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**Open innovation adoption from strategy to practice:
Implications from organizational ambidexterity and dynamic capabilities**

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Abstract

The aim of this paper is to explore if ambidextrous strategy can support structured open innovation practices through dynamic capabilities. Drawing on multi-disciplinary literature with complementary theoretical roots, open innovation is linked to higher level organizational ambidextrous strategy and organizational processes that encompass dynamic capabilities. A theoretical framework is developed to portray these subtle and nested relations that may facilitate open innovation solutions in response to organizational challenges. Finally, conclusion and contribution are briefly summarized.

Key words

Open innovation, organizational ambidexterity, dynamic capabilities, strategy, process, practice

1. Introduction

There appears to be a long standing gap in the field of open innovation strategy. Although firms progressively evaluate open innovation strategies as a means of creating value from innovation (Chesbrough and Bogers, 2014), Vanhaverbeke and Cloudt (2014) note that the relationship between organizational strategy and open innovation has not been fully considered in previous literature. According to Vanhaverbeke and Roijakkers (2013, p. 23), “it is time to explicitly incorporate open innovation into firm’s strategy. This has been a major gap in the open innovation literature over the last 10 years and has hampered its adoption as a mainstream concept”. They further point to the critical role of strategy and potential links to literature of ambidexterity and dynamic capabilities. They also consider the ecosystem metaphor in advancement of open innovation theory (Vanhaverbeke and Roijakkers, 2013).

Given the growing interest in open innovation, it is relevant that scholars explore this gap and conceptualize interactions between strategic intent and structural alignment within organizational capabilities. This paper aims to explore this strategic gap by investigating how open innovation initiatives fit with organizational ambidextrous strategy; how organizational ambidextrous strategy is implemented through processes of dynamic capabilities; and how scattered open innovation practices comprise specific dynamic capabilities in support of strategy implementation. Through exploring the linkages between these constructs, the aim of this paper is to identify how open innovation adoption can be translated from strategy to practice.

All organizations make strategic choices based on exploration and exploitation, either implicit or explicit (March, 1991), which aids long-run survival of business. The paradox of exploration and exploitation is linked to the fundamental tension between efficiency and creativity in all organizations (Trott, 2012). Despite inherent difficulties in managing both simultaneously (Andriopoulos and Lewis, 2009), ambidextrous organizations are believed to excel at both exploiting incremental innovations for existing products as well as exploring novel opportunities that foster radical innovation (Lavie and Rosenkopf, 2006). This paper proposes that ambidexterity is a critical strategic consideration for implementation of successful open innovation. Based on the strategic intent of being ambidextrous, a firm needs to combine both internal and external knowledge and ensure that evolving knowledge capabilities are integrated and aligned with a dynamic strategy (Chesbrough and Bogers, 2014). The question arises of 'how' organizations manage resources and capabilities so as to achieve ambidexterity. Dynamic capabilities are seen as dynamic organizational processes (Teece, 2007), acting as a bridge linking ambidextrous strategy and open innovation practices.

Borrowing concepts from organizational ambidexterity and dynamic capabilities in strategic management, we propose that ambidexterity is a strategic orientation (exploration and exploitation) within organizations, enabling them to actively adapt to and proactively shape the competitive environment. Dynamic capabilities develop from implementation of ambidextrous strategy, which may be deconstructed into detailed micro-foundations of open innovation practices. Furthermore, this research focuses more on the organization's ability to resolve organizational challenges and opportunities in response to environmental dynamism, instead of paying excessive attention to deconstruction of environmental

dynamism itself. A conceptual framework is offered that visualizes nested relationships of open innovation practices and activities as micro-foundations that substantiate organizational strategy and process.

The remainder of this article is structured as follows. Theoretical foundations are considered, followed by an integrated theoretical framework. Subsequently, the complementarity of theoretical roots are demonstrated. Finally, a brief conclusion and suggestions for empirical research are proposed.

2. Theoretical foundations

This section briefly outlines literature in fields of open innovation, organizational ambidexterity, and dynamic capabilities.

2.1 Open innovation

As firms look to advance their technology, open Innovation assumes that businesses can proactively adopt external as well as internal ideas and explore novel external paths to market (Chesbrough, 2003). This requires leveraging external sources of innovation based upon on “purposely managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization’s business model” (Chesbrough and Bogers, 2014, p. 17). Such understanding takes into consideration multiple directions of knowledge flow, innovation process and outcome and their integration into business models to facilitate value creation (Chesbrough and Bogers, 2014). In the study of

open innovation, the funnel view is generally adopted (Chesbrough, 2003; Chesbrough and Bogers, 2014), whereby innovations are garnered from both within and outside the firm via individuals, customers, suppliers, universities and other external sources. The process of knowledge acquisition includes not only upstream research and development but also downstream manufacturing and marketing, which assumes permeable organizational boundaries that facilitate knowledge flow (Chesbrough, 2003; Chesbrough et al, 2006; Chesbrough and Bogers, 2014). This highlights motivations to improve efficiency from economies of scale, as well as access to innovation producing capabilities from outside the firm (West and Bogers, 2014).

In terms of the open innovation phenomenon and based on Chesbrough (2006), Greco et al (2015) provide a comprehensive explanation of open innovation actions. Four directions of knowledge flow are suggested: inbound, outbound, coupled, and internal (Greco et al, 2015). The directions of knowledge flow and types of knowledge search are further linked to partners, or what the authors refer to as subclasses including customers, suppliers, research institutions, competitors and possibly foreign organizations (Greco et al, 2015). Such a mix and match of activities should provide opportunities to find solutions to a wide variety of organizational challenges. The anticipated performance outcome could be product innovations (radical and incremental) and process innovation (Greco et al, 2015).

Considering the importance of strategic utilization of open innovation (Vanhaverbeke and Cloudt, 2014), the concept of organizational ambidexterity in the field of strategic management is drawn upon.

2.2 Organizational ambidexterity

Organizational ambidexterity is conceptualized as the capacity to resolve tension between exploration and exploitation as two (strategic) organizational objectives (Birkinshaw and Gupta, 2013; O'Reilly III and Tushman, 2013). More specifically, it “refers to the ability of an organization to both explore and exploit—to compete in mature technologies and markets where efficiency, control, and incremental improvement are prized and to also compete in new technologies and markets where flexibility, autonomy, and experimentation are needed” (O'Reilly III and Tushman, 2013, p. 324). Practically, strategic choices regarding exploration and exploitation are made either implicitly or explicitly (March, 1991) and different approaches to ambidexterity – integration or differentiation of exploration and exploitation – are advocated (Andriopoulos and Lewis, 2009).

Processes of organizational ambidexterity differ in the nature of ambidextrous activities. Three modes of ambidexterity are identified (O'Reilly III and Tushman, 2013). First, sequential ambidexterity deals with organizational structural adaptation to environmental change over time, for example, temporary shift or switch of organizational structure (O'Reilly III and Tushman, 2013). Second, structural ambidexterity refers to simultaneously balancing exploration and exploitation efforts through structural arrangement and leadership (O'Reilly III and Tushman, 2013). The key lies in the internal alignment of competencies, systems, incentives, processes, and cultures in separate subunits with common strategic intent (O'Reilly III and Tushman, 2008; O'Reilly III and Tushman, 2013). Third, contextual ambidexterity is understood as building supportive contexts enabling immediate individual adjustment as well as managing the change of organizational identity

over time (O'Reilly III and Tushman, 2013). It facilitates individual judgement on their time allocation on exploration and exploitation in accordance with the surrounding environment (Gibson and Birkinshaw, 2004); meanwhile, it needs the organization to demonstrate culture and identity change (O'Reilly III and Tushman, 2013).

Furthermore, the over-arching framework of ambidexterity consists of context, conduct, and performance. Contextual antecedents comprise external environment, organizational characteristics, and cognition of senior management (Lavie et al, 2010). Antecedents then link to the strategic tension of exploration and exploitation, through conduct (modes) leading to short-term and long-term performance outcomes (Lavie et al, 2010). Lavie et al (2010) further note that short-term and long-term measures are not straightforward, may not be significant, contradictory or context dependent. Moreover, the consideration of organizational ambidexterity should not be confined within organizational boundaries. A study has been conducted on exploration-exploitation in the context of inter-organizational alliance formation (Lavie and Rosenkopf, 2006). Further research is suggested for wider open innovation context beyond strategic alliances.

Additionally, in choosing to explore or exploit, knowledge management is a critical consideration. The focus of such a view is the application of knowledge within and across organizational boundaries to deliver customer value (Grant, 1996). Taking into consideration the dimensions of both firm boundary and knowledge evolution process (exploration, retention, and exploitation), six knowledge capacities have been noted: "inventive, absorptive, transformative, connective, innovative, and desorptive capacity" (Lichtenthaler and Lichtenthaler, 2009, p. 1318). Excessive attention has been paid to the

inbound flow of knowledge, described as absorptive capacity, which is a firm's ability to recognize, assimilate and transform knowledge drawn from external sources (Cohen and Levinthal, 1990). Other types of knowledge capacities require attention as well. The ability to manage a knowledge base over time has been described as a dynamic capability, which is essential for open innovation implementation (Lichtenthaler and Lichtenthaler, 2009).

2.3 Dynamic capabilities

Dynamic capabilities are defined as “capabilities of an organization to purposefully create, extend, or modify its resource base” to fit an internal and external environment (Helfat et al, 2007, p. 4). Dynamic capabilities resolve the resource problem inherent in innovation and support the notion of ambidexterity for both strategy and processes. It is complementary to the production side view of open innovation (Chesbrough, 2003). The resource side of the story is yet to be explored. To address the criticism in traditional resource-based theory as being ‘static’ (Wernerfelt, 1984), Teece et al (1997) describe the capacity to manage resources in an agile way, as dynamic capabilities. Teece (2007) further deconstructs processes of dynamic capabilities into three firm-level sub-processes namely sensing, seizing, and reconfiguring, each of which consists of unique subsets of social and behavioural micro-foundations. “For analytical purpose, dynamic capabilities can be disaggregated into 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” (Teece, 2007, p. 1319). Micro-foundations include “distinct skills, processes,

procedures, organizational structures, decision rules, and disciplines” under the three organizational-level capacities (Teece, 2007, p. 1319).

More detailed micro-foundations of sensing involve learning, interpretative and creative capacities of individuals; embedded enterprise processes of scanning, interpreting, and creating; processes relevant to search stakeholders (customers, suppliers, or complementors) in wider business ecosystems and embracing collaboration possibilities; and the evaluation and scenario planning ability of management (Teece, 2007). Seizing comprises practices related to creating and making changes to business models including selecting enterprise boundaries to gain access to complementary resources, managing co-specialization of resources through platforms, ability of overcoming biases and act out corrective strategies and issues of culture and leadership (Teece, 2007). Moreover, transforming consists of decentralization through multidivisional organization form and collaborative management style, managing co-specialization through sourcing and integrating complementary assets and innovation, processes to manage outside-in learning and inside-out knowledge transfer, and development of proper governance mechanisms to allow continuous business renewal (Teece, 2007). Each of the three have open innovation aspects within. Open aspects are observed as technical scouting for external sources and collaboration with extern partners in R&D to deliver customer solution (Teece, 2007). Seizing, open aspects is seen as co-specialization of internal and external sources to reach certain developmental and commercialization goals (Teece, 2007). Besides, in transforming, witnessed open aspects are deemed processes of cross-boundary knowledge flow and deliberately designed co-specialization within and across (Teece, 2007).

Day and Schoemaker (2016) attempt to deconstruct organizational level dynamic capabilities of sensing, seizing, and transforming into more specific components. Six component of dynamic capabilities are demonstrated (Day and Schoemaker, 2016). In sensing, 1) 'peripheral vision' consists of capabilities of scoping and scanning, and 2) 'vigilant learning' is the capability of being vigilant to external signals through ways such as market insight (Day and Schoemaker, 2016). In seizing, 3) 'probe and learn' include capabilities of experiment design to explore new initiatives, trial-and-error learning, as well as tolerance of failure, and 4) 'flexible investing' is the ability to develop real options according to the rate of technological and market environment change (Day and Schoemaker, 2016). In transforming, 5) 'organizational redesign' involves an organization's ability to design organizational structure to accommodate strategic change or explore more radical strategic initiatives through structural separation, and 6) 'external shaping' is the ability to actively shape the company's ecosystem and co-evolve with multiple stakeholders. (Day and Schoemaker, 2016). The two components of transforming are very much open innovation oriented, because they encompass structural separation beyond single business units and co-evolution with external partners respectively (Day and Schoemaker, 2016). Such deconstruction has proved fruitful in bridging the gap between theoretical framing and practical application.

According to Barreto (2010), processes of dynamic capabilities are either directly linked to competitive advantage or, indirectly through alteration of knowledge base or, alteration of operational capabilities, which leads to performance improvement. Alternatively, from a resource perspective, Helfat et al (2007) express this as evolutionary fitness, which

describes the effectiveness of resource manipulation within operating contexts. The next section integrates the three theoretical streams noted above.

3. Integrated theoretical framework

Review of literature shows the fuzzy edges of the three research streams. Accordingly this section starts with the theoretical connection, followed by a demonstrative framework.

3.1 Overlapping edges of the three research streams

According to Randhawa et al's (2016) citation analysis of 321 open innovation articles there is a strong connection between the core of open innovation and research domains, namely 1) absorptive capacity, exploration and exploitation, knowledge-based view and 2) resource-based view and dynamic capabilities. Open innovation strategy formulation and implementation has been reckoned as one major gap for future research (Randhawa et al, 2016). To fill in this gap, organizational ambidexterity as strategy is considered.

Organizational ambidexterity can be realized within and across organizational boundaries (Lavie et al, 2010). In other words, strategic exploration should be considered in addition to exploitation of products and services in the internal innovation process (Vanhaverbeke and Cloudt, 2014). "To generate incremental growth in current business requires a different form of internal organization compared to the case when companies intend to develop completely new businesses in the long-run... open innovation should be explicitly linked to corporate growth strategy" (Vanhaverbeke and Cloudt, 2014, p. 260-261). In this way, open

innovation has been connected to corporate renewal strategy (Vanhaverbeke and Cloudt, 2014).

The question of 'how' to implement strategy is answered by linking to dynamic capabilities. The conceptualization of dynamic capabilities shares a similar turbulent environment as open innovation. Such environmental turbulence is described as commonplace in uncertain environments, such as globalization, dispersed sources of new technologies, and disruptions from a wide variety of sources (Teece and Leih, 2016). Open economy sets the scene for the orchestration of dynamic capabilities (Teece, 2007). "Dynamic capabilities demand both an external (outside the organization) and internal orientation by management" (Teece, 2014, p. 337). Leadership of the firm in a shifting business environment is facilitated by the development of dynamic capabilities that enable the creation, integration, and reconfiguration of resources internally, as well as externally (Teece, 2014).

In discussing the connection between open innovation and other research streams, attention should be paid to effective linkages between organizational ambidexterity and dynamic capabilities. That is, "dynamic capabilities are rooted in both exploitative and explorative activities" (Benner and Tushman, 2003, p. 238). Dynamic capabilities can either make changes to existing capabilities or create new capabilities (Di Stefano et al, 2014). Two seemingly distinct orientations are not necessarily contradictory when referring to organizational ambidexterity literature (Di Stefano et al, 2014; Benner and Tushman, 2003), as research has suggested combining the research streams of organizational ambidexterity and dynamic capabilities.

Birkinshaw et al (2016) integrates the two theoretical perspectives of organizational ambidexterity and dynamic capabilities to tackle critical challenges, when an organization looks to adapt to discontinuous change. They advocate specific dynamic capabilities may vary according to different organizational settings and strategic emphasis on modes of organizational ambidexterity (Birkinshaw et al, 2016). These modes include structural separation, behavioural integration, or sequential alteration (Birkinshaw et al, 2016). The existence of such contingencies should be noted although they miss the opportunity to demonstrate how to choose between modes of ambidexterity. The three modes are potentially complementary rather than isolated or exclusive (O'Reilly III and Tushman, 2013) and they make contributions to theory by including vision, culture and people, and show the multi-level nature of organizational ambidexterity and dynamic capabilities (Birkinshaw et al, 2016). Their findings are symbolically adopted without properly linking to micro-foundations.

In terms of theoretical integration of the research streams, Birkinshaw et al (2016) suggest it may be beneficial to separate the categories of organizational dynamic capabilities (sensing-seizing-transforming) by Teece (2007). Sensing capabilities are associated with exploration while seizing capabilities exploitation (Birkinshaw et al, 2016). They argue that capabilities of sensing and sizing are lower-order operational capabilities; by comparison, reconfiguration is considered higher-order capabilities residing in management in terms of the choice among the three modes of ambidexterity (Birkinshaw et al, 2016). It could be considered bold to suggest such linkage, but such argument might underestimate the strategic power of management in sensing and seizing. Due to excessive attention paid to the interaction between environmental dynamism and modes of ambidexterity, the gap should focus more

on internal formulation of ambidextrous strategy and strategic implementation through dynamic capabilities.

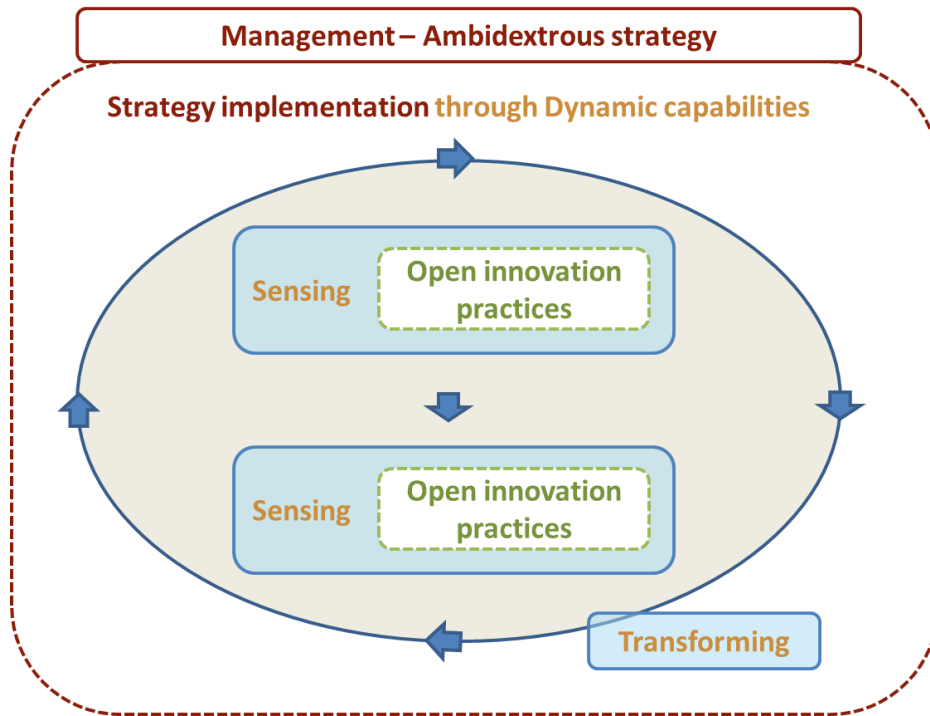
On the exploration side of organization ambidexterity, it is important to promote agility and flexibility into organizations faced with an uncertain environment (Teece et al, 2016). It implies that firms are constantly under the state of transformation (Teece et al, 2016). To understand such transformation, the authors deconstruct mechanisms into meta-processes of dynamic capabilities (Teece et al, 2016). Mechanisms for sensing include “generative sensing, sense-making, use of scenario planning, and the “purchase” of real options” (Teece et al, 2016, p. 21). Ways of seizing encompass “flexible sourcing arrangements, building “slack” into the organization, re-engineering rule-bound hierarchies, and adopting open innovation processes” (Teece et al, 2016, p. 22). Their argument of open innovation generally is that “open innovation can be used to augment internal efforts to drive innovation, quickly and flexibly” (Teece et al, 2016, p. 23). Additionally, in transforming, mechanisms can adopt ‘build-measure-learn’ methodology into the NPD process, understanding of both internal and external partners, leadership and learning, managerial entrepreneurial skills and a practical approach in resolving the efficiency/agility paradox (Teece et al, 2016).

3.2 The theoretical framework

The theoretical framework in Figure 1 integrates theoretical perspectives and linkages. The logic, from strategy to practice, is explained as follows. Organizations strive to balance exploration and exploitation, by means of ambidextrous strategy. Dynamic capabilities are

the processes of translating strategy into practice, which consist of clusters of organizational processes and sub-processes made up of structured open innovation practices.

Figure 1: The theoretical framework



The three organizational dynamic capabilities could be tentatively linked to different strategic orientations of ambidexterity and time horizon. Sensing is associated with exploration that is scanning and searching technology or marketing opportunities in competitive environments (Teece, 2007; O’Reilly III and Tushman, 2008). By comparison, seizing involves the alignment of strategy and ambidextrous activities through managing business model and resource allocation (O’Reilly III and Tushman, 2008). It is about implementation and execution, thus is more inclined toward exploitation (March, 1991).

Moreover we add to previous theory the transforming capabilities to change sensing and seizing capabilities in the short-run. In alignment with literature, transforming is concerned with balancing exploration and exploitation through resource allocation in the long-run, that is, to explore for flexibility and exploit for efficiency (O'Reilly III and Tushman, 2008). All three meta-organizational dynamic capabilities can be open across organizational boundaries, through the adoption of open innovation practices forming specific dynamic capabilities.

Following this argument, a re-definition of open innovation is required. If an open innovation initiative is linked to organizational ambidextrous strategy and open innovation practices and activities are regarded as processes of dynamic capabilities, then the conceptualization of open innovation may be adapted slightly from Chesbrough and Bogers' definition (2014). Accordingly we define open innovation as "distributed innovation processes based on purposively managing creation, development, application, and renewal of capabilities within and across organizational boundaries, in line with organizational strategy and the business model".

4. Theoretical roots

This section considers the origins of theoretical roots of dynamic capabilities and organizational ambidexterity. It examines how the two theoretical streams link with more general theories of economics, organization, and strategic management. Theoretical complementarity is anticipated. Open innovation seen more from a practical rather than theoretical perspective, is discussed.

We begin by referring to theory on the growth of the firm (Penrose, 1959). Thus economic return can originate from both supply and demand (Penrose, 1959). Principles of organizational growth include 1) constant return by finding the optimal scale of exploitation, 2) diversification to alternative markets, and 3) increasing cost incurred to grow (Penrose, 1959). The first principle implies excessive exploitation by expanding scale that may or may not be beneficial due to increased managerial difficulty (Penrose, 1959). The second forms the basic argument for the resource based view (Wernerfelt, 1984), which argues for coupling of resources and products to compete in different markets (Penrose, 1959). The third principle points to the management's difficulty in releasing resource in current operations in order to seize opportunities (Penrose, 1959). The first two rules imply exploitation and exploration respectively as ways to firm growth, while the third rule directly points the paradox of doing both. Such paradox of exploration and exploitation comprise the basic argument of organizational ambidexterity (O'Reilly III and Tushman, 2013).

Expanding on Penrose's rules of firm growth (Penrose, 1959), Wernerfelt (1984) brings together both supply/resource side and demand/product side to view, which demonstrates different resources to varied products (Wernerfelt, 1984). The growth strategy of the firm is described as establishing unique favourable resource positions (Wernerfelt, 1984). The unique resource position needs to have several characteristics to achieve sustained competitive advantage, including value, rareness, inimitability, and non-substitutability (Barney, 1991). To compete by resources, the firm needs to strike "a balance between exploitation of existing resources and the development of new ones" (Wernerfelt, 1984, p. 180). This relates to the firm's ability to explore and exploit, that is, to be ambidextrous

(O'Reilly III and Tushman, 2013). Despite advantages of the resource based view, there is the limiting inward-looking view of the firm with idiosyncratic resources (Lavie, 2006). Dynamic capabilities help to balance out the first limitation by looking to the dynamism of the external environment as well as the firm's response by changing processes of capabilities (Teece, 2007). Another limitation is the underestimation of cooperative interaction due to competitive assumption (Lavie, 2006). Extended RBV framework has been proposed that includes inter-firm resource interaction (Lavie, 2006). Strategic alliance allows preferential access to others' resources and capabilities (Lavie et al, 2010). Open innovation that embraces broader intra- and inter- organizational collaboration mechanisms beyond strategic alliance (Chesbrough and Bogers, 2014) should provide further opportunities in terms of theory development.

To add more dynamism to resource-based stream of research, dynamic capabilities infer development of a neo-Schumpeterian theory of the firm (Teece, 2007). Schumpeter argues the needs for entrepreneurial leaders able to orchestrate new combinations of organizational knowledge (Winter, 2006). Such combinations can be new product, new production process, new markets, new supplies, as well as a new industry competitive landscape (Winter, 2006). Also essential is a balance between dramatic innovation and adaptation to the environment (Winter, 2006). Taking on the evolutionary perspective and considering the nature of capabilities, derives the neo-Schumpeterian theory (Levinthal, 2006). Principles of neo-Schumpeterian theory include blurring the edge of known and unknown knowledge, importance of individual skills and perception in determining closeness of technology departure, as well as the unpredictable returns of outcome of manager's entrepreneurial actions (Winter, 2006). "Enterprises with good dynamic

capabilities will have entrepreneurial management that is strategic in nature and achieves the value-enhancing orchestration of assets inside, between, and amongst enterprises and other institutions within the business ecosystem” (Teece, 2007, p. 1344). Such asset orchestration process can happen beyond company boundaries, which rationales the opening up company boundaries in advance of technology (Chesbrough, 2003). In addition, the new combinations of knowledge can be either incremental or radical (Levinthal, 2006), which provides opportunities for organizations to be ambidextrous.

Evolutionary logic offers a workable approach to the Schumpeterian view (Nelson and Winter, 1982). It is important in recent research into business strategy, implicit or explicit (Levinthal, 2006). Evolutionary economics is based on two assumptions: 1) “the direction of adaptive response is the same as the direction of the change in profit maximization constellations” and 2) “the adaptive processes ultimately converge to the new equilibrium constellation” (Nelson and Winter, 1982, p. 26). It is not only blind evolution but also deliberate goals seeking (Nelson and Winter, 1982). Dynamic competitive enterprises go beyond passively defending to proactively shaping competitive environment by entrepreneurship, innovation, and reconfiguration of capabilities (Teece, 2007).

Evolutionary theory borrows the metaphor from biology to explain organizational selection and selection by environment (Nelson and Winter, 1982). Organizational ambidexterity research is based on the same biological metaphor. Literature of organizational ambidexterity attempts to answer the question, whether organizations are able to change and how to make the change over time, referring to natural processes of variation, selection and adaptation (O’Reilly and Tushman, 2008). Potential solutions can be either external or

internal (O'Reilly and Tushman, 2008), which points to the importance to change and openly innovate.

In summary, Di Stefano et al (2014) review the theoretical perspectives in research into dynamic capabilities and find that the main theoretical root of dynamic capabilities is the resource-based view. Evolutionary economics is suggested as one stream to generate potential theory development (Di Stefano et al, 2014). Ambidexterity perfectly complements the research stream within the dynamic capabilities research, as it originates from a theoretical perspective of evolutionary economics (O'Reilly III et al, 2009). Although no explicit claim is made, open innovation potentially relates to all theoretical perspectives. These emerging open innovation activities provide an organic way of advancing understanding of former theories.

5. Conclusion and contribution

In order to fill the strategy gap of open innovation, this paper shows the theoretical linkages between open innovation, organizational ambidexterity and dynamic capabilities. A comprehensive theoretical framework is developed to illustrate the relationships between the three theoretical streams: organizational ambidexterity as strategy, dynamic capabilities as processes, and strategic implementation of open innovation practices. The origins of the theoretical streams are also demonstrated to provide rationale for such original combinations. This research adds to a rapidly growing body of knowledge in open innovation by resolving the strategy gap of open innovation as well as engaging overlapping theories of open innovation, dynamic capabilities, and organizational ambidexterity.

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