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## RESEARCH PAPER

# A conceptual analysis of strategic capability development within product innovation projects

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*Strategic capability development refers to the renewal of the organisational capabilities which are sources of competitive advantage. The aim of this paper is to examine how strategic capability and competitive advantage build up over time. Recent literature points to the integration of dynamic capability and ambidexterity perspectives in explaining organisational capability development. Literature analysis reveals the role of knowledge integration and product innovation in integrating dynamic capability and ambidexterity. However, little attention has yet been paid to knowledge integration within innovation projects as a context for capability development. Accordingly, this paper aims to develop a conceptual framework for strategic capability development focusing on the role of knowledge integration within product innovation projects. This framework contributes to identifying and emphasising the role of micro processes in capability renewal which in turn enhances our understanding of strategic capability development.*

## Introduction

Strategies within organisations are based on the internal and external situations of the firm and are implemented through the processes of adapting organisational resources and capabilities to environmental changes (Venkatraman, 1989). The literature has focused on the fit between strategy and the internal and external situation, and its impact on performance and sustainability of competitive advantage. Less attention has been paid to how strategic capabilities within companies are developed to achieve fit between resources and the environment. In this paper, strategic capability development is defined as 'renewing and changing organisational capabilities to the new capabilities which are sources of competitive advantage in a new environment'. This paper explores this concept and devises a strategic and conceptual framework for effective capability development within firms based on internal and external factors.

There are two main approaches in the literature. The dynamic capability perspective argues that adaptation of organisational capabilities to the environment is achieved through a combination of internal and external capabilities (Teece *et al.*, 1997). Organisational processes, such as product innovation, have been identified as dynamic capabilities (Eisenhardt and Martin, 2000). However, it is not yet known which processes lead to the development of capabilities that are sources of competitive advantage and sustainability (Ambrosini and Bowman, 2009). The ambidexterity literature argues that the sustainability of competitive advantage in the face of

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environmental changes is based on a balance between exploration and exploitation (March, 1991; Tushman and O'Reilly, 1996; Gupta *et al.*, 2006). However, there is no discussion of how balancing exploration and exploitation can be achieved through capability development. While these two perspectives partially explain strategic capability development, a combination of them contributes to a better understanding of this process. The literature points to the role of product innovation and knowledge integration for combining these two views (Grant, 1996a; Danneels, 2002).

## Literature review

In this section, literature on the four areas of dynamic capability, ambidexterity, product innovation and knowledge integration will be briefly reviewed to gain an integrated view of capability development. The findings will be analysed against the role of knowledge integration and product innovation in fitting organisational capabilities with internal and external environmental requirements. Then, in the next section, these areas will be synthesised to develop a conceptual framework for strategic capability development through knowledge integration within product innovation projects.

### *Dynamic capability*

The resource-based view of the firm argues that firms which have resources that are valuable, inimitable, rare and non-substitutable (VIRN attributes) can achieve sustainable advantage (Barney *et al.*, 2001). However, the competitive advantage of firms is continuously eroded by competitors, and the distribution of resources within an industry is constantly changing (Jacobides and Winter, 2005). Hence, sustaining competitive advantage over time is not the same as gaining it. Some believe that knowledge is the most significant resource of a company and that heterogeneous knowledge bases are the main determinants of sustained competitive advantage and superior performance (Grant, 1996b; Spender, 1996; Zack, 2002). From this perspective, firms evolve their knowledge base in order to update their competitive advantage with the changing requirements of the environment.

On the other hand, according to evolutionary theory (Nelson and Winter, 1982), the resources and capabilities which are sources of competitive advantage are path dependent. In this theory, the distinctive competence is the result of the evolution of past capabilities of the organisation (Dosi *et al.*, 2000). Extending the path dependency argument, Teece *et al.* (1997) include external capabilities as sources of capability development, and define dynamic capability as the firm's ability to integrate, build and reconfigure internal and external competences to address a rapidly changing environment. Dynamic capability processes determine how organisations develop their capabilities (based on the integration of internal and external capabilities) in order to respond to the opportunity created by environmental change.

Hence, dynamic capability is the ability of the firm to change its capabilities to what the environment requires, based on the combination and recombination of the firm's existing capabilities and new capabilities. Zollo and Winter (2002) define capability development as the evolution of organisational routines through cyclical evolution of organisational knowledge. Some argue that capability evolution is a form of exploration (Rosenkopf and Nerkar, 2001), while others propose that

capability development is a form of exploitation (Danneels, 2007). In line with Gupta *et al*. (2006), this study will assume that the learning process of capability exploration is different from the learning process of capability exploitation.

In brief, Teece (2007) explicates dynamic capability as constituting three abilities: to sense opportunities, to seize these opportunities and to reconfigure organisational assets in accordance with internalised opportunities. This unpacking of dynamic capability reveals the opportunity-based nature of dynamic capability. Accordingly, the contribution of dynamic capability to the field of organisational capability development points to two major arguments. First, based on Teece (2007), exploration and exploitation of past organisational capabilities lead to developing new organisational capabilities. Second, based on Zollo and Winter (2002), each round of exploration of organisational capabilities leads to another round of exploitation of organisational capabilities. However, the existing frameworks for dynamic capability reveal different mechanisms for such operations regardless of which mechanisms are effective and which are not. Hence, the current models of dynamic capability are limited, unable to say when and why different mechanisms should be applied within organisational capability development.

While descriptive models of dynamic capability illustrate the process of operational capability change, the predictive and normative models can conceptualise the influence of organisational factors on dynamic capability development. The predictive and normative models of dynamic capabilities, such as the models based on contingency theory, are often ignored in the literature of dynamic capability. Less attention has been paid to the influential organisational variables involved in capability development and the relationship among them. These types of models will have more predictive and normative power. Zajac *et al*. (2000) argue that strategic fit is a core concept of normative models of strategy formulation, which have great performance implications. In line with this argument and based on the similarities and overlaps between strategic fit theory and contingency theory, contingency theory can be helpful in developing a normative model for dynamic capability development.

### *Ambidexterity*

The ambidexterity literature is based on balancing exploration and exploitation within organisational evolution (Tushman and O'Reilly, 1996; Gupta, *et al*., 2006; Raisch *et al*., 2009). March (1991) argues that balancing exploration and exploitation is fundamental to the survival of the firm. Gupta *et al*. (2006) find two possible assumptions behind balancing exploration and exploitation. One assumption is continuity, which refers to the situation where exploration and exploitation are balanced independently of each other. In this situation, firms can employ high levels of both exploration and exploitation simultaneously. Orthogonality balancing sees exploration and exploitation as two ends of a continuum where increasing one means decreasing the other. Hence, the balance between exploration and exploitation can be achieved either simultaneously or sequentially.

Gibson and Birkinshaw (2004) think that ambidexterity is achieved through establishing a balance between adaptation and alignment. This idea becomes clearer in the use of the terms 'ambidexterity' and 'achieving ambidexterity', which are treated differently in the ambidexterity literature. Ambidexterity refers to an intention towards a balance between exploration and exploitation. Most of the models based on this idea have considered the factors in the environment, organisational context

and inter-firm relationships that moderate the relationships between ambidexterity and performance (Raisch and Birkinshaw, 2008; Simsek, 2009). Less has been written on how these factors lead ambidexterity toward performance. This point is referred to in the literature as 'achieving ambidexterity', as the integration mechanisms mediate the relationship between ambidexterity and performance (Andriopoulos and Lewis, 2009; Jansen *et al*., 2009).

Zollo and Winter (2002) feel that firms develop organisational capabilities through balancing exploration and exploitation in response to external stimuli. He and Wong (2004) put the concept of strategic fit (Venkatraman, 1989) into the context of ambidexterity and argue that different types of balancing exploration and exploitation are correspondent with different modes of strategic fit ('fit as matching' and 'fit as moderator'). Fit as matching refers to internal alignment and fit as moderator refers to environmental adaptation. This notion is compatible with contingency theory, where effectiveness is based on balancing differentiation and integration (Lawrence and Lorsch, 1967). While fit as moderator is achieved through differentiation, fit as match is achieved through integration.

Contingency theory has been extensively examined, based on different aspects of organisation design such as structure (Morton and Hu, 2008), organisational configuration, information processing (Daft and Lengel, 1986), organising for innovation (Damanpour, 1991), knowledge management (Becerra-Fernandez and Sabherwal, 2001) and new product development (Souder *et al.*, 1998). However, the application of this theory in ambidexterity is little studied. Raisch *et al*. (2009) argue that contingency theory is one of the four central tensions upon which further progress in research on ambidexterity can be achieved.

### *Product innovation*

Product innovation is defined as 'the transformation of a market opportunity into a product available for sale' (Krishnan and Ulrich, 2001, p.1). Product innovation has been studied from several different perspectives (Brown and Eisenhardt, 1995; Krishnan and Ulrich, 2001). The recent trend in examining product innovation through a resource-based view has integrated different dimensions of product innovation to make a more comprehensive picture of strategic product development. For example, Eisenhardt and Martin (2000) argue that exploring the relationship between resource-based theory and product innovation will inform resource-based theory and enhance its empirical grounding. Helfat and Raubitschek (2000) offer a study that firmly positions new product activity within resource-based theory, arguing that organisational capabilities and products co-evolve over time.

Research also emphasises the relationship between product development and organisational capabilities from the dynamic capability perspective. For instance, Zollo and Winter (2002) argue that dynamic capability affects organisational capability development through applying different learning mechanisms. On the other hand, Eisenhardt and Martin (2000) argue that some organisational processes (such as knowledge acquisition, alliance formation, strategic decision-making and product innovation) are dynamic capabilities of firms which serve to change organisational capabilities. Hence, product innovation projects, as one of the contexts of dynamic capability, are a mechanism for capability development. In short, this stream of research focuses on the impact of product innovation on the development of

organisational capabilities (Eisenhardt and Tabrizi, 1995; Tatikonda and Montoya-Weiss, 2001; Francis and Bessant, 2005).

The literature argues that organisational capability development within product innovation is based on balancing the exploration and exploitation of organisational capabilities (Floyd and Lane, 2000; Danneels, 2002). This stream of research on product innovation is focused on studying product innovation from a resource-based perspective. Danneels (2002), for instance, argues that capability development via product innovation can be explorative and exploitative. In other words, in terms of innovation strategy, product innovation can be used for the exploitation of existing capabilities and the exploration of new capabilities (Floyd and Lane, 2000). Hence, capability development can be aligned with different innovation strategies of exploration or exploitation within product innovation projects. Therefore, it appears that product innovation is influenced by other factors, such as innovation strategy. The literature analysis also reveals that product innovation is affected by external and internal factors, such as industry architecture (Jacobides *et al*., 2006; Fixson and Park, 2008) and absorptive capacity (Stock *et al.*, 2001; Tsai, 2001) through the impact on innovation strategy.

*Industry architecture.* The concept of industry architecture recently emerged in the literature from the notion of division of labour and theories explaining the scope of the firm (Jacobides, 2006; Brusoni *et al.*, 2009). The theories explaining the scope of the firm are originally based on transaction cost economics (Coase, 1937), which investigates why firms exist. Williamson (1999) states that the firm's competences affect its decision whether to perform an activity in-house or externally. The issue is not really how firm A organises activity X; it is how firm A, having specific resources (strengths and weaknesses), organises activity X. In the context of innovation, this question turns into doing innovation in-house and through integration of innovative assets or outsourcing the innovative assets.

Teece (2000) has established a framework for investigating this issue in the context of product innovation. His argument is based on appropriability regimes and the concept of co-specialisation to investigate who stands to benefit from innovation. Jacobides *et al*. (2006) mix the two ideas of Teece (2000) and Williamson (1999) into a more comprehensive framework. They show that the pre-existing capabilities of a firm determine which approach in product innovation is more beneficial for the firm. They define two dimensions of co-specialisation as factor complementarity and factor mobility. Complementarity refers to the superior return to combinations of two or more assets, and mobility refers to the number of assets and substitutes that potentially can enter into a combination. While complementarity in innovative assets influences the size of the value to be bargained over (a bigger share of the cake), mobility influences the bargaining power of the asset holder and thus the division of value (a share of a bigger cake). Changes in these two factors lead to change in the industry architecture.

Jacobides (2006) defines industry architecture as social arrangements that support the condition of a product or service. He states that industry architecture is a more comprehensive concept than industry, including all supporting industry participants in the value chain. Brusoni *et al*. (2009) argue that industry architecture refers to the patterns of the division of labour in a sector and among industry participants of different kinds. The concept of industry architecture extends the analysis from bilateral

relations (based on transaction cost economics) to relationships across industry. From this perspective, transaction cost initially motivates integration and innovation. However, firms benefit from innovation if their innovative assets complement each other and, as a result, co-specialise (Jacobides *et al*., 2006).

As a result of co-specialisation and innovation, a new specialised knowledge will be created. Based on the concept of 'near decomposability' (Simon, 1996), the knowledge base of an industry can be conceptualised as a collection of specialised clusters of knowledge with a level of interdependence among them. The level of interdependence indicates the tacitness and the complementarity among knowledge clusters. When new specialised knowledge is established as a result of innovation, interdependencies and the degree of complementarity among knowledge clusters will differ because of changes in factor mobility and factor complementarity (Jacobides *et al.*, 2006). Hence, integration and specialisation, which alter the distribution of capabilities across the industry, change transaction costs, and a new round of knowledge and capability development starts (Jacobides and Winter, 2005). Because the division of task labour is different from the division of knowledge labour (Dibiaggio, 2007; Brusoni, *et al.*, 2009), change in the division of labour affects capability development and consequently the division of knowledge among industry participants (Takeishi, 2001; Cacciatori and Jacobides, 2005; Jacobides and Winter, 2005).

*Absorptive capacity.* Cohen and Levinthal (1990) define absorptive capacity as the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends. They argue that the basic antecedent of absorptive capacity is prior knowledge (related knowledge domains, basic skills and problem-solving methods, prior learning experience and learning skills, and shared language). Antecedents of absorptive capacity can be divided into prior related knowledge and internal mechanisms influencing a company's absorptive capacity (Van den Bosch *et al*., 1999).

This definition refers to the ability of a firm to integrate and utilise knowledge. Van den Bosch *et al*. (1999) define absorptive capacity as knowledge integration capability (comprising evaluation, acquisition, integration and commercial utilisation of new outside knowledge). Similarly, Zahra and George (2002) argue that absorptive capacity is the dynamic capability of the firm to integrate and utilise a competency. On the other hand, Tsai (2001) argues that absorptive capacity is not just a matter of sensing an opportunity through R&D, but also the ability of the firm to integrate competitive knowledge into its existing competencies. They think that some factors, such as knowledge ambiguity, will decrease the absorptive capacity of companies. Organisational stickiness prevents companies from integrating competitive knowledge across organisational units (Szulanski, 1996).

The literature explores the impact of absorptive capacity on innovation performance (Tsai, 2001), organisational adaptation and co-evolution (Lewin and Volberda, 1999), knowledge transfer (Gupta and Govindarajan, 2000) and new wealth creation (Deeds, 2001). However, one of the organisational outcomes of absorptive capacity is expectation formation (reactive/proactive strategic intent) (Cohen and Levinthal, 1990; Volberda, 1998). Zahra and George (2002) consider that absorptive capacity has four dimensions – acquisition, assimilation, transformation and exploitation – categorised into realised and potential absorptive capacity. However, little is known

about innovation strategies and capability developments associated with different types of absorptive capacity (including realised and potential absorptive capacity).

*Innovation strategy.* Different types of innovation strategies are discussed in the product innovation literature. These studies cover incremental and radical innovation, component and architectural innovation, and product and process innovation. These can be classified as explorative and exploitative innovation strategies. On the other hand, explorative and exploitative innovations are one of the bases for capability exploration and exploitation within organisations (Katila and Ahuja, 2002; Tushman and Smith, 2002). In fact, at the core of organisational adaptation is a firm's ability to continue to exploit its current capabilities as well as to explore future opportunities (March, 1991; Levinthal and March, 1993). While exploitative innovations are based on incremental innovation of a firm's current products, exploratory innovations are based more on radical innovation and extending firms' current products into new markets (Abernathy and Clark, 1985; Eisenhardt and Tabrizi, 1995; Venkatraman and Lee, 2004). Basically, exploitative innovation strategy departs from existing products and explorative innovation strategy departs from existing markets (Abernathy and Clark, 1985; R. Henderson and Clark 1990; Christensen, 1997).

The continuing success of a product depends on the capacity of the firm to compete at multiple points in innovation space, including exploitative innovation at some points and explorative innovation at others (March, 1991; McGrath, 1999). However, exploitative and exploratory innovations are associated with fundamentally different tasks, environmental contingencies, timeframes and search routines (Katila and Ahuja, 2002). Each requires its own distinct set of roles, incentives, culture and competencies (Bradach, 1997; Baghai, *et al.*, 1999; Sutcliffe, *et al.*, 1999; Siggelkow and Levinthal, 2003).

### *Knowledge integration*

Knowledge integration in firms has received considerable attention in the literature (Kogut and Zander, 1992; Grant, 1996b; Hansen *et al*., 1999; Grandori, 2001; Zollo and Winter, 2002). Grant (1996a, p.37) defines knowledge integration as the 'integration of specialist knowledge to perform a discrete productive task'. He thinks that transferring knowledge is not an efficient method of knowledge integration. From the perspective of the knowledge-based theory of the firm, the main problem lies in assuring the most effective integration of individuals' specialised knowledge at the lowest attainable cost (Grant, 1996a; Grandori, 2001).

Different mechanisms for knowledge integration have been identified (Hansen *et al.*, 1999; Grant, 1996a; Grandori, 2001; Zollo and Winter, 2002). Hence, it is necessary to identify when each mechanism is effective. An information processing view highlights the role of the environment in integration mechanisms (Galbraith, 1974). This view can provide a contingency framework for effective knowledge integration. For example, Daft and Lengel (1986) argue that in situations of uncertainty, coordination requires information from reports, plans and so on (codified knowledge). In other situations, coordination requires a richness of information (tacit information), which tends to be gained through personal contact.

Zollo and Winter (2002) suggest that economising on knowledge integration depends on task features – that is, the problems to be solved. Their framework offers

a range of combinations with regard to frequency, homogeneity and the causal ambiguity of the task. On the other hand, the approaches of Grant (1996a) and Grandori (2001) focus on how situational characteristics affect the suitability and comparative costs of various mechanisms for knowledge integration.

Grant (1996a) bases his arguments on the fit between knowledge integration and environmental requirements in terms of exploration and exploitation. He sees knowledge integration as organisational capability and identifies three sources of contribution to the competitive advantage of the firm: efficiency, scope and flexibility of knowledge integration. Efficiency in knowledge absorption includes how firms identify, assimilate and exploit knowledge. The scope of knowledge absorption includes the breadth of a firm's component knowledge. Finally, the flexibility of knowledge absorption refers to the extent to which a firm can access additional, and reconfigure existing, knowledge. De Boer *et al*. (1999) consider that the efficiency of knowledge integration refers to the way in which architectural knowledge accesses and utilises component knowledge. The scope of knowledge integration refers to the breadth of component knowledge that architectural knowledge draws upon. The flexibility of knowledge integration, finally, refers to the extent to which architectural knowledge can access additional component knowledge and integrate existing component knowledge. De Boer *et al*. (1999) also argue that while the efficiency dimension of knowledge absorption relates to knowledge exploitation, the scope and flexibility dimensions relate to knowledge exploration.

In short, the studies of knowledge integration have so far concentrated on specific environmental factors affecting knowledge integration. The impact of internal factors needs more investigation. Although the impact of absorptive capacity in developing organisational capabilities has been studied (Jansen *et al.*, 2005), the role of knowledge integration has not been considered. Furthermore, the impact of exploration and exploitation on knowledge integration has not yet been explored. The impact of ambidexterity in integration at top management teams has been studied (Mom *et al.*, 2009), but the integration of knowledge has not been examined in depth.

## Discussion and synthesis of literature

In the dynamic capability literature, it is argued that capability evolution is path dependent and new capabilities are achieved through the development of past capabilities. Although dynamic capability is stressed as the basis for organisational adaptation with environments, the relationship between organisational capability development and environmental requirements in terms of exploration or exploitation within dynamic capability processes receives little attention (Cepeda and Vera, 2007). Zahra *et al*. (2006) find that there are different underlying processes of dynamic capability. There are different approaches to strategic capability development. However, there is no agreement on identifying effective paths for capability development. There is also a lack of understanding about organisational capability evolution caused by applying multiple approaches to capability integration across organisational capability exploration and exploitation. Ambidexterity points to the role of product innovation and knowledge integration in linking dynamic capability organisational processes to environmental requirements and organisational capability exploration and exploitation.

The ambidexterity literature discusses two types of balancing between exploration and exploitation, sequential and simultaneous balancing (Gupta and

Govindarajan, 2000). Firms use both types of ambidexterity in sustaining their competitive advantage (He and Wong, 2004). It is also argued that the effectiveness of each type of balancing is contingent on environmental factors (Cao *et al.*, 2009). However, there is a gap in our understanding of the processes underlying the relationship between different modes of ambidexterity and performance. In fact, the processes associated with different types of ambidexterity and their relationships with organisational capability development have not yet been explored. We know even less about how sequential balancing of exploration and exploitation of organisational capabilities leads to organisational capability evolution. Research has paid less attention still to how firms simultaneously balance organisational capability exploration and exploitation throughout organisational processes. As discussed, the literature points to the role of product innovation and knowledge integration in presenting such organisational processes and mechanisms.

On the other hand, ambidexterity has been examined at different levels, including organisational, inter-firm and environmental (Simsek, 2009). However, ambidexterity at the project level has been the subject of less research. Product innovation is an appropriate context for studying ambidexterity because product innovation projects can be explorative or exploitative (Benner and Tushman, 2003; Jansen *et al.*, 2005). Danneels (2002) examines exploration and exploitation in the context of capability development and shows that product innovation can be used for both exploration and exploitation of organisational capabilities. Eisenhardt and Martin (2000) argue that product innovation is a context for dynamic capability. O'Reilly and Tushman (2008) argue that ambidexterity is a dynamic capability. Hence, product innovation would be an appropriate context for combining ambidexterity and dynamic capability perspectives. While the importance of product innovation in the exploration and exploitation of organisational capabilities has been identified (Floyd and Lane, 2000; Danneels, 2002), balancing exploration and exploitation of capabilities within product innovation has not been considered. Four modes of balancing have been identified based on different types of ambidexterity in innovation strategy, including exploration/exploitation of internal/external knowledge. However, balancing exploration and exploitation of organisational capabilities based on different types of ambidexterity in innovation strategy has not been considered.

In brief, while studies based on ambidexterity focus on explaining how organisational capability development shapes product innovation to be explorative or exploitative, research based on dynamic capability gives insights into how product innovation processes shape organisational capability development to be explorative or exploitative (see Table 1). However, an analysis of the reciprocal relationship between product innovation and organisational capability development is absent from the literature.

Ambidexterity in organisational capability can be achieved through balancing differentiation and integration (Jansen *et al.*, 2009). From this perspective, the effectiveness of each knowledge integration approach is contingent on internal and external conditions. Industry architecture and absorptive capacity have been identified as the result of knowledge integration within product innovation. Different knowledge integration mechanisms lead to the development of organisational capabilities at different levels of organisation (Iansiti and Clark, 1994; Grant, 1996a). However, it is not clear which type of capability will be developed as a result of specific conditions of industry architecture and absorptive capacity.

Table 1. Synthesis of the literature

| *Concepts* | *Key literature* | *Summary of findings* | *Theoretical base* | *Relevance to this paper* | *Proposed integrating view* |
|---|---|---|---|---|---|
| Ambidexterity | Tushman and O'Reilly (1996); Raisch and Birkinshaw (2008); Semsek (2009) | Organisational capability development consists of exploration and exploitation of organisational capabilities based on environmental requirements. | Competence-based view (Sanchez and Heene, 2004) | Organisational capability development includes exploration and exploitation of organisational capabilities based on explorative and exploitative organisational processes. | A complete cycle of strategic capability development includes both exploration and exploitation of organisational capabilities. Sequence of organisational capability exploration and exploitation along with employing aligned explorative and exploitative organisational processes leads to evolution of organisational processes. |
| | Gibson and Birkinshaw (2004); He and Wong (2004); Gupta *et al*. (2006) | Explorative and exploitative organisational capability developments are associated with aligned organisational processes. | | | |
| Dynamic capability | Zahra and George (2002); Teece (2007) | The sequence of organisational capability exploration and exploitation leads to evolution of organisational capabilities. | Capability-based view (Dosi *et al*., (2000) | Employing explorative and exploitative organisational processes leads to evolution of organisational processes. | |
| | Eiesenhardt and Martin (2000); Zollo and Winter (2002); Zahra et al. (2006); Ambrosini and Bowman (2009) | Organisational processes associated with dynamic capabilities change organisational capability development to be explorative or exploitative. | | | |
| Product innovation | Leonard-Barton (1992); Tripsas (1997); Tripsas and Gavetti (2000); Danneels (2007) | Organisational capability development being explorative or exploitative influences whether product innovation is explorative or exploitative. | Ambidexterity (Gibson and Birkinshaw, 2004) | Each round of explorative product innovation is followed by exploitative product innovation, and also each round of exploitative product innovation is followed by | Organisational capability development includes explorative and exploitative product innovation along with explorative and exploitative knowledge integration. Organisational |

(*Continued*)

Table 1. (*Continued*)

| | | | | | |
|---|---|---|---|---|---|
| | Eisenhardt and Tabrizi (1995); Eisenhardt and Martin (2000); Tatikonda and Montoya-Weiss (2001); Danneels (2002); Francis and Bessant (2005) | Product innovation being explorative or exploitative influences whether organisational capability development is explorative or exploitative. | Dynamic capability (Zollo and Winter, 2002) | explorative product innovation. | capability exploration and exploitation shape mechanisms of knowledge integration. However, explorative and exploitative knowledge integration within product innovation in an inverse relationship lead to organisational capability exploitation and exploration, respectively. In addition, the sequence of employing explorative and exploitative knowledge integration within product innovation leads to evolution of organisational capabilities. |
| Knowledge integration | Grant (1996a); Hansen *et al*. (1999); Zack (2002) | Organisational capability development consists of explorative and exploitative approaches to knowledge integration. | Knowledge integration model (Grant, 1996a) | The sequence of employing explorative and exploitative knowledge integration leads to organisational capability evolution. | |
| | Zollo and Winter (2002) | The sequence of employing explorative and exploitative knowledge integration approaches leads to evolution of organisational capability. | Zollo and Winter (2002) | | |

In sum, existing studies imply that micro processes which are dynamic capabilities in firms are context specific (Ambrosini and Bowman, 2009). In order to manage these micro processes for developing strategic capabilities, a match should be made between micro processes and internal and external factors (J. Henderson and Venkatraman, 1993). In the context of product innovation, this match refers to a fit between innovation strategy and internal and external factors. In other words, firms balance exploration and exploitation innovation strategies when designing product innovation projects.

The framework developed in the next section supports the argument that absorptive capacity and industry architecture are the most important internal and external factors influencing capability development trajectories (Zahra and George, 2002; Jacobides, 2006). On the other hand, within the product innovation process, where internal and external knowledge integrate to create new knowledge (Kodama, 2005), capability within firms develops at different levels (Grant, 1996a). Therefore, following the contingency theory argument, this study suggests that there should be a fit between the knowledge integration approach and the innovation strategy within product innovation projects. As a result, based on internal and external factors, capabilities develop at different levels through knowledge integration within product innovation to sustain the competitive advantage of the firm.

## Towards a conceptual framework

The literature review revealed the roles of knowledge integration and product innovation in fitting organisational capabilities with environmental requirements. To understand the role of knowledge integration within product innovation, two steps are required. First, it is necessary to clarify what the integration of identified roles means with regards to fitting organisational capabilities with environmental requirements. Second, it is required to conceptualise what knowledge integration within product innovation (as a context for integrating different identified roles) can create and what would be the outcomes of this.

### *Step 1: the role of knowledge integration within product innovation*

Dynamic capability and ambidexterity perspectives can be combined through product innovation and knowledge integration. In brief, there are two roles that knowledge integration within product innovation may play. First, it is expected that the dynamics of knowledge integration within product innovation projects leads to the evolution of organisational capabilities. Second, mechanisms of knowledge integration within product innovation should be determined by the exploration or exploitation orientation of organisational capability development. This in turn will shape the direction of explorative or exploitative processes for organisational capability development.

Indeed, applying explorative and exploitative knowledge integration mechanisms within product innovation leads to the evolution of organisational capabilities. Moreover, changing the knowledge integration approach from explorative to exploitative or vice versa helps firms to transfer from explorative to exploitative organisational capability development. Overall, knowledge integration within product innovation can help firms to explore and exploit their organisational capabilities. This argument is consistent with Zajac *et al*. (2000), who argue that an integrative view of fit

follows a dynamic view of strategy and explains how strategies vary over time. Indeed, integrating external fit and internal fit in the context of organisational capability development leads to different approaches to knowledge integration within the product.

Ambrosini and Bowman (2009) refer to the strategy of a firm at a point in time as what the firm 'has' and the actual strategy as what the firm 'does'. Organisational routines (Nelson and Winter, 1982), as the basic units of analysis of organisational capabilities (Dosi *et al*., 2000), constitute what firms actually do. Hence, developing new organisational capabilities means developing new strategy. More precisely, the evolution of organisational capabilities across organisational capability exploration and exploitation addresses changing strategies (what firms do) across multiple periods of time. On the other hand, as argued previously, an integrated view of strategic fit defines strategic fit as 'matching' or 'aligning' organisational resources with environmental opportunities and threats (Venkatraman and Camillus, 1984).

An integrated view of strategic fit is consistent with a dynamic view of strategy. It can be argued that fitting organisational capability with environmental requirements leads to developing new strategy for the organisation. A dynamic view of strategy suggests that the distinctive competencies required for a firm's position in industry are the main source of its competitive advantage (Porter, 1991). Ambrosini and Bowman (2009) explain that the resources and capabilities which are sources of competitive advantage are accumulated across multiple periods of time and through strategy dynamics.

Hence, the evolution of organisational capabilities based on knowledge integration across exploration and exploitation of product innovation leads to new organisational capabilities which are sources of competitive advantage. Aligned with this argument, strategic capability development is defined here as renewing organisational capabilities to new organisational capabilities which are sources of competitive advantage. Accordingly, managing knowledge integration across explorative and exploitative processes of product innovation leads to developing strategic capability.

### *Step 2: conceptualisation of knowledge integration within product innovation*

Strategic capability development is the organisational outcome of the reciprocal relationship between knowledge integration within product innovation and organisational capability development. To understand strategic capability development, it is necessary to analyse this reciprocal relationship, and to examine the organisational outcome of such a reciprocal relationship. It is essential to understand how knowledge integration within product innovation shapes organisational capability, and also how it is shaped by organisational capability. The framework developed in this section initially conceptualises the mechanics of the reciprocal relationship between knowledge integration within product innovation and the development of organisational capability. It then conceptualises the organisational outcome of the operation of such mechanisms in terms of organisational capability development.

To develop such a framework, the constructs and the underlying mechanisms which constitute the reciprocal relationships between knowledge integration and product innovation and organisational capability development must first be identified. Literature analyses reveal that industry architecture, innovation strategy, absorptive capacity and knowledge integration are critical constructs in capability

development within product innovation projects. Therefore, the framework should include these constructs.

On the other hand, since organisations integrate differently, the mode of integration should fit the type of differentiation based on the combination of the two ideas of balance between adaptation and alignment (Gibson and Birkinshaw, 2004) and balance between fit as moderator and fit as match (He and Wong, 2004). Tushman and Nadler (1978) were the first to suggest that fit between differentiation and integration is based on a fit between organisational capacities. This argument has been reflected in the conceptual framework of this paper through fit between differentiation and integration (Figure 1). Fit between these two phases can be achieved through fit between the characteristics of knowledge integration and the requirements of the environment in terms of exploration and exploitation.

However, different characteristics of knowledge integration lead to the development of different types of absorptive capacity (Van den Bosch *et al*., 1999). On the other hand, environmental requirements can be based on different mixes of exploration and exploitation, including exploration/exploitation of internal/external knowledge (Rosenkopf and Nerkar, 2001). Rothaermel and Alexandre (2009) refer to this classification of exploration/exploitation along technology or organisational boundaries. They argue that new or known technology can be sourced internally or externally. Based on these two models, and in line with Becker and Zirpoli (2003), innovation strategies can be classified in terms of these boundaries. Figure 1 illustrates processes of organisational capability development based on the formulation of innovation strategy and then the implementation of the strategy.

Industry architecture and absorptive capacity affect the formulation of innovation strategy. Besides, innovation strategy informs the development of absorptive capacity through knowledge integration mechanisms. On the other hand, it has been argued, developing absorptive capacity affects the formulation of innovation strategy

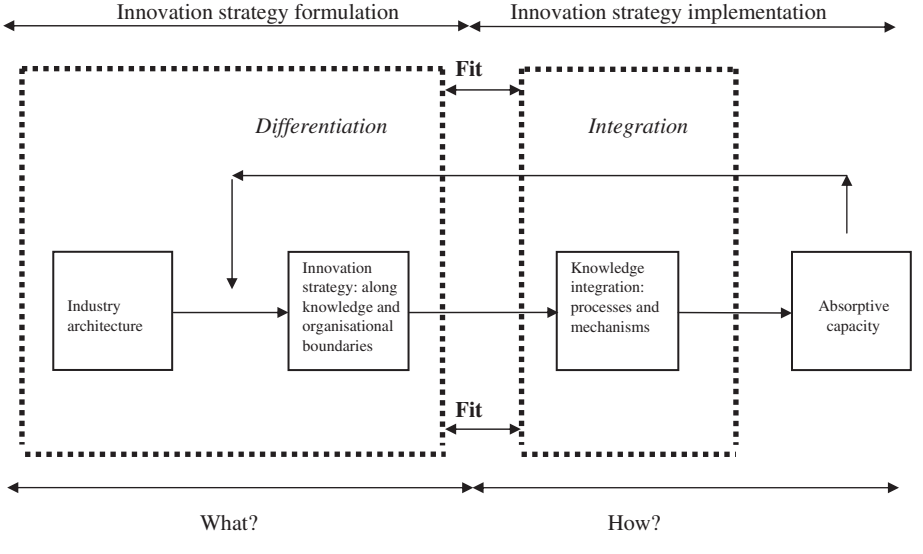


**Figure 1.** Conceptual framework for strategic capability development based on knowledge integration, industry architecture and absorptive capacity


**Figure 2.** Organisational capability evolution through exploration and exploitation of organisational knowledge

(Van den Bosch *et al.*, 1999; Rothaermel and Alexandre, 2009). Hence, it can be conceptualised that a new absorptive capacity can be developed which changes the innovation strategy in the next round of capability development. Accordingly, a loop is formed, based on different rounds of organisational capability development by which innovation strategy influences and is influenced by absorptive capacity development.

This loop constitutes the reciprocal relationship between knowledge integration within product innovation and organisational capability development. On the other hand, the reciprocal relationship between knowledge integration within product innovation and organisational capability development leads to strategic capability development. Thus, the loop between innovation strategy and absorptive capacity is the underlying mechanism upon which strategic capability can be developed. In other words, both the impact of innovation strategy on absorptive capacity and the impact of absorptive capacity on innovation strategy have mutual roles in strategic capability development.

The reciprocal relationship between absorptive capacity and innovation strategy is based on managing knowledge integration across explorative and exploitative product innovation projects. Different types of organisational capabilities can be developed (at component or architectural levels) which depend on different innovation strategies. From the formulation and implementation of explorative or exploitative innovation strategies (as shown in Figure 2), an organisational outcome should be expected. The accumulation of these organisational outcomes across organisational capability exploration and exploitation will lead to the evolution of organisational capabilities.

## Conclusion

Theoretically, this paper adds to recent attempts to combine dynamic capability and ambidexterity perspectives (Venkatraman and Lee, 2004; O'Reilly and Tushman, 2008; Jansen *et al.*, 2009) by conceptualising knowledge integration within product innovation projects. The conceptual framework developed here visualises the context specificity of dynamic capabilities and adds to the dynamic capability literature by offering a contingency framework for managing dynamic capabilities at the micro

process level. In addition, it shows how firms can balance exploration and exploitation of their organisational capabilities. It also conceptualises effective knowledge integration based on capability development at different levels of organisation. By revealing the impact of internal and external factors on capability development to improve performance, the paper contributes to strategic fit theory.

The paper develops a framework for strategic capability development based on internal and external factors. This framework may assist managers in formulating innovation strategy. It may also help managers implement innovation strategies through employing the right type of product innovation and knowledge integration mechanism. This framework further helps managers to assess the capabilities required at different organisational levels, based on an evaluation of the industry architecture and absorptive capacity of the firm. Hence, it can be a strategic tool and a guideline in developing the capabilities needed to sustain competitive advantage.

## References

Abernathy, W. and Clark, K. (1985) 'Innovation: mapping the winds of creative destruction', *Research Policy*, 14, 1, pp.3–22.

Ambrosini, V. and Bowman, C. (2009) 'What are dynamic capabilities and are they a useful construct in strategic management?', *International Journal of Management Reviews*, 11, 1, pp.29–49.

Andriopoulos, C. and Lewis, M. (2009) 'Exploitation-exploration tensions and organizational ambidexterity: managing paradoxes of innovation', *Organization Science*, 4, pp.696–717.

Baghai, M., Coley, S. and White, D. (1999) *The Alchemy of Growth: Practical Insights for Building the Enduring Enterprise*, Basic Books, New York, NY.

Barney, J., Wright, M. and Ketchen, D. (2001) 'The resource-based view of the firm: ten years after 1991', *Journal of Management*, 27, 6, pp.625–42.

Becerra-Fernandez, I. and Sabherwal, R. (2001) 'Organizational knowledge management: a contingency perspective', *Journal of Management Information Systems*, 18, 1, pp.23–55.

Becker, M. and Zirpoli, F. (2003) 'Organizing new product development: knowledge hollowing-out and knowledge integration – the FIAT auto case', *International Journal of Operations & Production Management*, 23, 9, pp.1033–61.

Benner, M. and Tushman, M. (2003) 'Exploitation, exploration, and process management: the productivity dilemma revisited', *Academy of Management Review*, 28, 2, pp.238–56.

Bradach, J. (1997) 'Using the plural form in the management of restaurant chains', *Administrative Science Quarterly*, 42, 2, pp.276–303.

Brown, S. and Eisenhardt, K. (1995) 'Product development: past research, present findings, and future directions', *Academy of Management Review*, 20, 2, pp.343–78.

Brusoni, S., Jacobides, M. and Prencipe, A. (2009) 'Strategic dynamics in industry architectures and the challenges of knowledge integration', *European Management Review*, 6, 4, pp.209–16.

Cacciatori, E. and Jacobides, M. (2005) 'The dynamic limits of specialization: vertical integration reconsidered', *Organization Studies*, 26, 12, pp.1851–84.

Cao, Q., Gedajlovic, E. and Zhang, H. (2009) 'Unpacking organizational ambidexterity: dimensions, contingencies, and synergistic effects', *Organization Science*, 20, 4, pp.781–96.

Cepeda, G. and Vera, D. (2007) 'Dynamic capabilities and operational capabilities: a knowledge management perspective', *Journal of Business Research*, 60, 5, pp.426–37.

Christensen, C. (1997) *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*, Harvard Business Press, Boston MA.

Coase, R. (1937) 'The nature of the firm', *Economica*, 4, 16, pp.386–405.

Cohen, W. and Levinthal, D. (1990) 'Absorptive capacity: a new perspective on learning and innovation', *Administrative Science Quarterly*, 35, 1, pp.128–52.

Daft, R. and Lengel, R. (1986) 'Organizational information requirements, media richness and structural design', *Management Science*, 32, 5, pp.554–71.

Damanpour, F. (1991) 'Organizational innovation: a meta-analysis of effects of determinants and moderators', *Academy of Management Journal*, 34, 3, pp.555–90.
Danneels, E. (2002) 'The dynamics of product innovation and firm competences', *Strategic Management Journal*, 23, 12, pp.1095–121.
Danneels, E. (2007) 'The process of technological competence leveraging', *Strategic Management Journal*, 28, 5, pp.511–33.
De Boer, M., Van Den Bosch, F. and Volberda, H. (1999) 'Managing organizational knowledge integration in the emerging multimedia complex', *Journal of Management Studies*, 36, 3, pp.379–98.
Deeds, D. (2001) 'The role of R&D intensity, technical development and absorptive capacity in creating entrepreneurial wealth in high technology start-ups', *Journal of Engineering and Technology Management*, 18, 1, pp.29–47.
Dibiaggio, L. (2007) 'Design complexity, vertical disintegration and knowledge organization in the semiconductor industry', *Industrial and Corporate Change*, 16, 2, pp.239–68.
Dosi, G., Nelson, R. and Winter, S. (2000) *The Nature and Dynamics of Organizational Capabilities*, Oxford University Press, Melbourne.
Eisenhardt, K. and Martin, J. (2000) 'Dynamic capabilities: what are they?', *Strategic Management Journal*, 21, 10, pp.1105–21.
Eisenhardt, K. and Tabrizi, B. (1995) 'Accelerating adaptive processes: product innovation in the global computer industry', *Administrative Science Quarterly*, 40, 1, pp.239–68.
Fixson, S. and Park, J. (2008) 'The power of integrality: linkages between product architecture, innovation, and industry structure', *Research Policy*, 37, 8, pp.1296–316.
Floyd, S. and Lane, P. (2000) 'Strategizing throughout the organization: managing role conflict in strategic renewal', *Academy of Management Review*, 25, 1, pp.154–77.
Francis, D. and Bessant, J. (2005) 'Targeting innovation and implications for capability development', *Technovation*, 25, 3, pp.171–83.
Galbraith, J. (1974) 'Organization design: an information processing view', *Interfaces*, 4, 3, pp.28–36.
Gibson, C. and Birkinshaw, J. (2004) 'The antecedents, consequences, and mediating role of organizational ambidexterity', *Academy of Management Journal*, 47, 2, pp.209–26.
Grandori, A. (2001) 'Neither hierarchy nor identity: knowledge-governance mechanisms and the theory of the firm', *Journal of Management and Governance*, 5, 3, pp.381–99.
Grant, R. (1996a) 'Prospering in dynamically-competitive environments: organizational capability as knowledge integration', *Organization Science*, 7, 4, pp.375–87.
Grant, R. (1996b) 'Toward a knowledge-based theory of the firm', *Strategic Management Journal*, 17, 10, pp.109–22.
Gupta, A. and Govindarajan, V. (2000) 'Knowledge flows within multinational corporations', *Strategic Management Journal*, 21, 4, pp.473–96.
Gupta, A., Smith, K. and Shalley, C. (2006) 'The interplay between exploration and exploitation', *Academy of Management Journal*, 49, 4, pp.693–706.
Hansen, M., Nohria, N. and Tierney, T. (1999) 'What's your strategy for managing knowledge?', *Harvard Business Review*, 77, 2, pp.106–18.
He, Z. and Wong, P. (2004) 'Exploration vs. exploitation: an empirical test of the ambidexterity hypothesis', *Organization Science*, 15, 4, pp.481–94.
Helfat, C. and Raubitschek, R. (2000) 'Product sequencing: co-evolution of knowledge, capabilities and products', *Strategic Management Journal*, 21, 10/11, pp.961–79.
Henderson, J. and Venkatraman, N. (1993) 'Strategic alignment: leveraging information technology for transforming organizations', *IBM Systems Journal*, 32, 1, pp.4–16.
Henderson, R. and Clark, K. (1990) 'Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms', *Administrative Science Quarterly*, 35, 1, pp.9–30.
Iansiti, M. and Clark, K. (1994) 'Integration and dynamic capability: evidence from product development in automobiles and mainframe computers', *Industrial and Corporate Change*, 3, 3, pp.557–605.
Jacobides, M. (2006) 'The architecture and design of organizational capabilities', *Industrial and Corporate Change*, 15, 1, pp.151–71.

Jacobides, M., Knudsen, T. and Augier, M. (2006) 'Benefiting from innovation: value creation, value appropriation and the role of industry architectures', *Research Policy*, 35, 8, pp.1200–21.
Jacobides, M. and Winter, S. (2005) 'Capabilities, transaction costs and evolution: understanding the institutional structure of production', *Strategic Management Journal*, 26, 5, pp.395–413.
Jansen, J., Tempelaar, M., Van den Bosch, F. and Volberda, H. (2009) 'Structural differentiation and ambidexterity: the mediating role of integration mechanisms', *Organization Science*, 20, 4, pp.797–811.
Jansen, J., Van Den Bosch, F. and Volberda, H. (2005) 'Managing potential and realized absorptive capacity: how do organizational antecedents matter?', *Academy of Management Journal*, 48, 6, pp.999–1015.
Katila, R. and Ahuja, G. (2002) 'Something old, something new: a longitudinal study of search behavior and new product introduction', *Academy of Management Journal*, 45, 6, pp.1183–94.
Kodama, M. (2005) 'Knowledge creation through networked strategic communities: case studies on new product development in Japanese companies', *Long Range Planning*, 38, 1, pp.27–49.
Kogut, B. and Zander, U. (1992) 'Knowledge of the firm, combinative capabilities, and the replication of technology', *Organization Science*, 3, 3, pp.383–97.
Krishnan, V. and Ulrich, K. (2001) 'Product development decisions: a review of the literature', *Management Science*, 47, 1, pp.1–21.
Lawrence, P.R. and Lorsch, J.W. (1967) 'Differentiation and integration in complex organizations', *Administrative Science Quarterly*, 12, 1, pp.1–47.
Leonard-Barton, D. (1992) 'Core capabilities and core rigidities: a paradox in managing new product development', *Strategic Management Journal*, 13, S1, pp.111–25.
Levinthal, D. and March, J. (1993) 'The myopia of learning', *Strategic Management Journal*, 14, S2, pp.95–112.
Lewin, A. and Volberda, H. (1999) 'Prolegomena on coevolution: a framework for research on strategy and new organizational forms', *Organization Science*, 10, 5, pp.519–34.
March, J. (1991) 'Exploration and exploitation in organizational learning', *Organization Science*, 2, 1, pp.71–87.
McGrath, R. (1999) 'Falling forward: real options reasoning and entrepreneurial failure', *Academy of Management Review*, 24, 1, pp.13–30.
Mom, T., Van Den Bosch, F. and Volberda, H. (2009) 'Understanding variation in managers' ambidexterity: investigating direct and interaction effects of formal structural and personal coordination mechanisms', *Organization Science*, 20, 4, pp.812–28.
Morton, N. and Hu, Q. (2008) 'Implications of the fit between organizational structure and ERP: a structural contingency theory perspective', *International Journal of Information Management*, 28, 5, pp.391–402.
Nelson, R. and Winter, S. (1982) *An Evolutionary Theory of Economic Change*, Belknap Press, Cambridge MA.
O'Reilly, C. and Tushman, M. (2008) 'Ambidexterity as a dynamic capability: resolving the innovator's dilemma', *Research in Organizational Behavior*, 28, pp.185–206.
Porter, M. (1991) 'Towards a dynamic theory of strategy', *Strategic Management Journal*, 12, S2, pp.95–117.
Raisch, S. and Birkinshaw, J. (2008) 'Organizational ambidexterity: antecedents, outcomes, and moderators', *Journal of Management*, 34, 3, pp.375–409.
Raisch, S., Birkinshaw, J., Probst, G. and Tushman, M. (2009) 'Organizational ambidexterity: balancing exploitation and exploration for sustained performance', *Organization Science*, 20, 4, pp.685–95.
Rosenkopf, L. and Nerkar, A. (2001) 'Beyond local search: boundary-spanning, exploration, and impact in the optical disk industry', *Strategic Management Journal*, 22, 4, pp.287–306.
Rothaermel, F. and Alexandre, M. (2009) 'Ambidexterity in technology sourcing: the moderating role of absorptive capacity', *Organization Science*, 20, 4, pp.759–80.
Sanchez, R. and Heene, A. (2004) *The New Strategic Management*, Wiley, New York.

Siggelkow, N. and Levinthal, D. (2003) 'Temporarily divide to conquer: centralized, decentralized, and reintegrated organizational approaches to exploration and adaptation', *Organization Science*, 14, 6, pp.650–69.
Simon, H. (1996) *The Science of the Artificial*, MIT Press, Cambridge, MA.
Simsek, Z. (2009) 'Organizational ambidexterity: towards a multilevel understanding', *Journal of Management Studies*, 46, 4, pp.597–624.
Souder, W., Sherman, J. and Davies Cooper, R. (1998) 'Environmental uncertainty, organizational integration, and new product development effectiveness: a test of contingency theory', *Journal of Product Innovation Management*, 15, 6, pp.520–33.
Spender, J. (1996) 'Making knowledge the basis of a dynamic theory of the firm', *Strategic Management Journal*, 17, 2, pp.45–62.
Stock, G., Greis, N. and Fischer, W. (2001) 'Absorptive capacity and new product development', *Journal of High Technology Management Research*, 12, 1, pp.77–91.
Sutcliffe, K., Sitkin, S. and Browning, L. (1999) 'Tailoring process management to situational requirements. Beyond the control and exploration dichotomy' in Cole, R. and Scott, R. (eds) *The Quality Movement and Organizational Theory*, Sage, Thousand Oaks CA, pp.315–31.
Szulanski, G. (1996) 'Exploring internal stickiness: impediments to the transfer of best practice within the firm', *Strategic Management Journal*, 17, 1, pp.27–43.
Takeishi, A. (2001) 'Bridging inter and intra firm boundaries: management of supplier involvement in automobile product development', *Strategic Management Journal*, 22, 5, pp.403–33.
Tatikonda, M. and Montoya-Weiss, M. (2001) 'Integrating operations and marketing perspectives of product innovation: the influence of organizational process factors and capabilities on development performance', *Management Science*, 47, 1, pp.151–72.
Teece, D. (2000) *Managing Intellectual Capital*, Oxford University Press, Oxford.
Teece, D. (2007) 'Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance', *Strategic Management Journal*, 28, 13, pp.1319–350.
Teece, D., Pisano, G. and Shuen, A. (1997) 'Dynamic capabilities and strategic management', *Strategic Management Journal*, 18, 7, pp.509–33.
Tripsas, M. (1997) 'Unraveling the process of creative destruction: complementary assets and incumbent survival in the typesetter industry', *Strategic Management Journal*, 18, s 1, pp.119–42.
Tripsas, M. and Gavetti, G. (2000) 'Capabilities, cognition, and inertia: evidence from digital imaging', *Strategic Management Journal*, 21, 10–11, pp.1147–61.
Tsai, W. (2001) 'Knowledge transfer in intraorganizational networks: effects of network position and absorptive capacity on business unit innovation and performance', *Academy of Management Journal*, 44, 5, pp.996–1004.
Tushman, M. and Nadler, D. (1978) 'Information processing as an integrating concept in organizational design', *Academy of Management Review*, 3, 3, pp.613–24.
Tushman, M. and O'Reilly, C. (1996) 'Ambidextrous organizations: managing evolutionary and revolutionary change', *California Mnagement Review*, 38, 4, pp.8–30.
Tushman, M. and Smith, W. (2002) 'Technological change, ambidextrous organizations, and organizational evolution' in Baum, J. (ed.) *Blackwell Companion to Organizations*, Blackwell, Oxford, pp.384–414.
Van den Bosch, F., Volberda, H. and De Boer, M. (1999) 'Coevolution of firm absorptive capacity and knowledge environment: organizational forms and combinative capabilities', *Organization Science*, 10, 5, pp.551–68.
Venkatraman, N. (1989) 'The concept of fit in strategy research: toward verbal and statistical correspondence', *Academy of Management Review*, 14, 3, pp.423–44.
Venkatraman, N. and Camillus, J. (1984) 'Exploring the concept of "fit" in strategic management', *Academy of Management Review*, 9, 3, pp.513–25.
Venkatraman, N. and Lee, C. (2004) 'Preferential linkage and network evolution: a conceptual model and empirical test in the US video game sector', *Academy of Management Journal*, 47, 6, pp.876–92.
Volberda, H. (1998) *Building the Flexible Firm: How to Remain Competitive*, Oxford University Press, Oxford.

Williamson, O. (1999) 'Governance and competence perspectives', *Strategic Management Journal*, 20, 12, pp.1087–110.
Zack, M. (2002) 'Developing a knowledge strategy' in Choo, C. and Bontis, N. (eds) *The Strategic Management of Intellectual Capital and Organizational Knowledge*, Oxford University Press, Oxford, pp.255–76.
Zahra, S. and George, G. (2002) 'Absorptive capacity: a review, reconceptualization, and extension', *Academy of Management Review*, 27, 2, pp.185–203.
Zahra, S., Sapienza, H. and Davidsson, P. (2006) 'Entrepreneurship and dynamic capabilities: a review, model and research agenda', *Journal of Management Studies*, 43, 4, pp.917–55.
Zajac, E., Kraatz, M. and Bresser, R. (2000) 'Modeling the dynamics of strategic fit: a normative approach to strategic change', *Strategic Management Journal*, 21, 4, pp.429–53.
Zollo, M. and Winter, S. (2002) 'Deliberate learning and the evolution of dynamic capabilities', *Organization Science*, 13, 3, pp.339–51.