



Exploration and exploitation across three resource classes

Market/customer intelligence, brands/bonds and technologies/processes

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Abstract

Purpose – Long-run corporate success requires engagement in two types of innovative activities: exploitation and exploration. However, earlier research has focused on exploration and exploitation concerning a firm's technologies. The purpose of the present article is to explicitly examine exploration and exploitation related to customers and markets.

Design/methodology/approach – The article is conceptual in nature, based on marketing, strategic management, and organization literatures.

Findings – The article explains the logic of exploration-exploitation with respect to two market-related resource classes – the firm's knowledge of markets and customers (market/customer intelligence) and market actors' knowledge of and bonds to the firm (brands/bonds) – as viewed in combination with the resource class of technologies, processes, and products (technologies/processes). The distinction of these three resource classes enables a three-dimensional conceptualization of the ideal types of a firm's business development projects, which are seen as combinations of exploration and exploitation of resources across the three classes. The article also introduces the notions of multidimensionality of exploration-exploitation within the resource classes and relativity of resource newness.

Originality/value – The article explicates how firms can orient their exploration and exploitation strategies not only on the technology dimension but also on the dimensions of market/customer intelligence and brands/bonds.

Keywords Innovation, Markets, Technology led strategy, Assets, Business development, Strategic marketing

Paper type Conceptual paper

1. Introduction

From the perspective of corporate success in the long run, a central strategic concern for a firm is how much to invest in innovative activities. Research has suggested two broad types of activities pertaining to innovation:

- (1) exploration; and
- (2) exploitation.

The authors thank Kristian Möller for valuable comments on earlier versions of the article.



Since advocated by March (1991), this conceptual distinction has been used in a wide range of management research areas, most notably in strategic management (e.g. Auh and Menguc, 2005; Danneels, 2002; Lavie and Rosenkopf, 2006; Levinthal and March, 1993) and organization theory (e.g. He and Wong, 2004; Mom *et al.*, 2007; Sidhu *et al.*, 2007; Smith and Tushman, 2005)[1]. More recently, also marketing research (Atuahene-Gima, 2005; Judge and Blocker, 2008; Kyriakopoulos and Moorman, 2004; Olsen and Sallis, 2006) as well as innovation and product development research (Dittrich and Duysters, 2007; Faems *et al.*, 2005) have become increasingly interested in the roles of exploration vs. exploitation in firm performance.

In broad terms, exploitation refers to the use, refinement, and extension of a firm's current knowledge, resources, and capabilities, while exploration refers to the firm's search for, discovery of, and experimentation with new alternatives (Atuahene-Gima, 2005; Cheng and Van de Ven, 1996; March, 1991). Although traditional views tend to emphasize that exploration and exploitation activities are of inherently competing or contradictory nature (see Kyriakopoulos and Moorman, 2004; March, 1991), research has increasingly supported the notion that a firm's sustained performance and success essentially calls for finding a balance between the two, i.e. engagement in both exploration and exploitation (Kyriakopoulos and Moorman, 2004; Levinthal and March, 1993; Lewin and Volberda, 1999). Also marketing research has come to advocate this notion recently (Atuahene-Gima, 2005; Kyriakopoulos and Moorman, 2004; Noble *et al.*, 2002).

However, while we subscribe to the general view that a firm's long-term success depends on a careful balance between exploitation and exploration, we find a considerable gap in extant literature's understanding of these basic concepts. The gap is notable particularly from a marketing researcher's point of view. Namely, while the focus in exploration-exploitation literature has been on exploration and exploitation concerning a firm's technological knowledge and resources, exploration and exploitation related to customers and markets have been left with rather little explicit attention (see Danneels, 2002; Sidhu *et al.*, 2007; Smith and Tushman, 2005; Tushman *et al.*, 2002). This is a point where the extant research clearly falls short – and provides us with an opportunity to advance the theory and managerial applications.

Specifically, this conceptual article fills a theoretical gap by explicating how a firm can practice exploration and exploitation not only with respect to its technology and product knowledge and resources but also with respect to its customer and market knowledge and resources. In fact, we identify and explicate the logic of exploration-exploitation with respect to two distinct customer/market dimensions: the firm's knowledge of customers and markets and market actors' knowledge of and bonds to the firm. Adding these to the technology dimension, we come to account for exploration and exploitation concerning three broad resource classes. This paves way, *inter alia*, for a new kind of three dimensional conceptualization of the ideal types of a firm's development projects, which addresses the kinds of innovative combinations that the firm can pursue across the three resource classes. In our opinion, this provides advantage over traditional two-dimensional matrixes.

In general, our arguments are consistent with the general view emerging in marketing research, which considers a firm's relationships to and knowledge about customers and markets as its central strategic resources (Danneels, 2002; Gulati *et al.*,

2000; Srivastava *et al.*, 1998; Srivastava *et al.*, 2001; Wilkinson and Young, 2005), alongside the firm's technological resources. Furthermore, within the exploration-exploitation literature in particular, we build on recent work that has made the point that a firm can pursue both exploration and exploitation not only on technology/product dimension but also on market/customer dimension (Burgers *et al.*, 2008; Danneels, 2002; Sidhu *et al.*, 2007). Our contribution to this literature stems from identifying market/customer intelligence and brands/bonds as resource classes that are distinct from each other, as well as detailing the subclasses of these broad resource classes. To achieve this, we make use of relevant marketing research on the role of market intelligence (e.g. Jaworski and Kohli, 1993; Jaworski *et al.*, 2000; Kohli and Jaworski, 1990; Srivastava *et al.*, 2001), on one hand, and the firm's brands and network relationships, on the other (e.g. Chaudhuri and Holbrook, 2001; Keller, 1993; Morgan and Hunt, 1994; Palmatier *et al.*, 2006; Zeelenberg and Pieters, 2004). Moreover, we derive two entirely new notions concerning exploration and exploitation on the different dimensions: multidimensionality within the resource classes and relativity of resource newness. These notions are aimed to resist over-simplification of the exploration-exploitation issue in the firm context – something that has often plagued the earlier literature.

The article is structured as follows. In the following section, we briefly review the conceptual foundations of the exploration-exploitation discourse, and outline prior research on the dimensions or classes of resources on which a firm can practice exploration and exploitation. In sections 3 and 4, we derive a new, three-dimensional conceptualization of the ideal types of a firm's (business) development projects, with respect to exploration and exploitation. In section 5, we elaborate on the notions of multidimensionality within the resource classes and the relativity of resource newness. Finally, in the concluding section 6 we discuss our contributions to exploration-exploitation and related literatures.

2. Conceptual background: exploration and exploitation

While not intending to provide a complete review of the rather ambivalent and extensive earlier literature on exploration and exploitation (for such a review, see, e.g. Li *et al.*, 2008), in this section we seek to outline the basic assumptions that our research perspective adopts from the earlier literature.

2.1 Basic notions

A wide range of management literature has addressed, implicitly or explicitly, the distinction between the innovative activities of exploration and exploitation. Generally, the literature has conceptualized exploration and exploitation in relation to a firm's existing knowledge, resources, and capabilities. This notion is consistent with the resource-based view of the firm (e.g. Barney, 1991; Penrose, 1959; Wernerfelt, 1984) and – being essentially about organizational adaptation and learning (March, 1991) – with the notion that resources and competences are developed through path dependent learning processes (Ahuja and Katila, 2004; Henderson and Cockburn, 1994). Thus, exploitation concerns the use as well as improvement of the organization's current knowledge, resources, and capabilities, whereas exploration involves search for new knowledge, resources, and capabilities, relative to the current ones (Kyriakopoulos and Moorman, 2004; Levinthal and March, 1993; Lewin and Volberda, 1999; March, 1991).

As Kyriakopoulos and Moorman (2004) note, research traditionally implies that exploration and exploitation are competing strategies or activities. However, research increasingly supports the view that a firm should engage both in exploration and exploitation, at the same time (e.g. Kyriakopoulos and Moorman, 2004; Levinthal and March, 1993; Lewin and Volberda, 1999; Smith and Tushman, 2005). Long-term success depends on the organizational ability to adapt and change through innovation, yet a firm must also continue to perform in the short term (Brown and Eisenhardt, 1997; Tushman and O'Reilly, 1996; Van de Ven *et al.*, 1999). Indeed, a firm must, on one hand, engage in innovation to avoid the detrimental consequences brought about by, e.g. increasing obsolescence of its products, entries of low-cost competitors, and environmental turbulence. But on the other hand: if a firm innovates and explores by ignoring the exploitation of its existing product and other knowledge/resources, it fails to capture the ongoing benefits of historically rooted efficiencies (Smith and Tushman, 2005) and, hence, risks compromising its profitability and survival chances. At the extreme, this has evidently occurred to many of the young research-heavy IT and biotech firms, which never achieved profitability before going bankrupt. And in any case, existing product business provides the slack resources, knowledge, and routines that are needed in launching innovations.

We return to the issue of balancing between exploration and exploitation in the discussion section of this article; however, the main focus of our research is on the nature of the distinct dimensions of exploration and exploitation.

2.2 Background for different dimensions of exploitation and exploration

With respect to our basic assumptions, we focus on exploration and exploitation that occurs at the level of the firm, manifesting in a particular firm's innovation efforts in relation to existing resources and knowledge that it holds at a given moment. This means that exploration in this article refers to the extent of novelty or newness that an innovation or business development project represents to the focal firm, in requiring the firm to build new resources and knowledge for itself (e.g. Danneels, 2002; Greve, 2007; Sitkin *et al.*, 1994). Exploitation refers, in turn, to the use and refinement of existing resources and knowledge that the firm already has.

The linking of exploration to newness-to-the-firm echoes the notion of new-to-firm innovations in product development/innovation literature, but does not necessarily imply (macro-level) newness-to-market or world (Booz, Allen and Hamilton, 1982; Garcia and Calantone, 2002). In other words, we are dealing with newness to a firm, which can sometimes represent newness to an industry or the world as well, but in most cases will not. On the other hand, the linking of exploitation to the use and refinement of the firm's existing resources and knowledge echoes the notion of marketing/technological synergy, as stemming from a firm's ability to use its existing marketing/technological resources in executing a new (product) initiative (Henard and Szymanski, 2001; Kyriakopoulos and Moorman, 2004).

Thus – despite the fact that there are some pieces of prior research that link exploration to (radical or breakthrough) innovations that are new-to-world or new-to-industry (Atuahene-Gima, 2005; Bierly and Daly, 2007; Gilsing and Duysters, 2008; Herrmann *et al.*, 2006; McNamara and Baden-Fuller, 2007; Rothaermel and Deeds, 2004) – in this article we focus on exploration vs exploitation as manifesting in the application of resources that are new vs existing to the firm. This is consistent with the

original notion of exploration-exploitation, stemming from firm-specific organizational adaptation and learning (Levinthal and March, 1993; March, 1991).

For marketing research, our stance is also useful since it can be easily applied to any firm, notwithstanding the firm's size or the absolute volume or quality of its existing resources. Hence, we are not dealing primarily with market-driving firms (cf. Jaworski *et al.*, 2000; Johnson *et al.*, 2003) that pursue and are able to change markets and market structures by introducing novelty relative to existing markets, but rather with any firm that pursues novelty relative to its current resource and knowledge position. For instance, a local barber shop's decision to start selling massage services in addition to hairstyling services would be, in our terms, exploration even if its new massage services are hardly anything new to the world or even to the local market.

A central further issue for the exploration-exploitation perspective is, what kind of relevant resource domains there are, in which a firm can conduct exploitation insofar as it possesses previously built resource stocks, and exploration insofar as it is searching for new resources. As a matter of fact, most of the existing exploration-exploitation research has implicitly assumed that technologies or technical knowledge bases are the (only) relevant resource domains in which exploration and exploitation is practiced. Specifically, the research has referred interchangeably to technological resources, assets, skills, knowledge, capabilities, or competences (Danneels, 2002; Li *et al.*, 2008; Sidhu *et al.*, 2007).

To the extent that prior research has referred to market or customer knowledge or resources, it has mostly considered them as something that is needed for the exploitation of firm's current technologies and products – i.e. their commercialization (e.g. Gilsing and Nooteboom, 2006; Rothaermel and Deeds, 2004). However, recent research has begun to distinguish firm resources related to customers and markets as a resource domain which is highly relevant in its own right, and in which both exploration and exploitation can be conducted. Indeed, research by, e.g. Sidhu *et al.* (2007) and Danneels (2002) suggests that a firm can pursue both exploration and exploitation on both the dimensions: customers as well as technology. Sidhu *et al.* make the general point that organizations can invest – on both dimensions – in search efforts that are to varying degrees explorative (nonlocal) and exploitative (local), relative to the firm's existing knowledge[2]. Danneels, in turn, provides a more detailed view to the types of resources and knowledge that a firm can explore or exploit on the technology and customer dimensions, respectively. Notably, we build our three-dimensional perspective in the following section on the two-dimensional perspective of Danneels – further developing it and overcoming some of its shortcomings by utilizing certain prevalent notions from marketing research.

3. Three broad resource classes as dimensions for exploration-exploitation

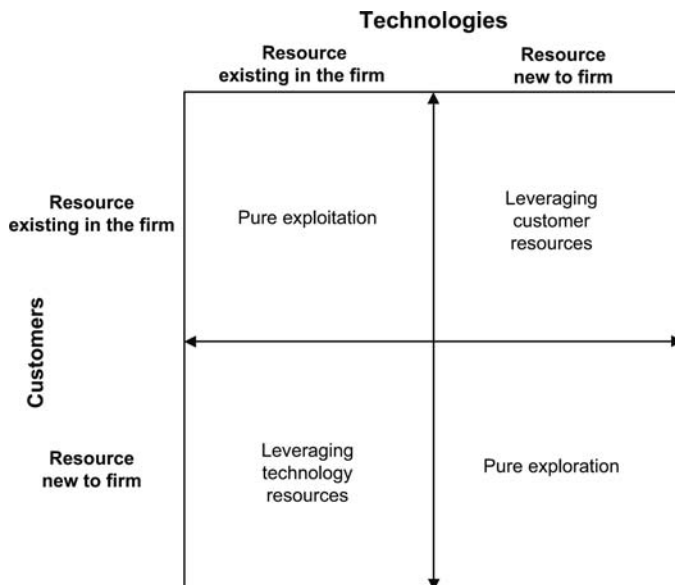
3.1 Existing typologies with customer vs technology dimensions – example project “Vertu”

As stated, in Danneels's view (Danneels, 2002; also adopted by, e.g. Burgers *et al.*, 2008) a firm can practice exploration and exploitation on two dimensions of resources: technology and customers. Danneels assumes that the degree of exploration (vs. exploitation) on a dimension means the degree to which the resources or knowledge[3] required by an innovation project or a new product are new to (vs. existing in) the firm.

In his view, the simultaneous consideration of exploitation and exploration of customer vs. technological knowledge and resources yields the kind of matrix depicted in Figure 1. According to Danneels, the types of innovation indicated in the matrix represent “ideal types” for innovation. The extreme types are “pure exploration” (new resources pursued on both customer and technology dimensions; no existing resources utilized) and “pure exploitation” (only existing resources utilized; no new resources pursued on either customer or technology dimensions). The other two ideal types are “leveraging customer resources” (existing customer resources utilized but new resources pursued on technology dimension) and “leveraging technology resources” (existing technological resources utilized but new resources pursued on customer dimension).

It is worth noting that, in fact, Danneels’s (2002) typology is a matrix quite like Ansoff’s (1957, 1965) well-known growth vector matrix, which outlines a firm’s typical strategic options for achieving growth and expansion. Danneels does present a more refined theoretical basis for his typology – grounded on the resource-based notion of exploration-exploitation. Yet, there seems to be close correspondence between Ansoff’s typology of diversification, market penetration, product development, and market development, and Danneels’s pure exploration, pure exploitation, customer leveraging, and technology leveraging, respectively.

In any case, from marketing research perspective, the way Danneels as well as Ansoff collapse their matrixes is rather constrained, particularly when it comes to the understanding of a firm’s resource stocks concerning customers and markets. Specifically, we show in the following section that an enhanced typology of the ideal types of a firm’s innovative projects can be developed by distinguishing between two classes of market-based resources:



Source: Adapted from Danneels (2002)

Figure 1.
Two-dimensional new
product typology

- (1) a firm's knowledge of customers and markets ("market/customer intelligence"), on one hand; and
- (2) customer and market actors' knowledge of and bonds to the firm ("brands/bonds"), on the other.

We will illustrate our arguments in the following sections with multiple examples about typical contemporary corporate business development projects. Yet, our primary (real-life) firm example concerns a development project by Nokia Corporation, whereby the firm has pursued the introduction of a new luxury mobile phone brand "Vertu" to the world markets, targeted at wealthy, high-end consumers. After the initiation of the project in 1998, the first phones bearing the Vertu name were introduced to the market in 2002. During 2002-2008, the Vertu business has exhibited fairly steady growth: from a few thousands of units sold (yearly) towards several hundreds of thousands units sold; from a few retail outlets in selected cities to hundreds of outlets around the world; and from being non-profitable at first towards becoming a profitable multi-billion business (de Burton, 2008; Heiskanen, 2003; Kauppalehti, 2008; Myllylahti, 2006; Scott, 2007).

Besides the new brand name Vertu – which has not been explicitly associated with the Nokia brand name in marketing communications – other central aspects of the project have included: building new reseller relationships with, e.g. watch and jewellery stores; franchising a Vertu retail store concept; and developing processes and methods for manufacturing mobile phone shells out of valuable metals and gemstones. Notably, Nokia's Vertu project is a prime example of a project which cannot be well analyzed or categorized with the two-dimensional matrix of Danneels (or that of Ansoff), especially when it comes to the customer or market dimension. Specifically, the project has involved creation of an entirely new brand name and new kinds of channel bonds – which implies exploration on Danneels's customer dimension. Yet, Vertu was targeted at a subset of mobile phone users, a market of which Nokia possessed a great amount of knowledge due to decades of operating in the market. This would – contrary to the above – imply exploitation, rather than exploration on Danneels's customer dimension. In other words, having only one, singular customer dimension presents us a problem. Fortunately, the problem can be partly solved by distinguishing the dimension of "brands/bonds" from the dimension of "market/customer intelligence" as follows.

3.2 A firm's knowledge of the market vs. the market's knowledge of and bonds to the firm
Indeed, we contend that a firm's knowledge of customers and markets (market/customer intelligence) is essentially distinct as a class of resources from market actors' knowledge of and bonds to the firm and its brand (brands/bonds). This two-fold classification is supported by marketing research on "market-based assets", as our two classes broadly correspond to the two main classes of market-based assets identified by Srivastava *et al.* (2001):

- (1) intellectual assets; and
- (2) relational assets[4].

Note also that this distinction also allows reclassification of the example resources that Danneels (2002) views to belong to customer resources: "knowledge of customer needs

and processes” mentioned by Danneels falls to market/customer intelligence, while “company reputation”, “distribution and sales channels”, and “communication channels” fall to brands/bonds. For exploration and exploitation, the implication is that a firm can invest in or conduct exploration and exploitation in these two classes of resources rather independently from each other – and combine a certain degree of exploration and exploitation on these dimensions to certain degree of exploration on the dimension of technological knowledge.

3.2.1 The dimension of market/customer intelligence. Specifically, a firm’s knowledge of customers and markets is the very knowledge or resource class to which the broad literature on market orientation often refers (e.g. Jaworski and Kohli, 1993; Kohli and Jaworski, 1990; Narver and Slater, 1990; see also Levitt, 1960). Usual terms are “market knowledge/intelligence” or “customer knowledge/intelligence”. This class of knowledge is also what Sidhu *et al.* (2007) primarily refer to, when discussing how a firm can, when pursuing innovation, invest in search efforts which concern “demand side” knowledge and are to varying degrees explorative and exploitative.

As subclasses of a firm’s customer and market knowledge, market orientation literature has referred to knowledge at different levels. At the most general level, there is the firm’s knowledge of market, environmental, and societal trends. At a more special level, the firm has knowledge of specific market or customer segments, and typical behavior, decision-making processes, needs, and wants of (typical) actors belonging to the segments. The firm will also have knowledge of potential competitors in the segments, as well as substitute and complementary products. At the most specific knowledge level, then, there is the firm’s knowledge of individual customers or other market actors and their (idiosyncratic) behavior, decision-making processes, and special needs/wants, as well as their contact information (proper name, address etc). Concerning customers’ needs and wants, it is worth noting that market orientation literature has emphasized both knowledge of current needs and knowledge of needs that are latent and become, perhaps, manifest in future (Atuahene-Gima, 2005; Day, 1999; Jaworski *et al.*, 2000; Slater and Narver, 1995, 1998). At the same time, the literature has pointed out that the question is not only about knowledge of the needs of the firm’s current customers but also about knowledge of the needs of a wider group of potential customers or customer segments.

There is also (business-to-business) marketing-related literature that further notes that the “customer” may be represented by various individuals such as buyers, users, deciders, influencers, and gatekeepers, and resellers (Anderson and Narus, 2004; Jackson *et al.*, 1984; Kotler and Armstrong, 2005; Webster and Wind, 1972: pp. 78-80), even licensees (Mitchell, 1992). Thus, information of these different players and their behavior and interdependencies represent relevant market knowledge as well. Finally, in an even wider view, knowledge of not only customers but also suppliers and other supply chain actors is relevant market knowledge. This is because marketing research increasingly views the understanding of the links between supply chain relationships and customer relationships as a key aspect of marketing knowledge (Srivastava *et al.*, 1999).

3.2.2 The dimension of brands/bonds. Whereas the above kinds of knowledge resources – market/customer intelligence – are central resources for a firm, they are essentially distinct from another class of market-based assets that firms typically hold. The other class of resources, in which exploration and exploitation may also be practiced, is not about the firm’s knowledge of markets and customers, but rather the

market's and customers' knowledge of the firm as well as bonds to the firm. This class of resources is dealt with most often by relationship marketing and brand management literatures.

Indeed, the notion of customer-based brand equity (Keller, 1993, 2003) holds that markets' and customers' knowledge of a firm's brand(s) is a central resource for the firm. It assumes that people's familiarity with the firm's brand (brand awareness) and the images that they associate to the brand (brand image or associations and brand attitudes) are significant drivers of their behavior towards the firm, e.g. their product purchases. Moreover, market actors' trust in the firm and its brand as the provider of certain kinds of offerings (e.g. Aspara and Tikkanen, 2008; Chaudhuri and Holbrook, 2001; Morgan and Hunt, 1994; Palmatier *et al.*, 2006) is also a significant resource for the firm – as is customer satisfaction (e.g. Anderson *et al.*, 2004; Gustafsson *et al.*, 2005; Olsen and Johnson, 2003).

Together these resources, which primarily reside in market actors' minds rather than inside the firm, will contribute to a resource at a further level, i.e. brand loyalty that the customers or other market actors may have towards the firm (e.g. Chaudhuri and Holbrook, 2001; Jacoby and Kyner, 1973). Brand loyalty is an even more influential emotional-behavioral bond – than mere brand awareness or attitude – and manifests in market actors' psychological commitment to and favorable repeat patronage towards the firm, in the form of, e.g. repeat purchases and positive word-of-mouth. Note, however, that repeat purchases can be an effect of another behavioral bond, too, that does not necessarily involve positive attitude or satisfaction on the behalf of the market actor. Namely, brand inertia is a phenomenon whereby actors repeatedly patronize the firm out of habit or passivity, to save time or effort, or due to lack of alternatives – even if they did not have particularly positive attitude towards the brand (e.g. Bozzo, 2002; Colgate and Lang, 2001; Zeelenberg and Pieters, 2004).

Finally, there are also bonds between market actors and the firm that are not cognitive or emotional but in fact quite concrete – as outlined by relationship marketing literature on the various kinds of bonds (e.g. Arantola, 2002, 2003; Liljander and Strandvik, 1995; Storbacka *et al.*, 1994; Wendelin, 2004). These include bonds such as the actor's ongoing use of a physical product produced by the firm (i.e. “installed base”); an IT or other interaction system linking the actor to the firm; juridical or other contract between the actor and the firm; and even mere geographic proximity of the actor and the firm, or their subsidiaries, offices, inventories, or stores. Often such bonds coexist with the cognitive-emotional bonds within the relationships between market actors and the firm. Besides in the form “simple” customer or other stakeholder relationships, such co-existence may also manifest in the form of more complex structures, such as distribution and communication channels (cf. Danneels, 2002) – or business networks relationships in general.

3.3 The dimension of technology, processes, and products

The two broad classes of customer and market related resources identified above – market/customer intelligence and brands/bonds – will allow us to provide an enhanced, three-dimensional view of the ideal types of innovative projects, when technological resources are considered as well.

As technological resources, we view the firm's knowledge of products, processes, and technologies. The basic assumption in, e.g. Ansoff's (1957, 1965) and Danneels's

(2002) views is that the firm's knowledge related to its current products (or services) is a resource that can be exploited – while knowledge of new products can be alternatively explored. When it comes to the sub-classes of technology resources, research often refers, first of all, to technical knowledge of product components, modules, and architectures (Baldwin and Clark, 2000; Henderson and Clark, 1990). Operations management literature also refers to product “platforms”, such a platform being a combination of subsystems and interfaces serving as common components and/or common architecture for multiple products (Jose and Tollenaere, 2005; Meyer and Lehnerd, 1997). In any case, the knowledge of product (or service) designs is usually codified in the form of physical blueprints and, sometimes, patents – as well as embodied in the firm's physical manufacturing plants and equipment (see, e.g. Moorman and Miner, 1997).

Moreover, beyond the products themselves, the proponents of the resource-based view see technological knowledge to be embedded in organizational/procedural knowledge of production and assembly methods, processes, and routines (Larsson, 2007; Leonard-Barton, 1992; Moorman and Miner, 1997; Teece, 1982). Also this kind of knowledge is often codified in the form of explicit blueprints (Winter and Szulanski, 2001). At the least, the process routines are implicitly or tacitly stored within employee knowledge, skills, values, and norms as well as the firm's technical and management systems (Leonard-Barton, 1992).

In a broad view, the class of technological resources can also contain the knowledge of methods, processes, and routines concerning other value activities than production and assembly. This is consistent with Kyriakopoulos and Moorman's (2004) view that among (marketing) resources that a firm can explore or exploit are procedures related to promotion, pricing, and distribution, for example[5]. Thus, also process routines concerning such value chain activities as sourcing, logistics, selling, servicing, pricing, and financing are relevant technological/process knowledge (e.g. Markides, 2006; Quinn, 1992; Szulanski and Jensen, 2004) – as are processes and methods of mass-customization (e.g. Da Silveira *et al.*, 2001; Kotha, 1995; Pine *et al.*, 1993; Yusuf *et al.*, 1999).

Table I provides a summary of the three main/principal resource classes as well as subclasses of resources in the three classes.

4. Ideal types of innovative projects

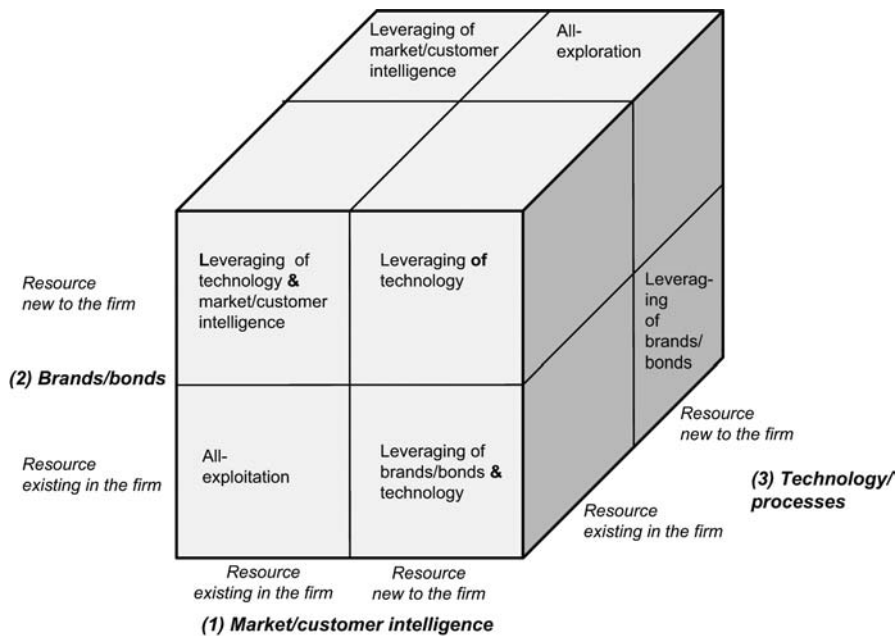
The simultaneous consideration of the three identified broad classes of firm resources leads to a three-dimensional illustration of the ideal types of innovative projects, depicted in Figure 2 as a cube. This typology indicates the ideal types of innovative projects in which a firm can engage, by utilizing its existing resources in some of the classes of resources, while simultaneously creating new resources in some of the resource classes.

4.1 Assumptions

Specifically, the typology represents innovative projects typified by their ex-ante strategic objectives: what kind of innovation a firm may be pursuing with its innovative development projects, through investing in such projects. Note that these strategic project objectives may deviate from what is eventually achieved through the projects as project outcomes, in terms of learning or new resources (such as achieved

Table I.
The main resource
classes for exploration
and exploitation

Principal resource class	Brief description	Subclasses of resources
1. Market/customer intelligence	Firm's knowledge of customers and markets	<p>Knowledge of individual actors (and their behavior, processes, special needs/wants, interrelationships, even contact information)</p> <p>Customers (buyers, users, deciders, influencers, gatekeepers)</p> <p>Resellers, suppliers and other network actors</p> <p>Knowledge of market/customer segments and actor types (their typical behavior, processes, needs/wants, reachability)</p> <p>Knowledge of competitors, substitutes</p> <p>Knowledge of complementary products/services</p> <p>Knowledge of market and societal trends</p> <p>Brand awareness and image among certain actors</p> <p>Brand trust and credibility among certain actors with respect to certain kinds of offerings</p> <p>Certain actors' psychological-behavioral bonds to the firm</p> <p>Brand affect</p> <p>Brand/customer loyalty, repeat patronage</p> <p>Certain actors' concrete bonds to the firm, e.g. actor's using of the firm's physical product or system</p> <p>shared IT system, distribution equipment, or warehouse mutual juridic or other contract;</p> <p>geographical proximity of factories, offices, distribution outlets, or stores of the actor and the firm</p>
2. Brands/bonds	Market and network actors' knowledge of and bonds to the firm	
3. Technology/processes	Firm's knowledge of technology, process routines, and products	<p>Knowledge of product components and platforms (incl. patented ones)</p> <p>Knowledge of product/service offerings (concepts)</p> <p>Knowledge of efficient process methods and routines (blueprints, incl. patented ones)</p> <p>Production, assembly, mass-customization</p> <p>Sourcing, financing</p> <p>Promoting, selling, delivering, servicing</p>



Note: The invisible cell in the left-hand, bottom rear corner of the cube is “Leveraging of market/customer intelligence” & brands/bonds

Figure 2. Three-dimensional view to the ideal types of development projects across three principle resource classes

patents or new products eventually introduced to the market) (He and Wong, 2004; Vanhaverbeke and Peeters, 2005; see also Li *et al.*, 2008).

To further explicate our assumptions, the typology focuses on business development projects destined to expand or grow the firms’ business and/or create new self-sustaining businesses within the firm (Burgers *et al.*, 2008; Thornhill and Amit, 2001). In so doing, the typology addresses new-to-firm ways of (re)combining and leveraging existing and new resources across the three classes (for combinative innovation in general, see, e.g. Ahuja and Lampert, 2001; Ahuja and Katila, 2004; Burgers *et al.*, 2008; Kogut and Zander, 1992)[6]. Consequently, although we do recognize that a firm can and will also simultaneously have projects – call them “mere-research projects” (as opposed to business development projects) – destined for acquisition of resources within one of the three classes, such projects are out of the main scope of the present article. In other words, the typology addresses projects that pursue new-to-firm combinations of resources across the different classes rather than projects that merely pursue new-to-firm resources within one class (see Ahuja and Katila, 2004; Sidhu *et al.*, 2007)[7].

We further assume that a firm can invest in multiple development projects at the same time, different in terms of their type. Since different projects may differ in terms of the degree of exploration and exploitation as well as run at different phases (close to the beginning of development vs close to being self-sustaining businesses, see Burgers *et al.*, 2008), investments in several projects provide a large variety of possibilities at finding a balance between exploration and exploitation at the corporate level.

Moreover, we even assume that a certain project can in itself represent multiple innovation objectives. This means that the project objectives will not be singular but rather involve strategic real options (for discussion of real options in marketing and strategy see, e.g. Haenlein *et al.*, 2006; Johnson *et al.*, 2003; Kogut and Kulatilaka, 2001; McGrath, 1997; McGrath and Nerkar, 2004; Vassolo *et al.*, 2004). That is, a given development project may be initiated due to several desirable outcomes (or outcome combinations) that the project is envisioned to potentially yield – and that may “fall around” different parts of the cube. It may be not until later in the course of the development project – when learning has occurred and some new resources have been achieved as intermediate outcomes – that the project objectives will be determined in a more singular way (to fall to one or two cells of the cube, for example). Due to reduced “fuzziness” at later stages of a project, further investments can then be correspondingly allocated to orient the project towards the refined, final objectives. Alternatively, separate projects, with different objectives, may be spun off from the initial project, or the project may be abandoned altogether.

For instance, when Nokia started its Vertu project, it had rather open-ended vision to “create and define the luxury mobile [phone] market”, with regard to “potential for a high-end mobile handset with qualities . . . that could be likened to those in the Swiss watch industry” (de Burton, 2008). This mission loosely implied an objective to exploit or leverage the existing technology/process knowledge (about mobile handsets) and existing market/customer intelligence (about mobile market), yet did not fix how much new knowledge in these domains should be pursued. Also, it was only later that the project objectives and efforts were refined to involve exploration of an entirely new brand (Vertu) as well as the novel channel relationships and retail concepts (including the establishment of Vertu concept stores and even becoming a virtual telecom operator in some countries).

4.2 Cells of the typology – examples

Going to the cells of the cubical typology, at one extreme the firm just draws on its existing resources and knowledge with respect to all the three resource classes: the firm’s knowledge of customers and markets, market actors’ knowledge of the firm and bonds to its brands, and the firms’ technological and process knowledge. This “all-exploitation” means investing in a project with the objective of introducing relatively minor improvements to the firm’s current technological knowledge, processes, or products; market or customer intelligence; and/or brands or bonds. Such a project does not pursue any significantly new ways of (re)combining and leveraging existing and new resources but the newness rather arises from incremental development within one or more of the resource classes.

At the other extreme, the firm pursues new resources and knowledge in all the resource classes so as to combine them in new ways, too, while not relying on (any) existing resources or knowledge. Although rare or non-existent in a pure form, projects likening this kind of “all-exploration” may occur in new ventures or when an incumbent firm engages in diversification that is completely unrelated to its existing businesses.

The rest of the cells represent ideal types of new ways of (re)combining and leveraging new and existing knowledge or resources, and fall between the two extremes. In practice, real-life firm projects are unlikely to represent any of the ideal types in pure form, which is a point, which we return to in the following section. Nevertheless, in

Table II we provide practical examples of development projects (or, project objectives) that can be considered to liken the various ideal types. Consider “leveraging of market/customer intelligence and brands/bonds”, for example. This ideal type is characterized by project aim to create or expand business by developing new technology, process, and/or product and combining it with the firm’s existing brands and bonds, and customer and market knowledge. As a practical example likening this ideal type, a firm may pursue development and introduction of a product or service that it readily knows its current customers use complementarily with the firm’s current product category (e.g. the introduction of a stain remover pen by a laundry detergent producer; the introduction of a pet insurance service by a pet shop chain). As another practical example, a firm might pursue backward or forward integration in a value chain in which it currently participates, by relying on the familiarity and credibility that people and organizations in its current industry associate with the firm as well as the knowledge that the firm has concerning the value chain in question.

With respect to our real-life firm example, it is interesting to ask which cell of the three-dimensional framework of Figure 2 would Nokia’s Vertu development project fall into. As elaborated in the following section, real development projects are hardly exact representatives of any of the ideal types depicted in Figure 2. Nevertheless, a given development project may in most cases be interpreted to lean towards one of the ideal types. In the case of Nokia’s Vertu, the development project seems to lean towards “leveraging of technology and market/customer intelligence”. Namely, the Vertu project represents relatively heavy pursuit of novel resources in the brands/bonds resource class (with the entirely new sub-brand and new kinds of distribution channel contacts). In the resource classes of market/customer intelligence and technology/processes, in turn, the project has involved more intensive exploitation (relative to exploration). Namely, albeit that the luxurious Vertu were to be targeted towards a special and wealthy, prestige-oriented subsegment of customers, the to-be buyers would still be mobile phone users – of which Nokia had an abundance of exploitable market/customer intelligence due to decades of experience on serving the market. And albeit that Nokia would need to develop some new knowledge to manufacture gemstone and valuable metal components for mobile phone shells, many components and subsystems of Vertu phones would be similar to those of Nokia’s existing phone models – technology/process knowledge that could be effectively exploited.

5. Multidimensionality and relativity of exploration and exploitation

Although we have, above, provided examples of development projects (or, project objectives) that can be considered to liken the various ideal types of innovative development projects, it must be further emphasized that real-life firm projects are unlikely to represent the ideal types in pure form. This point, while complicating the landscape of exploration and exploitation for a firm, becomes clear as two further aspects of exploration-exploitation dynamics are considered. First, real development projects – or certain activities or investments therein – often exploit one subclass of resources within one of the three principal classes while exploring another subclass within the same principal class. Let us refer to this as “multidimensionality of the resource classes”. Second, even with respect to the subclasses of resources, the degree of exploration (pursuing new resources) relative to exploitation (drawing on existing

Table II.
Example development
projects likening the ideal
types

Development phase: objectives (real options) concerning to-be-developed business	Example objectives: expanded business and profits through ...
<p><i>All-exploitation</i> Aim for opportunities to create business With the firm's existing/enhanced technology/process/product knowledge Through the firm's existing/enhanced brands/bonds With the firm's existing/enhanced customer/market intelligence</p>	<p>Introducing an improved version of the firm's existing offering to existing buyers or customer segment Installing an improved selling process targeting the firm's existing customer segments Building improved brand familiarity/credibility among the firm's existing target segments for existing offering</p>
<p><i>Leveraging of market/customer intelligence and brands/bonds</i> Aim for opportunities to create business With to-be-developed new technology/process/product knowledge Through the firm's existing/enhanced brands/bonds With the firm's existing/enhanced customer/market intelligence</p>	<p>Introducing, as a brand extension, a new product/service that is known to be complementary to the firm's existing product/service bought by its existing customers Backward or forward integrating by relying on the firm's existing brand familiarity/credibility within its current industry as well as its knowledge of the value chain Creating a new selling process based on analysis of the firm's existing customer databases and successful prior sales/customer cases Creating a new mass-customization process for selling and delivering customized products to existing customers</p>
<p><i>Leveraging of market/customer intelligence and technologies/processes</i> Aim for opportunities to create business With the firm's existing/enhanced technology/process/product knowledge Through to-be-developed new brands/bonds With the firm's existing/enhanced customer/market intelligence</p>	<p>Introducing a new version of the firm's existing offering and selling it to a new up-scale customer segment Introducing a new targeted subbrand for selling the firm's existing offering to a special new segment of customers Creating a new sales/distribution channel for the firm's existing offering Serving customers in a new geographical market area – customers similar to existing ones with products/services similar to or adapted from existing ones</p>

(continued)

Development phase: objectives (real options) concerning to-be-developed business	Example objectives: expanded business and profits through . . .
<p><i>Leveraging of brands/bonds and technologies/processes</i></p> <p>Aim for opportunities to create business</p> <p>With the firm's existing/enhanced technology/process/product knowledge</p> <p>Through the firm's existing/enhanced brands/bonds</p> <p>With to-be-developed new customer/market intelligence</p>	<p>Persuading the firm's existing customers to adopt new use/purchase situations for the firm's existing products</p> <p>Installing an improved process for screening the most profitable ones of the firm's existing customers by using new type of market/customer intelligence</p> <p>(Cross-)selling the firm's other products to customers that have previously purchased/used another of the firm's products (by identifying such selling opportunities through new customer/market intelligence)</p> <p>Persuading an existing customer or retailer to purchase the firm's existing product/service at its various international locations (by identifying relevant customers and locations through new market/customer intelligence)</p>
<p><i>Leveraging of market/customer intelligence</i></p> <p>Aim for opportunities to create business</p> <p>With to-be-developed new technology/process/product knowledge</p> <p>Through to-be-developed new brands/bonds</p> <p>With the firm's existing/enhanced market/customer intelligence</p>	<p>Backward or forward integration within the firm's existing industry or value chain</p> <p>Creating a new customer acquisition process based on analysis of the firm's existing customer databases and successful prior sales/customer cases</p> <p>Creating a new mass-customization process for selling and delivering customized products to new, demanding customers</p>
<p><i>Leveraging of brands/bonds</i></p> <p>Aim for opportunities to create business</p> <p>With to-be-developed new technology/process/product knowledge</p> <p>Through the firm's existing/enhanced brands/bonds</p> <p>With to-be-developed new customer/market intelligence</p>	<p>Introducing a new product/service offering, as a brand extension, targeted to existing end-customers or end-customer segments, by identifying feasible offerings through new market/customer intelligence</p> <p>Introducing a new product/service offering, to be sold through existing sales/distribution channels, by identifying feasible offerings through new market/customer intelligence</p> <p>Creating a new selling process targeting existing end-customers or end-customer segments, on the basis of new customer/market intelligence</p>

(continued)

Exploration and exploitation across classes

Table II.

Table II.

Development phase: objectives (real options) concerning to-be-developed business	Example objectives: expanded business and profits through ...
<i>Leveraging of technologies/processes</i>	
Aim for opportunities to create business	Persuading new customer segments to adopt the firm's existing product/service offerings by identifying such segments through new market/customer intelligence
Through to-be-developed new brands/bonds	Installing an improved process for screening and targeting the most profitable new individual customers (through new type of market/customer intelligence)
With to-be-developed new customer/market intelligence	Introducing the firm's offering to customers in new geographical regions by identifying feasible regions and customers through new market/customer intelligence
<i>All-exploration</i>	
Aim for opportunities to create business	Introducing new offerings to new kinds of customers in value chains new to the firm
Through to-be-developed new technology/process/product knowledge	Non-related diversification
With to-be-developed new brands/bonds	
With to-be-developed new customer/market intelligence	

resources) is a question of framing and level of abstraction. Let us call this “relativity of resource newness”.

5.1 *Multidimensionality of principal resource classes*

For multidimensionality of the principal resource classes, consider Figure 3. In the figure, we illustrate the multidimensionality of the three principal resource classes by re-emphasizing that each of them – market/customer intelligence, brands/bonds, and technologies/processes – actually comprise multiple subclasses of resources, as indicated by the arrows in the figure. While earlier exploration-exploitation research has remarked that the degree of newness (exploration) within a principal resource class is continuous, rather than dichotomous, and can be indicated by arrows (Danneels, 2002), it has fallen short of explicitly recognizing that each principal resource class will contain multiple subclasses of resources. Accordingly, an enhanced view to exploration-exploitation is achieved if each of the multiple subclasses is warranted its “own” dimension or arrow – instead of reducing or reifying the picture down to merely two or three (principal) dimensions, as is usually done.

Specifically, Figure 3 illustrates the generic case of exploration-exploitation: how a firm’s exploration (or exploitation) in one sub-class of resources tends to be correlated with exploration (or exploitation) in another sub-class of resources, yet not perfectly

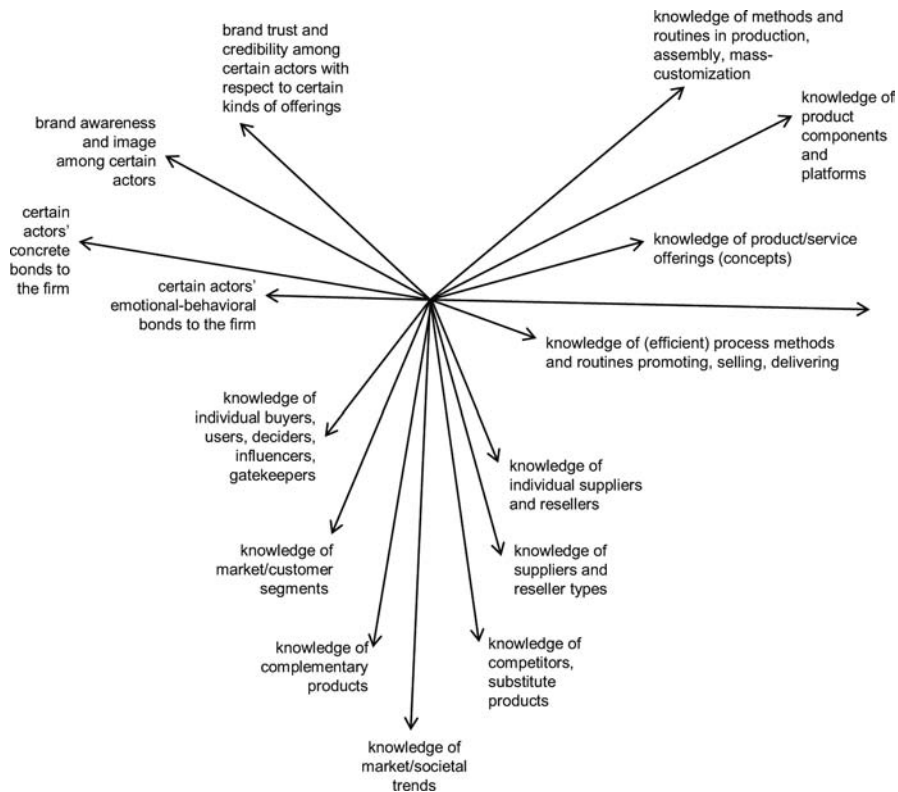


Figure 3. Multidimensionality of exploration (exploitation) within the principal resource classes

correlated. In the projection of the figure, one can distinguish that the multiple arrows or dimensions make up three principal orientations – corresponding to the three principal resources classes of market/customer intelligence, brands/bonds, and technologies/processes. Yet, while each arrow is approximately oriented towards one of the principal dimensions, it is distinct and non-aligned with the other arrows oriented towards the same principal dimension. In precise terms, the pursuit of new resources (or utilization of existing ones) in one sub-class, represented by an arrow, tends to be often accompanied by simultaneous pursuit of new resources (utilization of existing ones) in another, close subclass that has the same principal orientation. However, an important point is that the pursuit of new resources (or utilization of existing ones) in one sub-class is not always nor necessarily accompanied with the pursuit of new resources (utilization of existing ones) in another, close sub-class – not even if the sub-classes belong to the same principal resource class.

The essential, further implication is that exploration in one resource subclass does not exclude exploitation in another, close resource subclass – even if these were part of the same principal resource class. In other words, a firm can explore new resources in one subclass of a principal resource class while exploiting existing resources in another subclass of the same principal resource class. This point has often been blurred in prior research, which has assumed that the degree of exploration vs exploitation in a principal resource class falls on a one-dimensional and bipolar continuum (Burgers *et al.*, 2008; Danneels, 2002) – and hence seemingly positioned that more exploration in a principal resource class automatically means less exploitation in that class (e.g. Danneels, 2002; Sidhu *et al.*, 2007). In contrast, we think that the degree of exploration in a subclass of a principal resource class – pursued in a certain development project – may be somewhat independent of the degree of exploitation pursued in the same development project in another subclass of the same principal resource class.

Take as an example the principal resource class of market/customer intelligence. Consider Nokia's Vertu development project, which we above claimed to lean towards exploitation on the dimension of market/customer intelligence. Indeed, the project has involved plenty of exploitation of Nokia's existing knowledge of markets and customers. Since the very start of the project, Nokia has been exploiting vast existing knowledge of the mobile phone end-user market and different sub-segments therein (e.g. businesspeople, fashion-oriented people, different income classes); its existing knowledge of complementary products (e.g. mobile subscriptions and plans, mobile services, cars, hand-free sets); and its existing knowledge of relevant market and societal trends (e.g. trend towards mobile society; mobile phones becoming fashion-like items).

Nevertheless, while heavily exploiting its plentiful existing knowledge in these subclasses of market/customer intelligence, Nokia has also been exploring plenty of new knowledge in some other subclasses of market/customer intelligence. Especially, new knowledge of reseller and suppliers types (e.g. resellers and retailers of hand-held luxury products; suppliers of gemstones and valuable metal parts) and new knowledge of competitors and substitute products (e.g. watch and other luxury product manufacturers) have been explored. Figure 4 illustrates this, by extracting as its dimensions the mentioned resource subclasses of the principal resource class of market/customer intelligence. In the Figure, the solid arrows represent the degree of

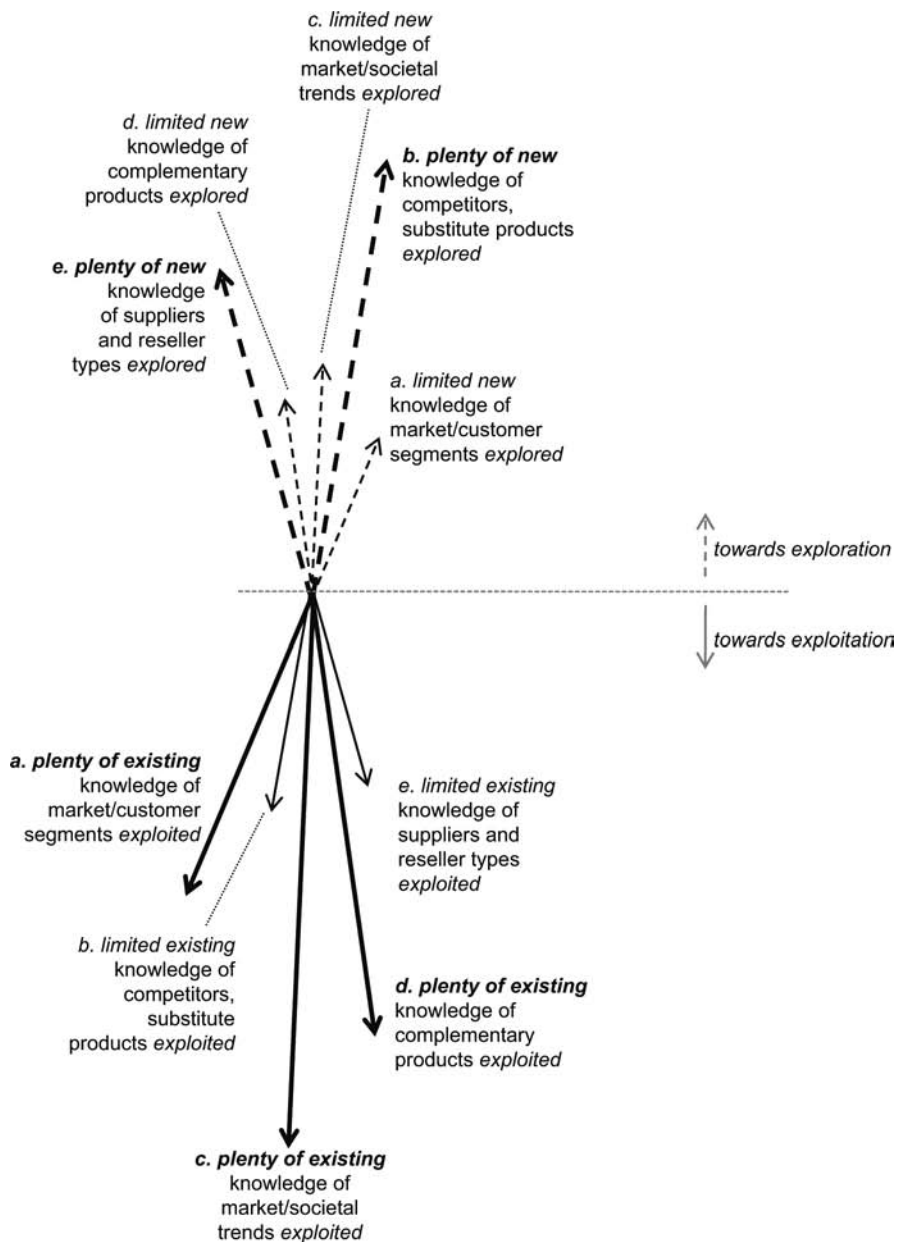


Figure 4. Illustration of multidimensionality within a primary resource class: simultaneous exploitation and exploration with subclasses of “market/customer knowledge” in Vertu development project

exploration that Nokia has pursued in some of the subclasses of market/customer intelligence, while the dashed arrows represent the degree of exploitation.

Figures 5-6 present further examples of common corporate business development projects whereby one subclass of resources in a principal resource class is explored

while another subclass is exploited. The examples depicted in these figures concentrate on within-class exploration-exploitation in the principal resource classes of market/customer intelligence (Figure 5) and brands/bonds (Figure 6), respectively. For the former, consider “identification of complementary (brand extension) products” for example. In such a project, a firm pursues exploration in the resource subclass of “knowledge of complementary products” so as to develop a brand extension product that could be sold to the firm’s existing customer segment, to be used complementarily with the firm’s current products. Yet, while acquiring new information to identify the most feasible complementary brand extension products, the firm most likely also exploits its vast existing knowledge of customers in that segment. Other examples illustrating the multidimensionality of market/customer intelligence in Figure 5 include “new-customer search within target segment” and “benchmarking of individual customer relationships” as well as “strategic search of new suppliers/resellers”, “forecasting trends by lead users”, and “definition of a new segment based on market trends”.

For multidimensionality of the principal resource class of brands/bonds (Figure 6), in turn, the examples range from “showcasing customer solutions as references”, “free product/service trials to hesitant”, and “introduction of delightful user experience to high tech laggards”, through “provision of user opportunities to show off the firm’s brand” to “reseller contracting by utilizing end-user enthusiasm/pull” and “supplier contracting by emphasizing the firm’s large order volumes”.

Due to limited space, we do not provide a similar example figures for the principal resource class of technologies/processes. Yet, it is rather easy to come of with common examples for this principal resource class, as well, whereby one subclass of resources is explored while another subclass is exploited. For instance, in a development project whereby a firm develops a totally new production process (or, selling and delivery process) for its existing product or service, it is exploring a new production (selling and delivery) process, while exploiting its existing product/service offering. An opposite case occurs when a firm develops a new product that can be produced (or sold and delivered) with its existing production (selling and delivery) process and equipment.

5.2 Relativity of resource newness

In the preceding section, we elaborated on the notion that the principal resource classes are actually multidimensional, essentially meaning that development projects – or certain activities or investments therein – can exploit one subclass of resources within one of the three principal classes while exploring another. Yet, our final point is that even this notion is not unambiguous: what one must take into account is that even with respect to a given subclass of resources, the degree to which a firm explores (pursues new resources) vs exploits (draws on existing resources) is, eventually, a question interpretation, framing, and level of abstraction.

Theoretically, this point is echoed in some of the basic works on resource-based view of the firm. Although usually focusing on technological resources, a basic argument of advocates of the resource-based view has been that a firm’s technological resources or competences are to be identified as distinct from and transcending the firm’s physical end products in which they are embodied (Danneels, 2007; Prahalad and Hamel, 1990; Teece, 1982; Wernerfelt, 1984). A further point has been that in the context of a particular firm, its resources can be interpreted at various levels of

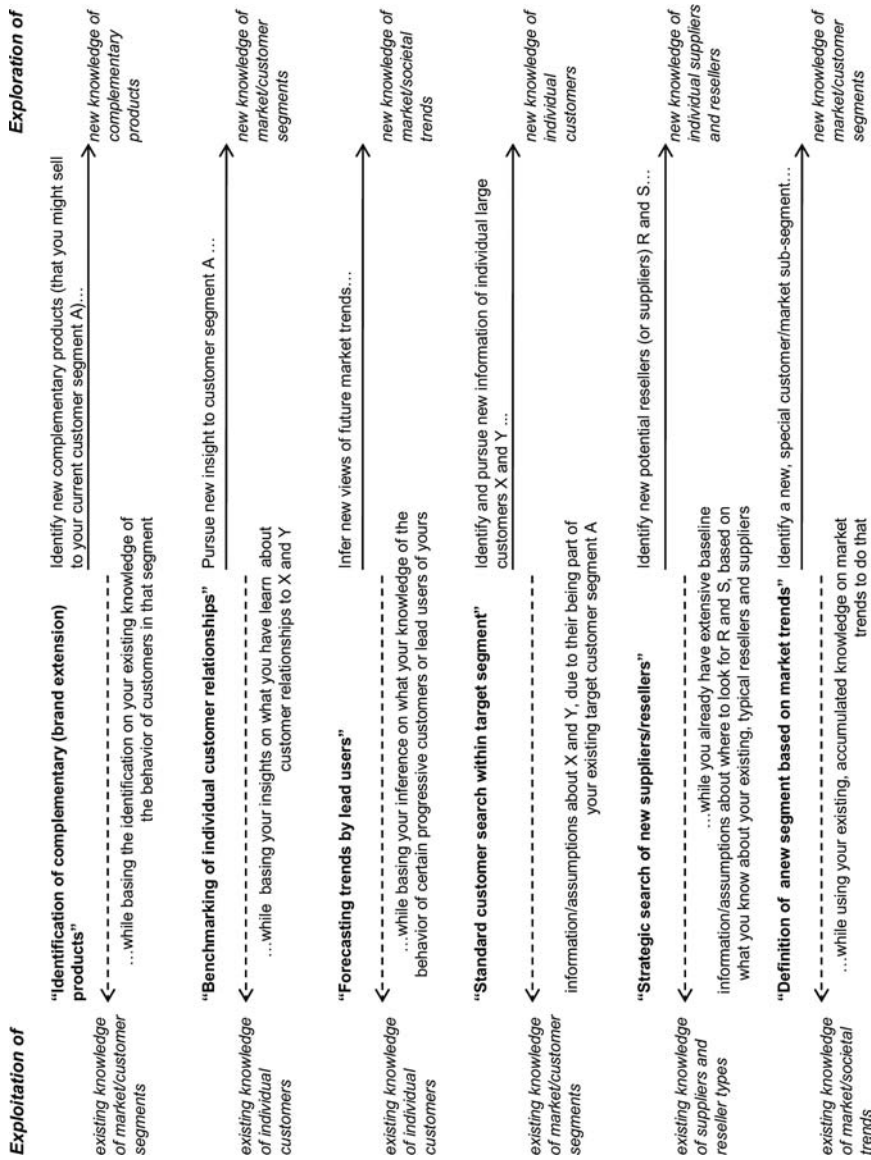


Figure 5. Examples of common development projects whereby one resource subclass of market/customer intelligence is explored while another one is exploited

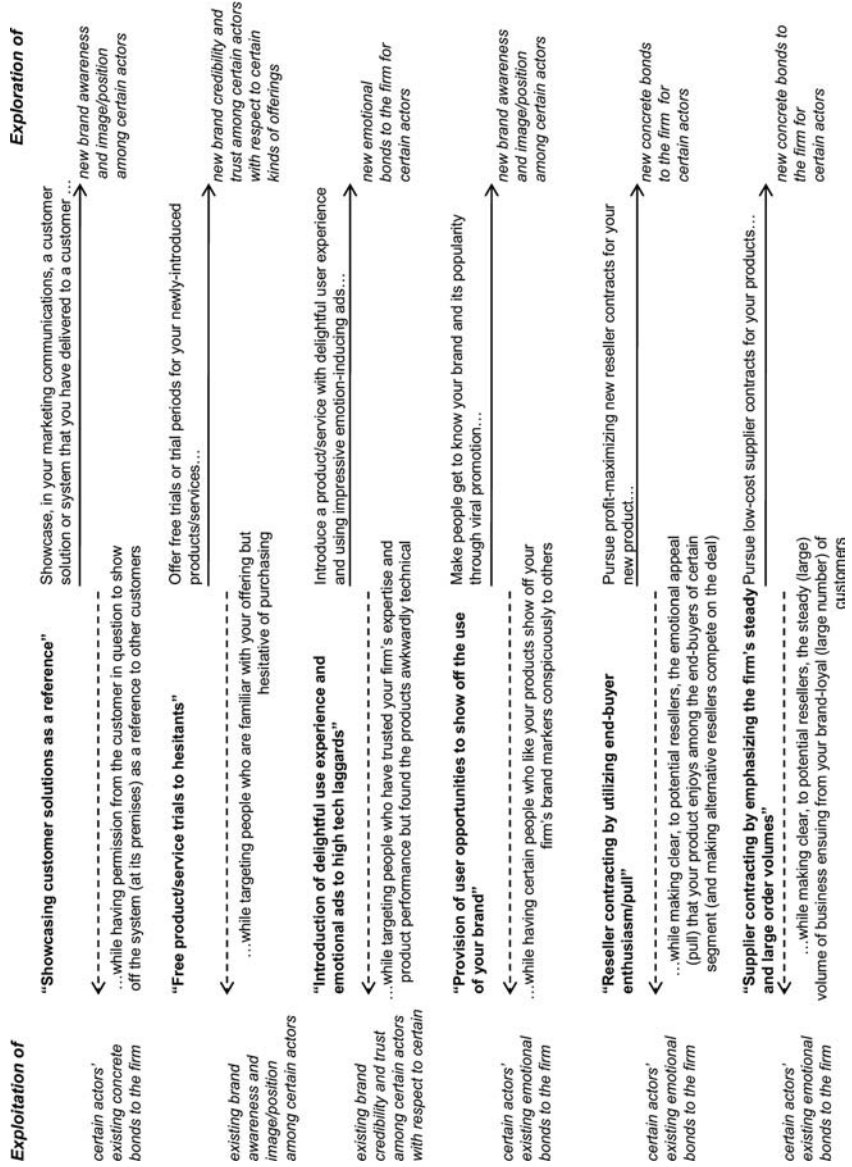


Figure 6.
Examples of common development projects whereby one resource subclass of brands/bonds is explored while another is exploited

abstraction, or generalizability. For instance, Teece (1982) assumed that different applications for firm's existing resources can be found depending on what is conceived to be its "generalizable" resources or capabilities. Hamel and Prahalad (1994), in turn, refer to the need of managers to "abstract away" from, e.g. particular product configurations so as to identify or define the firm's core resources or competences.

Thus, it is an established notion, in the literature on resource-based perspective to firms, that a firm's (existing or to-be-created) resources can be interpreted or framed at different levels of abstraction. For exploration-exploitation, an implication of this notion is that in any given resource subclass, a certain development project may be interpreted as exploration in one sense and exploitation in another sense. Specifically, if framed at a lower level of abstraction, a development project aspect can be considered to pursue (i.e. explore) new kind of resources in a certain resource sub-class, but if framed at a higher level of abstraction, it can be considered to build on (i.e. exploit) existing resources in the same class. For instance, if a company develops a new subbrand so as to bond itself to a new subsegment – like Audi developed the TT brand for enthusiasts of small sport cars – it is exploring a new kind of brand to itself as well as new bonds to a new customer segment. Yet, the firm might also be considered to be exploiting its existing corporate brand and customers' bonds to it, namely the Audi corporate brand and car-buyers' as well as resellers' and suppliers' existing bonds to it.

Similar conclusions – about the relativity of resource newness – can be drawn in the case of Nokia's Vertu project. With respect to "knowledge of market/customer segments", for instance, Nokia's existing knowledge on mobile phone users certainly has represented existing knowledge to be exploited in Vertu project, as the firm has augmented its competence and business to luxury-oriented mobile phone users. In this sense, hence, Nokia has been exploiting existing knowledge of market/customer segments. Yet, one can also consider that the information gathered on prospective luxury mobile phone users has represented quite new kind of segment information to be explored by Nokia – considering that its existing consumer segment information pertained to rather basic consumer and business user segments. In this sense, then, the firm has actually been exploring new knowledge of market/customer segments.

Concerning the relativity of resource newness of brands/bonds in Vertu project, consider the subclasses of "brand awareness and image among certain actors" and "brand trust and credibility among certain actors with respect to certain kinds of offerings", for example. Taking into account that a central aspect of the project has been the creation of an entirely new brand name Vertu, Nokia has certainly engaged in exploration: creating entirely new brand awareness and image for the Vertu brand among market actors, as well as new kind of trust and credibility as a provider of luxurious mobile phones. In this sense, hence, Nokia has been exploring new resources in the resource subclasses in question. However, most consumers and distribution channel partners have actually – all the way since the introduction of the Vertu brand – been aware of the fact that it is the Nokia Corporation that is "behind" the Vertu brand, acting as its "shadow endorser" (Aaker and Joachimsthaler, 2000). This has enabled Nokia, to some extent, to utilize its existing corporate brand awareness and credibility as a mobile phone supplier so as to back up the Vertu brand. In this sense, thus, Nokia has been actually exploiting existing resources in the subclasses of brand awareness and image and brand trust and credibility.

As another example regarding “brands/bonds”, consider “certain actors’ psychological bonds to the firm”. Here, the watch and jewellery store resellers and franchisee entrepreneurs that Nokia-Vertu has contracted have been new kinds of actors to which Nokia has explored commitment bonds. Indeed, the bonds to these actors have been new kinds of bonds for Nokia, considering that actors, which had previously committed themselves to the firm had been quite different in kind: consumers, business users, telecom operators, and electronics stores. Yet, if considering that actually most of the “new actors” were already somewhat familiar with Nokia Corporation as a firm – due to its reputation as a world-class, highly successful company – and viewed it, with goodwill, as a desirable business partner, Nokia was actually exploiting those actors’ existing psychological bonding to the firm when pursuing partnerships with them.

Finally, as an example of relativity of resource newness concerning technologies/processes, consider the subclass of “knowledge of product components and platforms”. Clearly, since in the luxury Vertu phones, many components and subsystems have been quite similar to Nokia’s existing phone models, Nokia has been able to effectively exploit its existing (knowledge of) a variety of mobile phone components and its existing (knowledge of) mobile phone platforms. In this sense, the firm has been exploiting its existing knowledge of product components and platforms. Yet, Nokia has also had to develop quite new knowledge of how to use gemstones and valuable metal components in mobile phone shells – considering that its earlier knowledge had pertained to the use of basic materials such as plastic, steel, and aluminum. In this sense, Nokia has, thus, been exploring new knowledge of product components and platforms.

Full analysis of the relativity of resource newness in Nokia’s Vertu case is available from the authors.

6. Discussion and conclusion

While management research in general and marketing research in particular (e.g. Atuahene-Gima, 2005; Judge and Blocker, 2008; Kyriakopoulos and Moorman, 2004; Olsen and Sallis, 2006) have increasingly addressed the role of exploration and exploitation in firm performance, the understanding of dimensions on which a firm can conduct exploration and exploitation have been rather constrained. Notably, whereas earlier research has mostly dealt with exploration and exploitation concerning a firm’s technological resources and knowledge, our research adds to the emerging research that pays explicit attention to exploration related to customers and markets, as well (Burgers *et al.*, 2008; Danneels, 2002; Sidhu *et al.*, 2007; Smith and Tushman, 2005).

Specifically, the contribution of our research is to explicate the logic of exploration-exploitation with respect to two distinct customer/market dimensions: the firm’s knowledge of customers and markets and market actors’ knowledge of and bonds towards the firm, alongside with the dimension of technology, products, and processes. This classification allowed us to present a new kind of three-dimensional conceptualization of the ideal types of a firm’s development projects, which provides an enhanced perspective to the possible combinations of exploration and exploitation across resource classes over the earlier two-dimensional matrixes (Ansoff, 1957, 1965; Danneels, 2002). Notably, the identification of market/customer intelligence and brands/bonds, respectively, as distinct resource classes in which a firm can practice

exploration and exploitation also echoes the general marketing research notion that views a firm's knowledge about customers and markets and relationships to them as central strategic resources or market-based assets for the firm (Srivastava *et al.*, 1998; Srivastava *et al.*, 2001; Wilkinson and Young, 2005). Moreover, especially our explication of a firm's brands and relational bonds as a distinct resource class answers for Li *et al.*'s (2008) recent call for studies of exploration and exploitation that would pertain to firms' relational network ties.

An additional contribution of our research is to resist over-simplification of the exploration-exploitation issue by elaborating on the notions of multidimensionality within the resource classes and relativity of resource newness. By explicating the issue of multidimensionality of the three principal resource classes, our research recognizes that a firm's development project can exploit existing resources in one resource subclass of one of the three principal resource classes while – somewhat independently – exploring new resources in another subclass of the same principal class. This is a significant revision to the assumptions of prior research, which has tended to view the degree of exploration vs. exploitation in a principal resource class to fall on a one-dimensional and bipolar continuum (e.g. Burgers *et al.*, 2008; Danneels, 2002). In other words, unlike prior research, our research emphasizes that more exploration in a resource class does not necessarily mean less exploitation in that class, or exclude it.

Moreover, by identifying the issue of relativity of resource newness, we recognize that the degree of exploration vs exploitation in any subclass of resources is a question of how the resource class is framed and at what level of abstraction. Namely, if a resource class is framed at a lower level of abstraction, a certain development project can be considered to represent exploration – i.e. pursue the first resources of that kind for the firm – but if the same resource class is framed at a higher level of abstraction, the project might be considered to just be building on and/or adding to existing resources in the same class. This point essentially introduces the notion that resources can be interpreted at different levels of abstraction (e.g. Hamel and Prahalad, 1994; Prahalad and Hamel, 1990; Teece, 1982; Wernerfelt, 1984) to the exploration-exploitation context.

In any case, our research has also implications to two broader theoretical issues pertaining to exploration and exploitation. One implication is addressed to the literature that examines how to find a balance between exploration and exploitation, so as to ensure the firm's sustained performance and long-term success (Kyriakopoulos and Moorman, 2004; Levinthal and March, 1993; Lewin and Volberda, 1999; Smith and Tushman, 2005; Tushman and Smith, 2002; Tushman *et al.*, 2002). By projecting a more versatile view, than prior research, to how a firm may practice exploration and exploitation in its development projects, our research provides new opportunities to consider how to find a balance between exploration and exploitation at the level of the corporation. For instance, a firm may simultaneously invest in multiple development projects, varying in terms of the degree to which they aim at exploitative and explorative outcomes with respect to the three principal resources classes and their subclasses. Moreover, we noted that a single development project may be associated, especially at its early, fuzzy stages (see Griffin, 1997; Koen *et al.*, 2001; Reid and de Brentani, 2004), to various outcome (real) options, in terms of exploration and exploitation.

All in all, our multi-dimensional perspective to exploration and exploitation – as well as the notion that many development project aspects may, depending on framing,

be viewed as explorative in one sense, yet as exploitative in another sense – downplay the notion often emphasized in earlier research, that exploration and exploitation are highly difficult to pursue simultaneously. In our view, most development projects inherently involve both exploration and exploitation in certain resource classes, and in certain senses. Moreover, these “hybrid” business development projects of ours are only to add to the extreme levers of balancing between exploration and exploitation: the running of current, self-sustaining businesses, characterized by pure exploitation (or even inertia), at one extreme, and mere-research projects within certain resource classes, characterized by pure exploration, at the other.

A final implication of our research addresses the firm’s higher-order capability of continually developing its business. Note the “resources” which this article refers to are rather static – or inert – aspects and properties of a company’s business. Of course, within certain limits the workings of these static elements – or, the (first-order) capabilities embodied in them, as well as the related organizational inertia (Hannan and Freeman, 1984) – keep the firm’s business up and running, and perhaps even growing moderately if conditions are favorable. Yet in our view, it is the development projects of creating new resources in the resource classes and combining them with existing ones that are the main drivers of more significant firm renewal and adaptation to more radical environmental changes. This makes the firm’s ability to optimally configure and manage such development projects a highly valuable capability – in fact, a dynamic capability (e.g. Eisenhardt and Martin, 2000; Teece *et al.*, 1997; Wang and Ahmed, 2007) or second-order capability/competence (e.g. Collis, 1994; Danneels, 2002, 2007; Rosenkopf and Nerkar, 2001; see also Day, 1994).

The main contribution of our research to this literature is to imply that an important (second-order) dynamic capability is the firm’s capability to manage business development projects that pursue and hold the (real) options to achieve new kinds of combinations of existing and new resources across the three principal resource classes of market/customer intelligence, brands/bonds, and technology/processes. Also, the concrete examples of development projects that we provide help researchers and managers better recognize the variety and scope of opportune development projects in terms of exploration and exploitation. Such concrete examples are particularly helpful because prior research on dynamic capabilities has remained rather abstract (see Schreyogg and Kliesch-Eberl, 2007). Our typologies and concrete examples can, hence, be valuable “lenses” through which a firm can continually try to identify opportunities and options involved in its current and prospective development projects, so as to maintain optimal market-focused strategic flexibility (Johnson *et al.*, 2003).

Notes

1. See also applications in managerial economics (e.g. Ghemawat and Costa, 1993; Politis, 2005), industry evolution (e.g. Greve, 2007), entrepreneurship (e.g. Bierly and Daly, 2007; Kang and Uhlenbruck, 2006; Politis, 2005), international business (e.g. Ahuja and Katila, 2004; Barkema and Drogendijk, 2007; Cesaroni *et al.*, 2005), operations management (e.g. Jayanthi and Sinha, 1998; Menor *et al.*, 2002), and technology management (e.g. Geiger and Makri, 2006; Gilsing and Duysters, 2008).
2. Sidhu *et al.* refer to the customer dimension and the technology dimension as the “demand side” and the “supply side”, respectively.

3. Danneels refers to these resources and knowledge interchangeably with the term “competences”.
4. Note, however, that we classify some of the (firm-internal) “process capabilities” and “selling knowhow” that Srivastava *et al.* (2001) classify as intellectual assets, to the class of technological/process knowledge. Some others of Srivastava *et al.*’s assets (e.g. new product introduction know-how), in turn, we consider as higher-order capabilities, which we will discuss in Discussion section. Thus, our class of market/customer intelligence corresponds mostly what Srivastava *et al.* (2001) refer to as “many classes and types of knowledge about the external environment”.
5. Note that some of the other resources identified by Kyriakopoulos and Moorman (2004) fall better to the class of market/customer intelligence in our classification. These include the firm’s “[thinking/knowledge with respect to] targeting and segmentation” and “[thinking/knowledge with respect to] product positioning and differentiation”.
6. Note again that our perspective addresses new-to-firm ways of combining resources and knowledge – ways that are not necessarily novel (Schumpeterian combinations) to market, industry, or society as a whole (see Abernathy and Clark, 1985; Fleming, 2001; Hargadon and Douglas, 2001; Henderson and Clark, 1990; Utterback, 1994).
7. Of course, the firm can invest in the latter type of (mere-research) projects both as stand-alone projects and as integral sub-projects of the former type of (development) projects. Moreover, projects pursuing new-to-firm resources within one of the resource classes may also do it by recombining and leveraging existing resources in that resource class.

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