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Dynamic Capabilities: Current Debates and Future Directions

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The field of dynamic capabilities has developed very rapidly over the last ten years. In this paper we discuss the evolution of the concept, and identify two major current debates around the nature of dynamic capabilities and their consequences. We then review recent progress as background to identifying the contributions of the seven papers in this special issue, and discuss the relative merits of qualitative and quantitative studies for investigating dynamic capabilities. We conclude with recommendations for future research arguing for more longitudinal studies which can examine the processes of dynamic abilities over time, and for studies in diverse industries and national contexts.

A topic of broad interest

More than ten years have passed since the publication of Teece, Pisano and Shuen's (1997) seminal work on dynamic capabilities, but the topic continues to command the attention of management scholars and practitioners around the world. If anything, interest in this topic has been increasing, as evidenced by citation counts and the amount of programme time devoted to it at major conferences, such as those sponsored by the Strategic Management Society and the Academy of Management. In keeping with this trend, and a perceived need to advance our understandings in this area, a special issue on dynamic capabilities is timely. Indeed, it is remarkable that this effort represents the first

special issue focused explicitly on this topic in a scholarly journal.

There are undoubtedly many reasons for the intense interest in the topic of dynamic capabilities. It is associated closely with the resource-based view (Barney, 1991; Peteraf, 1993; Wernerfelt, 1984), which is itself a highly active area of research. Like the resource-based view, its focus is on core issues such as competencies and firm performance, of longstanding importance in the field of strategic management. In contrast to the resource-based view, however, its emphasis is on dynamics.¹ This allows it to be disassociated from criticisms levelled at the resource-based view as a static and equilibrium-based model (e.g. Simon, Hitt and Ireland, 2007; Teece, 2007), thus broadening its appeal. It also suggests an antidote to

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¹While the topic of dynamic capabilities focuses squarely on dynamics, many articles central to the resource-based view (e.g. Dierickx and Cool, 1989; Wernerfelt, 1984) have dynamic elements as well. Helfat and Peteraf (2003) are explicit in suggesting that there can be a 'dynamic resource-based view'.

the dark side of a resource-based advantage, when changing conditions turn core competencies into core rigidities (Leonard-Barton, 1992).

Its concern with dynamics and with mechanisms for bringing about organizational change expands its appeal in other ways as well. It is connected to the knotty problem of change management, which is of great importance to managers and the bread and butter of countless consulting practices. It is similarly allied to issues of strategic renewal, adaptation and growth. It involves temporal dynamics, including capability lifecycles (Helfat and Peteraf, 2003) as well as the lifecycles and evolutionary paths of firms and industries. It accords with and complements the popular view of the external environment of firms as increasingly turbulent and hypercompetitive (Anderson and Tushman, 1990; D'Aveni, 1994). Because it deals with mechanisms for change, it links to innovation and organizational learning (Fiol and Lyles, 1985), which in turn connect it to knowledge management (Easterby-Smith and Lyles, 2003; Easterby-Smith and Prieto, 2008) and the knowledge-based view (Kogut and Zander, 1992). Mechanisms also imply processes, a broad topic of fundamental importance in both management research and practice (Shanley and Peteraf, 2006).

As the breadth of these topics suggests, the opportunities to advance research on dynamic capabilities come from many directions. Accordingly, scholars with a wide variety of focal interests, research expertise, methodological approaches and disciplinary training have been drawn to this topic. Progress to date has been made through combination and recombination of different theoretical and scholarly traditions. This has contributed to the richness of the research on dynamic capabilities, and has also engendered a certain amount of debate.

The key debates

Most of the debates have focused on two critical issues. The first concerns the nature of dynamic capabilities and the definition of the term; the second concerns their effects and consequences. These issues are interrelated and are key to developing, testing and applying the dynamic capabilities construct fruitfully.

Despite the wide usage of the dynamic capabilities construct, a universally accepted definition has

been slow to emerge. This may be due, in part, to the fact that the definition provided by Teece, Pisano and Shuen (1997) was broad enough to provide opportunities for others to refine, reinterpret and expand the concept. Teece, Pisano and Shuen (1997) defined dynamic capabilities as *the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments* (1997, p. 516). This definition, while providing a start, left open the questions of what constitutes such abilities, what their attributes are, how they can be recognized, and where they come from.

The slowness to converge on a common definition may be due as well to variations within the community that contributed to the development of this concept. Scholars coming from different research traditions have viewed dynamic capabilities with different lenses, reflecting their different backgrounds. Winter (2003) and his co-authors (e.g. Zollo and Winter, 2002), for example, define dynamic capabilities in terms of routines, a central feature of evolutionary economics (Nelson and Winter, 1982). In contrast, Eisenhardt and Martin (2000) define them in terms of processes whose nature varies with the degree of market dynamism, taking the form of simple rules (Eisenhardt and Sull, 2001) in high velocity environments (Eisenhardt, 1989).

There has been significant debate as well concerning the effects and consequences of dynamic capabilities, particularly in regard to market advantages and firm performance. Teece, Pisano and Shuen (1997) argue most forcefully for a link between dynamic capabilities and competitive advantage. In saying, 'we refer to this ability to achieve new forms of competitive advantage as *dynamic capabilities*', they come close to suggesting a one-to-one correspondence between these concepts (Teece, Pisano and Shuen, 1997, p. 515). Teece (2007) returns to this idea in his article on the microfoundations of dynamic capabilities. He argues that dynamic capabilities are 'the foundation of enterprise-level competitive advantage in regimes of rapid (technological) change' (2007, p. 1341). Further, he disaggregates dynamic capabilities into component capabilities that are 'necessary to sustain superior enterprise performance' in a highly dynamic environment (2007, p. 1319).

Eisenhardt and Martin (2000) take a very different view of dynamic capabilities, asserting

that they represent best practices and exhibit equifinality. As such, they argue, dynamic capabilities cannot be a source of competitive advantage or superior firm performance. Teece (2007) counters these claims by responding that, while best practices will not lead to competitive advantage, they are unlikely to constitute dynamic capabilities. Zollo and Winter (2002, p. 340) take a more agnostic view of this issue, arguing only that dynamic capabilities are 'in pursuit of improved effectiveness'.

These uncertainties about the effects of dynamic capabilities are very much associated with the different understandings of precisely what dynamic capabilities are and what properties they have. During the developmental stages of a framework, this type of haziness is by no means a deficiency, as Winter (1995, p. 149) has observed, since it leaves room for 'pragmatic adjustment as new problems are addressed'. At some point, however, the lack of agreement will impede progress on both the conceptual and empirical fronts. Meaningful conversation and further conceptual development of the framework require some common understandings. Empirical work may be misdirected and may be of dubious worth without a well-developed construct and a clear set of testable predictions.

Recent progress

The time is now ripe to settle some of the more basic questions, so that others may be pursued more fruitfully. Some progress in this direction has been made recently by the joint efforts of a group of scholars, including Teece, Winter and other key contributors to the dynamic capabilities literature (Helfat *et al.*, 2007). Working in concert, they have striven to define terms more precisely, to eliminate logical inconsistencies from the framework, and to suggest some yardsticks for measuring the effects of dynamic capabilities.

They define dynamic capabilities as *the capability of an organization to purposefully create, extend, or modify its resource base* (Helfat *et al.*, 2007, p. 4). This definition is precise enough to be meaningful, yet broad enough to allow scholars to learn more about the nature and origins of dynamic capabilities through investigation. It makes few *a priori* assumptions. It thus accommodates both Teece, Pisano and Shuen's (1997) view that dynamic capabilities enable a firm to

respond to environmental change as well as Eisenhardt and Martin's (2000) broader notion that they can also be the source of disruptive change. It leaves open the possibility that they may address or bring about organizational changes unrelated to environmental change. It specifies that, regardless of any ultimate effect, the action of dynamic capabilities is foremost upon the firm's resource base, including both tangible and intangible assets and capabilities.

In other respects, Helfat *et al.* (2007) take a considerably sharper stand. They point out that a direct association between competitive advantage and dynamic capabilities is tautological, in the same way that it is for the resource-based view (Bromiley and Fleming, 2002). At the same time, they reject the view that dynamic capabilities are nothing more than best practices, with equifinal effects on performance. They argue that whether dynamic capabilities contribute to competitive advantage depends on the same sort of factors identified by Peteraf and Barney (2003) for the resource-based view. Similarly, they argue that the analytical tools from resource-based theory should be applied to address the question of whether particular dynamic capabilities confer a sustainable competitive advantage (e.g. Amit and Schoemaker, 1993; Dierickx and Cool, 1989).

Whether this work will settle the key debates concerning dynamic capabilities remains to be seen. What it represents at this point is a cooperative effort to provide a coherent and consistent set of definitional and analytical underpinnings for the dynamic capabilities construct. Without a unifying foundation of the sort that this attempt represents, research on dynamic capabilities will ultimately falter, despite the enthusiasm for the concept. With a unifying foundation in place, the stage is set to build upon this base and accumulate a deep store of knowledge about the dynamic capabilities construct in theory and in practice.

Building on the foundation

The aim of this special issue is to further this process. The dynamic capabilities framework is still in nascent form, with many opportunities to refine and deepen the model. Many questions, apart from those driving the key debates, still need to be addressed. Much remains to be learned about the underlying mechanisms, processes and

intermediate outcomes associated with dynamic capabilities.

Despite the progress that has been made, the way forward is far from clear. For example, even with a clearer definition of terms, dynamic capabilities are difficult to identify. As the *capacity* to effect change, dynamic capabilities remain hidden until exercised, and even then may not be utilized to their fullest extent. The problem is compounded by the association of dynamic capabilities with tacit organizational elements and intangibles, such as routines, processes, managerial cognition and knowledge. The fact that dynamic capabilities as well as their effects are intertemporal phenomena adds to the problem. Even Teece's (2007) ambitious attempt to reveal the microfoundations of sustainable performance by disaggregating dynamic capabilities into its component parts opens up at least as many questions as it answers.

While these problems can hardly be resolved in the space of a special issue, each of the papers in this issue wrestles with one or more problems of importance to our understandings of the dynamic capabilities construct.

Research questions explored

The above discussion is offered as a summary of the current discussions about dynamic capabilities, and as a background against which the papers in the special issue can be reviewed. We therefore organize this section around the two major debates identified earlier, regarding the nature and consequences of dynamic capabilities, and in addition we consider some of the methodological recommendations made by papers. We finish in the concluding section with some guidance on future research agendas in this field.

The nature, origins and evolution of dynamic capabilities

Dynamic capabilities are responses to the need for change or new opportunities, and the changes can take many forms: they involve the transformation of organizational processes, allocations of resources, and operations. The changing allocation and utilization of resources is a critical part of dynamic capabilities. These resources can include human capital, including managers and

employees, technological capital, knowledge-based capital, and tangible-asset-based capital, among others. Dynamic capabilities can be improved over time or can decay. But ironically, they can also remain at an unchanged level even as they continue to induce change.

They can take on multiple roles in organizations, such as changing resource allocations, organizational processes, knowledge development and transfer, and decision making. Several authors comment on types of dynamic capabilities such as operational (zero level) and dynamic (Winter, 2003) and first category and meta capabilities (Collis, 1994). Ambrosini, Bowman and Collier (2009) build on these typologies and suggest that there are three levels: incremental, renewing, and regenerative. The distinction is that incremental and renewing capabilities utilize and leverage the current resource base, but regenerative dynamic capabilities evaluate and adapt the overall portfolio. Although not explicitly addressed in prior literature, it would seem that organizations can have several different kinds of dynamic capabilities such as idea generation capabilities, market disruptiveness capabilities, new product development capabilities, marketing capabilities or new process development capabilities. Teece (2007, p. 1319) suggests that there are three even more fundamental types of capabilities involved: 'the capacity (1) to sense and shape opportunities and threats, (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets'.

Dynamic capabilities can be created because top management provides a vision for processes aimed at shaping the dynamic capabilities. The case study of Narayanan, Colwell and Douglas (2009) suggests that – at least in their case – the process was initiated by top management, who influenced middle management, through demonstrating their willingness to reallocate resources to create the capabilities. There were also underlying processes and mechanisms in the development of dynamic capabilities that were identified in this special issue. These processes and mechanisms include methods for structuring R&D, information technology assisting with codification, problem-solving processes, knowledge-sharing processes, marketing knowledge development,

and absorptive capacity mechanisms. Several studies mention the importance of the viewpoints and shared mindsets of the management involved, although these were topics that were complementary to the other processes discussed.

Zollo and Winter (2002) identify the importance of deliberate learning mechanisms that build on learning from experience and then create new processes and routines. Macher and Mowery (2009) base their study in the semiconductor industry on utilizing deliberate learning mechanisms as a starting point. They suggest that new process development constitutes a dynamic capability in the semiconductor industry, since each new semiconductor design requires a new approach to product development processes. The operational mechanisms that influence new process development are rooted in knowledge articulation and knowledge codification, and these reflect managerial decisions. Knowledge articulation can include managerial decisions to have functionally diverse teams, which may include co-location strategies to improve learning and problem-solving performance. Knowledge codification includes investment in information technology requirements that will identify new process development.

Some of the papers in this special issue test specifically how dynamic capabilities can change over time. McKelvie and Davidsson (2009) address how improving access to different resources can influence their development. For example, they find that access to human and technological expertise and to modern operational resources is positively related to what they call 'market disruptiveness capability'. They also find that improvements to reputational and technological resources are positively related to another dynamic capability – one concerned with new product development. Dynamic capabilities can also be shaped by the development and maturation of operational capabilities. Newey and Zahra (2009) demonstrate through their case study that the development of operational capabilities can shape the dynamic capabilities involved. Their study also shows that management sometimes views opportunities as negative and that this can lead to the demise of a potential dynamic capability. This suggests the importance of conducting more research on the influence of managerial beliefs and cognitive states on the exercise and development of dynamic capabilities.

Consequences of dynamic capabilities

As we noted earlier, the consequences of dynamic capabilities are closely linked to discussions about their nature, since they are not directly observable and have to be inferred from other indicators. Nevertheless, there are studies that follow the downstream effects of dynamic capabilities. Bruni and Verona (2009) emphasize the importance that marketing capabilities play in new product development in pharmaceutical firms. They emphasize that dynamic marketing capabilities involve processes of knowledge dispersion, social network building, and integration with other processes. They also highlight the changing nature of dynamic marketing capabilities. From another perspective, Pandza and Thorpe (2009) state that evolutionary economics (Nelson and Winter, 1982) and experiential learning are insufficient to explain the existence of dynamic capabilities. They emphasize that knowledge discontinuities emerge from managerial agency and competency which lead to 'creative search', 'path creation' and 'strategic sense-making'. They argue that dynamic capabilities may encourage discontinuity from past paths in order to create new knowledge trajectories.

There is also growing interest in a co-evolutionary view which links the firm to the environment in which it is competing. In our special issue, several of the papers take a longitudinal view to show the processes whereby dynamic capabilities co-evolve with the environment (Lewin and Volberda, 1999). In order to capture the changing nature of the firms, the paper by McKelvie and Davidsson (2009) investigates new firms in two time periods and suggests that in these cases the resource base needs to be growing over time along with the utilization of this resource base. Narayanan, Colwell and Douglas (2009) also take a longitudinal view by tracking the development of two dynamic capabilities over a nine-year period. They poignantly show that after years of working on their development, a merger caused by changes in the pharmaceutical industry led to the loss of them both. In the pharmaceutical industry, the competitive structure of the industry has shifted and now demands that marketing capabilities are integrated into the product innovation process (Bruni and Verona, 2009). The dynamic marketing capabilities involve exchange processes with external experts in

order to exchange knowledge about what is happening in the industry and with customers, as well as cross-functional processes within the firms. Ambrosini, Bowman and Collier (2009) suggest that top management perceptions of the environment and the need for change will trigger change in the way the resources are utilized or change in the way the resource base is configured. They also build on research done in the 1970s which demonstrates that managerial perceptions of the environment are not necessarily based on the objective characteristics of that environment. Thus, top management may, or may not, create change based solely on their own cognitions. Newey and Zahra (2009) also show that it is not just exogenous shocks which cause changes in dynamic capabilities; reconfiguration can also be driven by internal endogenous entrepreneurship. They suggest that this viewpoint is largely ignored in the literature. Thus, the special issue papers emphasize the *dynamic* nature of dynamic capabilities and have excellent illustrations of the importance of the acceptance of change in internal processes and in external environments.

Methodologies for researching dynamic capabilities

One of the criticisms of the dynamic capabilities concept is that they are difficult to measure empirically, as are the underlying operational processes as well as the relationship between dynamic capabilities and firm performance. It is also difficult to measure the routines and processes that are often idiosyncratic to firms or part of resource bundles (Penrose, 1959). Five of the seven papers in the special issue are empirical and utilize diverse methodologies for showing the existence of, and the nature of, dynamic capabilities and their antecedents.

Three of the papers are qualitative and build on case studies. Narayanan, Colwell and Douglas (2009) provide a case study of a single pharmaceutical company and its attempt to create two dynamic capabilities, and Newey and Zahra (2009) offer a drug development case study which involves two pharmaceutical firms. Bruni and Verona (2009) conducted interviews in six pharmaceutical firms in order to determine the role of dynamic marketing capabilities in the processes surrounding new drug development.

Others have taken a more quantitative route to show the relationship between various organizational antecedents and dynamic capabilities. Macher and Mowery's (2009) longitudinal study quantifies performance measurements in terms of yield and cycle time of manufacturing semiconductors over a six-year period. They use measures of operational processes affecting the dynamic capability of new process development in semiconductor manufacturing. These include deliberate learning mechanisms such as intra-team diversity, inter-team diversity and co-location strategies of team members. Their deliberate learning mechanisms include IT practices such as knowledge codification, information handling, database analysis and production scheduling. They then show the differences in using these operational processes against the performance measures, and the results show that these deliberate learning mechanisms are helpful to the firms, particularly when large volumes are being manufactured. McKelvie and Davidsson (2009) examine the origins and development of dynamic capabilities in new firms using questionnaires completed by founders and chief executives, and conclude that quantitative measures are viable for conducting research into dynamic capabilities, although they stress the importance of maintaining tight focus with regard to the narrowness of the sample and the clarity of theoretical questions.

From this we can see the strength of qualitative studies: that they provide detailed descriptions of what processes are involved, the role of management, the reconfiguration of the dynamic capabilities, and the interaction with the environment. On the other hand, the quantitative studies are stronger in providing precise definitions of the factors involved, a more explicit identification of their interactions and generalizability within and between samples. One point of consensus among all the authors who discuss methodology is about the need for more longitudinal studies, whether qualitative or quantitative, in order to provide insights into the practice of dynamic capabilities.

Conclusions

In summary, dynamic capabilities can take a variety of forms and involve different functions, such as marketing, product development or

process development, but the overriding common characteristics are that they are higher level capabilities which provide opportunities for knowledge gathering and sharing, continual updating of the operational processes, interaction with the environment, and decision-making evaluations.

We can see several challenges for future research on dynamic capabilities. The biggest problem follows from the above methodological discussion and concerns the dynamic nature of capabilities. Research needs to reflect the phenomena it is studying by investigating processes of creation and evolution over time, which points to the need for more longitudinal studies. Second, there is a need to provide more focused studies of dynamic capabilities, for example by looking at how they link to functional capabilities such as IT, R&D and marketing. Third, it is notable that studies, both in this issue and elsewhere, tend to focus most frequently on obviously 'dynamic' industries, such as semiconductors or biotechnology. There may be value therefore in exploring the construct in other contexts, including more traditional industries, the public sector, and in other countries where different constraints and conditions prevail. Fourth, we think there is a need to establish clearer linkages about how dynamic capabilities include the utilization of resources and the implementation of new processes. Fifth, there is a need for more attention to the links between dynamic capabilities and more micro issues, such as managerial cognition and search processes (Gavetti and Levinthal, 2000). And finally, there remain the conceptual problems such as distinguishing between operational and higher order capabilities, and distinguishing between capabilities which rely on incremental learning processes and those that presuppose dramatic new knowledge trajectories.

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