, the resource base and DCs, with there being more clearly defined underlying concepts and how they relate (note the lack of overlap and more direct links from concept to concept). The text indicates the increasing attention is being dedicated to the role of management, processes and the human element – i.e., the micro-foundations of DCs (e.g., Helfat & Peteraf, 2015) – and how they and the asset base relate – encompassed in role of business models (e.g., Bock et al., 2012).

Textmining: Research Orientation and Methodology

Our final analysis of the text concentrated on the methodological and theoretical orientation of the respective works. In this analysis we separate the articles into whether they are conceptual or empirically based, resulting in 58 conceptual articles and 81 empirical articles, of which 25 are of qualitative and 56 of quantitative nature (some articles used mixed methods and were included in both types of empirical research). Figure 9 shows the concept map for the conceptual articles, Figure 10 shows the map for the qualitative articles, and Figure 11 shows the map for the quantitative empirical articles.

Insert Figures 9, 10 & 11 About Here

Looking at these three maps, we can see that conceptual articles (Figure 9) predominantly look at DCs and their link to *learning* and the *firm* and *organizational* aspects such as *performance*. The qualitative research (Figure 10) focuses less on performance and more on the *development* of DCs, the *experience* and *routines* underlying them, and the *technology* aspects of DCs. The quantitative articles (Figure 11) more intensively examine *performance* implications and *resources* in relation to DCs. Interestingly, the map reveals that quantitative research investigates the performance implications of DCs taking into account the mediating role of the organizational resource base. This is slightly different to the conceptual and qualitative articles, which view firm/organizational factors as mediators between DCs and performance. Additionally, albeit less (green bubble), attention has been given to organizational processes, routines and learning underlying DCs in quantitative articles. Finally, the central themes of *organizational* and *firms* seen on the quantitative research map implies that much of this research has been concentrated on higher levels of analysis such as the firm.

It is rather obvious that the conceptual topics covered differ across the three modes of

research, implying a methodological and theoretical determinism that may be constraining scholars ability to integrate concepts within the DCV. For example, Helfat et al. (2007) notes that the processes relating to DCs can be divided into development and deployment processes, however, our results reveal that these aspects are not being effectively studied methodologically by the same researchers via a single methodological lens (not potentially with an effective mixed methods approach). Based on our analysis, it appears that qualitative research largely covers the development processes while more quantitative articles address the deployment processes and their outcomes.

Author Survey and Roundtables

As discussed earlier we took our textual analysis findings of the DCV to researchers active in the field through a survey and roundtables. We summarize our findings around: (1) past and persistent themes; (2) emerging themes; and (3) hypothesized themes. Table 2 provides an overview of these themes as revealed in the articles reviewed and Table 3 presents the results of the survey.

Insert Tables 2 & 3 About Here

Past and Persistent Themes

Several themes can be identified that played an important role in the early formulations of DC research but either have disappeared from view or been moved to the sidelines of the core discussion over time. For example, much of the early scholarly discussion was concerned with how DCs can be a basis of competitive advantage, particularly in turbulent environments. This followed in the classic tradition of market-based and resource-based scholars searching for the dominant source of competitive advantage and is also evident by the direct link between DCs

and performance seen in Figure 6 and discussed earlier. Accordingly, DCs were initially seen as a primary capability impacting performance such as new product development, alliancing, and strategic decision making (Eisenhardt & Martin, 2000). While competitive advantage is still seen as a core and persistent part of DCV – as evidenced by 80.2% of authors rating it so – the focus has moved away from finding a dominant DC to investigating the processes underlying DCs that impact evolutionary fitness.

Second, the survey and roundtable findings are in line with our textual findings that much of the early research revolved around the technology and R&D related aspects of DCs, seen in work such as by Helfat (1997) and Tripsas (1997). Today, the role of technology and R&D is not seen as a core component of the DCV, with scholars viewing them as conditioning factors in relation to firms, industries, markets and contexts in which capabilities are arising and used; for example, 62.4% of survey respondents viewed these contingencies as non-core, while authors were split almost 50:50 as to the centrality of technology. In a similar vein, DC research was initially strongly linked to work on ambidexterity and the strategy of market exploration and exploitation. Some early conceptualizations even suggested that ambidexterity, by itself, was a DC such that “dynamic capabilities are rooted in both exploitative and exploratory activities” (Benner & Tushman, 2003, p. 238). However, much of this work is now effectively being integrated into other more persistent and emerging themes, such as organizational routines and the enablers of DCs, with survey respondents split over its centrality, and the direction of its influence.

Although not as clear in the survey results, an interesting finding from our roundtables is the decline in the importance of market and environmental conditions and change in the DCV. For example, Teece (1997) tied the existence of DCs to uncertain and turbulent markets while

later research assumed that DCs existed in all environments (Helfat et al., 2007; Zollo & Winter, 2002). More recent empirical research seems to imply that what matters is the ability of latent DCs to be realized in the most appropriate circumstance, which can be contingent on environmental turbulence (Protogerou et al., 2011; Wilden et al., 2013; Wilden & Gudergan, 2015).

Overall, there is a fairly strong consensus amongst both survey participants and those attending our roundtables that the core of the DCV is *resources, learning, routines* and *performance* (Danneels, 2008; Kale, 2010; Romme et al., 2010; Verona & Ravasi, 2003; Zollo & Winter, 2002) with many of the aforementioned themes being either integrated into this core set of ideas or being viewed as marginal and discarded. *Learning, routines, resources* and *performance* were rated as three of the four most central themes – with positive responses of 88.1%, 88.1%, 86.1% and 76.2%, respectively – and all seen as clearly the most persistent of the themes investigated.

Emerging Themes

Our results reveal a clear shift in focus in the current and future orientation of DC research. Recent research has focused more intensively on the processes and micro-foundations underlying DCs and the enablers that take latent DCs and allow them to be realized. We see a growing interest in the role of how cognitive models underpin organizational routines with 63.4% of authors viewing this as core and 53.5% seeing it as an emerging and important theme. All together, these results show a much more intermediate and micro level approach to DCs and are in line with the increased interest in managerial capabilities as complementary to firm based DCs.

In addition, the conversation on DCs has shifted from being mainly reactive to market

dynamics towards a role for DCs in actively shaping and creating markets (36% of survey respondents view this as an emerging theme; 4th in rank of all emerging themes). The roundtable discussants were keen to emphasize the need of assigning DCs a more active role instead of defining them as mainly being responsive to the environment; a view seen in Pitelis and Teece (2010, p. 1247), who noted the lack of work on “value creation through market and eco-system creation and co-creation”, which was particularly important in the context of turbulent environments where entrepreneurial managers often need to create markets for their ideas as these markets may not or only vaguely exist or be imperfect. Consequently, organizations differ in that some have to respond to market dynamics (i.e., they are market-driven) while others seek to actively change (or create new) markets (i.e., market-driving) (Day, 2011).

SUMMARY OF RESULTS

Our discussion of the DC scholarship leads us to the conclusion that there are four main issues influencing the further advancement of the DCV: (1) emphasis on the microfoundations of DCs and their relationship to performance; (2) an accounting for multilevel nature of DCs; (3) a confusion about DC definition, and (4) methodological demands arising from the prior three issues.

Issue 1: The microfoundations of DCs and their performance implications

Our findings suggest that DC research is coalescing around two core components: (1) the microfoundations of DCs (namely, processes, learning, and routines) and their effect on organizational outcomes (such as innovation, performance, competitive advantage); and (2) the enablers of DCs that concentrate on when and how such capabilities arise and have an impact (such as organizational structure and culture). These two streams of research have traditionally been treated independently with little regard to how they could or should be integrated. The

discussion on performance was already raised by Baretto (2010a) and Helfat and Martin (2015) started to discuss the link between DC microfoundations and performance.

Issue 2: Accounting for multilevel nature of DCs

One major source of confusion identified in the literature is the question of the level at which DCs reside. More specifically, our roundtables and survey found that DCs are essentially a multi-level phenomenon spanning individuals, groups, business units, organizations and alliances, and that much of the definitional confusion arises from a failure to account for the interactions across levels and between contexts. Although some previous research acknowledges this issue (see e.g., Salvato & Rerup, 2011; Teece, 2007a), few researchers take these levels into account formally when conducting their empirical analyses.

In line with the contingency view of strategic management (Henderson & Mitchell, 1997), the relationship between DCs and the organizational resource base and, ultimately, firm performance is likely to depend on environmental conditions, such as industry dynamics and competitive intensity. Ignoring this complexity leads to an under-specified conceptualization of the DC–performance relationship. Much of the existing empirical research has focused on investigating DCs at the business unit or corporate level of single-business firms (e.g., Drnevich & Kriauciunas, 2011; Protojerou et al., 2011), rather than looking across individual, business-unit and corporate levels. Furthermore, research that focuses only on one level of analysis explicitly assumes that the chosen level of analysis is independent of other levels of organizational activity. Thus, the assumptions of homogeneity in, and independence from, other levels of analysis represent serious theoretical and empirical limitations to the extant DC research. While one might think that this issue is being resolved with a more cognitive and microfoundational approach to DCs, the reality is that the more recent research has, more often

than not, simply focused on a different level of analysis rather than effectively integrating the levels of analysis is a complete and parsimonious model (Devinney, 2013).

Issue 3: DC definition

Because the majority of research in the field is evolving quasi independently, the edifice of the theory is not being ‘tested’ but is being reformulated by researchers using various definitions of DCs and combining their work with thinking in related areas. What our work reveals is that a very basic confusion still exists about the nature of DCs and how to best measure them and assess their relationships to various outcomes of interest. In addition, although the roundtables showed some coalescence of ideas, this is less evident in what those authors were writing about in their articles. Of course, the conclusion alone that DCs research is “confused” is not new, as other authors have made this point. This is also what might be expected given the ad hoc and evolving, rather than systematic, nature of much of the written work. Roundtable participants were consistent in believing that many existing definitions are too narrow, leaving out important aspects of DCs in the desire for precision and a desire to be consistent with prior theory. For example, Helfat et al.’s (2007) definition focused mainly on internal resources, capabilities and processes, thus missing aspects of how organizations deal with the external environment directly. That is, their definition sees the organization as passive, responding to the environment rather than acting proactively in driving change in the external environment in the organization’s favor, a view at the heart of Pitelis and Teece’s (2010) criticism of the extant DC research. All this discussion begs the question of whether the search for a single DC definition is the way forward or if a rather architectural definition, addressing the wider aspects of DCs, is more desirable. For the most part, workshop participants were likely to opt for the architectural logic, rather than search for narrow definitions.

Issue 4: Methodological determinism

The differences in the conceptualizations of DCs seen across research types imply that there may be a disconnect between conceptual developments, theoretical advancements and empirical investigations to the point that the more tightly linked relationships seen in Figure 1 begin to get lost when one examines what arises when different lenses are applied to what is meant to be a singular theoretical conceptualization. This problem is apparent in the fact that explorations of different conceptualizations of DCs seem to demand different methodological approaches which leads invariably to the significant differences between conceptual, qualitative and quantitative studies in terms of their research focus. This is a concerning finding, as it appears that theory may be confounded with the methodology without authors understanding that their hypotheses are being conditioned on the methods chosen for their testing. Articles that have chosen qualitative methods generally have concentrated their investigation on questions regarding the development of DCs and underlying routines with little emphasis on understanding how that path relates to firm performance. On the other hand, quantitative studies have focused on understanding the impact that DCs have on performance and their strategic role, with little concern for how that impact is realized in via organization routines and managerial actions.

TOWARD A CONFIGURATIONAL APPROACH TO DYNAMIC CAPABILITIES

To synthesize our findings and offer a first step towards resolving the four issues just outlined, we advance DC thinking by focusing on the integration of DC logic – as it is evolving from the perspective we have uncovered – with configuration (systems) theory (e.g., Bertalanffy, 1968; Boulding, 1956; Meyer et al., 1993) as an alternative to existing process theory and variance theory based conceptualizations of DCs. The need for using a configurational approach for the DCV was highlighted by Kor and Mesko (2013, p. 234) who state that

“dynamic managerial capabilities (...) fail to capture how the firm’s set of managerial capabilities drive and are influenced by the unique configuration of resources and competencies in the firm. Thus, an in-depth understanding of dynamic managerial capabilities requires new insight about (1) how dynamic managerial capabilities themselves are configured and orchestrated and (2) how executives’ capabilities result in (re)configuration of a firm’s resources and capabilities.”

Configuration theories are well suited to investigate DCs (Doty et al., 1993; Fiss, 2007; Meyer et al., 1993). They complement variance theories and process theories to help better understand DCs and we posit that they have the potential to significantly advance DC investigation. For example, while process theories (e.g., Schreyögg & Kliesch Eberl, 2007) are best at explaining phenomena and performance outcomes over time, they are less suited to investigating interaction effects of multiple system elements. In addition, variance theories (e.g., Furneaux & Wade, 2011; Wilden et al., 2013) are well-suited to explain levels of outcomes of predictor variables, but are restricted in explaining changes in system elements and their relationships (El Sawy et al., 2010; Meyer et al., 2005). In contrast, configuration theories concentrate on understanding the designs and combinations of system elements (e.g., in this case DC processes, individuals, organizations, and available resources and capabilities) and how they, as configurations, lead to outcomes such as evolutionary fitness and performance. Configurations can be empirically or conceptually driven (Cardinal et al., 2010) with previous research differentiating between typologies (conceptual frameworks that are hard to test) and taxonomies (empirically driven but lack underlying theory). In line with Cardinal et al. (2010) we use the term configuration as a concept that is both theory-driven and empirically testable.

The DCV revolves around how dynamic exchange systems integrate different types of

resources in order to affect the operational capabilities and ultimately evolutionary fitness. Configurations are specific combinations of causal variables that generate an outcome of interest (Rihoux & Ragin, 2009). Finally, the nature of configuration theories connects the idea of mutual causality of system elements to their context, making them appropriate to middle-range, context-sensitive (rather than universal) theories – which is appropriate for DC thinking (Rihoux & Ragin, 2009). For example, Burton-Jones et al. (2014, p. 5) suggest that as systems “are assumed to exist within other systems (hence an environment) [and because] properties ‘emerge,’ entities can change and thus time is a key part of one’s theory.” This is especially relevant for any conceptualization of DCs. Using a configurational approach to DCs may also help to resolve the debate about whether DCs have to fulfill the VRIN criteria (valuable, rare, inimitable, and non-substitutable) underlying resource-based logic to create performance or whether Eisenhardt and Martin’s idea of equifinality is more appropriate. Equifinality posits that there may be multiple equally effective configurations of DCs (variance theories only allow unifinality) (Doty et al., 1993). Configuration approaches also allow to assess complex interconnectedness of multiple system elements, nonlinearities, and discontinuities (Meyer et al., 1993).

To bring these ideas together in a parsimonious manner, we develop a conceptual configurational framework we entitle the ‘House of DCs’ (see Figure 12). The goal is to use the analogy (Lakoff & Johnson, 2008) of a house and its neighborhood as a visualization of the various levels of analysis and the need for understanding the internal interactions between (i.e., configurations of) various DC processes and microfoundations with the firm’s existing operational capabilities in order to investigate the performance implications of DCs. In what follows we discuss the key building blocks identified by our analysis which future research will need to incorporate when developing configurations of DCs.

Insert Figure 12 About Here

In applying the analogy of a house, we are accounting for the nature of the broader environment, the structure of the organization, and how the combination of the two create value. The *weather* outside the house represents the exogenous environment in which the organization and its actors exist. The *neighborhood* in which the house is located represents the firm's industry (or ecosystem), with its direct competitors being those located more closely. The neighborhood and house are embedded and, hence, have endogenous interrelationships and value. The *roof* holding the house together is the organizational strategy chosen. The *joists* of the house represents the organization's operational capabilities. Both the roof and the joists (i.e., the strategy and the operational capabilities) need to be strengthened and carried by strong pillars to withstand weather changes. These *pillars* represent the organization's DCs in the form of sensing, seizing and reconfiguring processes. The different *floors* in the house represent the levels of analysis relevant to conceptualize DCs. The house rests on strong *foundations*, which represent the enablers of DCs. The *value* of the house represents the organization's performance. All parts of the house (i.e., strategy, operational capabilities, DCs and enablers need to be configured in a way to stay up (i.e., survive) and weather *storms* (i.e., environmental turbulence).

One implication of the 'House of DC's' is that different houses will need to be structured differently depending on the specific needs of its owners and the neighborhood in which it lives. However, the basics of structural integrity remain the same. That is, the roof (strategic orientation) and the pillars (DCs) will shape the house. These may rest on different foundations and the structural components may be different, but it is the DCs and their alignment with the firm's strategic orientation that will provide the house with structural integrity over time. Accordingly, the house will be stable no matter whether the organization starts with setting out

its strategic orientation and develops operational capabilities, or whether the strategic orientation is developed based on available operational capabilities. These different house structures represent various configurations of resources and capabilities in the DCV. Configurations are defined as a number of specific and separate attributes that are meaningful collectively rather than individually and are characterized as representing a tightly integrated set of dynamics (Miller, 1981, 1986; Miller & Mintzberg, 1981). Within the house, DCs are reflective of the interior design of the house. In the discussion that follows, we focus on the configurational elements of environment, strategic orientation, operational capabilities, DCs, and enablers of DCs, all of which form building blocks that future theoretical development needs to include in deriving a configurational approach to DCs.

Environment and Industry

In the context of a multi-level configurational structure for the DCV, the industry and wider socio-economic environment are the overarching conditioning/contingencies that influence the structure and design of the house. According to a configurational logic, different environmental conditions require the use of different DC processes, operational capabilities and culture, just as homes in different climates require different structures to survive the environmental conditions and terrain on which they are built. For example, Wilden and Gudergan (2015) found that frequent use of sensing and reconfiguring processes have stronger positive relationships with technological and marketing capabilities in environments characterized by higher degrees of competitor turbulence. There is a mixture of exogeneity and endogeneity in this characterization. While the house cannot influence factors such as the weather, it can potentially influence the value of any home in the neighborhood, and its design mediates the influence of the environment on the components of the house. Similarly, the better a house is designed for its specific

environment – i.e., the better its components collectively fit – the better it will be able to do that.

Strategic Orientation and Operational capabilities

Within our framework, a firm's strategic orientation is the roof of the house – covering its internal components – while the ceiling joists, which push the load downward onto the other floors, represent the operational capabilities. The strategic orientation provides the reference point regarding what configuration is needed to achieve a set of desired strategic and operational outcomes (Van de Ven & Drazin, 1984) and refers to the overall long-term direction of the organization. Strategic orientation comprises the long-term managerial plans that are put in place to adapt to internal and external change (Day et al., 1990; Hofer & Schendel, 1978) and outlines the major components of the organizational operational capabilities needed to achieve fit with the environment (Miles & Snow, 1986).

A number of frameworks characterizing strategic orientation exist. For example, Porter (1980; 1996) articulates three generic strategic orientations available to organizations – differentiation, cost leadership and focus – while Miles and Snow's (1978; 1986) classification of strategic orientations distinguishes organizations along the rate at which it changes its products or markets (Hambrick, 1983), resulting in firms being identified as prospectors (first to market and proactive), defenders (efficiency & reactive), analyzers (efficiency & flexibility) and reactors (no clear strategy). Based on our roundtables, we saw a consensus around the belief that future DC scholarship needs to address DCs' role in interacting with and shaping markets – in other words, there needs to be more understanding of the market-driven versus market-driving aspects of DCs. Hence, we argue that a more fruitful operationalization is to simply ask the question as to what degree the firm is attempting to drive/react to existing market needs – i.e., is more *market driven* – or attempting to create *new markets* (either via de novo creation or through

radical disruption). This allows for a direct link to the core concepts of the DCV, while also allowing scholars to integrate other strategic frameworks simply. For example, organizations with a *market-driven* orientation require more emphasis on continuously sensing and seizing opportunities in their existing markets. Firms with a *market-driving* strategic orientation gain more sustainable performance by generating increased customer value through new business models that change, or create, new value in a market. Similarly, the operational capabilities necessary for the different orientations will vary, with market driven firms needing more exploitative operational capabilities and those with a market creating orientation more explorative and risk absorbing capabilities.

Dynamic capabilities

Organizations deploy DCs to create reconfigurations of operational capabilities; accordingly their impact on performance is indirect and mediated through operational capabilities (Eisenhardt & Martin, 2000; Teece, 2007a; Wilden et al., 2013; Zahra et al., 2006a). That is, DCs are only valuable if they create operational capability configurations that are valuable (Protogerou et al., 2011). Their value lies in the ability to integrate and leverage corporate and business unit mechanisms that affect firm strategy and performance. Within our House of DCs logic, they are the pillars holding the house up and bearing the load being transmitted from the roof (strategic orientation) and the joists (operational capabilities).

As our roundtable discussions showed, authors believe that DCs exist on multiple levels within the organization; i.e., at the individual, team⁵, business unit, and corporate levels and hence any conceptualization of DCs must address their spanning of the floors of the house. Teece

⁵ We excluded a detailed discussion of ‘team’s as its own level of analysis in our framework. Future research may also want to discuss this level, integrating upper echelon theory and discuss top management team decision making in the context of dynamic capabilities (see Buyl et al., 2011; Hambrick & Mason, 1984).

(2007b) stressed the importance of managers in the DC context and there is an emerging and growing stream of research on managers and their behaviors as key micro-foundations of DCs (Buyl et al., 2011; Felin et al., 2012; Powell et al., 2011; Salvato & Rerup, 2011). Research at this level includes understanding managerial cognition and the interpretive processes that managers and top management teams (TMTs) use in the deployment of DCs as well as how other individual characteristics and influence and impact the organizations ability to deploy DCs (Benner & Tripsas, 2012; Eggers & Kaplan, 2009; Gavetti, 2005; Hodgkinson & Healey, 2011; Kunc & Morecroft, 2010). Much of the empirical work on this dimension has found that managers mattered in the sense that that they were likely to follow second best heuristics (Gigerenzer & Gaissmaier, 2011) that were driven by the need to reduce complexity and/or address uncertainty and turbulence in the market (Binmore (2008). For example, Maitland and Sammartino (2015) found considerable managerial heterogeneity in the decision models used for assessing market entry opportunities and that while the heterogeneity was related to the manager's internationalization experience there was still significant unexplained variation. It is also the case that managers have specific biases that become manifest with certain types of decisions. For example, Garbuio et al. (2011) show that when it comes to reconfiguring decisions managers can suffer from an endowment effect where they overestimate the value of existing resources and capabilities and hold on to existing operational capabilities for longer than is economically rational. Adner and Helfat (2003) argue that 'dynamic managerial capabilities' can be thought about on three individual dimensions – managerial cognition, managerial social capital, and managerial human capital (for more details see Helfat & Martin, 2015) – while others (Helfat et al., 2007; Maritan, 2001) have labeled DC processes on the individual level as 'asset orchestration', comprising the search for resources and capabilities; their selection,

investment, and deployment and their reconfiguration

As proposed in our ‘House of DCs’ framework, all these individual level DC processes, need to be configured to fit the organization’s overall strategic orientation. When looking at market-driving organizations, the “element of dynamic capabilities that involves shaping (and not just adapting to) the environment is entrepreneurial in nature (Teece, 2007a, p. 1321).” This statement implies that individuals, i.e., managers, differ in their cognitive processes and behavior depending on whether their organization aims at defending their position, responding to market needs (market driven) or driving change (market driving). For the latter type of organizations, Maclean et al.’s (2015) concept of creative action may explain individual behavior. They suggest that creative action rests on creativity as individuals engage in purposive improvisation to resolve experienced difficulties.

As we move from the managerial level to the business unit and organizational levels of analysis, cognitive models give way to routines and structures. For example, although our research has shown that ambidexterity does not form the core of DC research, linking these two research streams may be fruitful. Using the house analogy, we might ask whether rooms and floors should be designated for specific uses or be multifunctional. This is akin to making the organization structure decision. Structural ambidexterity would imply that one is better off with clearly defined use-based rooms that utilize the “different competencies, systems, incentives, processes, and cultures – each internally aligned” (O’Reilly III & Tushman, 2008, p. 192) that are necessary to achieve the maximum value of the building.

Mechanisms need to be in place that allow moving across levels, thus, representing *stairs* in our house analogy. In this context, Argote and Ren (2012) suggest the concept of an organizational transactive memory system. Such a ‘stairs’ system needs to be built in a way to

allow for access to and use of specialist knowledge held by individuals within the organization. This system will need to be flexible in its integration, that is, it needs to be able to access complementary knowledge and reconfigure existing knowledge (Kogut & Zander, 1992). In this cross-level system the development of new capabilities to seize opportunities requires rapid access to information and the capacity to collectively filter information about new opportunities and the flow of information to those who can make sense of it (Teece, 2007a).

Enablers of DCs

Our analyses have hinted that ‘just’ having good quality DCs is not enough, as an organization needs to have critical characteristics that enable the successful utilization of DCs in a manner that leads to sustainable performance. Although routines in the context of DCs are not the focus of this article, the discussion on routines in the context of operational and DCs warrants some discussion. In the context of our House of DCs we conceptualize that routines regulate behavior within and across levels as individuals live and act in the house and routines provide either a weak or a strong foundation of team, business-unit organizational behavior. This is in line with the conceptualization of organizations as a set of interdependent operational and administrative routines (Nelson & Winter, 1982) but counter Teece’s (2012) argument that routines are more likely to underlie operational capabilities than DCs.

The degree of routinization of DCs needs to be put into the context of environmental conditions the organization is facing and the organizational strategic orientation. Market-driven organizations may be able to rely on routine-based DC sensing, seizing and reconfiguring processes as these are effective for adapting incrementally based on past experiences and path dependency (Schilke, 2014a). However, market-driving organizations, and organizations active in highly turbulent environments may not benefit from these type of DCs (Levinthal & Rerup,

2006; Levinthal & March, 1993).

Besides the discussion on routines, the predominant strategic orientation and resulting configuration of DCs and operational capabilities needs to be configured with a supporting organizational culture and structure. The roundtable discussions indicate that little previous research has investigated the DCs-organizational culture relationship, which is also evidenced by the fact organizational culture not appearing in our Leximancer analysis of the existing literature.

Organizational culture influences corporate and individual behavior (Selznick, 1996) and influences organizational and individual processes (e.g. Deshpandé et al., 1993; Moorman, 1995). DC deployment rests on the behavior, willingness and ability of organizational members to act. This willingness is influenced by the organization's culture (Schein, 2004). Thus, cultural values influence the utilization of DCs (Helfat et al., 2007). This is seen in a comparison of market-driven versus market-driving organizations once again. In the former management needs to establish an open and inquisitive culture, creating an exploitative mind-set (Day, 1994). The DC sensing needs to be focused on identifying existing product-market combinations. In the latter, high adhocracy values in the culture will enable the organization to innovate through fostering risk taking, innovativeness, and interactive organizational learning (Carrillat et al., 2004). Further, strong market values will enable the organization to coordinate change through the coordination of the firm's departments (Carrillat et al., 2004).

Organizational structures influence firms' ability to sense and seize opportunities and make necessary reconfigurations to operational capabilities (see for example, Teece, 1996). The corporate structure will determine how much decision authority is allocated to individual business units, and thus, which opportunities may be seized. In general, organizational structures can be classified on a continuum from mechanistic to organic. Organic structures imply de-

centralized decision-making, open communication, adaptiveness, and de-emphasize formal rules and procedures. Mechanistic structures typically comprise centralized decision-making, formal rules and procedures, detailed reporting structures, and control of information flows (Burns & Stalker, 1961; Lawrence & Lorsch, 1967).

Which of these structures is more amenable to DCs operating effectively is up to debate. For example, market-driving organizations typically rely on flexible structures in which planning and control are decentralized (Miles & Snow, 1986) and Teece (2007a, p. 1335) argues that to “sustain dynamic capabilities, decentralization must be favored because it brings top management closer to new technologies, the customer, and the market.” In support of this view, Wilden et al. (2013) find that organic organizational structures positively moderate the relationship between DCs and firm survival and firm growth. Alternatively, some research has challenged the belief that control and structure always harm organizational adaptation and innovation. For example, Cardinal (2001) finds that different control mechanisms actually foster radical and incremental innovation. Thus, we are left with the conundrum that organizational structures may, on the one hand, constrain behaviour, while, on the other hand, they may also “enable efficient information processing, knowledge development and sharing, coordination and integration, and more generally, collective action (Felin et al., 2012, p. 1364).” Thus, on the individual level, employees and managers may be enabled or restricted in regards to how sensed opportunities can be seized (e.g., through required decisions processes). Consequently, when deriving specific DC-relevant configurations, future research needs to develop a more nuanced understanding of the interrelationships between organizational structure dimensions, DCs, decision-making processes, environmental context and other relevant configurational elements.

Performance

We can operationalize the market value of the house as encapsulating the performance of a specific configuration of the house, in a specific location in a specific neighborhood.

Conceptualizing and measuring performance is a challenge for any business researcher. Three ways of conceptualizing performance exist in previous research: 1) performance as a latent construct with the various dimensions sharing variance; 2) performance as separate constructs; and 3) performance as aggregate construct with dimensions being low in shared variance (Miller et al., 2013). Miller et al. (2013) find that less than 35% of empirical studies exhibit internal consistency between theoretical definition and operationalization of the performance construct. Further, of great concern is that many authors fail to define the nature of the performance construct underlying their study explicitly. While most studies apply the latent construct approach in theory building, Miller et al. find that cumulative empirical evidence does not support continued measurement of a general latent construct of organizational performance, a fact supported empirically by Devinney, et al. (2010). For future DC research this implies that studies need to theoretically investigate more specific aspects of performance to match existing practices in empirical work, rather than ‘simply talking about performance in general’.

In line with this thinking, Helfat et al. (2007) suggest that empirical assessments of DC performance should first assesses DCs effect on intermediate outcomes, such as strategic change, and subsequently measure the effect of these intermediate outcomes on business and organizational outcomes, such as survival, growth, and financial performance. The challenge for future DC research using a configurational framework will be to assess both the performance of the individual system elements (e.g., DCs, operational capabilities) and the outcomes of the

entire configuration as well as to establish a link between the various performance measures that exist at the respective levels.

According to Felin and Ployhart (2015) much of previous micro-level research has investigated performance measures such as turnover, individual job performance or team-level performance. However, “it cannot be assumed that job performance or small group performance translates directly into firm or higher level heterogeneity, performance, and especially competitive advantage (Felin et al., 2015, p. 601). Helfat and Martin (2015) stress that is crucial to avoid measuring dynamic managerial capabilities as organizational performance (see also Grant & Verona, 2013; Helfat et al., 2007). Felin et al. (2015) state that individual-level factors provide one starting point for analyzing business-unit and organizational outcomes (Felin & Foss, 2005), and that by definition the explanandum of microfoundations is found at the higher level. This is because the microfoundations discussion fundamentally deals with explaining differences in social outcomes and heterogeneity in competitive advantage (Barney & Felin, 2013; Felin & Foss, 2005; Molina-Azorín, 2014). Such outcomes “exist at the strategic business unit, firm, market, industry cluster, or competitive group levels. While they differ in their specific levels, they all share a common focus on outcomes at the level above the individual (Felin et al., 2012, p. 601).” Some attempts exist to translate individual and aggregate effects of turnover on organizational performance (Campbell et al., 2012).

Helfat et al. (2007, p. 7) introduced the concept of evolutionary fitness as a performance measure for DCs, defined as ‘the extent of evolutionary fitness depends on how well the dynamic capabilities of an organization match the context in which the organization operates’. This definition implies the need for an appropriate configuration of the firm’s dynamic and operational capabilities with other internal factors (e.g., strategic orientation, structure and

culture) and environmental conditions. High evolutionary fitness results in organizational survival and growth. Organizational survival indicates the degree to which an organization is capable of adapting to its external environment; organizational growth indicates the extent to which the organization has increased in size (Helfat et al., 2007; Teece, 2007a).

Empirical Advances Needed

The empirical modeling of DCs has been dominated by either traditional econometric approaches that have flowed on from the economic foundations of strategic management research – predominantly the RBV – or qualitative case studies that have been based on the logic of Eisenhardt (1989). This has raised a number of issues that we have noted already, in particular the methodological and conceptual determinism related to theory development and testing being co-determined. However, there are additional issues that arise when one adds a configurational logic of DCs into the mix.

Configuration theories can allow researchers to investigate holistic effects of DCs explicitly; but to do so future research propositions and methods must be designed to “capture those simultaneous systemic effects in triadic configurations as opposed to additive two-way correlations, even with moderator/mediator variables that model the interaction effects among individual elements” (El Sawy et al., 2010, p. 842). Advances in configuration theory have led to more sophisticated approaches that go beyond simple identification of effective sets of configurations towards a better understanding of individual elements of a given configuration (Fiss, 2011).

From a measurement perspective, we believe there are five elements that need to be accounted for based on the House of DC logic. First, a configurational logic focuses not on the value of any specific component of the configuration but its value holistically. Hence, any

assessment of DCs must be done as part of a portfolio of capabilities, no one of which can be separated from the whole. Hence, standard econometric approaches that assume independence (orthogonality) of the independent variables is not only logically inconsistent – i.e., no one part of the configuration can be separated from any other without compromising structural integrity and, hence, value – but an improper empirical model. Hence, what matters is not just the existence of any set of DCs but the existence and structural relationship amongst those DCs and between those DCs and all other structural components.

Second, one implication of a configurational approach is that every configuration is unique. That is, the structure chosen by a firm in its environment will be unique to that environment and that firm. This implies a level of heterogeneity that needs to be accounted for at the firm level, at a minimum. Historically, heterogeneity has been modelled using classical parameterizations that account for environmental, industry, or firm level effects as fixed or random effects and/or moderators of models of central tendencies. In other words, the models assume a ‘best’ model that varies at the margin depending on known and measurable contingencies. However, if (a) every firm is unique and (b) most heterogeneity is hidden (unobserved), such approaches will be unnecessarily restrictive and will be a fundamental misspecification of the true underlying source of firm level variation.

Third, if we believe Eisenhardt and Martin (2000), then equifinality will imply a different model than what we see in most studies of performance. Devinney, Yip and Johnson (2010) argue that standard linear modeling approaches to the modeling of performance are incorrect if one is to believe in standard strategic management models, such as those based on competitive advantage and the RBV. As many different configurations (even for the same firm) can generate similar performance outcomes, and/or there are many dimensions to what it means to ‘perform’,

a frontier modelling approach will naturally follow as the appropriate empirical response to the theoretical structure (see Devinney et al. (2000) for an example of how this applies in the case of global firm's strategic orientation and how it can account for strategic orientation and organization structure over time).

Fourth, DCs operate over time and across levels, implying the need for multi-level longitudinal approaches to DCs but with a more complex structure as what is evolving are configurations. Hence, for each firm, one needs to account for the interrelationship across levels at any point in time, taking into consideration the evolution of the configuration of operational and dynamic capabilities, while attempting to estimate both of these effects on performance that itself will have time varying properties.

Fifth, different components of configurations comprise different things and may imply different modelling approaches. Using again our house analogy, we could say that the foundation is made of concrete, the pillars and joists from woods, the floors are tiles, the roof is slate, and so on. Some components move (e.g., windows and doors) while others are fixed. The same is true with the components of the configuration. For example, capabilities can include both stocks and flows, each of which has to be measured differently. Similarly, across levels of analysis we may need to use very different methodological logics – e.g., measuring cognition may need to be done very differently from measuring capabilities or organizational culture. Measuring items that are not just on different scales (e.g., a stock at a point in time as opposed to a process operating over time at some rate) but at and across levels implies a level of complexity that is beyond what research currently uses.

Together all of this discussion suggests that if want to move the DCV forward there is a need to seriously rethink our methodological approaches in a manner that aligns better to what

the theory is implying. The RBV and competitive advantage are theoretically consistent with cross-sectional analysis (or at least not inconsistent with it). However, by definition the DCV is about observing, reacting and changing – none of which are occurring contemporaneously. In addition, if we believe more recent conceptualizations, which have added multi-level complexity to the DCV, we cannot assume that the flow across levels is consistent (e.g., different levels may react with different rates of speed when it comes to reconfiguration). In some sense, so much of the energy in DC research has concentrated on definitions and theory that measurement and methods have simply been assumed appropriate, when this is hardly true.

This implies that if we are to progress the DCV we need to change our empirical approaches considerably. This is not just an issue of the appropriateness of qualitative versus quantitative approaches, but how we structure the information. We need to come up with a parsimonious and theoretically meaningful modelling approach. While we cannot solve this issue in this article, we hint at where some possibilities may lie. First, researchers need to think more broadly about replacing their models of moderated or mediated central tendencies with models that account for equifinality and align more properly with the models of superior performance associated with the DCV and RBV. We already have candidates for this in frontier models, such as data envelope analysis (DEA) and stochastic frontier analysis (see Chen et al., 2015; Devinney et al., 2010; Yip et al., 2009 for applications of these approaches). Second, we need to not just apply multilevel models but also adapt these models to the point that they can address the time varying aspects of capabilities at the various levels. Further, we need to account for the basic differences in the structure of the measurement of capabilities themselves. This requires a merger of quantitative and qualitative approaches that goes beyond just mixed methods but includes ‘mixed measurement’. Mixed measurement is how one takes data that varies in its structure –

e.g., the real difference between qualitative and quantitative measurement is in how the data is structured and who does the structuring (see e.g., Feldman & Sanger, 2007) – and fuses it into a meaningful measured construct. This is an unexplored area in the social sciences but examples exist in other domains and some scholars have attempted to apply fusion models more broadly (see e.g., Castanedo, 2013). Third, we need to move beyond a definitional focus to a configurational focus in measurement. This implies not a comparison of the different levels of DCs but mixtures of the levels and types of DCs, conditional on the other structures in the organization (i.e., conditional on the structure of the house) and the configurations chosen by competitors. This implies a need to go beyond defining DCs to coming up with how we can characterize mixtures of DCs holistically. Again, several approaches exist but have thus far largely been ignored by strategy scholars. One approach is archetypal analysis (Cutler & Breiman, 1994), which operationalizes any structure as a mixture of pure structures and has a robustness that makes it superior to classical clustering techniques (Bauckhage & Thureau, 2009). Fourth, we need to think more effectively about how we account for heterogeneity. In line with our first point, there is a need to recognize that the DCV does not imply an optimal general model with variations for contingencies but different optimal models for different firms. Hence, we need estimation techniques that inform individual firm level models with information from both those individual firms and the collection of firms in the sample. While classical econometric models have attempted this, the more appropriate structure is Bayesian. Bayesian models allow for more generalized assumptions about estimated parameters and have the advantage of allowing scholars to estimate individual, group and aggregate level models as well as multilevel and structural equation models easily.

CONCLUSION

The purpose of this article has been to provide a systematic review of published articles in leading management journals on the DCV, assessing almost two decades of research in this field, but to do so with an eye on where scholars believe the field is heading. Our text analysis finds that researchers have used the DCV to investigate two core foci – performance and process. Our subsequent interaction with authors showed that DCs are essentially a multi-level phenomenon, with few researchers considering these levels formally when conducting their empirical analyses. A concerning finding is that DC theory may be confounded with the chosen methodology without authors understanding that their hypotheses are being conditioned on the methods chosen for their testing. All this leads to a confusion about the nature, performance implications, and measurement of DCs. The roundtables indicate that an architectural definition, addressing the wider aspects of DCs, is the more promising way forward compared to trying to find a single definition. The framework that emerged, which we call the ‘House of Dynamic Capabilities’, advances DC research by: (1) emphasizing the microfoundations of DCs and their relationship to performance; (2) accounting for the multilevel nature of DCs; (3) addressing the confusion about DC definitions; and (4) providing methodological alternatives to current modelling. We integrate configuration theory into DC thinking to avoid spurious findings due to unobserved heterogeneity, caused by not accounting for the various levels of analysis. Furthermore, by proposing a configuration logic, our framework stresses the importance of understanding the designs and combinations of system elements (e.g., DC processes, individuals, organizations, and available resources and capabilities) and how they, as configurations, lead to outcomes (e.g., evolutionary fitness).

In essence, our review exposes the core factors that have motivated many scholars to criticize the DC view of strategy. What this suggests is that new scholarship needs to account for

these shortcomings in its design and execution. If it continues to extend the current style of thinking, then it is unlikely to reveal new insights into the role of DCs in helping organizations run today and build tomorrow. One way to start this journey is to identify different archetypical DC architectures (styles of house) and their suitability for providing different house values and qualities of living (performance) in different climates (environments). Equifinality suggests that companies will compete using different configurations of DCs, some of which will be more effective than others. Identifying these different sets of viable configurations will also help to explain heterogeneity in performance and suggest new insights about how DCs ‘work’. One of the outcomes of this approach is that it obviates the necessity for formally defining the construct of a DC, which is an issue that has frustrated many scholars. The focus also shifts from trying to identify all the possible dimensions of DCs to describing archetypical configurations of DCs and modeling how these drive different types of performance. Future work on configurations of DCs should be both theory-driven and tested empirically (Cardinal et al., 2010).

Our study is subject to limitations. One is that a significant amount of research in the field has been published in books and it may be that some of the more forward thinking research is less likely to appear in journals (e.g., Helfat et al. (2007)). It is also possible that some influential and important research in the field was published in journals other than the journals that formed the basis of our study and that a different perspective would be found if we included DC research published in fields such as marketing, economics and IT. Finally, we only included articles that include the identifier ‘dynamic capabilities’ in its title and/or abstract, which may have biased us against work where dynamic capabilities were not the focus of the article but important DC related concepts were being examined.

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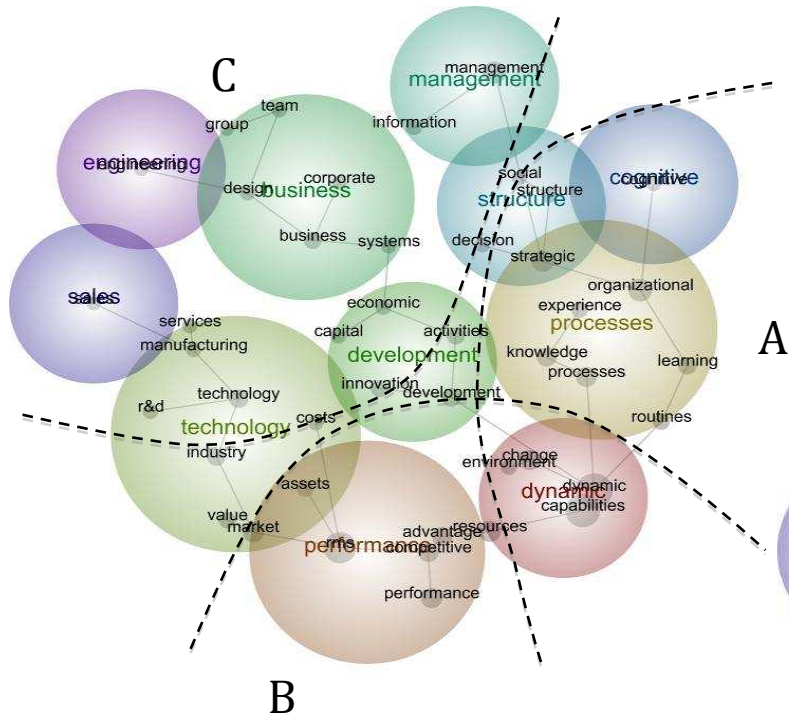


Figure 1: All articles map (1997-2015)

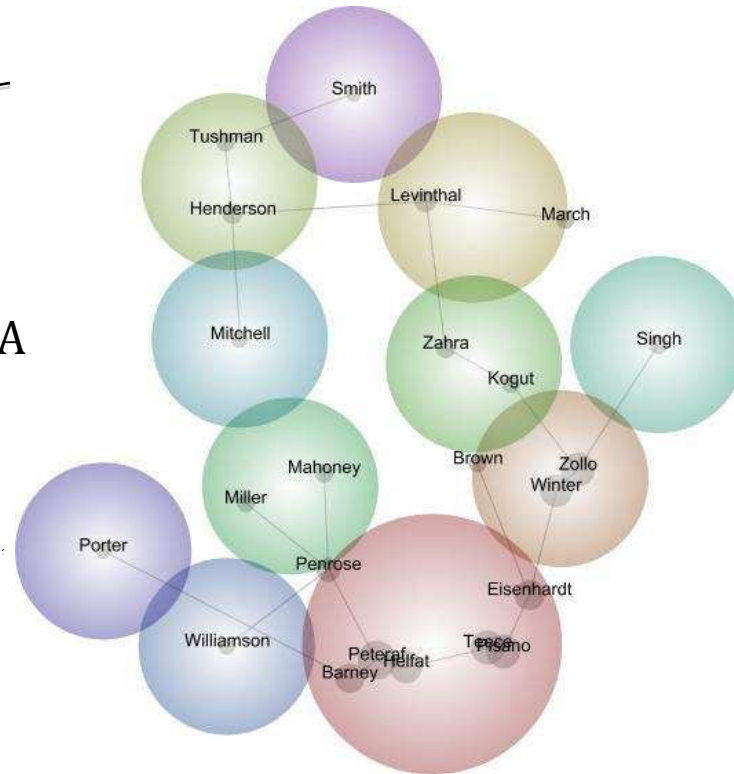


Figure 2: Authors map (1997-2015)

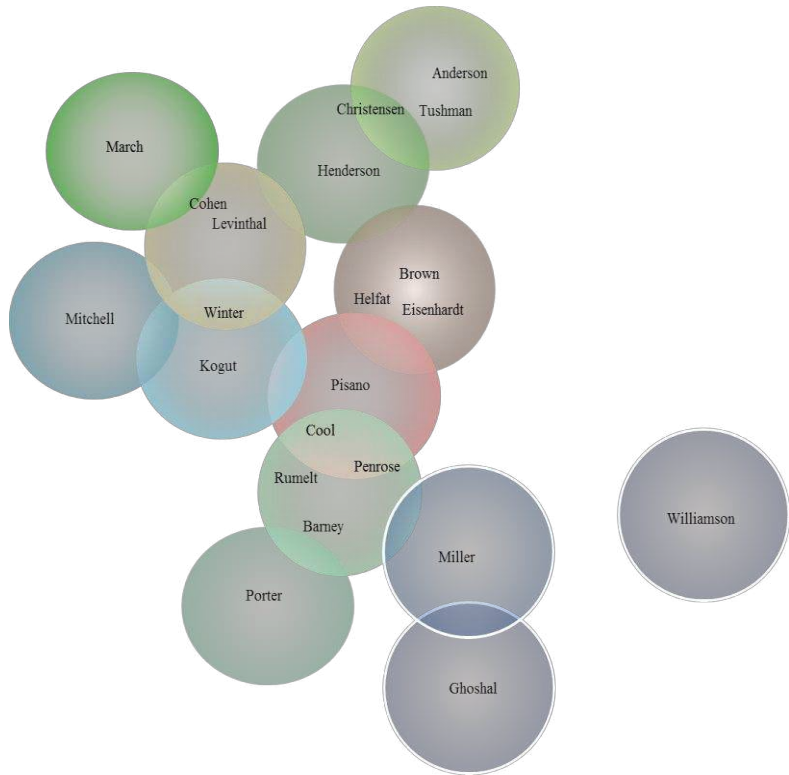


Figure 3: Authors map 1997-2006

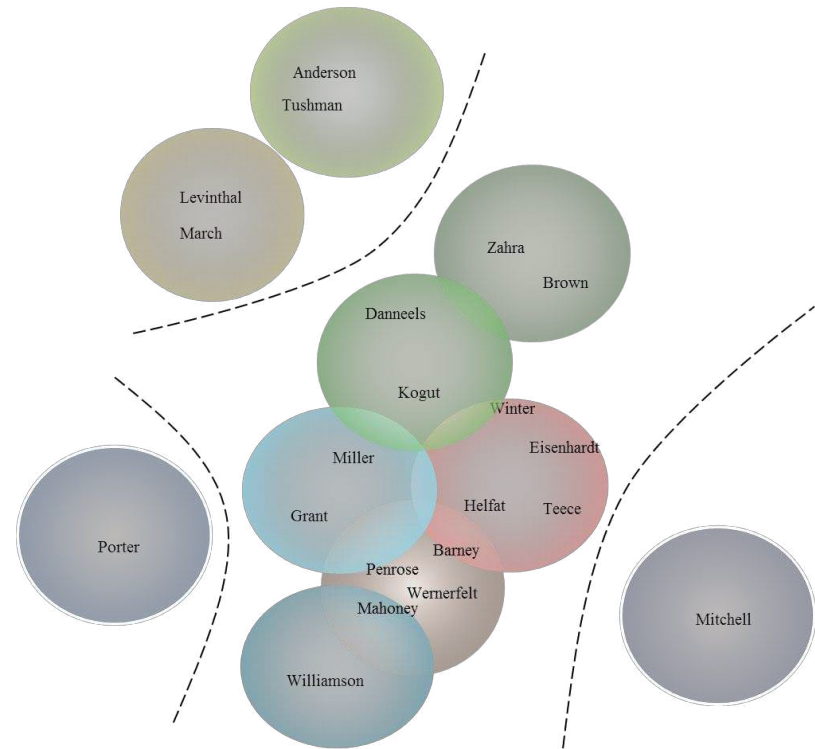


Figure 4: Authors map 2007-2011

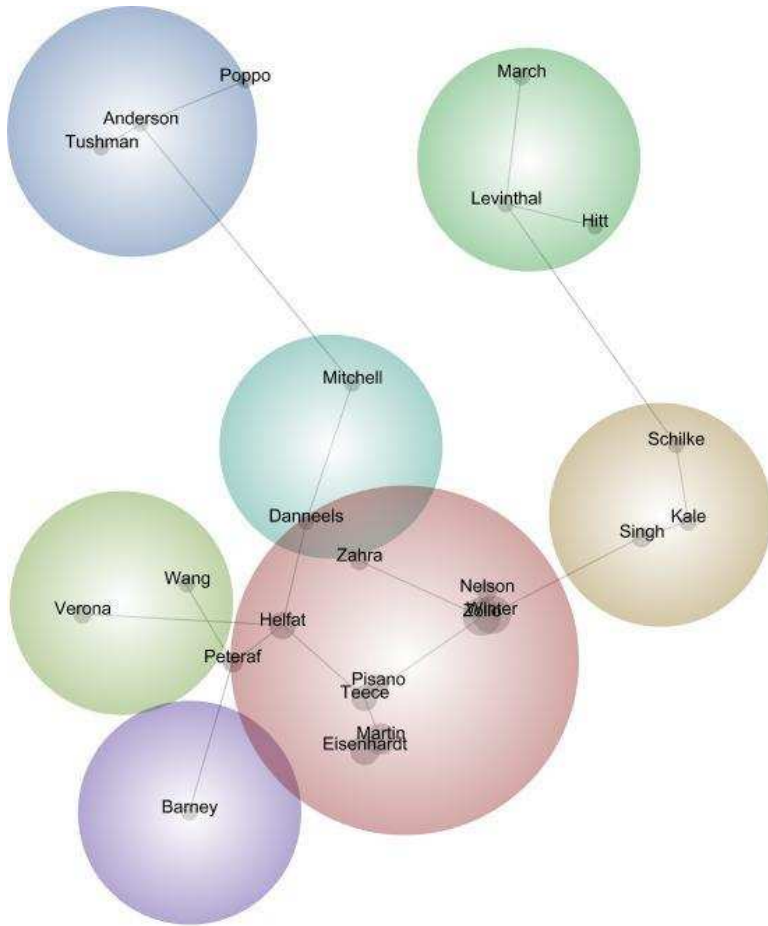


Figure 5: Authors map 2012-2015



Figure 6: All articles map 1997-2006

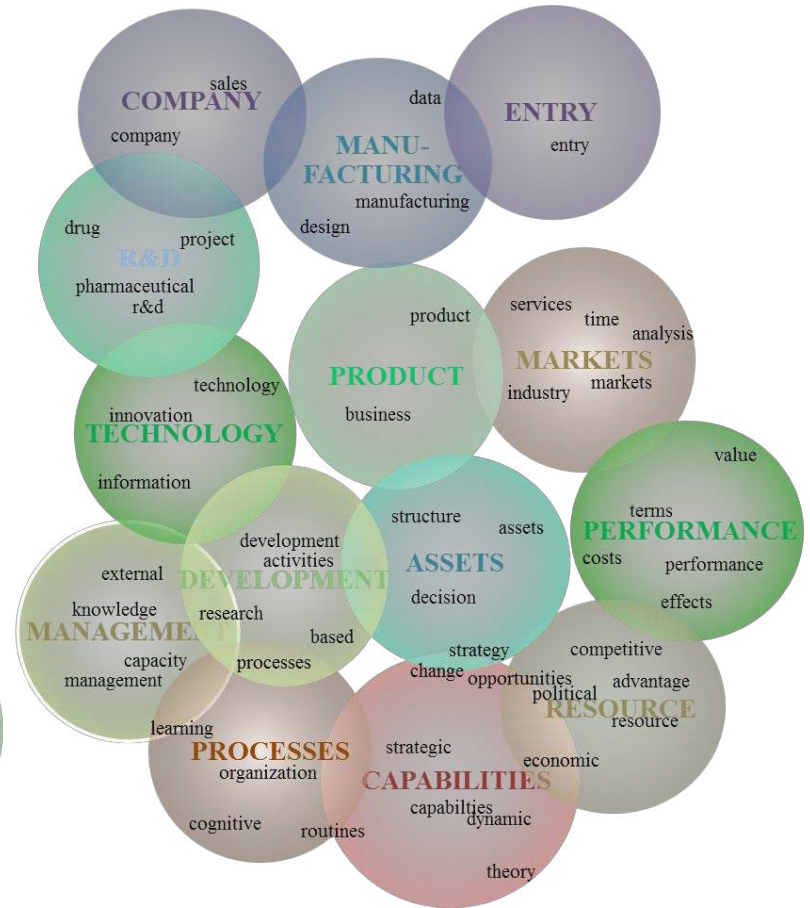


Figure 7: All articles map 2007-2011

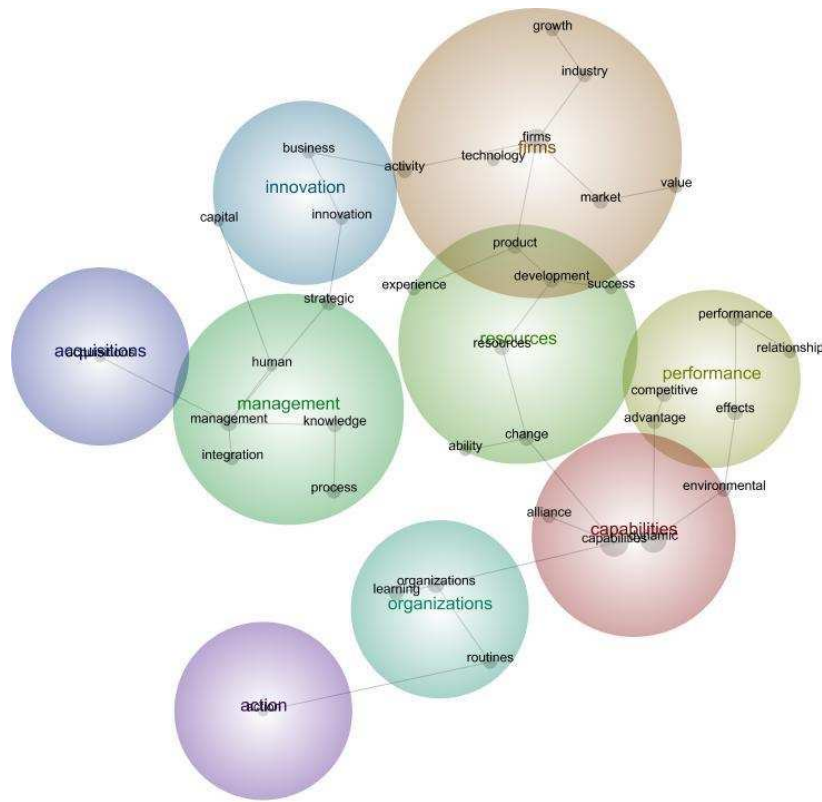


Figure 8: All articles map (2012-2015)

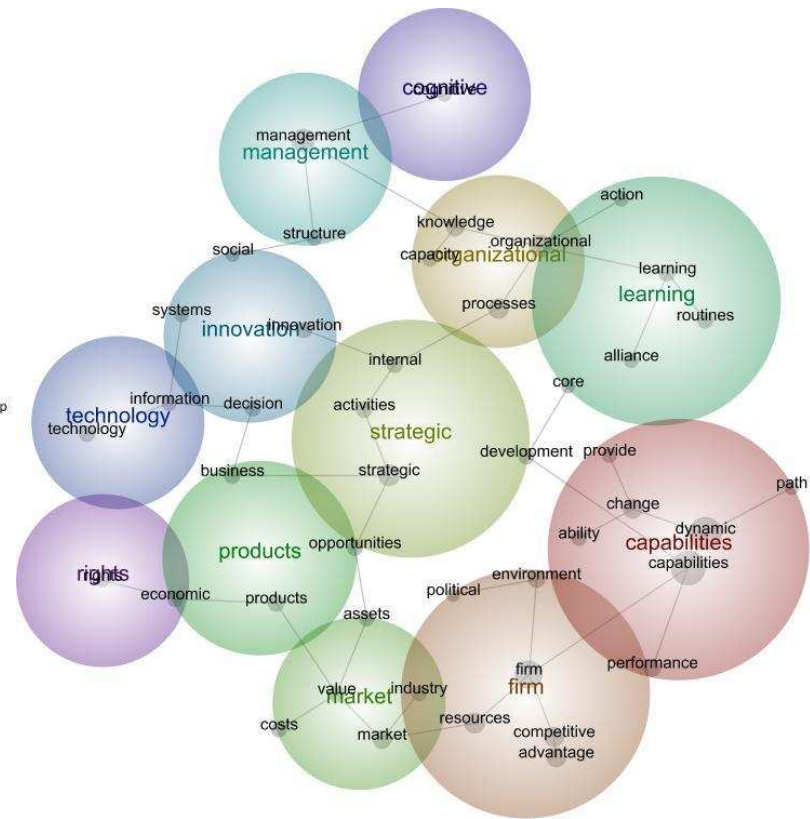


Figure 9: Conceptual articles map (1997-2011)

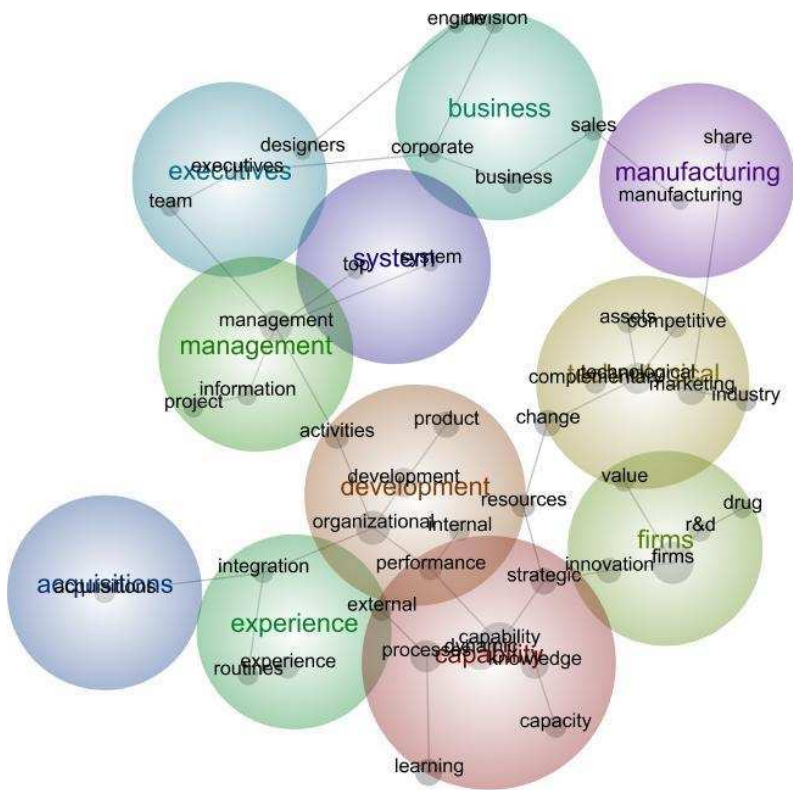


Figure 10: Qualitative articles map (1997-2015)

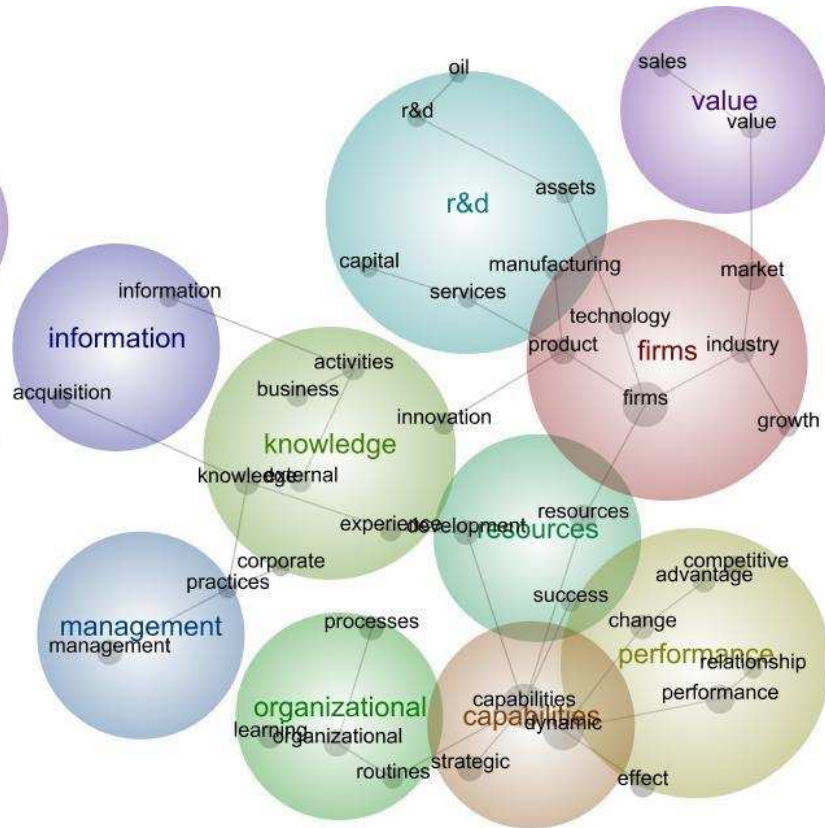


Figure 11: Quantitative empirical articles map (1997-2015)

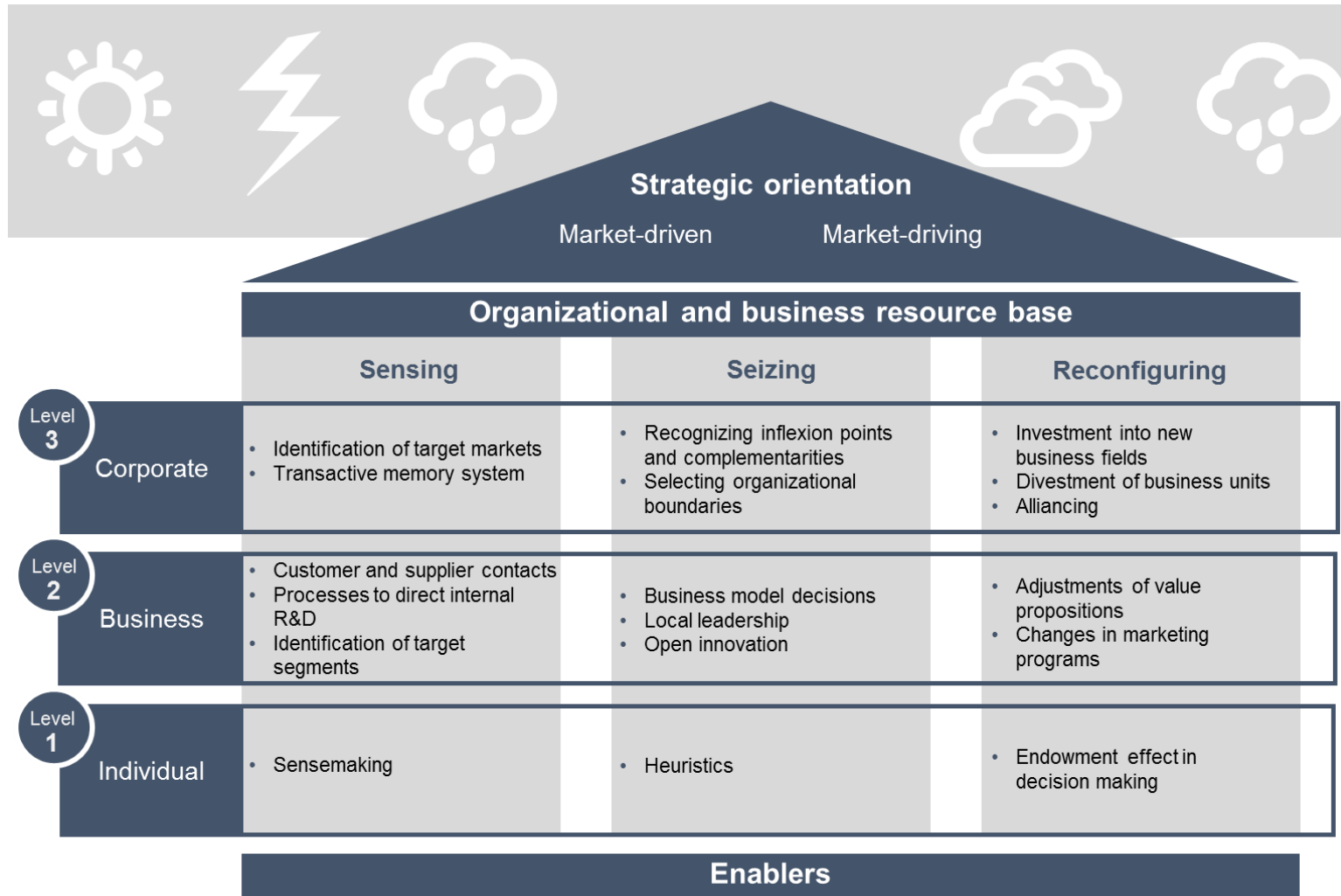


Figure 12: House of Dynamic Capabilities (including sample DC processes)

Table 1

Overview of previous reviews on dynamic capabilities

Authors	Summary	Methodology	Our findings
Newbert (2007)	<ul style="list-style-type: none"> • Few empirical studies on the DCV exist. • No consistent findings concerning the DC - performance relationship. • DCs may be significantly related to competitive advantage and performance by itself, when interacted with a resource this relationship is eliminated. 	Review of 55 empirical articles on the resource-based view	<ul style="list-style-type: none"> • We find that the number of empirical articles has increased significantly. • However, we stress that the effects of DCs on performance need to be investigated using a configurational mindset, that is, including both internal and external contextual factors. • We find that qualitative research largely covers the development processes while more quantitative articles address the deployment processes and their outcomes.
Wang and Ahmed (2007)	<ul style="list-style-type: none"> • DCs influence firm performance/competitive advantage via firm strategies and capability development in an environment where market dynamism is a required antecedent. • Define DCs as being embedded in processes and comprising three component factors: adaptive capability, absorptive capability and innovative capability. 	Qualitative review	<ul style="list-style-type: none"> • We also support a process view of DCs; that is, investigating underlying process of DC deployment. • Our configurational framework further stresses the importance of strategy in the form of a firm's overall strategic orientation influencing the required configuration. • However, we do not see dynamism as an antecedent but rather a contingency factor.
Arend and Bromiley (2009)	<ul style="list-style-type: none"> • Criticize the ability of the DCV to explain organizational change cohesively with logical consistency, conceptual clarity and empirical rigor: • (1) it is unclear what additional value is created via the dynamic capability view when compared to existing theories such as the resource and knowledge-based views and evolutionary economics • (2) there is a lack of coherent theoretical foundations • (3) there is a lack of strong empirical support for the positive effects of dynamic capabilities on 	Qualitative review	<ul style="list-style-type: none"> • In contrast to Arend and Bromiley we find that the field is based on a strong theoretical foundations, with two core foci: performance and process. • The author survey and roundtables also show that the DCV deserves further research attention.

	<p>organizational performance; and</p> <ul style="list-style-type: none"> • (4) the managerial implications of a dynamic capabilities approach to strategy are unclear. 		
Ambrosini and Bowman (2009)	<ul style="list-style-type: none"> • Stress the mediating effect of the organizational resource base in the DCs - performance/competitive advantage relationship. • Deployment and effects of DCs are moderated by various internal and external variables (e.g., managerial behaviours and perceptions, and the presence of complementary assets and resource) 	Qualitative review	<ul style="list-style-type: none"> • Our configurational framework also stresses the importance of a complementary organizational resource base and the role of managers in influencing performance.
Baretto (2010a)	<ul style="list-style-type: none"> • Concludes that a ‘theory’ of DCs does not yet exist. • This is largely due to the lack of a commonly agreed upon definition. • Conceptualizations differ in terms of nature, specific role, relevant context, heterogeneity assumptions, and purpose of DCs. Confusion about DCs - performance relationship (direct vs. mediated). • Two central ongoing debates are identified: Confusion about role of environmental turbulence; and confusion about whether different kinds of firms may benefit more from the deployment of DCs (e.g., firm’s organizational structure, international scope, age, size, and objectives). 	Qualitative review of 38 studies published in eight leading management journals	<ul style="list-style-type: none"> • We implement Baretto’s (2010a) findings in our framework of DCs by stressing the importance of creating configurations that consider the alignment of DCs with organizational variables and external factors that affects the strategic posture of the firm and its subsequent performance.
Di Stefano et al. (2010)	<ul style="list-style-type: none"> • Identify two primary ‘invisible colleges’ of scholarship. • The major college deals with ‘Foundations and Applications’. • The second college centers on ‘Interrelationships with other Theoretical Perspectives’ – connecting the DCV with theoretical perspectives such as the resource-based view, transaction cost economics, 	Co-citation analysis of the 40 most influential DC articles in the field of management (as determined by their citations)	<ul style="list-style-type: none"> • We also find strong theoretical foundations such as the RBV, learning and evolutionary economics. • We further propose the integration of additional colleges of scholarship.

learning theory, and social psychology.

Giudici and Reinmoeller (2012)	<ul style="list-style-type: none">• Conclude that DC construct deserves more focused research.• To progress the field, researchers need to: (1) strive for clarity in their definition(s); (2) engage with the foundational core of the DC construct; and (3) engage in empirical research. The authors caution scholars that “dynamic capabilities are at the crossroads between establishing itself as a robust strategic management theory and being abandoned” (p. 444).	Cross-citation analysis of 104 articles in which DCs featured prominently	<ul style="list-style-type: none">• Our findings are aligned as we find strong focus of previous research, namely on process and performance.• We further find a solidification of paradigmatic camps.
Vogel and Göppel (2012)	<ul style="list-style-type: none">• DCV still lacks consensual concepts that allow comparisons of empirical studies and advance the theoretical understanding of dynamic capabilities.	Bibliographic coupling analysis of 1,152 articles	<ul style="list-style-type: none">• We find that differences in applied concepts between qualitative and quantitative studies exist, thus making comparisons between studies difficult.• We develop a configurational framework and provide empirical methods to advance modelling of the DCV.
Peteraf et al. (2013b)	<ul style="list-style-type: none">• Find that Teece et al.’s (1997) and Eisenhardt and Martin’s (2000) contributions represent contradictory conceptualizations of the DC construct.• Development of a contingency-based framework to unify the DCV.• Conclude that DC can support organizations to achieve sustainable competitive advantage regardless of the degree of environmental turbulence and the nature of specific DCs in certain conditional cases.• DCs characterized as simple rules and processes	Historiograph analysis of the 61 most influential articles (based on citations)	<ul style="list-style-type: none">• Our findings are aligned as we find a clear distinction between authors building on economics and others focusing more on the sociological foundation.• Confirming Peteraf et al.’s (2013b) logic is the almost complete lack of linkage between the authors appearing on the right hand side of our Figure 2 (authors map) and those on the left hand side.

employed by organizations in high-velocity markets and as best practices in moderately dynamic markets.

Helfat and Martin (2015)

- Investigation of dynamic managerial capabilities construct.
- Find that managers vary in their influence on organizational change and overall organizational performance due to variances in managerial cognition, social capital, and human capital.

Qualitative analysis of 34 core and 70 related articles on dynamic managerial capabilities

- We build on this work by integrating the discussion on dynamic managerial capabilities into a broader framework that addresses the need for accounting for various levels of DCs.

Pezeshkan et al. (2015)

- Find overall positive and significant DCs - performance relationship.
- DCV has received slightly higher support than RBV and other theories in strategic management research.
- Identify the importance of including context into DC investigation.
- Find differences depending on which performance measure is used (performance vs. competitive advantage).

Analysis of 89 studies that investigated the DC - performance relationship

- Supports our view that DC enables us to better understand firm performance.

Table 2
The Evolution of Dynamic Capability Themes

	Theme	Tendency Over Time as Revealed in the Text
Past themes	Alliancing	↓↓
	Competitive advantage	↓↓
	Technology	←←
	Ambidexterity	←←
Persistent themes	Learning	↔
	Resources	↔
	Performance	↔
	Routines	↑
Emerging themes	(Cognitive) processes	↑
	Contingencies	↑
	Micro-foundations	↑↑
	Enablers of dynamic capabilities	↑↑
	Market creation	↑

Key: ↓↓ declining strongly; ←← Becoming non-core; ↔ Plateauing; ↑ Increasing; ↑↑ Increasing strongly

Table 3

Centrality and Prevalence of Various Themes in Dynamic Capability Research Based on
Survey Responses of Academics (n=101)

Theme	Centrality		Prevalence			
	Core	Non-core	Emerging	Persistent	Plateauing	Past
Alliance	26.7%	73.7%	13.9%	38.6%	29.7%	17.8%
Ambidexterity	56.4%	43.6%	18.8%	31.7%	29.7%	19.8%
Cognitive processes	63.4%	36.6%	53.5%	30.7%	8.9%	6.9%
Competitive advantage	80.2%	19.8%	4.0%	49.5%	27.7%	18.8%
Contingencies	37.6%	62.4%	23.8%	38.6%	20.8%	16.8%
DC Enablers	77.2%	22.8%	42.6%	34.7%	16.8%	5.9%
Learning	88.1%	11.9%	10.9%	62.4%	18.8%	7.9%
Market creation	71.3%	28.7%	36.6%	33.7%	13.9%	15.8%
Microfoundations	85.1%	14.9%	60.4%	24.8%	7.9%	6.9%
Performance	76.2%	23.8%	6.9%	56.4%	17.8%	18.8%
Resources	86.1%	13.9%	4.0%	47.5%	28.7%	19.8%
Routines	88.1%	11.9%	6.9%	64.4%	15.8%	12.9%
Technology	43.6%	56.4%	7.9%	50.5%	25.7%	15.8%

Note: Survey respondents were presented with the results of the Leximancer analysis along with the key themes identified. They were then asked to (a) categorize the theme as either 'core' or 'non-core' to the DCV. Subsequently, respondents were then asked (b) to categorize the theme as past or emerging (at the extremes) or persistent or plateauing (themes that were neither past nor emerging). Bold indicates differences that are significantly different from the other options.

Appendix 1: List of articles included in the analysis

Reference	Method	Main approach	Summary
Adner & Helfat (2003)	Quantitative	ANOVA decomposition of variance; hierarchical regression	Conceptualization of dynamic managerial capabilities as underpinning heterogeneity in managerial decisions and firm performance in the face of changing external conditions
Ambrosini et al. (2009)	Conceptual	Literature review; illustrative examples	Hierarchy of dynamic capabilities related to managers' perceptions of environmental dynamism: incremental, renewing and regenerative DC
Anand et al. (2010)	Quantitative	Heckman probit model	Theory development around how technological and complementary capabilities affect firms' abilities to enter emerging technologies
Aragon-Correa & Sharma (2003)	Conceptual	Literature review; hypothesis/proposition development	Integration of perspectives from the literature on contingency, dynamic capabilities, and the natural resource-based view
Arend (2015)	Conceptual	Theoretical discussion	Linkages between the infinite hierarchical levels that form the paths to the origins of sustainable competitive advantage in both the resource-based view and dynamic capabilities view
Arend & Bromiley (2009)	Conceptual	Literature review	Criticism regarding how the dynamic capabilities view can add to management research
Athreye et al.(2009)	Qualitative	Case study	Impact of regulatory changes on strategy and evolution of dynamic capabilities
Athreye (2005)	Qualitative	Case study	Analysis of the evolution of dynamic capabilities in the Indian software industry
Augier & Teece (2009)	Conceptual	Literature review	Investigation of the role of managers in the economic system
Augier & Teece (2008)	Conceptual	Literature review	Discussion of the intellectual roots of the dynamic capability view
Barrales-Molina et al. (2013)	Quantitative	Hypothesis development, surveys, exploratory and confirmatory analysis	Development of a multiple-indicator, multiple-cause model to explain dynamic capability generation
Barreto (2010a)	Conceptual	Literature review	Development of new conceptualization of dynamic capability as an aggregate multidimensional construct
Benner & Tushman (2003)	Conceptual	Literature review; proposition development	Contingency view of process management's influence on both technological innovation and organizational adaptation
Bingham & Eisenhardt (2011)	Qualitative	Multiple case, case study	Theory development clarifying that heuristics are central to

			strategy
Bingham et al. (2015)	Qualitative	Extended case study	Emergent theoretical framework that develops the concept of 'concurrent learning'; insights about managing growth and the utility of distributed practice
Blyler & Coff (2003)	Conceptual	Literature review; proposition development	Identification of the specific role of social capital in a dynamic capability
Bock et al. (2012)	Quantitative	Hypothesis development, survey, regression analysis	CEO perceptions of the drivers of strategic flexibility during business model innovation
Bowman & Ambrosini (2003)	Conceptual	Literature review	Dynamic capability view can be used to extend resource-based view to inform our understanding of strategy
Bruni & Verona (2009)	Qualitative	Case study	Conceptualization of dynamic marketing capabilities as a complementary source of competitive advantage
Buenstorf & Murmann (2005)	Qualitative	Case study	Drawing a parallel between Ernst Abbe's management principles at Carl Zeiss and resource- and capabilities-based views of the firm
Capron & Mitchell (2009)	Quantitative	Interviews, survey and longitudinal data	Influence of firms' selection capability on their ability to renew their capabilities
Carpenter et al (2001)	Quantitative	Ordinary least squares (OLS) multiple regression analysis	Using a dynamic capability framework, study analyses whether CEOs with international assignment experience create value for their firms and themselves through their control of a valuable, rare, and inimitable resource
Chen et al. (2012)	Quantitative	Hypothesis development, secondary data, panel regression analysis	Examination of how entrepreneurial entry by diversifying and de novo firms in new industries lead to different levels of performance
Coen & Maritan (2011)	Conceptual	Computer simulation; agent-based modeling	Investigation of the role of dynamic capability of resource allocation to invest in operational capabilities
Danneels (2008)	Quantitative	Longitudinal and cross sectional data regression	Analysis of how dynamic capabilities used to build new competences affect marketing and R&D capabilities
Danneels (2010)	Qualitative	Case study	Investigation of resource alteration process by which dynamic capability operates
Delmas (1999)	Quantitative	Multinomial logit regression	Complements transaction cost economics with dynamic capabilities approach
Di Stefano et al.(2010)	Quantitative	Bibliometrics/co-citation analysis	Structure of the dynamic capabilities research domain
Dixon et al.(2010)	Conceptual	Literature review; hypothesis development	Theoretical framework of organizational transformation
Døving & Gooderham (2008)	Quantitative	Linear regression (OLS)	Differences in the scope of related diversification in firms can

			be accounted for by differences in their dynamic capabilities
Drnevich & Kriauciunas (2011)	Quantitative	Confirmatory factor analysis, exploratory factor analysis, regression with clustering	Clarifying the conditions and limits of contributions of dynamic capabilities to firm performance
Dunning & Lundan (2010)	Conceptual	Literature review	Institutional underpinnings of dynamic capabilities
Easterby-Smith et al.(2009)	Conceptual	Literature review	Evolution of the concept
Easterby-Smith & Prieto (2008)	Conceptual	Literature review	Conceptual connection between dynamic capabilities and knowledge management
Eggers (2012)	Quantitative	Hypothesis development, OLS regression analysis	Contingencies relating firm experience to product development capabilities, focusing on experience type (breadth vs depth) and timing (prior vs concurrent).
Eisenhardt & Martin (2000)	Conceptual	Literature review; theory development	Explication of nature of dynamic capabilities which are specific and identifiable processes; commonalities of dynamic capabilities exist across firms
Eisenhardt et al.(2010)	Conceptual	Literature review	Microfoundations of performance in dynamic environments - balancing efficiency and flexibility in dynamic environments
Farrant & Flynn (1999)	Qualitative	Case study	Analysis of how enterprises successfully develop dynamic capabilities
Foss (2003)	Conceptual	Literature review; proposition development	Investigation of how organizational structure affects dynamic capabilities
Galunic & Eisenhardt (2001)	Qualitative	Multiple case study	Presentation of microsociological patterns of architectural innovation and theorization of an organizational form termed “dynamic community”
George (2005)	Quantitative, qualitative	Mixed methods - Case study (Qual); OLS regression (Quant)	Effects of experiential learning on the cost of capability development
Gilbert (2006)	Qualitative	Multi-level; longitudinal case study	Identification of threat and opportunity frames as part of a broader class of competing processes that lie at the root of dynamic capabilities
Giuduci & Reinmoeller (2012)	Conceptual	Literature review and theoretical discussion	Investigation of the process of reification of dynamic capabilities as the basis for reconciling divergent views in the literature
Hahn & Doh (2006)	Conceptual	Bayesian modeling approach	Usefulness of Bayesian approaches in strategy research that integrates micro- and macro-phenomena within a dynamic and interactive environment
Hart & Dowell (2011)	Conceptual	Theoretical discussion	Reevaluation of Natural Resource Based View (NRBV) linking with dynamic capabilities perspective

Heimeriks et al. (2012)	Quantitative, qualitative	Hypothesis development, interviews, surveys, OLS regression analysis	Underlying mechanisms of deliberate learning in the context of post-acquisition integration; successful acquirers develop higher-order routines that prevent the generalization of zero-order routines.
Helfat (1997)	Quantitative	Tobit regression	Investigation of role of complementary technological knowledge and physical assets in dynamic capability accumulation
Helfat (2000)	Conceptual	n/a	Provision of overview how dynamic capabilities emerge
Helfat & Peteraf (2009)	Conceptual	n/a	Discussion of the developmental path of dynamic capabilities research
Helfat & Peteraf (2015)	Conceptual	Theoretical discussion	Identification of specific types of cognitive capabilities underpinning dynamic managerial capabilities for sensing, seizing and reconfiguring, and their potential impact on strategic change in organizations
Hodgkinson & Healey (2011)	Conceptual	Literature review	Discussion of psychological and behavioral foundations underpinning dynamic capabilities
Hsu & Wang (2010)	Quantitative	Bayesian regression analysis	Development and test of theoretical model on how dynamic capability mediates the impact of intellectual capital on performance
Hsu & Wang (2012)	Quantitative	Hypothesis development, Bayesian regression model	Explanation of dynamic capabilities mediates the impact of intellectual capital (human, relational and structural capital) on performance
Jenkins (2010)	Qualitative	Grounded theory approach	Explore the dynamics between firm level performance and technological discontinuities
Jiang et al.(2010)	Quantitative	Generalized least squares (GLS) regression analysis	Comprehensive alliance portfolio diversity construct - partner, functional, and governance diversity and relationship with firm performance
Kale (2010)	Qualitative	Case study	Analysis of learning processes involved in the development of innovative R&D capabilities
Kale & Singh (2007)	Quantitative	Confirmatory factor analysis; structural modeling	Analysis of alliance learning process that involves articulation, codification, sharing, and internalization; theorizing of how alliance management know-how positively relates to a firm's alliance success
Karim (2006)	Quantitative	Akaike information criterion (AIC) model	Investigation of the reconfiguration of internally developed vs. acquired units; exploration of what forms of unit recombination are common

Karim (2009)	Quantitative	Negative binomial regression model	Examination of how business unit reorganization affects innovation, and explores how the learning process may mediate this relationship
Karim (2012)	Quantitative	Hypothesis development, logistic regression model	Examination of the simultaneous effects of activity and unit reconfiguration on activity retention to gain insight on structural embeddedness.
Karna et al. (2015)	Quantitative	Hypothesis development, Meta-analysis	Relationship between both ordinary and dynamic capabilities and the financial performance of firms in relatively stable versus changing environments
Katkalo et al. (2010)	Conceptual	Review	n/a
Kay (2010)	Conceptual	Literature review	Discussion on how dynamic capability view links to strategic decisions, structures and systems
Kim (2010)	Conceptual	Literature review	Application of property rights theory to dynamic capabilities
King & Tucci (2002)	Quantitative	Random-effects logistic regression	Analysis of organizational structures and their reconfiguration using a dynamic capabilities framework
Kor & Mahoney (2005)	Quantitative	Fixed-effects regression	Discussion of how firms can successfully deploy and develop their strategic human assets while managing the tradeoffs in their service and geographical diversification strategies
Kor & Mesko (2013)	Conceptual	Proposition development	Interplay between the firm's dominant logic and dynamic managerial capabilities (managerial human capital, social capital, and cognition)
Lampel & Shamsie (2003)	Quantitative	Regression	Analysis of evolution of capabilities (mobilizing and transforming capabilities)
Lavie (2006)	Conceptual	Literature review; hypothesis development	Theorizing around substitution, evolution, and transformation as three mechanisms of capability reconfiguration
Lazonick & Prencipe (2005)	Qualitative	Case study	Theory of innovative enterprise by analyzing the roles of strategy and finance in sustaining the innovation process
Lee et al.(2010)	Quantitative	Longitudinal ordered logistic regression	Analysis of how dynamically changing complementarity relationships between markets increase industry hypercompetition
Lee et al.(2002)	Quantitative	Genetic algorithm-based simulation model	Examination of conditions under which strategic groups emerge and their performance differences persist
Leiblein (2011)	Conceptual	n/a	Discussion of RBV and dynamic capability view
Lichtenthaler (2009)	Quantitative, qualitative	Semi-structured interviews; structural equation modeling (SEM)	Identification of technological and market knowledge as two critical components of prior knowledge in the organizational learning processes of absorptive capacity

Lichtenthaler et al. (2010)	Quantitative	OLS and logit regression	Development of the concept of “not-sold-here (NSH)”, its antecedents and consequences
Lichtenthaler & Lichtenthaler (2009)	Conceptual	n/a	Discussion of knowledge management, absorptive capacity, and dynamic capabilities to arrive at an integrative perspective as a framework for open innovation
Macher & Mowery (2009)	Quantitative	Econometric modeling	Investigation of dynamic capability ‘development and introduction of new process technologies’
Makadok (2001)	Conceptual	Literature review; theory and hypothesis development	Examination of the nature of the interaction between resource-picking and capability-building
Makadok (2002)	Conceptual	Literature review; theory and hypothesis development	Inclusion of rational-expectation assumptions in previous theoretical models
Malik & Kotabe (2009)	Quantitative	OLS regression	Analysis of model of the dynamic capability development mechanisms in emerging markets
Marcus & Anderson (2006)	Quantitative	Regression	Investigation of whether a general dynamic capability affects both firms' skills in supply chain management and competence in environmental management
Mathews (2003)	Conceptual	Theoretical discussion	Development of model for blending internal resource accumulation with external resource leverage
Mathews (2010)	Conceptual	Theoretical discussion	Discussion of strategizing as capture of resource complementarities, activities reconfiguration and reconfiguration of routines
McKelvie & Davidsson (2009)	Quantitative	Hierarchical regressions	Analysis of how dynamic capability development is affected by access to firm-based resources and changes to these
Moliterno & Wiersema (2007)	Quantitative	Cross-sectional time series regressions	Investigation of resource divestment capability (dynamic capability) as a two-step organizational change routine
Möller & Svahn (2006)	Conceptual	Theoretical discussion	Investigating the role of knowledge in intentionally created business networks
Morgan et al.(2009)	Quantitative	Structural equation modeling, Hierarchical regression	Analysis of the effects of market orientation and marketing capabilities on firm performance
Narayanan et al.(2009)	Qualitative	Narrative analysis	Investigation of the process of dynamic capability development
Newey & Zahra (2009)	Qualitative	Iterative inductive and deductive theory building; process research method; longitudinal case study	Theorizing shows how interactions between dynamic and operating capabilities build the adaptive capacity of the organization.
Ng (2007)	Conceptual	Literature review; theory and hypothesis development	Unrelated diversification is explained by an organization’s ‘three pillars’-strength of dynamic capabilities, absorptive capacity, and weak ties

Oliver & Holzinger (2008)	Conceptual	Literature review; theory and proposition development	Development of framework investigating how particular dynamic capabilities are associated with the effectiveness of alternative political strategies
Pablo et al.,(2007)	Qualitative	Inductive grounded theory building	Development of strategic approach through use of an internal dynamic capability (learning through experimenting)
Pandza & Thorpe (2009)	Conceptual	Literature review; theory and hypothesis development	Conceptualization and analysis of complementarity effects of creative search and strategic sense-making
Pentland et al. (2012)	Conceptual	Theoretical discussion	Development of a generative model of organizational routines and their change over time; variation and selective repetition of patterns of action as the basis for macro-level dynamics of routines.
Peteraf et al. (2013b)	Conceptual	Co-citation analysis	Reasons for the contradictory understandings of the core elements of the dynamic capability construct in the two seminal articles; suggestions of ways to unify the field through a contingency-based approach
Pierce (2009)	Quantitative	OLS and Cox hazard models	Examination of shakeouts in the context of business ecosystems
Pil & Cohen (2006)	Conceptual	Literature review; theory and hypothesis development	Investigation of the link between product architecture, imitation and dynamic capabilities
Pitelis & Teece (2010)	Conceptual	Literature review; theory and hypothesis development	Investigation of the role of entrepreneurial management in orchestrating system-wide value creation
Powell (2014)	Conceptual	Theoretical discussion	Exploration of the causes and consequences of impersonalism and advocating a personalist rebalancing in strategic management research.
Protogerou et al (2011)	Quantitative	Structural equation modeling	Analysis of the relationship between dynamic capabilities and firm performance
Rahmandad (2012)	Quantitative	Simulation experiments	Examination of firm-level capability development trade-offs in the context of a firm's market level competition and growth
Ridder et al. (2014)	Conceptual	Theoretical discussion	Three ways of positioning to demonstrate a theoretical contribution through case study research in the field of management
Rindova & Kotha (2001)	Qualitative	Inductive grounded theory building	Examination of how organizational form, function, and competitive advantage of firms dynamically coevolve; conceptualization of continuous morphing
Romme et al. (2010)	Quantitative	Simulation model; System dynamics modeling	Analysis of differential effects of articulated knowledge, codified knowledge and operating routines on dynamic capability at different levels of environmental dynamism

Rosenbloom (2000)	Qualitative	Case study	Identification of the importance of learning and processes in the context of dynamic capabilities to achieve transformation
Rothaermel & Hess (2007)	Quantitative	Regression	Identification that antecedents of dynamic capabilities lie in organizational and individual levels
Saalge & Vera (2013)	Quantitative	Hypothesis development, panel data analysis	Antecedants, moderators and consequences of incremental learning capabilities conceptualised as a dynamic capability
Salvato (2009)	Quantitative, qualitative	Case study; cluster analysis	Exploration of the role of capability evolution in achieving organizational renewal taking a process perspective
Schepker et al. (2014)	Conceptual	Literature review	Synthesis of existing literature on interfirm contracting, identification of research gaps and avenues for future research
Schreyögg & Kliesch Eberl (2007)	Conceptual	Literature review; theory and hypothesis development	Establishment of a separate function ('capability monitoring') to overcome potential rigidities of organizational capability building
Shamsie et al. (2004)	Quantitative	Econometric modeling	Examination of the differences in the ability of late movers to penetrate the market
Shamsie et al. (2009)	Quantitative	Time series, cross section regression	Identification of replication and renewal as two types of strategies that firms use to add a dynamic component to their capabilities
Schilke (2014b)	Quantitative, qualitative	Qualitative field interviews, large scale survey, OLS regression analysis	Examination of the effect of dynamic capabilities on firm competitive advantage as contingent on the level of dynamism of the firm's external environment
Slater et al. (2006)	Quantitative	Regression	Development of a comprehensive model of strategy formation in the context of the firm's strategic orientation
Song et al. (2005)	Quantitative	Structural equation modeling	Effects on performance of marketing capabilities, technological capabilities, and their complementarity (interaction)
Stadler et al. (2013)	Quantitative	Hypothesis development, Tobit regression analysis	Impact of dynamic capabilities on the amount and success of activities directed toward accessing resources and developing resources to make them commercially usable
Tang & Liou (2010)	Quantitative	Inductive Bayesian interpretation; discriminant function analysis	Development of a theoretical framework to understand the causal relationships among (1) sustainable competitive advantage, (2) configuration, (3) dynamic capability, and (4) sustainable superior performance
Taylor & Helfat (2009)	Qualitative	Case study	Analysis of the linkages between complementary assets managerial linking activity, and ambidexterity
Teece (2007a)	Conceptual	Literature review; theory and hypothesis development	Discussion of the nature and microfoundations of the capabilities in the context of open innovation

Teece et al. (1997)	Conceptual	Literature review; theory and hypothesis development	Dynamic capabilities resting on positions, paths and processes
Tripsas (1997)	Quantitative, qualitative	Industry analysis; in-depth analysis of three firms	Exploration of the process of creative destruction; Identification of importance of absorptive capacity and organizational structure
Vergne & Durand (2011)	Conceptual	Theoretical discussion	Development of an evolutionary perspective on path dependence and dynamic capabilities
Verona & Ravasi (2003)	Qualitative	Exploratory case study	Dynamic capabilities are made up of: knowledge creation and absorption, knowledge integration and knowledge reconfiguration
Wang & Rajagopalan (2015)	Conceptual	Literature review and conceptual framework development	Review of literature on alliance capabilities; development of an integrative framework distinguishing alliance capabilities in terms of value creation and value capture; methodological suggestions and theoretical themes for future research
Wang et al. (2015)	Quantitative	Hypothesis development, survey, structural equation modelling	Effects of success traps on dynamic capabilities and consequently firm performance, taking into account firm strategy and market dynamism
Wilhelm et al. (2015)	Quantitative	Hypothesis development, survey, structural equation modelling	Role of dynamic capabilities in the differences in operation-routine performance
Winter (2003)	Conceptual	Theoretical discussion	Strategic substance of capabilities involves patterning of activity; zero-level and higher-order capability
Witcher & Sum Chau (2012)	Conceptual	Literature review and theoretical discussion	Examination of the varieties of capitalism thesis and its implications for an integrated approach to strategic management.
Zahra & George (2002)	Conceptual	Proposition development	Deduction of key dimensions of absorptive capacity and development of a reconceptualization of this construct
Zahra et al.(2006b)	Conceptual	Proposition development	Definition of dynamic capabilities, separating them from substantive capabilities as well as from their antecedents and consequences
Zollo & Winter (2002)	Conceptual	Hypotheses development	Discussion of the mechanisms through which organizations develop dynamic capabilities (organizational routines)
Zott (2003)	Conceptual	Simulation study	Analysis of how the dynamic capabilities are linked to differential firm performance within an industry
Zúñiga-Vicente & Vicente-Lorente (2006)	Quantitative	Cluster algorithm; Probit regression	Examination of the effects of 'strategic moves' (or strategic change) on the likelihood of organizational survival

Appendix 2: Survey template

As noted in our email linking you to this survey, our intention is to examine how scholars like you interpret and conceptualize the conception of dynamic capabilities. The impetus for this work was our own examination of 107 published papers on the topic along with recent work in other fields that reveal the degree of consensus around key research topics in a wide variety of domains (the most famous being the work examining physicist's views on quantum mechanics). Our intention is to integrate the results of this short survey with our own work on the topic.

The survey should take less than 10 minutes of your time. As a means of introduction to the topic we present below a key part of our own analysis on the topic. You will see two graphics that are 'maps of meaning' created via computer based text mining. The results are based on textual data extracted from 107 papers published in leading management journals that included the keywords 'dynamic capability' and/or 'dynamic capabilities' in title and/or abstract. The map on the left includes **all important concepts** discussed in published research. The map on the right provides an overview of **important authors** and how they are mentioned together within the text (note that this is not a co-citation analysis but the extent to which the authors are mentioned together).

The graphs reveal (a) the key topics, (b) the degree to which these topics are related based on textual usage, and (c) the degree to which specific authors are seen to relate to one another. By examining the evolution of these maps we have created a series of topics that we see as representing the past, present and potential future core ideas related to dynamic capabilities research. This survey asks simply for your opinion about each and then seeks your input about emerging areas of research

Again, thank you for participating in our short survey on the **evolution of dynamic capability research** and our results will be available to you once the research is completed.

The researchers are Dr. Ralf Wilden, Professor Timothy Devinney and Professor Grahame Dowling. Should you have any queries or concerns, or experience technical difficulties, please do not hesitate to contact Ralf Wilden at ralf.wilden@uts.edu.au.

Figure 1: 'All papers' map

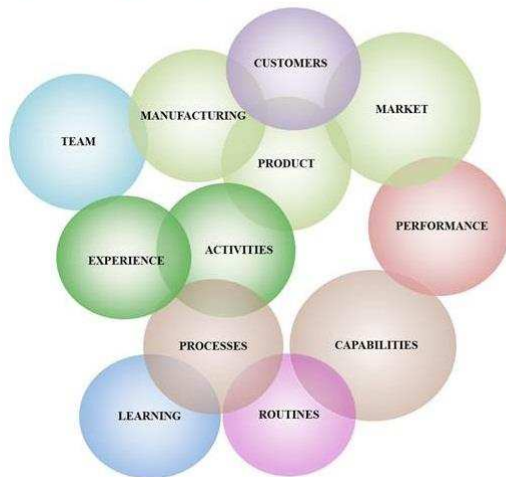
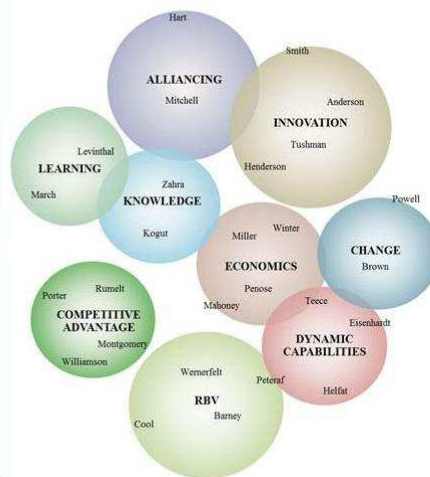


Figure 2: Authors map



Part I: Based on our complete analysis of the literature (including analyses by time periods) we have identified several themes that have arisen or are arising in the literature. Below is a list of the themes along with an indication of some of the more cited papers relating to that topic examined. For each theme we ask you to make two assessments: A. In your assessment, is this topic currently a core part of the concept of dynamic capabilities or a more peripheral or contingent aspect of the concept? B. In your assessment is this a topic that is (a) of Past relevance but not of current relevance or its relevance is on a downward trajectory, (b) of Current relevance and persistent in its importance (meaning it still has momentum), (c) of current relevance but Plateauing in terms of its importance (meaning that while still relevant it is neither increasing or decreasing in relevance), or (d) it is an emerging aspect of the concept that needs to be incorporated and studied more.

	Centrality to DC		Prevalence			
	non-core	core	1 Emerging	2 Persistent	3 Plateauing	4 Past
Alliance						
Micro-foundations of dynamic capabilities						
Ambidexterity						
Contingencies						
Performance						
Technology						
Routines						
Enablers of dynamic capabilities						
(Cognitive) processes						
Learning						
Market creation						
Competitive advantage						
Resources						

Part II: One of the main criticism in the literature is the lack of a commonly agreed upon definition of dynamic capabilities. We would like to challenge you to provide us with a short definition of the core construct of dynamic capabilities in your own words. Do not worry about the exact wording, but make sure that all relevant aspects are included in your definition.

Part III: In thinking about the state of research in the field, which theories, research contexts and/or aspects of dynamic capabilities have been under-researched or even been excluded from existing discussions? Which research topics and specific points of emphasis and phenomena would you like to see happening in the dynamic capability field?

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