Complementarity versus substitutability of dynamic and operational capabilities in B2B firms: a configurational approach

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Abstract

Despite extensive research into dynamic and operational capabilities, understanding of their interplay is still scant. Both complementary and substitutive roles have been proposed in prior conceptual studies, but only limited systematic empirical investigations into the mutual interdependence of these capabilities have been conducted. Drawing on a sample of 219 Hungarian B2B firms, this study incorporates prior literature on dynamic and operational capabilities and employs a set-theoretical approach to examine whether the capabilities complement or substitute each other in producing high levels of business performance. While evidence for both types of interdependency is provided, our findings generally support the view that dynamic and operational capabilities are complementary rather than substitutive. The two types of capabilities also explain business performance better jointly than in isolation. Several effective capability configurations, associated with high business performance, are identified. The findings paint a detailed picture of the complex interplay between dynamic and operational capabilities, thereby contributing to academic and managerial audiences alike.

Keywords: Dynamic capabilities; Operational capabilities; Complement; Substitute; Business performance

1. Introduction

The capability-based theory asserts that distinctive organizational capabilities are an important source of performance differentials between firms (Karna, Richter & Riesenkampff, 2016; Theoharakis et al., 2009; Weerawardena & Mavondo, 2011; Felin et al., 2012; Peteraf, 1993). The capabilities that constitute distinct market positions include operational capabilities (which enable firms to "make a living") and dynamic capabilities (which help in building and reconfiguring "internal and external competences to address rapidly changing environments") (Teece, Pisano, & Shuen, 1997: 516; Winter, 2003). Due to rapid changes in industrial markets – such as frequent introduction of new technologies, rapidly changing customer needs, and constantly increasing level of competition – understanding and deploying operational and dynamic capabilities is of crucial managerial importance (Karna et al. 2016; Teece, 2007).

When it comes to the interplay of operational and dynamic capabilities, extant conceptual studies propose several ways the two might be connected. The more classical (stronger) view outlines a hierarchy between the capabilities and emphasizes the distinctiveness and independence of dynamic capabilities (Teece et al., 1997; Collis, 1994). In line with this view, Winter (2003) poses that dynamic capabilities may not only extend or modify, but also create operational capabilities, whereas Teece (2014) goes even further and contends that firms do not even need to possess operational capabilities as long as they can access them. In contrast, the more moderate view rejects the superiority of dynamic capabilities as it conceives operational and dynamic capabilities as mutually reinforcing (i.e., the latter enhancing the former), so that together they explain performance better than either of them in isolation (Ambrosini et al., 2009; Cassiman & Veugelers 2006; Freeman, 1991; Rigby & Zook, 2002; Rothwell et al., 1974). The latter view is in line with the ambidexterity literature, which argues that firms need to both 'exploit' the existing lines of activities and 'explore' new ones (Tushman & O'Reilly, 1996) and stresses the importance of keeping both of these abilities within the same organization (Gibson & Birkinshaw, 2004). However, between the main viewpoints, a consensus is yet to be reached.

The current empirical body of research on operational and dynamic capabilities offers valuable insights about their (potentially) hierarchical nature and their performance implications is reasonably well developed. Drnevich and Kriauciunas (2011) and Karna et al. (2016), for example, find that both operational and dynamic capabilities – considered separately – positively affect business performance. Teece (2014), in turn, shows how operational and dynamic capabilities relate to other business functions and operations and thus, indirectly, performance. The existing research thus implies how operational and dynamic capabilities might lead to high business performance in industrial markets (e.g., Camisón & Villar-López, 2011; Gebauer 2011; Tzokas et al. 2015).

What we do not know much about, however, are holistic, system-level effects of capability configurations (Woodside, 2013), which prior studies have largely neglected (Smirnova et al., 2011). Whether dynamic and operational capabilities are complementary or substitutable appears as a particularly prominent question, given different view in prior literature (e.g. Cassiman & Veugelers, 2006; Teece, 2007). In this regard, Karna et al.'s

(2016) recent meta-analysis provides an important contribution to the discourse as it supports the more moderate view by finding evidence of a potential complementary relationship between operational and dynamic capabilities. Such finding calls for a configuration approach, which is something Wilden et al.'s (2016) study also suggests. Nonetheless, prior empirical knowledge about the ambiguous nature of relationships across operational and dynamic capabilities is scant (Helfat & Winter, 2011) and we know little about how firms should configure their operational and dynamic capabilities – both within and across capabilities – to perform well in specific internal firm characteristics and varying levels of environmental dynamism (see Kor & Mesko, 2013).

The present study addresses this research gap by studying firms that operate in business-to-business markets where nurturing customer relationships is deemed particularly important (La Rocca & Snehota, 2014) and effective product/service development can complement it by serving as a guarantee in mutual understanding and benefits in customer relationships but also as a source of market knowledge and effective process configuration (Hitt & Borza, 2000; Jacob, 2006; Ma et al., 2009; Smirnova et al., 2011; Tzokas et al. 2015; Wilden, Akaka, Karpen & Hohberger, 2017; Heirati, O'Cass, Schoefer, & Siahtiri, 2016). Moreover, in an attempt to maximize complementarities across operational and dynamic capabilities (Teece, 2012), capitalizing effectively on the above manifestations of operational capabilities calls for dynamic capabilities, such as a good ability to sense the wider market (Narver & Slater, 1990; Morgan, Vorhies & Mason, 2009), an ability to seize the opportunities identified in industrial markets (Atuahene-Gima, 2005; Yalcinkaya, Calantone, & Griffith, 2007) and a potential to find new ways of serving industrial customers by reconfiguring the organization's capability constellations. Such dynamic exchange systems (i.e. configurations) that successfully integrate various types of resources and capabilities (Rihoux & Ragin, 2009; Wilden et al., 2016) are in the focus of this study. Configurations are here defined as sets of attributes that collectively represent an integrated constellation of different types of capabilities and the business context (Meyer et al. 1993; Wilden et al. 2016).

Specifically, our study makes four contributions to the capability-based literature. First, it provides empirical examination on how operational and dynamic capabilities, considered separately, combine to produce high (or low) business performance. Second, this study investigates whether dynamic capabilities serve both unique and/or complementary roles in boosting operational capabilities leading to high performance. Third, this study explores and empirically tests the complex interplay between operational and dynamic capabilities, emphasis being on whether the two complement or substitute each other (cf. Misangyi & Acharia, 2014). Fourth, this study brings in key determinants of business context and investigates under which contingencies a specific capability configuration is associated with high (or low) business performance.

2. Theoretical background and propositions

2.1. Organizational capabilities – operational and dynamic

Organizational capabilities refer to “socially complex routines that determine the efficiency with which firms physically transform inputs into outputs” (Collis, 1994: 145). This definition contains two implicit elements: (1) capabilities are embedded in firm routines, and these routines are a product of the organization as an entire system, and (2) capabilities guide the transformation of physical input into output inside the ‘black box’ of the firm (Collis, 1994). Stronger organizational capabilities (and combinations of these capabilities) allow firms to improve the performance of their activities more effectively, for example, and to develop high quality products and manage customer relationships efficiently (Collis, 1994). While recent literature has proposed several different categorizations and classifications for capabilities (see Hine, Parker, Pregeljy & Verreynne, 2013; Wilden et al., 2016), there is a general consensus that they can be classified into operational capabilities and dynamic capabilities (Karna et al., 2016).

Operational capabilities are defined as those that enable firms to “make a living” on a continuous basis (Winter, 2003), embodied in routines that support customer value creation or process optimizing activities leading to cost reductions. Such capabilities contribute to performance gains in a firm’s existing line of business (Karna et al., 2016; Winter, 2003). However, firms also need dynamic capabilities, which embody their “ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece et al., 1997: 516). That is, dynamic capabilities support a firm in identifying need for change (Teece, 2007) and building the capacity to compete in existing and new markets (Chandler, 1990). Critically, through overlapping tasks of sensing, seizing and reconfiguration (Wilden et al., 2013), they help renew firms’ operational capabilities over time (Collis, 1994).

2.2. Operational capabilities and business performance

Two key tasks apply to any industrial firm: develop new products/services so that a firm’s offering remains relevant and valued and nurturing existing customer relationships (e.g. Nath, Nachiappan, & Ramanathan, 2010; O'Cass & Ngo 2012). These help exploit firms’ investments in research and development and customer relationship management and the related capabilities – in line with Day (1994, 2011), Vorhies and Morgan (2005) and Karna et al. (2016) – are here considered as key operational capabilities for industrial firms.

First, customer-linking capability reflects a firm’s ability to initiate, develop and maintain its relationships with customers and business partners (Tzokas et al., 2005). Since retaining customer is often less costly than attracting new ones (e.g. Anderson & Sullivan, 1993), financial gains related to high retention rate are likely. Customer-linking capability is considered particularly valuable for industrial firms, since individual customers can form a large percentage of a firm's revenue (e.g., La Rocca & Snehota, 2014) and the positive association between customer-linking capability and a firm's performance has been found in previous studies (e.g. Theoharakis et al., 2009; Tzokas et al., 2015).

Second, product development capability manifests in a set of activities through which members of a firm diversify, adapt, and even reinvent their organization to match evolving market and technical conditions (Brown & Eisenhardt, 1995). Since satisfying customers' needs is inherent to securing strong product development capability, it makes the capability critical success factor for firms in industrial markets as it is consequently less likely to lose its client base due to introducing products and services customers do not like (Clark & Fujimoto, 1991).

Despite absence of systematic, empirical testing of the complex interplay of the two capabilities, it is easy to see potential complementarities between them. Customer-linking capability extends customer focus and insights to the new product/service development process (Tzokas et al., 2005); a firm that is good at developing and maintaining relationships with its customers is in a good position to satisfy their needs through successful new product/service development, too. Likewise, strong product/service development capability helps initiate and maintain customer relationships and can thus help initiate a "virtuous cycle", which often results in high business performance (Fuchs & Schreier, 2011; Ogawa & Piller, 2006). To these ends, it seems clear why an industrial firm would embrace a balanced attention to customer relationships and product/service development by investing in these two seemingly distinct – but inextricably linked – capabilities (Baker & Sinkula, 1999; Clark & Fujimoto, 1991; La Rocca & Snehota, 2014; Morgan, Vorhies, & Mason, 2009; Tzokas et al.

2015). At the same time, a plausible counter-argument can be made: firms may not have sufficient resources to be good at everything so that they may need to focus and choose between "customer intimacy" and "product leadership" (Treacy & Wiersema, 1993), for example. Thus, we propose that:

P1a: Operational capabilities (i.e. customer-linking capability and product development capability) complement each other for high business performance.

P1b: Operational capabilities (i.e. customer-linking capability and product development capability) can also substitute each other for high business performance.

2.3. Dynamic capabilities and business performance

Dynamic capabilities help firms modify operational capabilities and other dynamic capabilities and, in doing so, affect business performance indirectly (e.g. Helfat et al., 2007; Teece, 2007). Following a widely accepted logic, dynamic capabilities involve (1) activities of searching for and exploring information, and learning about the external environment (sensing) (Augier & Teece, 2009), (2) procedures concerning "the [systematic] evaluation of existing and emerging capabilities" (seizing) (Wilden et al., 2013, p. 74), and (3) activities that encompass the recombination of bundles of resources and capabilities to maximize complementarities between these assets in a specific organizational environment (reconfiguration) (Teece, 2012; Wilden & Gudergan, 2015).

The present study considers three dynamic capabilities – market orientation, learning orientation, and innovativeness – each of them important for firms operating in business markets (Cho & Pucik, 2005; Hult & Ketchen, 2001; Yiu & Lau, 2008; Worren, Moore, & Cardona, 2002), and each potentially complementing one another. First, to match evolving customer needs and to react rapidly to technological changes, industrial firms need a sensing capability that supports scanning, searching and exploring the environment for existing and emerging opportunities (Teece, 2007). Market orientation, manifested in levels of customer orientation, competitor orientation and inter-functional coordination (Narver & Slater, 1990), is considered to serve as such capability (e.g. Foley & Fahy, 2009; Menguc & Auh, 2006; Morgan et al., 2009) that is particularly helpful in market-driven customer value creation as it helps firms to source, track, store and disseminate market information for greater awareness of business opportunities (Day & van den Bulte, 2002).

However, second, in order to *seize* the opportunities identified by market orientation, firms need learning orientation, or a firm-specific culture that gives "rise to that set of organizational values that influence the propensity of the firm to create and use knowledge" (Sinkula, Baker, & Noordewier, 1997: 309). Commitment and openness to learning enable continuous improvements to a firm's activities and processes as well as finding new ways of serving customers and exploiting new business opportunities that result from synthesizing information and "thinking outside of the box" (e.g. La Rocca & Snehota, 2014; Sinkula et al., 1997), thus contributing to seizing of existing and emerging capabilities.

Third, and related to the first two, the dynamic capabilities-based view contends that performance differentials between firms also depend on the level of organizational innovativeness, that is, the ability to *reconfigure* the organization's capabilities so as to maximize complementarities between capabilities (Teece, Pisano & Schuen, 1997; Teece, 2007, 2012; Wilden & Gudergan, 2015). Organizational innovativeness refers to defining and initiating new methods, procedures and/or systems for achieving the businesses' targets and objectives, and/or initiating changes in the job contents and work methods, for example. Such activities, which could mean a complete redesign of business processes and tapping into completely new markets (Pamisano, 2004: 64), help enhance the reconfiguration of the organization’s capabilities (Teece et al., 1997; Teece, 2007, 2012; Theoharakis & Hooley, 2008).

For industrial firms, sensing, seizing and reconfiguring are inherently interrelated and, thus, potentially complementary. For example, learning can reinforce processes associated with innovation that eventually improve business performance (Cabanelas et al., 2013). Also, while sensing enables firms to generate information on opportunities and threats, it remains true that the advantages that accrue from sensing arise through seizing and/or reconfiguring capabilities (Teece, 2007; Wilden & Gudergan, 2015). Therefore, although sensing can provide assurance for the top management team that no adjustments for a firm’s offering or processes are needed, sensing alone is typically of limited value.

A practical example illustrates the above points. In order to renew market offerings, industrial firms need to add new performance attributes to them (e.g., core product-performance improvements, relationships, services, and co-creation of value) that can satisfy customer needs better than their existing offering (O'Cass & Ngo, 2012). They can do so via sensing and seizing a new business opportunity, or alternatively decision can be simply based on top managers’ “gut feeling”. Importantly, therefore, reconfiguration can occur – and be of considerable value – even without strong sensing capability. The three types of dynamic capabilities are thus not (entirely) hierarchical and could therefore also serve as substitutes. Thus, it is of crucial importance to understand the designs and combinations of systems elements of dynamic capability processes, and how they, as configurations, lead to outcomes such as business performance (Wilden et al., 2016). Following this logic, we propose that:

P2a: Dynamic capabilities (i.e. market orientation, learning orientation and innovativeness) complement each other for high business performance.

P2b: Dynamic capabilities (i.e. market orientation, learning orientation and innovativeness) can also substitute each other for high business performance.

2.4. Reconfiguring operational capabilities

Reconfiguration encompasses activities that recombine bundles of resources and capabilities (Sirmon et al., 2011; Wilden & Gudergan, 2015) in an attempt to "maximize" complementarities inside and outside the enterprise (Teece, 2012, p. 1398). Following Teece et al. (1997), in rapidly changing environments "there is obviously value in the ability to sense the need to reconfigure the firm's asset structure and to accomplish the necessary internal and external transformation" (p. 520). As Danneels (2015: 11) notes, "sensing and seizing could be considered precursors or antecedents to resource reconfiguration". Indeed, with a strong sensing capability firms are better in perceiving opportunities and threats, which can stimulate companies to seize of new opportunities and/or to recombine existing resources and operational capabilities (Fainshmidt & Frazier, 2016). As such, the advantage that firms may accrue from a sensing capability take place through seizing and reconfiguring activities (Teece, 2007; Wilden & Gudergan, 2015). However, even though a sensing capability might signal firms to alter their operations and practices (and enhances reconfiguration and seizing of capabilities), a sensing capability in and of itself does not reflect a dire need to implement changes in the organization (Fainshmidt & Frazier, 2016). In addition, a seizing capability may create future growth paths and valuable resource bundles which may not necessarily result in making profound and irreversible investments in tangible and intangible assets (Helfat & Peteraf, 2015; However, Helfat & Peteraf, 2009). Thus, a seizing capability may contribute to firm performance alone without the supportive effect of capability reconfiguration (Pettus, Kor, & Mahoney, 2009), as dynamic capabilities function in firm-specific, idiosyncratic ways (Eisenhardt & Martin, 2000) and although the processes underlying dynamic capabilities overlap "they serve unique and complementary roles to boost the likelihood of operating successfully in environments of significant change" (Pettus, Kor,

& Mahoney, 2009: 189). Notwithstanding the different effect mechanisms of dynamic capabilities, it can be concluded that the reconfiguration of operational capabilities does not occur automatically but requires an active presence of dynamic capabilities (Fischer, Gebauer, Ren, Gregory, & Fleisch, 2010; Teece et al., 1997; Teece, 2007, 2014). This coordinated adaptation is necessary to maintain strategic fit among organizational assets and external changes, which may be a factor in sustaining high business performance (Peteraf & Reed, 2007). It follows that:

> **P3**: Dynamic capabilities (i.e. market orientation, learning orientation and innovativeness) serve both unique and complementary roles to boost operational capabilities (i.e. customer-linking capability and product development capability) eventuating in high firm performance.

2.5. Operational and dynamic capabilities: substitutes or complements?

The need to study the effects of operational and dynamic capabilities holistically has been noted by several scholars (e.g. Kor & Mesko, 2013; Wilden et al., 2016). Specifically, as dynamic capabilities may affect operational capabilities (Collis, 1994; Teece et al., 1997) or the two may mutually reinforce one other (Cassiman & Veugelers 2006; Rigby & Zook, 2002), the interplay of different capabilities needs to be assessed from a complexity point of view, presuming nonlinearity and discontinuity among multiple system elements (Meyer et al., 1993). Two viewpoints seem particularly prevalent: operational and dynamic capabilities as substitutes (Collis, 1994; Misangyi & Acharya, 2014) and/or complements (Cassiman & Veugelers, 2006; Misangyi & Acharya, 2014).

Complementarity refers to a situation where the combination of system elements, such as organizational capabilities (Morgan, Slotegraaf, & Vorhies, 2009), leads to a “surplus over and above the sum of the amounts of values the elements could create independently”

(Clougherty & Moliterno, 2010: 465). Complementarities between different types of capabilities further often constitute to above average performance (Adegbesan 2009; Lachmann, 1947). In our study context, it is easy to see how high levels of organizational learning and innovativeness would enable continuous improvement of key operational capabilities, for example. Sensing could also help identify changing market needs and help target the most prominent customers and keep the offering relevant. Substitutability, on the other hand, points to a situation where there are alternative elements that can take one element's place (in system architecture) when pursuing a specific outcome (Demsetz, 1983). Innovativeness and produce development capability, for example, could be seen as substitutes because innovativeness may well help firms to create and capture value by other means than produce development. Provided these competing lines of argumentation and evidence in extant literature, we outline two competing propositions as follows:

> **P4a**: Operational and dynamic capabilities complement one another for high business performance.
>
> **P4b**: Operational and dynamic capabilities substitute one another for high business performance.

2.5. The effects of business context

Environmental dynamism. The traditional capabilities-based view regards dynamic capabilities as crucially important in highly dynamic business environments (Drnevich & Kriauciunas, 2011; Teece et al., 1997), characterized by high technological turbulence and intense competition (Jaworski & Kohli, 1993). This is largely because such conditions call for swift organizational responsiveness and rapid and flexible product/service innovation (Sher & Young, 2005), or overall ability to sense and capitalize on emerging opportunities before competitors. On the other hand, under high level of environmental stability, operational capabilities typically have a stronger effect on firm performance (Drnevich & Kriauciunas, 2011; Vorhies, Morgan & Autry, 2009). A logic here is that, since the external business environment puts only limited pressure for organizations to adjust their approach and capabilities, competition culminates in capabilities that help organizations "make their living" effectively and cost-efficiently. It follows that:

> **P5a**: Low environmental dynamism (i.e. technological turbulence, competitive intensity) and high levels of operational capabilities (i.e. customer-linking and product development capability) lead to high business performance.
>
> **P5b**: High environmental dynamism (i.e. technological turbulence, competitive intensity) and high levels of dynamic capabilities (i.e. market orientation, learning orientation and innovativeness) lead to high business performance.

Firm size. Since it is challenging for small firms to manage a wide range of capabilities, they often develop their core capabilities and specialize in certain types of activity (Matthysens & Vanderkempt, 1998). Conversely, large firms tend to have enough resources to maintain a set of diverse operational capabilities and reconfigure them when environmental conditions signal they should do so. Large firms also have sufficient resources to develop dynamic capabilities in-house through structured managerial incentives (Merriless, Rundle-Thiele & Lye, 2011), while their smaller counterparts may have to compensate for a lack of dynamic capabilities through strategic partnerships. At the same time, small firms can benefit from their more flexible, less bureaucratic and faster problem-solving capabilities, ensuring nimbler adaptation to environmental changes than is impossible for large firms with highly hierarchical structure and more complex and formalized decision-making processes (Covin & Slevin 1989). To counter these problems, the only way for large firms to gain performance superiority may be via comprehensive and consistent development of operational and dynamic capabilities, while small companies may afford to be more selective with their approach. It follows that:

> **P6a**: Small firm size and a selective set of operational and dynamic capabilities leads to high business performance.
>
> **P6c**: Large firm size and a comprehensive set of operational and dynamic capabilities leads to high business performance.

Figure 1 illustrates the theoretical framework for the present study.

Figure 1 here

3. Methodology

3.1. The importance of using configurational analysis

The causal complexity in configuration theory as well as the study's set-theoretical assumptions – necessary and sufficient conditions, equifinality, causal ambiguity and asymmetry, and substitutability and complementarity – can best be addressed using fsQCA (Fiss 2007; Short, Payne, & Ketchen 2008). fsQCA allows for a detailed analysis of how causal conditions contribute to an outcome of interest. It examines causal patterns by focusing on the set-subset relationship at a firm level. For a specific outcome (e.g. high performance), it examines members of the set of "high-performing" organizations and then identifies that combinations of attributes associated with the outcome of interest using Boolean algebra and algorithms (that allow logical reduction of numerous, complex causal conditions into a reduced set of configurations that lead to the outcome) (Fiss, 2011).[1]

Methods such as moderated regression analysis, clustering algorithms, latent class analysis, and the deviation score approach – albeit more widespread in management research – all have their notable limitations (for a detailed discussion, see Frösén, Luoma, Jaakkola, Tikkanen, & Aspara, 2016). Instead of considering an isolated net effect of independent variables, fsQCA allows us to examine how variables combine into configurations to explain the outcome of interest (Woodside, 2013; Woodside et al., 2012). Previously, fsQCA has also been used prominently in business-to-business setting to provide enhanced understanding of the complexities of technology transfer (Leischnig, Geigenmueller, & Lohmann, 2014) and marketing-sales relationships (Biemans, Brencic, & Malshe, 2010), for example.

3.2. Data

To explore the potential interplay of dynamic and operational marketing capabilities, survey data was collected from Hungarian B2B firms. The sampling frame was provided by Dun & Bradstreet's company directory of Hungarian firms and was based on US Standard Industrial Classification (SIC) codes, following US industry-specific and area-specific classifications. This resulted in a pool of 18,293 B2B and B2C firms. B2B and B2C firms were equally represented in the sampling frame. The questionnaire was pre-tested with top managers responsible for marketing operations. After making necessary adjustments to the survey instrument, 2500 questionnaires were sent out to chief marketing executives of B2B firms.

[1] For a better understanding of the methodological principles which underpin fuzzy set Qualitative Comparative Analysis, we recommend consulting, for example, Ragin, C. C. (2009). *Redesigning social inquiry: Fuzzy sets and beyond*. University of Chicago Press.

This was followed by a second wave of queries to non-respondents. Non-response bias was tested by comparing early and late respondents – no significant differences were observed in the construct measures, suggesting that non-response bias is not an issue in the study (Armstrong & Overton, 1977). 219 usable questionnaires were received, corresponding to a response rate of 8.76%. Considering the relative complexity and length (eight pages) of the survey instrument and the fact that the respondents were top executives, the response rate is considered acceptable. Appendix B shows the sample distribution for industry, main sector and firm size. Product (N=111) and service-focused (N=108) businesses are almost equally represented in the sample.

3.3. Measures

Validated measurement scales were employed to assess the central concepts under study. The measurement scales for innovativeness and strategic partnering capability were adopted from Theoharakis, Sajtos and Hooley (2009), while learning orientation measurement was based on Sinkula, Baker and Noordewier (1997). To account for product/service development capability, Day's (1994) conceptual initiative was used, while the scale for customer-linking was drawn from Theoharakis et al. (2009). Two dimensions of environmental dynamism – technological turbulence and competitive intensity – were measured using Jaworski and Kohli's (1993) metric. Finally, financial performance was measured by accounting operating margin, return on investment (ROI) and return on assets (ROA) (cf. Reimann, Schilke & Thomas, 2010), while market performance was assessed using sales volume and market share. Five-point Likert scales were used in all the measurement items. In addition to the dimensions of environmental dynamism, firm size (measured by number of employees) was used in the configurational analysis to help identify differences accruing from firm size.

3.4. Analytical procedure

The study adopted a combination of confirmatory factor analysis (CFA) and fsQCA. CFA in AMOS was first employed to obtain the latent variables to identify organizational configurations in a follow-up analysis. The final measurement model fitted the data well ($\chi 2$ =675.91, df=368, RMSEA=0.06, GFI=0.84, CFI=0.91). The final measurement items and their standardized loadings are available in Appendix C. Discriminant validity of the scales was also good, as the square-roots of average variance extracted (AVE) indices are higher than the correlations between the corresponding construct and other constructs (Fornell & Larcker, 1981). In support of convergent validity, all relevant construct reliabilities (CR) were above the recommended level of 0.60 (Diamantopoulos, Siguaw, & Cadogan, 2000). The key descriptive statistics and construct reliability and validity indices are presented in Table 1.

Table 1 here

Following Harman's one-factor test for common method variance (CMV), an unrotated principal component analysis was conducted for all measurement items used in the analyses. The analysis identifies five factors with eigenvalues greater than one, which together explain 63.2% of the total variance, with no single factor accounting for more than 50% of the variance. Additionally, the study employs the marker variable test to control for CMV by including "a measure of the assumed source of method variance as a covariate in the statistical analysis" (Podsakoff et al., 2003: 889). The four-item scale of "internal marketing support assets"[2] was used as this construct is theoretically unrelated to at least one of the focal

[2] The items for this five-point Likert scale include: cost effective production, advanced marketing information system, advanced cost-controlling system, and patents and licenses.

variables[3]. The correlation between the marker variable and the theoretically unrelated variable is interpreted as an estimate of CMV (Lindell & Whitney, 2001). Here, the CMV is only 0.18, further suggesting that common method bias does not appear to threaten the findings' validity.

3.5. Calibration

Our configurational analyses employ the truth table algorithm (Ragin, 2008) via fsQCA 3.0 software. The algorithm looks for the most parsimonious, logically valid expressions that encompass all the configurations which meet a certain frequency threshold (here 2) and consistency threshold (here 0.80). Consistency is an index that reflects whether a configuration systematically leads to the focal outcome in the data. In turn, coverage represents how many cases with the outcome are represented by a particular causal condition (Ragin, 2008). For the purpose of the fsQCA procedure, latent factor scores obtained through CFA were transformed into membership scores varying between 0 and 1. The approach outlined by Emmenegger, Schraff and Walter (2014) was used to obtain theoretically meaningful cut-off points (3="neither disagree nor agree" for exclusion, 3.5 as the crossover point, and 4="agree" for full membership) on 5-point Likert scales. Additionally, since market orientation and learning orientation were measured using internal benchmarks (unlike the other constructs under investigation), Cheli and Lemmi's (1995) procedure was adopted to take sample distribution into consideration when deriving fuzzy-set relative membership scores. Based on set-theoretical membership scores, this ensures that the cases belong to the same universe. Cheli and Lemmi's (1995) procedure was also applied for technological turbulence and competitive intensity as it was crucial to distinguish the different types of

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[3] Specifically, such support assets have little bearing with learning orientation, for example, given that the latter is deeply embedded in organizational DNA and culture and manifested in, among other things, their level of open-mindedness and willingness to learn (Sinkula et al., 1997).

environmental contexts within the sample. In calibrating firm size, the number of employees was used following the European Commission's definition and the 2004 XXXIV Hungarian law on firm size. This resulted in a four-value fuzzy score: under 50 employees (0), 50-99 employees (0.33), 100-299 employees (0.67) and 300 or more employees (1).

4. Key findings

4.1. Effective capability configurations

Table 2 presents the configurations of dynamic capabilities, operational capabilities, environmental dynamism and firm size that are associated with high financial performance. Five configurations for high financial performance were identified. The findings suggest that a combination of high and comprehensive dynamic and operational capabilities is a consistent recipe for small companies facing high levels of competitive intensity (configuration C3) to achieve good financial performance. For large firms facing either a high degree of competitive intensity or technological turbulence, innovativeness, learning orientation and customer-linking capability are important, but even with a low level of product development capability (C2) or low market orientation (C3), they can thrive. The last two "success recipes", C4 and C5, apply to small firms only. Firms that belong to these configurations vary in their environmental dynamism, C4 being linked to high dynamism and C5 to low dynamism. For C4, high market orientation and low learning orientation are necessary, in addition to high innovativeness and high customer-linking capability, whereas for firms belonging to C5, innovativeness and customer-linking capability are sufficient for good performance. In all the configurations consistently associated with strong financial performance, a high level of innovativeness and high customer-linking capability is required. Furthermore, innovativeness is a core condition – that is, a causally important component – in four configurations, while learning orientation, market orientation and customer-linking capability are core conditions in two configurations, with product development capability in one configuration only. The overall coverage of the configurations identified in the study sample is relatively high (0.53). Overall consistency is relatively good as well (0.75).

Table 2 here

Some overall insights into the complementarity and substitutability of dynamic and operational capabilities – and individual capabilities within each configuration – can already be drawn from the results presented in Table 2. For instance, it seems that dynamic and operational capabilities are complementary rather than substitutes—as at least one component from each is always present in all the configurations consistently associated with high financial performance. Innovativeness and customer-linking capability also complement one another in high financial performance as they simultaneously occur in each configuration leading to high financial performance scenarios (C1 through C5). Furthermore, the three dynamic capabilities might also complement each other, particularly under high competitive intensity.

The results in Table 3 indicate that effective configurations for high market performance are similar to those identified in Table 2. Again, five consistent configurations, including a configuration with effective and comprehensive sets of dynamic and operational capabilities, are identified. Furthermore, innovativeness and customer-linking capability seem the most critical determinants for high market performance. However, customer-linking capability, in the same way as market orientation, is not a core condition in any of the configurations, while product development capability appears to be a more critical factor for high market performance compared to solution sets with high financial performance.

Interestingly, C5 implies that for small firms faced with dynamic environments, high product development capability alone is a sufficient condition for good market performance.

When it comes to potential complementary or substitutable relationships, the findings reported in Table 3 indicate that, on the one hand, innovativeness and customer-linking capability could be complementary. On the other hand, it seems that product development capability and the three dynamic capabilities – innovativeness in particular – could substitute each other for high market performance.

Table 3 here

4.2. Substitution versus complementarity within capabilities

To shed more light on complementarity and substitutability, a series of configurational analyses were run. To this end, Misangyi and Acharya's (2014) approach was followed to examine the effects of both within and across dynamic and operational capabilities. First, the potential interplay within dynamic capabilities and within operational capabilities was explored. Meta-sets of all possible combinations of dynamic capabilities (i.e., Learnor and/or Inno, Inno and/or Markor, Learnor and/or Markor) and operational capabilities (i.e. PDC and/or Custlink) were constructed. More specifically, each of these pairs of mechanisms were combined via "fuzzy or" and "fuzzy and" operations. Fuzzy or" uses the maximum value for each case of combined sets (i.e., the union), allowing us to examine whether the mechanisms serve as substitutes. For instance, if Learnor and Inno substitute one another, then only one or the other need be present for high financial performance (Learnor_or_Inno) and consequently, only the better score of the two matters (i.e., one could be active while the other is absent). In contrast, when mechanisms complement each other, both mechanisms need to be present. This can be captured via the "fuzzy and" operation (e.g., Learnor_and_Inno), which takes the minimum value (i.e., intersection) of the sets. While this does not capture synergistic effects, it is nevertheless conceptually consistent with complementarity: both mechanisms need to be present when they are complements, and the effect is thus subject to the minimum of the two (Misangyi & Acharya, 2014).

In conducting the analyses, baseline solutions were used (see Tables 2 and 3) to identify the solutions that best fit the data (i.e., solution coverage ≥ .53 (financial performance), solution coverage ≥ .59 (market performance), and whether the analyses captured any empirically relevant configurations[4] beyond the five reported in the baseline solutions). Rather than reporting the solutions in table form, the study discusses the key findings in the main text.

First, we examined models in which all of the within-capability combinations were entered as substitutes (Learnor_or_Inno, Inno_or_Markor, Learnor_or_Markor, PDC_or_Custlink). No configurations sufficient for high financial performance were found. The specified model in which all the mechanisms were complements (Learnor_and_Inno, Inno_and_Markor, Learnor_and_Markor, PDC_and_Custlink) did yield a solution, but its fit was inferior to the baseline (coverage=0.47). For market performance too, the second model produced higher coverage (0.51 versus 0.32). These offer the first evidence in support of the complementarity argument concerning dynamic and operational capabilities.

In order to gain a more detailed understanding of potential complementarity, model specifications were examined in which each of the specific pairs were entered separately as substitutes and then as complements. The results suggest that learning orientation and market orientation (coverage=0.54) are substitutes, although they can also

[4] These refer to configurations where the pattern with regard to complementarity/substitutability in the overall solution is consistent

serve as complements (coverage=0.53), especially if a firm is facing high competitive intensity. Innovativeness and market orientation also appear to be substitutes (coverage=0.53) rather than complements (coverage=0.49). With regard to operational capabilities, no evidence for complementarity or substitutability was found. Overall, the findings show that dynamic capabilities can both substitute and complement one another, but substitutive effect is stronger. As to the analysis of market performance, such interplay is not identified as none of the relationships examined produce better coverage than the baseline model (in Table 3).[5]

4.3. Substitution versus complementarity across capabilities

The interplay between dynamic and operational capabilities can be better explored by studying components across the two capability types. All possible capability combinations were analyzed, examining individual mechanisms as well as building on previous findings. Combinations of each of the individual mechanisms were examined (i.e., Learnor and/or PDC, Learnor and/or Custlink, Inno and/or PDC, etc.), as well as how they combined with the within-capability combinations (i.e., Learnor and/ or PDC_or_Custlink, Inno and/or

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[5] We also ran necessary condition analyses in fsQCA and found that none of the individual conditions meet the commonly used criterion of qualifying as a necessary condition (i.e. consistency ≥ 0.90) (Vis and Dul, 2016) for either of the performance outcomes, and same can said about the negative performance outcomes (using individual negated conditions). However, further analyses demonstrate that having at least one of the dynamic capabilities (i.e. Learnor OR Inno OR Markor) in the organization meets the threshold for necessity for both financial performance (consistency = 0.954) and market performance (consistency = 0.92). In fact, for high financial performance, even sensing or seizing (i.e. Markor OR Learnor; consistency = 0.94) and seizing or reconfiguring (i.e. Learnor OR Inno; consistency = 0.91) meet the necessity threshold. The operational capabilities (i.e. PDC OR Custlink), on the other hand, do not prove necessary even though they come close to the commonly used threshold (resulting in consistencies of 0.88 and 0.89, respectively). These findings further highlight the substitutive roles within dynamic capabilities, but not within operational capabilities.

PDC_or_Custlink, Learnor_or_Inno and/or PDC_or_Custlink, etc.). Again, the analytical procedure was guided by fit (i.e., coverage/content) and the key findings are reported below.

The analyses provide support for both complementarity and substitutability across dynamic and operational capabilities. On the one hand, most of the interplay identified for high financial performance suggests that dynamic capabilities and operational capabilities complement one another. Inno and CustLink, for example, appear to complement each other (coverage=0.53), as do Learnor and PDC (coverage=0.53), Markor and CustLink (coverage=0.54) and Markor and PDC (coverage=0.54). On the other hand, for high market performance, only one complementary relationship and two substitutable relationships were found. More specifically, providing further support for dynamic and operational capabilities as complements, Learnor and CustLink (coverage=0.61) work effectively together. Inno and PDC (coverage=0.60) and Markor and PDC (coverage=0.59), however, seem to work as substitutes.

Table 4 summarizes the findings for the substitutability and complementarity both within and across dynamic and operational capabilities. The range of findings paints a detailed and highly contextualized picture of complementarity and substitutability and reveals the complex interplay between the constructs under study.

Table 4 here

4.4. Non-effective capability combinations

Analyses on the sufficiency of the absence of outcome variables was also performed (see Misangyi & Acharya, 2014) to identify recipes that seem to consistently lead to low financial performance and low market performance. The findings from these analyses are presented in the right-hand panel of Tables 2 and 3. Using frequency cutoff 5, four consistent configurations are identified for low financial performance and three for low market performance. Not surprisingly, the majority of configurations identified apply to firms facing highly dynamic environments. In such conditions, irrespective of firm size, firms with low innovativeness and product development capability – even if they were high on learning orientation and customer-linking capability – fail to perform well financially (C1), as do small firms that are comprehensively weak in their dynamic capabilities (C2). C3 is like C1, but only applies to small firms and at varying levels of environmental dynamism. C4 is a curious case as it suggests that even firms with comprehensively high levels of dynamic capabilities and selective operational capabilities can fail if they are small and operate in a dynamic environment.

For both of the performance dimensions under study, low innovativeness and weak product development capability appear critical in low performance scenarios. In terms of market performance, weak product development capability is presented as a central condition in all of the identified configurations (C1 through C3). Configuration C2 applies to all firm sizes and is characterized by high environmental dynamism, low innovativeness and weak product development capability, so that even high levels of learning and/or market orientation and/or customer-linking capability cannot help avoid the unfavorable performance outcome.

4.5. Testing configurations with conventional techniques

We also compared findings with those obtained via three conventional techniques for analyzing configuration theory: interaction terms in regression analysis ("fit as moderation"), cluster analysis (Venkatraman & Prescott, 1990), and deviation score analysis (Drazin & Van de Ven, 1985). As fsQCA, compared to conventional approaches, employs assumptions of complex causality, aims to identify configurations that constitute sufficient and necessary conditions for an outcome of interest (Fiss, 2007; Ragin, 2008), and works with cases instead of variables to draw relationships, the comparisons should be treated with caution, however. Thus, from a strictly analytical standpoint, the empirical comparisons may not hold true. They, nonetheless, serve our purpose of demonstrating whether and how fsQCA performs better when modelling complex relationships involving a range of attributes. The comparisons, presented in Appendix A, suggest that fsQCA indeed helps us understand better how firms' capability constellations help them achieve good business performance.

4.6. Robustness checks

Finally, it is important to ensure that the results are not affected by the cut-off points used in calibration. Therefore, additional analyses were performed using the commonly employed cut-off points of 2="disagree", 3="neither disagree nor agree" and 4="agree" for most of the 5-point Likert scales. Here too, Cheli and Lemmi's (1995) approach for measures with internal benchmarks was used. The configurations identified by these analyses[6] follow closely the ones reported in Tables 2 and 3, lending support to the robustness of our findings.

5. Discussion

Systems-level effects of dynamic and operational capabilities allow researchers to move beyond two-way correlations, and two- or three-way interactions effects, to study the simultaneous systematic effect of capabilities configurations (Meyer et al. 1993; Wilden et al.'s, 2016; Woodside, 2013). Recognizing this knowledge gap, our study offers four contributions. First, it illustrates how operational and dynamic capabilities – considered separately – combine leading to high (or low) business performance. Second, the study

[6] Available from the authors on request.

examines whether dynamic capabilities serve both unique and/or complementary roles in affecting operational capabilities. Third, it adds to systems-level understanding of operational and dynamic capabilities by investigating their complementarity and substitutability. Fourth, this study looks at how different contingency factors affect capability configurations leading to high (or low) business performance.

5.1. Operational capabilities, dynamic capabilities, and business performance

The configurations identified reveal that the co-occurrence of the key operational capabilities (i.e. customer-linking capability and product development capability) for high business performance is rare. Only one out of five configurations for both high market performance and high financial performance incorporates both capabilities. The follow-up analyses on complementarity and substitutability (as per Misangyi & Acharya, 2014), and necessary conditions (as per Vis & Dul, 2016) further point that the key operational capabilities under study do neither consistently complement nor substitute each other for high levels of business performance. Thus, for industrial firms, effective customer relationship management and effective product development appear to be difficult to reconcile (Tzokas et al., 2015), or at least it appears to be difficult to gain benefits of both of them in business performance terms.

Consequently, we find no support for **P1a**. This might be because effective customer relationship management and effective product development are conflicting objectives. A sensible approach for a firm might, for example, be to settle for serving existing customers as well as possible and not even involve in substantial new product/service development activities. Supported by our configurational findings, in business-to-business setting where the importance of individual customer relationships is typically particularly high (La Rocca & Snehota, 2014), doing the opposite – focus extensively on product development and place less emphasis on customer linking – is less likely to result in favorable performance implications. Moreover, product development that is based on insights gained from current customers, can lead to new offerings that resemble closely the firm's existing offering rather than truly innovative or revolutionary offerings, which might diminish a firm's market position and performance gains over time (Christensen & Bower, 1996).

While the key operational capabilities do not act as complements, they cannot substitute each other either and thus **P1b** is not supported. Therefore, customer-centric product development is important to an extent, since if a firm introduces products that do not match customer expectations, it is likely to fail (Tzokas et al., 2015) as even the strongest loyalty towards a firm eventually wears off if a customer faces too many disappointments or needs to wait for too long for new product/service introductions. In fact, our findings highlight the importance of product development capability as one of the key success factors in competition (cf. Clark & Fujimoto, 1991) as low product development capability is included in most configurations associated with poor business performance. Effective product development may not suffice for good performance either, without organizational ability to retain customers because of the cost implications of attracting new customers.

In terms of dynamic capabilities, we find weak support for **P2a** and more so for **P2b**. That is, our findings rather surprisingly suggest that dynamic capabilities act as substitutes, rather than complements (cf. Karna et al., 2016). In particular, sensing capability (manifested as market orientation) and seizing capability (i.e. learning orientation)[7], as well as sensing capability and reconfiguring capability (i.e. innovativeness), substitute each other among our case firms. The first finding goes against Sinkula, Baker & Noordewier's (1997) argument related to the importance of market-based organizational learning, which effectively is a combination of the two dynamic capabilities. The second finding, in turn, suggests that

[7] Our findings suggest that these two capabilities can also complement each other.

both sensing and reconfiguring are not simultaneously needed in industrial firms for high business performance. This either presents “gut feeling” decision-making for reconfiguring a firm’s capabilities as a viable approach for companies or suggests that business markets are so dynamic that sensing is less valuable for firms. In most of the configurations identified, innovativeness indeed seems to be linked to good performance, while high market orientation is included in much fewer configurations. The necessary condition analysis also suggests that, in order for firms to gain high financial or market performance, at least one of the dynamic capabilities needs to be at a high level. This is as expected, given the overall importance argued for dynamic capabilities in extant literature (e.g. Teece, 2007).

5.2. Reconfiguration of operational and dynamic capabilities

The results of the fsQCA analysis show that the symbiotic interplay between customer-linking capability and product development capability is accompanied by market orientation and innovativeness (configuration C1) for high market performance, and the concerted support of all dynamic capabilities in configuration C1 for high financial performance. Thus, sensing capability seems to critically enhance customer-centric product development (Teece, 2007). As market orientation may signal to a firm that it should implement changes, learning orientation can help a firm seize opportunities through a systematic evaluation of existing and emerging capabilities (both operational and dynamic) (Wilden et al., 2013). Innovativeness helps firms to adapt and reconfigure the organization’s operational and dynamic capabilities to maximize complementarities both inside and outside the company (Teece, Pisano & Schuen, 1997; Teece, 2012), enhancing customer-centric product development, which in turn leads to high market performance and high financial performance (configuration C3) (Teece, 2007; Teece, 2012; Wilden & Gudergan, 2015). Thus, the hierarchical interrelatedness of dynamic capabilities and their stimulating effect on operational capabilities and business performance (see Teece, 2007; Wilden & Gudergan, 2015) receives some empirical support.

In addition, other configurations in Table 2 and 3 seem to support the view that different combinations of market orientation, learning orientation and innovativeness can co-occur with customer-linking capability and/or product development capability, which can also effectively lead to high market and financial performance. Furthermore, it seems that innovativeness is of crucial importance in adapting and reconfiguring a firm's operational and dynamic capabilities to maximize complementarities between these capabilities (Teece, Pisano & Schuen, 1997; Teece, 2012). As for negative performance outcomes, lack of innovativeness seems to consistently lead to failure, despite co-occurring with strong customer-linking capability and learning orientation. Thus, following Eisenhardt and Martin (2000), dynamic capabilities may function in firm-specific, idiosyncratic ways, and while showing some overlap in process development/implementation, they serve as both unique and complementary agents in boosting high business performance in rapidly changing environments (Pettus, Kor, & Mahoney, 2009; Gelhard et al., 2016). **P3** is supported.

5.3. Complementarity and substitutability of operational and dynamic capabilities and performance

According to the capability-based view, a firm needs both operational and dynamic capabilities to attain high performance (Collis, 1994; Weerawardena & Mavondo, 2011). A more moderate view on capabilities considers dynamic capabilities as superior to operational capabilities (Ambrosini, Bowman & Collier, 2009; Teece et al., 1997), while the less orthodox view posits that "the value of dynamic capabilities lies in the set, and its configuration, of operational capabilities (that they create)" (Weerawardena & O'Cass, 2010: 1222), and the two types of capability together explain firm performance better than either of them in isolation (Ambrosini et al., 2009; Cassiman & Veugelers 2006; Freeman, 1991; Karna et al., 2016; Rigby & Zook, 2002; Rothwell et al., 1974). In assessing the complex interplay of operational and dynamic capabilities, this study takes the complementarity versus substitutability tenet (Cassiman & Veugelers, 2006; Collis, 1994; Misangyi & Acharya, 2014). Moreover, the study identifies configurations where dynamic capabilities – by themselves – may be sufficient for high financial performance (either by mutually reinforcing one another or by replacing one capability with a similarly effective one) (see Pettus, Kor, & Mahoney, 2009; Gelhard et al., 2016). This supports the view that dynamic capabilities can themselves contribute to high financial performance (Ambrosini, Bowman & Collier, 2009).

Furthermore, by investigating across-capability configurations, this study identifies cases where operational and dynamic capabilities also mutually reinforce one another and explain firm performance better than either of them in isolation (Ambrosini et al., 2009; Cassiman & Veugelers 2006; Freeman, 1991; Karna et al., 2016; Rigby & Zook, 2002; Rothwell et al., 1974). Table 5 shows that learning orientation can support the exploitation of opportunities stemming from strong customer relationships (Nakamura et al., 1996; Wilden et al., 2013), market orientation can strengthen a firm's customer-linking capability (Day & Van den Bulte, 2002) and enhance product development (Tzokas et al., 2015), while customer-linking capability (a less developed form of market-sensing) can provide useful insights into the innovation process (La Rocca & Snehota, 2014; Sinkula, Baker & Noordewier, 1997) that may lead to stronger market and financial performance (Teece, 2007, 2012; Wilden & Gudergan, 2015).

In addition, across-capability configurations show that innovativeness and product development capability, as well as market orientation and product development capability, can be substitutes. Indeed, most often, new product development capability – while involving new solutions that exploit research and development investments – may "not [necessarily] extend to imagining new ways for delivering customer value or reaching the market through new channels" (Day, 2011: 186). Moreover, as market orientation implies both responsive market orientation (meeting the expressed needs of customers) and proactive market orientation (addressing the latent needs of customers) – depending on environmental conditions (i.e. high competitive intensity) – responding to customers' expressed needs may not entail more resources than implementing small changes to existing products, implying that market orientation and product development can be substitutes (Narver, Slater & MacLachlan, 2004). It follows that, depending on external and internal contingencies, operational and dynamic capabilities can mutually reinforce one another and explain firm performance better than either of them in isolation (see Ambrosini et al., 2009; Cassiman & Veugelers 2006; Freeman, 1991; Karna et al., 2016; Rigby & Zook, 2002; Rothwell et al., 1974). **P4a** is therefore supported. On the other hand, other contingencies suggest that operational capabilities can be replaced by dynamic capabilities (and vice versa) when implementing firm strategies, since both capabilities move a firm towards the same outcome (see Barney, 1991; Collis, 1994; Teece et al., 1997). Hence, **P4b** is supported. However, fsQCA results imply that operational and dynamic capabilities are more complementary than substitutive.

When capabilities complement one another, their potential to create sustainable competitive advantage and enhance business performance increases. The magnitude of the impact of these complements is contingent on the value, rareness, inimitability and non-substitutability of the capabilities behind the combinations (Barney, 1991, 1996). The results imply that most of the combinations of within-dynamic and operational, and across-dynamic and operational capabilities yield capability combinations that support the exploitation of market opportunities and/or the neutralization of threats posed by competitors. They do so because these complementary combinations are embedded in an organizational system that leverages, sustains and develops them (Morgan, Vorhies & Schlegelmilch, 2006). And these combinations of (both within and across) complementary capabilities enhance the firm's ability to achieve competitive advantage and the desired economic benefits (Morgan, Vorhies & Schlegelmilch, 2006). Other capabilities vary in terms of their substitutability, as competitors may deploy another capability (or a different set of capabilities) to attain the same outcome (Barney, 1991; Collis, 1994). These capabilities are less "co-specialized", are not strongly embedded in organizational processes (Morgan, Vorhies, & Schlegelmilch, 2006), and the range considered as potential substitutes is larger (Collins, 1994).

5.4. The effect of business context

Moreover, the configurations imply that most of the operational and dynamic capabilities co-occur with a high level of competitive intensity and, in some cases (though with less frequency), with a high level of technological turbulence. This is in line with the theory, as dynamic capabilities help firms "to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece et al., 1997: 516) as these contingencies require swift responsiveness, rapid and flexible innovation, technological capabilities and high R&D intensity. However, operational capabilities can have an equally strong effect on performance in high velocity environments if disruptive technologies and intensifying competition force companies to exploit their existing capabilities to extract cost reductions and efficiency gains (Brush & Artz, 1999) (see configuration C5 in Table 3). **P5a** and **P5b** are therefore supported.

In addition, the results indicate that small firms may not be able to manage a wide range of capabilities well, so that they seem better off with focused and specialized approach to capabilities (Crick & Jones, 2000; Matthysens & Vanderkempt, 1998). However – whether (or not) it occurs together with other capabilities – innovativeness does seem to be an essential contributor to the high market and financial performance of small firms. For large firms, a wide range of operational and dynamic capabilities is needed if they want to achieve strong business performance (Merriless, Rundle-Thiele & Lye, 2011). **P6a** and **P6b** are thus supported.

6. Managerial implications

The configurational approach employed here to test the complex causality and complementarity/substitutability in particular, should help firms understand which capabilities they should put higher emphasis on to reach high performance (see Rihoux & Ragin, 2009). To these ends, we believe that our study also yields useful insights for managers of industrial firms, who should now be better equipped to select the most appropriate set of capabilities to their specific business context to develop and nurture (e.g. Collis, 1994).

While justified by extant empirical research, the study suggests that customer-linking capability and product development capability are distinct approaches and often difficult to reconcile. Organizational processes built around strong customer-linking capability signal the importance of identifying attractive customers, initiating and maintaining relationships with them, and leveraging these relationships into profit. Customers assess a firm based on how it can deliver value propositions to them through a series of interactions supposed to fulfill the promise embodied in the product/service offer. If the perceived value proposition does not meet customer expectations, customers may well break off the relationship with the firm, leading to shrinking revenue and profits. At the same time, key customers may drain valuable resources that could have otherwise been used for new product development, or they may force a firm to dedicate significant time and resources to maintaining these relationships, putting less emphasis on new innovations. Both perspectives can help drive a firm towards lucrative strategies. However, if a firm cannot afford to have both under the same roof, it may be more economically viable to focus on only one of the two.

Since developing and maintaining a comprehensive set of capabilities is costly and time-consuming, industrial firms should identify which capabilities are critical for success. It is possible to get away with having only dynamic capabilities, and to build core competencies around market sensing, opportunity seizing and capability reconfiguring. It is well known that complex technologies demand the simultaneous use of different sets of skills and knowledge, and firms need to collaborate to bring together complementary skills. Industrial firms with strong innovativeness can reconcile the capabilities possessed by other firms (e.g., market sensing, customer-linking, product development, etc.) and coordinate activities so that the network delivers high value to customers. In addition, since creating and maintaining market orientation is costly for an industrial firm, managers may well benefit from the notion that innovativeness can be equally effective in achieving company goals as market orientation. Moreover, marketing orientation and learning orientation can be both substitutes/complements signaling that e.g. seizing can create future growth paths without having invested in formal and costly sensing mechanisms across the organization. Thus, various recipes of dynamic capabilities may themselves well explain firm performance.

Complementarity of capabilities is a systems-specific phenomenon. When investigating relationships between individual systems elements (i.e., capabilities), the full range of factors (and their dynamism) needs to be assessed to understand their interrelatedness. Furthermore, when capabilities complement one another, the likelihood that they create sustainable competitive advantage and high business performance increases. The magnitude of the impact of these complementarities depends on the value, rareness, inimitability and non-substitutability of capabilities behind the combinations. However, a position of competitive advantage today accruing from a static configuration of capabilities cannot provide industrial firms with a sustainable market position as (1) capabilities can erode while the firm adapts to environmental changes, (2) a configuration of capabilities may be replaced by different configurations leading to the same outcome (i.e. equifinality of capability configurations), or (3) a configuration may be surpassed by better capability. Thus, in line with the dynamic capabilities view, industrial firms need to constantly reconfigure their capabilities (and develop new ones) to stay ahead of the competition.

7. Limitations and avenues for future research

This study, as any empirical work, is subject to limitations, which nevertheless point to opportunities for future research. First, as shown in the solution coverage indices, the solutions presented do not explain all the variance in market and financial performance. The unexplained variance is due partly to the fact that the fsQCA focuses on identifying configurations that consistently lead to an outcome (i.e., high market performance and high financial performance), rather than attempting to identify all the configurations that might explain the outcome. Thus, the future research could include additional contingency variables in order to see if the same configurations will lead to the same outcome. In addition, configurations of dynamic and key operational capabilities are not exhaustive, and individual firms that do not belong to any of the configurations may well reflect high performance as well. However, firms included in the set findings that reflect combinations of dynamic and operational capabilities consistently reflect high performance. This implies that the configurations identified in the present study represent relatively secure organizational benchmarks.

Future research can also investigate how organizational culture influences organizational and individual processes as capability deployment depends on the behavior, willingness, and ability of organizational members to act. This willingness is, however, dependent on norms, values and artifacts of the organization which may affect how capabilities get utilized and deployed. This is seen as a comparison of different culture typologies (i.e. clan, adhocracy, hierarchy, and market) wherein management needs to establish and enhance various mindsets to effectively exploit organizational resources in response to external contingencies.

Second, our study incorporates both external (i.e. environmental dynamism) and internal (i.e. firm size) contingency conditions. The effectiveness of dynamic and operational capabilities is shaped by the business context, as also identified in the present study, future research might want to investigate potential contingencies further by including even other contingency factors that could affect the complementarity and substitutability of capabilities. Such factors might also include organizational structure, depth of business relationships, distance between strategic partners in the network structure, and market dynamism. Incorporating some of these would enable offering more detailed recommendations for managerial audiences.

Third, because of the cross-sectional nature of the data, the present study was not able to investigate the evolution of capability complementarities and substitutes within and across firms over time. As organizations face various threats from the external environment, and their position in strategic partnerships alters, interesting insights could emerge from future studies that attempt to account for such dynamic settings. To understand the within-firm dynamics of capabilities, and provide a better understanding of the symbiotic evolution of dynamic and operational capabilities, an in-depth longitudinal study of the capabilities would be a recommendable avenue for further research.

Fourth, this study narrows the research to three dynamic and two operational capabilities. While this was done to secure a sufficient level of focus in theory development, analysis and depth of discussion, future research could test the interplay between other operational and dynamic capabilities (e.g. business operations and processes, strategic decision making, or strategic human capital management). In so doing, alternative analyses of the capability interplay, as well as a more comprehensive account of such capabilities, might emerge, and thus further advance the focal discussion of the present study.

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TABLES AND FIGURES

Figure 1. Conceptual model

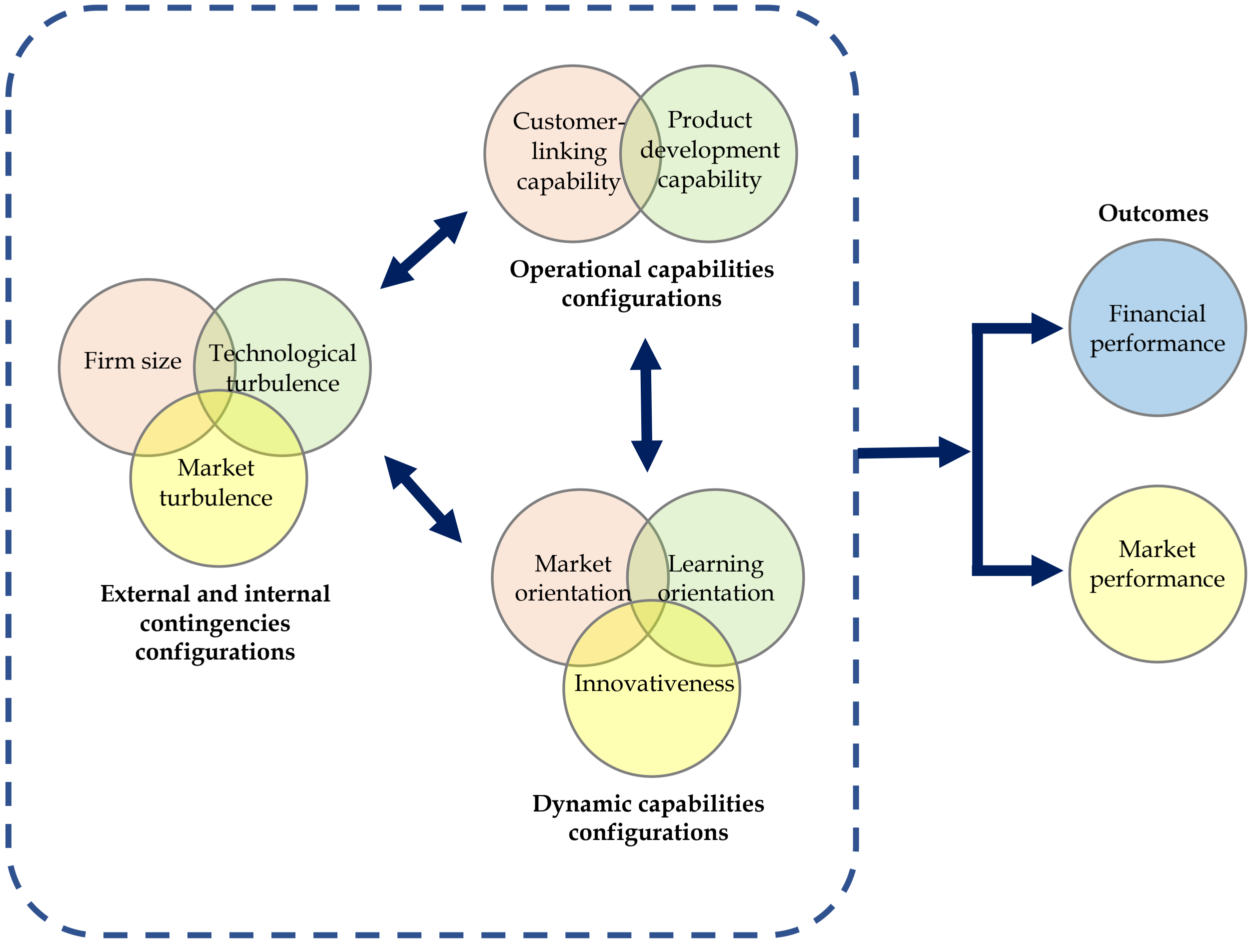

Table 1. Descriptive statistics, correlations, and construct reliability and validity

Construct	Mean (S.D.)	CR	AVE	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Inno	3.20 (0.68)	0.88	0.64	**0.80**								
2. Learnor	3.80 (0.83)	0.90	0.83	0.34	**0.91**							
3. Markor	3.37 (0.76)	0.81	0.60	0.55	0.39	**0.77**						
4. PDC	3.01 (0.71)	0.75	0.59	0.50	0.17	0.38	**0.77**					
5. Custlink	3.82 (0.70)	0.91	0.83	0.35	0.26	0.25	0.37	**0.91**				
6. Financial performance	3.13 (0.80)	0.91	0.78	0.46	0.25	0.23	0.31	0.35	**0.88**			
7. Market performance	3.28 (0.80)	0.89	0.80	0.37	0.18	0.18	0.38	0.25	0.53	**0.89**		
8. Technological turbulence	3.45 (0.82)	0.69	0.53	0.22	0.24	0.36	0.10	0.14	0.06	0.06	**0.73**	
9. Competitive intensity	4.22 (0.75)	0.81	0.68	0.03	0.10	0.17	0.06	0.06	-0.04	0.04	0.45	**0.82**

Note: Square-root of AVE on the diagonal in bold; correlations off-diagonal

Table 2. Configurations consistently associated with high and low financial performance (N=219).

	High financial performance (FP)					**Not-high FP**			
	C1	**C2**	**C3**	**C4**	**C5**	**C1**	**C2**	**C3**	**C4**
Dynamic capabilities									
Innovativeness (Inno)	●	•	●	●	●	⊗	⊗	⊗	•
Learning orientation (Learnor)	●	•	●	⨂		•	⊗	•	•
Market orientation (Markor)	●	●		•			⊗	⊗	•
Ordinary marketing capability									
Product development capability (PDC)	●					⊗	⊗	⊗	
Customer-linking capability (Custlink)	●	•	●	•	•	•		•	•
Business context									
Technological turbulence		⨂	●	•	⨂	•	•		•
Competitive intensity	•	•	⨂	•	⨂	•	•	•	•
Firmographics									
Firm size (Large)	⊗	●	●	⊗	⊗		⊗	⊗	⊗
Goodness of fit									
Raw coverage	0.36	0.18	0.20	0.25	0.23	0.33	0.22	0.25	0.22
Unique coverage	0.06	0.01	0.03	0.03	0.04	0.08	0.07	0.03	0.04
Consistency	0.82	0.83	0.82	0.79	0.81	0.88	0.97	0.92	0.82
Overall solution coverage	**0.53**					**0.46**			
Overall solution consistency	**0.75**					**0.84**			

Note: Black circles (●) indicate the presence of a condition, circles with "×" indicate its absence, and blank spaces indicate "don't care". Large circles indicate core conditions, small circles peripheral conditions. Frequency cutoffs: 2 (high FP), 5 (not-high FP); consistency cutoff: 0.80.

Table 3. Configurations consistently associated with high and low market performance (N=219).

	High market performance					**Low market performance**		
	C1	**C2**	**C3**	**C4**	**C5**	**C1**	**C2**	**C3**
Dynamic capabilities								
Innovativeness (Inno)	•		●	●			⊗	⊗
Learning orientation (Learnor)		●						
Market orientation (Markor)	•			•				⊗
Operational capabilities								
Product development capability (PDC)	●				●	⨂	⨂	⨂
Customer-linking capability (Custlink)	•	•	•	•				
Environmental dynamism								
Technological turbulence (Techtur)		⨂	⊗	•	•	•	•	
Competitive intensity (Compint)	•	•	⊗	•	•	•	•	•
Firm demographics								
Firm size (Large)		●	⨂	⨂	⊗	⊗		⊗
Goodness of fit								
Raw coverage	0.35	0.22	0.21	0.36	0.35	0.41	0.48	0.36
Unique coverage	0.03	0.05	0.04	0.04	0.04	0.03	0.10	0.05

Consistency	0.88	0.81	0.81	0.78	0.83	0.81	0.86	0.88
Overall solution coverage	**0.59**					**0.56**		
Overall solution consistency	**0.76**					**0.82**		

Note: Black circles (●) indicate the presence of a condition, circles with "×" indicate its absence, and blank spaces indicate "don't care". Large circles indicate core conditions, small circles peripheral conditions. Frequency cutoffs: 2 (high MP), 5 (low MP); consistency cutoff: 0.80.

Table 4. Dynamic and operational capabilities: substitutes or complements for financial performance (FP) and market performance (MP)

Within-capability findings		***FP***	***MP***
Learnor / Markor	Substitutes [a] or complements[b]	X	
Inno / Markor	Substitutes[a]	X	
Across-capability findings		***FP***	***MP***
Inno / Custlink	Complements[a]	X	
Learnor / PDC	Complements[a, c]	X	
Markor / Custlink	Complements[a, d]	X	
Markor / PDC	Complements[a]	X	
Inno / PDC	Substitutes[a]		X
Learnor / Custlink	Complements[a, e]		X
Markor / PDC	Substitutes[a, f]		X

[a] The complement/substitute term is also part of a core condition

[b] When capabilities can serve as both substitutes and complements, the better-fitting solution is listed first

[c] Function of competitive intensity – only applies under high competitive intensity.

[d] Function of competitive intensity – only applies (for innovative firms) under high competitive intensity.

[e] Function of competitive intensity – only applies under high competitive intensity.

[f] Function of firm size – only applies for small firms.

APPENDICES

Appendix A

fsQCA versus conventional approaches on configuration theory

fsQCA versus cluster analysis

Following Hair et al. (2010), a two-step cluster analysis was performed – a hierarchical cluster analysis followed by k-means clustering. Employing the ward method, hierarchical clustering yielded a six-cluster solution. Following this, the k-means analysis was used to generate and interpret the profiles of six clusters (see Table A1). An analysis of variance with the six clusters (as treatment variables) was conducted for high financial and market performance (as the dependent variables) to assess whether cluster membership can predict high financial performance and high market performance. The variance analysis reveals statistically significant solutions ($F=6.86$; $p<0.001$ versus $F=4.72$; $p<0.001$); clusters three, five and six have a strong propensity for high financial and market performance (fuzzy score > 0.5), clusters one and four have a strong propensity for low performance (fuzzy score < 0.5), and the second cluster is close to the set of firms with high financial and market performance (fuzzy score ≅ 0.5).

Comparing the cluster analysis results with the results of fsQCA, significant differences can be observed. First, the explanatory power of cluster membership is weaker compared to the fsQCA coverage index ($R^2=0.01$ and $R^2=0.00$ versus coverage=0.59 and coverage=0.53). Second, although some of the clusters resemble specific configurations, cluster analysis may not be able to replicate the capability configurations diversity provided by fsQCA. Clusters three, five and six score high on learning orientation, market orientation, innovativeness and customer-linking capability, and somewhat high on product development capability (like configurations C1, C2, C3 and C5 in Table 2). Here, external and internal contingency factors also take high/low value, suggesting that firms combine their capabilities to stay ahead of competition. In clusters one and four, learning orientation and customer-linking capability seem to score high for low financial performance (like configurations C1 and C3 for low performers in Table 2). Cluster two shows high scores on all but one capability (i.e., product development capability), leading to mediocre performance. These results provide further evidence of fsQCA's ability to yield richer and more precise findings than cluster analysis.

fsQCA versus deviation score analysis

The next study compares the fsQCA results with those obtained through deviation score analysis. The profile deviation approach determines the gap between the best performing firms and those falling below the 10-15 percent threshold level (Venkatraman & Prescott, 1990). First, we need to calibrate the set of capabilities of the top performing firms as the ideal profile. Second, we compare the capabilities of the "remaining" firms in the dataset in relation to this benchmark (Venkatraman & Prescott, 1990). This was done by calculating the Euclidean distance from the benchmark of all the other firms in the sample across the five capability dimensions. The results provide a "profile-deviation" score representing the gap between the benchmark firms' capabilities and those of each of the remaining firms in the sample. Firms with an average score above 0.80 on the calibrated financial and market performance measures were designated as most likely to be top performers (the subset constituted 10% of the sample)[8]. The vector of mean score of the five capabilities for these

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[8] To ensure an unbiased sample domain for testing the coalignment proposition, the bottom 10% of least performing firms were also removed (Venkatraman & Prescott, 1990).

firms constituted the ideal score, and for the remaining firms, deviation scores were calculated as the Euclidean distance of their profiles from the ideal profiles. Following this, the profile deviation score for each firm (using variables measuring internal and external contingencies) was regressed onto financial and market performance. While benchmarking capabilities have the potential to significantly improve performance, the results should indicate that the deviation from the benchmark profile is negatively and significantly related to performance (Drazin & Van de Ven, 1985; Venkatraman & Prescott, 1990).

Table A2 shows that the coefficients derived from the ideal capability configurations explaining financial and market performance is negative but non-significant (β=–0.14, n.s. and β=–0.00, n.s.). This does not support the proposition that a firm’s ideal capability configuration leads to high financial and market performance. The fuzzy scores on the financial performance drivers for the ideal subset of firms indicates a profile high on learning orientation (0.75), market orientation (0.65) innovativeness (0.53) and customer-linking capability (0.67), and low on product development capability (0.37). A somewhat similar profile was drawn up for market performance (0.59, 0.61, 0.54, 0.46, and 0.71). Though the deviation score results appear to be consistent and more or less in line with theoretical assumptions, the deviation score analysis did not show statistically significant differences between the best performing firms and those of the “remaining” firms in terms of ideal capability configurations (Drazin & Van de Ven, 1985; Venkatraman & Prescott, 1990). In addition, deviation score analysis has less explanatory power than fsQCA (R^2=0.08 and R^2=0.13 versus coverage=0.59 and coverage=0.53).

fsQCA versus multiple regression analysis

In addition, we conducted a multiple regression analysis with interaction terms. Fit as moderation explains how the interaction between organizational structure and process elements explain the variance in organizational performance. The premise of the interaction approach is that organizations can be broken down into components and these components can be studied separately. Information gathered in this way can then be aggregated to enhance understanding of the organization's operations (Venkatraman & Camillus, 1984). Out of the five capabilities, only innovativeness and product development capability seem to have a significantly positive effect on financial and/or market performance (see Table A3). For financial performance, innovativeness explains 100% of the variance, and for market performance, 47% of the variance is explained by innovativeness, while the remaining 53% of variance is accounted for by product development capability.

While regression models identify some four- or five-way interactions (see Table A3) whose components reflect configurations C2 and C3 to some extent in Table 2, they can only tangentially grasp the complexity of organizational processes/activities and their effect on firm performance. These results point to the limitation of regression analysis in investigating complex, higher-order interactions. While regression analysis parametrizes average effects for all variables, fsQCA can show how variables combine into configurations to explain the outcome of interest (Woodside, 2013).

Conclusion

All of the above combined, fsQCA adds value vis-à-vis cluster analysis, deviation score analysis and regression analysis in our research context.

Table A1. Cluster analysis based on fuzzy-set membership scores

Cluster	Learnor	Markor	Inno	PDC	Custlink	Techtur	Compint	Large
1	0.41	0.21	0.14	0.16	0.60	0.28	0.44	0.52
2	0.65	0.46	0.61	0.33	0.70	0.37	0.19	0.19
3	0.81	0.66	0.52	0.33	0.80	0.69	0.64	0.84
4	0.51	0.46	0.22	0.19	0.16	0.62	0.76	0.32
5	0.79	0.80	0.74	0.62	0.86	0.73	0.71	0.17
6	0.60	0.54	0.29	0.20	0.83	0.72	0.74	0.10
Centroid	0.63	0.52	0.42	0.31	0.66	0.57	0.58	0.36

Note: $F(\text{ANOVA}_{\text{Financial performance}})=6.86$; $R^2(\text{ANOVA}_{\text{Financial performance}})=0.01$

$F(\text{ANOVA}_{\text{Market performance}})=4.72$; $R^2(\text{ANOVA}_{\text{Market performance}})=0.00$

Table A2. Regression results for deviation from 22 top performance benchmarks

Independent variables	Dependent variables	
	Financial performance	Market performance
	β (t-value)†	β (t-value)†
Deviation from benchmark	-0.14 (-0.93)	-0.00 (-0.02)
Dynamic capabilities		
Market orientation (Markor)	0.02 (0.20)	0.12 (0.14)
Learning orientation (Learnor)	0.01 (0.05)	0.13 (1.71)*
Innovativeness (Inno)	0.19 (2.13)**	0.21 (2.33)**
Operational capabilities		
Customer-linking capability (Custlink)	0.02 (0.19)	0.05 (0.49)
Product development capability (PDC)	0.11 (1.27)	0.18 (2.18)**
Environmental dynamism		
Technological turbulence (Techtur)	-0.06 (-0.69)	-0.11 (-1.36)
Competitive intensity (Compint)	-0.04 (-0.50)	0.10 (1.27)
Firm demographics		
Firm size (large)	-0.01 (-0.10)	0.05 (0.71)
Adjusted R^2	0.08	0.13
F-statistics	2.70	3.81
Number of firms‡	175	175

† *p<0.10 **p<0.05 ***p<0.01

‡ Total less benchmark and lowest performing firms.

Table A3. Multiple regression on financial performance and market performance with multiple interaction terms

Independent variables	Dependent variables					
	Financial performance	Market performance	Financial performance	Market performance	Financial performance	Market performance
	β (t-value)†	β (t-value)†	β (t-value)†	β (t-value)†	β (t-value)†	β (t-value)†
Dynamic capabilities						
Market orientation (Markor)	0.10 (1.39)	0.02 (0.29)	-	-	-	-
Learning orientation (Learnor)	0.09 (1.37)	0.06 (0.83)	-	-	-	-
Innovativeness (Inno)	0.27 (3.42)**	0.22 (2.91)**	-	-	-	-
Operational capabilities						
Customer-linking capability (Custlink)	0.07 (1.13)	0.08 (1.18)	-	-	-	-
Product development capability (PDC)	0.06 (0.89)	0.23 (3.31)**	-	-	-	-
Environmental dynamism						
Technological turbulence (Techtur)	-0.00 (-0.02)	-0.07 (-1.01)	0.05 (0.07)	-0.05 (-0.70)	0.06 (0.80)	-0.04 (-0.63)
Competitive intensity (Compint)	-0.09 (-1.37)	-0.01 (-0.12)	-0.07 (-1.06)	-0.01 (-0.07)	-0.08 (-1.14)	-0.01 (-0.17)

Firm demographics						
Firm size (large)	0.00 (0.04)	-0.09 (-1.44)	0.02 (0.30)	-0.09 (-1.34)	0.02 (0.25)	-0.09 (-1.43)
Interactions						
Custlink*PDC*Markor	-	-	-0.05 (-0.40)	0.08 (0.59)	-	-
Custlink*PDC*Learnor	-	-	0.16 (1.22)	0.14 (1.11)	-	-
Custlink*PDC*Inno	-	-	0.20 (1.29)	0.18 (0.24)	-	-
Custlink*PDC*Markor*Learnor	-	-	-	-	0.03 (0.22)	0.12 (0.78)
Custlink*PDC*Markor*Inno	-	-	-	-	-0.03 (-0.18)	0.02 (0.11)
Custlink*PDC*Learnor*Inno	-	-	-	-	0.27 (2.02)**	0.26 (1.97)*
Custlink*PDC*Markor*Learnor*Inno	-	-	-	-	-	-
Adjusted R^2	0.15	0.17	0.08	0.12	0.06	0.12
F-statistics	5.93***	6.49***	3.95***	5.91***	3.42***	6.05***
Number of firms‡	219	219	219	219	219	219

† *p<0.10 **p<0.05 ***p<0.01

Table A3, *continued.* Multiple regression on financial performance and market performance with multiple interaction terms

Independent variables	Dependent variables: Financial performance β (t-value)[†]	Dependent variables: Market performance β (t-value)[†]
Dynamic capabilities		
Market orientation (Markor)	-	-
Learning orientation (Learnor)	-	-
Innovativeness (Inno)	-	-
Operational capabilities		
Customer-linking capability (Custlink)	-	-
Product development capability (PDC)	-	-
Environmental dynamism		
Technological turbulence (Techtur)	0.07 (0.95)	-0.03 (-0.44)

Competitive intensity (Compint)	-0.09 (-1.32)	-0.03 (-0.39)
Firm demographics		
Firm size (large)	0.01 (0.21)	-0.09 (-1.46)
Interactions		
Custlink*PDC*Markor	-	-
Custlink*PDC*Learnor	-	-
Custlink*PDC*Inno	-	-
Custlink*PDC*Markor*Learnor	-	-
Custlink*PDC*Markor*Inno	-	-
Custlink*PDC*Learnor*Inno	-	-
Custlink*PDC*Markor*Learnor*Inno	0.23 (3.35)**	0.35 (5.35)***
Adjusted R^2	0.04	0.11
F-statistics	3.45***	7.65***
Number of firms	219	219

† *p<0.10 **p<0.05 ***p<0.01

Appendix B. Sample distribution

Industry	**Frequency**	**%**	**Sector**	**Frequency**	**%**
Agriculture	25	11.4	Raw materials and components	67	30.6
Construction	72	32.9	Industrial production equipment	44	20.1
Transportation	2	0.9	Industrial services	108	49.3
Wholesale	9	4.1			
Financial services	3	1.4	**Firm size**		
Mining	15	6.8	**(nr. of employees)**	**Frequency**	**%**
Processing industry	46	21.0	Less than 20	15	6.8%
Telecommunications	5	2.3	20-49	80	36.5%
Retail	1	0.5	50-99	60	27.4%
Other services	19	8.7	100-499	51	23.3%
Other	22	10.0	500 or more	13	5.9%

Appendix C. Measurement items and standardized loadings

Source(s)	Construct	Item	Stand. loading
Theoharakis, Sajtos and Hooley 2009	Innovativeness[1]	1. We are more innovative than our competitors in deciding what methods to use in achieving our targets and objectives.	0.76
		2. We are more innovative than our competitors in initiating new procedures or systems.	0.80
		3. We are more innovative than our competitors in developing new ways of achieving our targets and objectives.	0.87
		4. We are more innovative than our competitors in initiating changes in the job contents and work methods of our staff.	0.75
Adapted from Baker, Sinkula & Noordewier (1997)	Learning orientation[1]	1. Employee training and learning is seen as an investment rather than an expense.	0.82
		2. The underlying values of our company include learning as a key to improvement.	0.99
Narver and Slater (1990)	Market orientation[1]	1. Close attention is given to after sales services.	0.74
		2. Competitive strategies are based on understanding customer needs.	0.66
	Customer orientation	3. Customer satisfaction is systematically and frequently assessed.	0.78

		4. Our commitment to serving customers needs is closely monitored.	0.60
		5. Business strategies are driven by increasing value for customers.	0.80
	Competitor Orientation	1. Sales people share information about competitors.	0.60
		2. Top management regularly discuss competitors' strengths and weaknesses.	0.86
		3. We achieve rapid response to competitive actions.	0.70
	Inter-functional coordination	1. Business functions are integrated to serve market needs.	0.66
		2. Information about customers is freely communicated throughout the company.	0.77
		3. Our managers understand how employees can contribute to value for customers.	0.82
Day (1994)	Product development capability[2]	1. Ability to launch successful new products/services.	0.77
		2. Effective new product/service development processes.	0.77
Theoharakis, Sajtos and Hooley 2009	Customer-linking capability[2]	1. Good at creating relationships with key customers or customer groups	0.89
		2. Good at maintaining and enhancing relationships with key customers	0.93

Hooley et al. (2005); Reimann et al. (2010)	Financial performance[3]	1. Profit/profit margins relative to main competitors	0.89
		2. Return on investment (ROI) relative to main competitors	0.87
		3. Return on assets (ROA) relative to main competitors	0.88
Hooley et al. (2005)	Market performance[3]	1. Sales volume relative to main competitors	0.95
		2. Market share relative to main competitors	0.83
Jaworski and Kohli (1993)	Technological turbulence[1]	1. Technological changes are becoming faster.	0.83
		2. New products and services are becoming to the market increasingly rapidly.	0.61
Jaworski and Kohli (1993)	Competitive intensity[1]	1. Competition is lively and constantly changing.	0.75
		2. Competition for sales is intense.	0.89

[1] The response options ranged from 1, ‘strongly disagree,’ to 5, ‘strongly agree.’

[2] The response options ranged from 1, ‘strong competitor’s advantage,’ to 5, ‘our strong advantage.’

[3] The response options ranged from 1, ‘much worse,’ to 5, ‘much better.’