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Organizational integration of the IT function: A key enabler of firm capabilities and performance

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ABSTRACT

Organizational integration between intra- and inter-organizational subsystems is an important factor of operational coordination, innovation, and strategic effectiveness. Scholars have mainly focused on the organizational integration of three sub-systems: production/operations, marketing/sales, and R&D. This study explored the organizational integration of the organizational unit in charge of the firm's IT and information systems: the IT function. This construct has five key dimensions: integration of the IT function with top management, business units, customers, non-IT suppliers, and IT providers. Analysis of data from 236 responses to a survey questionnaire confirmed that all five dimensions positively influence the firm's market performance. The contribution of the firm's information systems to both competitive and cooperative organizational capabilities strongly mediates this relationship. This research model highlights the complementary explanatory power of Lawrence and Lorsch's (1967) theory of organizational integration, the business-IT alignment literature, and the resource-based view (RBV). The results suggest that the more firms evolve towards IT-enabled business environments, the more they need IT managers to be socially embedded in these environments and to contribute actively to the overall knowledge-based organizational integration of the system.

La integración organizacional de la función IT: un facilitador clave de las capacidades y el rendimiento de la empresa

Palabras clave:
Integración organizacional
Unidades organizacionales
Valor de gestión de IT
Capacidades competitivas

RESUMEN

La integración organizacional entre los subsistemas intra e inter organizacionales es un factor importante de coordinación operacional, innovación y eficacia estratégica. Hasta ahora, los estudiosos se han centrado principalmente en la integración organizacional de tres subsistemas: producción/operaciones, marketing/ventas e investigación y desarrollo. Este estudio investiga la integración organizacional de la unidad organizacional a cargo de la

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Capacidades de cooperación
CIO

tecnología de la información (IT) de la empresa y los sistemas de información (SI): la función IT. Se identifican cinco dimensiones clave al respecto: integración de la función informática con el equipo directivo superior (TMT), unidades de negocio, clientes de la empresa, proveedores no IT y proveedores IT. Un cuestionario de encuesta con 236 encuestados confirma que todas estas cinco dimensiones de la integración organizacional de la función IT influyen positivamente en el desempeño del mercado de la empresa; Esta relación está fuertemente mediada por la contribución de la IS de la empresa a las capacidades competitivas y cooperativas de la organización. Este modelo de investigación resalta el poder explicativo complementario de la teoría de la integración organizacional de Lawrence y Lorsch, la literatura de alineación de negocios-IT y la visión basada en recursos (RBV). Los resultados sugieren que cuanto más empresas evolucionan hacia entornos empresariales habilitados para IT, más necesitan que los administradores de IT estén socialmente integrados en estos entornos y contribuyan activamente a la integración organizacional global del sistema basada en el conocimiento.

Introduction

Organizational integration can be defined as the extent to which distinct and interdependent organizational components rapidly and adequately respond and/or adapt to each other while pursuing common organizational goals (Barki & Pinsonneault, 2005; Lawrence & Lorsch, 1967). The term "component" in this definition indicates any organizational sub-system, such as organizational units, functions, or external partners. Organizational integration is essential in the knowledge age. For example, in a highly integrated supply chain, a firm's research and development (R&D) function, its marketing function and its key, trusted supplier can systematically collaborate and learn from each other for new product development.

The literature has identified several organizational mechanisms that are direct enablers of organizational integration. Among these mechanisms, some have proved particularly relevant, such as process standardisation, good social relationships within the senior team, purposeful inter-component connectedness, cross-functional projects, cross-functional teams, and technological interfaces (Gilbert, 2005; Glouberman & Mintzberg, 2001; Gupta & Govindarajan, 2000; Hansen, 2002; Jansen, Tempelaar, van den Bosch, & Volberda, 2009; Klein & Rai, 2009; Lawrence & Lorsch, 1967; Martinez & Jarillo, 1989; Nelson, 1989; Tsai, 2002).

Technological interfaces, in particular, play an increasingly crucial role in innovation-oriented organizational integration. In the last decades, the evolution of IT has enabled an unprecedented integration of processes and information flows, both within and across organizational boundaries (Berente, Vandenbosch, & Aubert, 2009; Sambamurthy, Bharadwaj, & Grover, 2003). Today, internet-based systems are the key enablers of social connectedness in business environments (Jue, Marr, & Kassotakis, 2009). In addition, the implementation of some new technological interfaces, such as enterprise resource planning (ERP) systems or e-business platforms, results in gigantic cross-functional projects in which cross-functional teams of IT people must bridge organizational silos (Barki & Pinsonneault, 2005; Newell, Tansley, & Huang, 2004). For these reasons, effective relationships between the highest-ranked IT manager, often called the chief information officer (CIO) and the top management team (TMT), including the chief executive officer (CEO), may offer a key contribution to innovative strategies and growth in the e-business era (Feeny, Edwards, & Simpson, 1992; Naranjo-Gil, Hartmann, & Maas, 2008).

In sum, the relevance of the IT function and, in particular, IT managers (including the CIO) to organizational integration is at least fourfold. First, this function is in charge of designing, adjusting and implementing the tools that are key to process standardisation, which is an important mechanism enabling integration. Second, the IT function is in charge of supporting all the system's social connectedness through smooth web-based communication; also social connectedness is a powerful mechanism enabling integration. Third, the IT function periodically participates in cross-functional teams in charge of key cross-functional projects, when new important IS systems are designed and implemented: both cross-functional teams and projects are key mechanisms for integration. Fourth, the highest-ranked IT managers are in the position to play a pivotal role in fostering constructive relationships and cooperation within the firm's senior team, a key factor to spread the culture of integration throughout the whole organization.

All these reasons notwithstanding, the literature has overlooked the role of the IT function and IT managers in organizational integration so far. Scholars have investigated the importance of specific aspects: for example, the importance of an effective relationship between the CIO and the CEO has been highlighted and tested (Feeny et al., 1992). Nevertheless, to the best of the authors' knowledge, an empirical investigation of the IT function's overall organizational integration and its impact on firm performance is still missing.

Previous studies on the organizational integration of specific functions have thus far mainly focused on the role of the marketing/sales, production, and R&D functions (Barki & Pinsonneault, 2005; Jaspers & van den Ende, 2006; Millson, 2013), whilst the IT function has not attracted scholarly attention so far. These studies have confirmed that the

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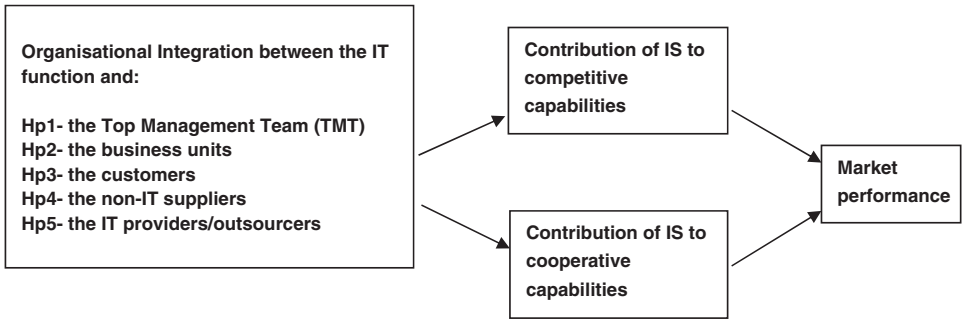

Fig. 1 – Research model.

organizational integration of marketing/sales, production, and R&D functions is an important antecedent of performance.

Three theoretical views have so far proved particularly suited to provide explanations to this link between organizational integration and firm performance: Lawrence and Lorsch's theory of organizational differentiation (Lawrence & Lorsch, 1967), the resource-based view (RBV) and its sister theories (Barney & Arikan, 2001), and the strategic alignment view (Johnson & Lederer, 2010). Although scholars usually adopt one of these views at a time, this study leverages the complementary explanatory power of all three approaches. The novelty of this article, then, results from both the lack of studies on the topic (the organizational integration of the IT function) and the cross-fertilization of three theoretical approaches (organizational differentiation and integration, RBV and business-IT alignment) that have evolved quite independently so far.

This cross-fertilization allowed the authors to focus on the contribution of IS to organizational capabilities as a key possible mediator between the organizational integration of the IT function and firm performance. Organizational capabilities are a key concept in RBV and sister theories, such as the knowledge-based view (Phelps, Heidl, & Wadhwa, 2012) and the relational view (Lavie, 2006). These theories highlight that different firms can rely on different resources and, even more importantly, can re-combine and leverage their resources in different, divergent ways, thus developing specific organizational capabilities that may prove hardly imitable and enabling the development of competitive advantage (Jay Barney, 2001). The way each organization leverages and recombines its resources is strongly influenced by the social exchanges between individuals and organizational units in that organization's context. For this reason, some scholars have focused on the possible link between organizational integration, capabilities, and performance (Argyres, 1996; Zahra & Nielsen, 2002). The three theoretical approaches mentioned above (RBV, organizational differentiation and integration, and strategic alignment) converge in predicting that high organizational integration enables more effective relationships, specialisation, coordination and alignment. Therefore, organizational integration may prove crucial to develop unique, valuable and inimitable organizational capabilities.

This study leverages this view to investigate the specific link, hitherto neglected, between the organizational integration of the IT function, the contribution of the firm's IS to organizational capabilities, and market performance.

Through literature analysis and factor analysis, based on a survey questionnaire with 236 respondents, the research model presented in this study (see Fig. 1) identifies five dimensions of the organizational integration of the IT function: integration of the IT function with the TMT, business units, firm's customers, non-IT suppliers, and IT providers.

The same survey also allows the authors to identify two dimensions of the key organizational capabilities that the firm's IT may contribute to: competitive capabilities (including customer orientation, strategic innovation capability, and the capability to face market challenges) and cooperative capabilities (including inter- and intra-organizational commitment, knowledge sharing, and trustworthiness).

The analysis of survey data confirms that all these five dimensions of the organizational integration of the IT function positively influence the firm's market performance; this relationship is strongly mediated by the contribution of the firm's IS to both competitive and cooperative organizational capabilities. Our analysis also shows that all five dimensions of the organizational integration of the IT function have a comparably relevant influence on performance, including those aspects of the IT function's integration (with the customers and non-IT suppliers) that have been completely overlooked by the empirical research so far.

Background and hypotheses development

The organizational integration of the IT function

Lawrence and Lorsch's seminal study (Lawrence & Lorsch, 1967) on organizational differentiation and integration states that, in dynamic competitive environments, different parts of the organization become increasingly specialised, and each part tends to diverge from the others as for its people's shared goals, beliefs and attitudes. Therefore, organizations rapidly evolve into systems where people in different units think and act differently. However, excessive differentiation, if not balanced by effective integration, can cause inefficiencies and conflict. Differentiation and specialisation are successful strategies in dynamic environments only if the differing specialised parts of the organization remain capable of understanding each other in order to collaborate for common goals.

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Coordination and collaboration issues emerge wherever operational interdependencies are present, including both intra- and inter-organizational relationships between key subsystems (Whang, 1995). Active, creative cooperation becomes even more important when innovation needs emerge (Ettlie, 1992; Jansen et al., 2009; Millson, 2013). For these reasons, the organization should develop formal and informal organizational mechanisms that enable and encourage integration (Volkoff, Strong, & Elmes, 2005), and managers should strive continuously and creatively for integration (Barki & Pinsonneault, 2005). Managers that drive projects and activities involving the whole organization are the best candidates for strong integration roles (Lawrence & Lorsch, 1967). IT managers, including the CIO, are certainly among them, since IT plays a pivotal role in business process integration (Berente et al., 2009; Cheung, Mocker, Schlagwein, Sunyaev, & Turowski, 2015; Mangan & Kelly, 2009; Ranganathan & Brown, 2006; Volkoff et al., 2005). The IT managers' contribution to firm performance and competitive advantage largely depends on these managers' ability to understand and support the evolving business needs and processes (Ding, Li, & George, 2014; Peppard, 2007). This ability may be developed only if the IT management is at the centre of an effective and well-structured network of intra- and inter-organizational relationships (Cravens, Piercy, & Shipp, 1996). In fact, in today's networked economy, increasingly based on extensive IT outsourcing and e-business, the possible strategic role of IT goes far beyond the boundaries of a single firm (Chun & Mooney, 2009); thus, along with traditional interactions with the so-called internal customer, IT management is also more and more involved in inter-organizational interactions, especially with the firm's customers, IT providers and outsourcers and non-IT suppliers (Kohli & Grover, 2008). Therefore, IT managers should be able to, and put in the condition to, actively and collaboratively interact with different parts of the organization's ecosystem, not only to avoid, minimise or solve conflicts, misunderstandings and inefficiencies, but also to contribute to strategic growth through product, process and market innovation (Chen, Preston, & Xia, 2010).

As synthesised in Table 1, the literature mentions five categories or types of relationships of the IT managers and IT functions as crucial to organizational integration and performance. Three of these typical relationships have already been empirically investigated, although separately (the relationships with the CEO/TMT, business units and IT providers/outsourcers). Scholars have asserted the importance of the other two (the relationships with the firm's customers and non-IT suppliers), but these relationships have been overlooked by empirical research so far. This study will consider all of these five dimensions to describe the organizational integration of the IT function. This is the first study that investigates the impact of the organizational integration of the IT function by analysing its connectedness through a comprehensive range of intra- and inter-organizational relationships.

Competitive and cooperative capabilities

In this study, we focus on the contribution of IS to organizational capabilities (Day, 1994) as the possible key mediator between the organizational integration of the IT function and firm performance. Researchers maintain that IT management influences firm performance by enabling key organizational capabilities through IS (Bullini Orlandi, 2016; Liang, You, & Liu, 2010). For example, Mithas and Ramasubbu (2011) found that information management capability favourably affects the development of other firm capabilities for customer management, process management and performance management. In turn, these capabilities positively affect several measures of firm performance.

Many attempts have been made to classify organizational capabilities. Day (1994) proposes a model where organizational capabilities fall into three dimensions: inside-out capabilities (efficiency, technological solutions and cost controls), outside-in capabilities (customer relationships, understanding competitors and market responsiveness), and spanning capabilities (partnerships management and planning). Hulland, Wade, and Antia (2007) propose a simplified view, including just two dimensions: internal capabilities (intra-organizational control, internal cooperation and IT experience) and external capabilities (supply chain cooperation and understanding customer needs). A similar two-dimension model is proposed by Bharadwaj (2000).

This study also adopts a two-dimension view of organizational capabilities: competitive capabilities and cooperative capabilities (see Fig. 1).

The competitive capabilities of a firm describe the extent to which the firm is capable of effectively facing the market (Koufteros, Vonderembse, & Doll, 2002). These capabilities are usually measured through several indicators, including cost leadership, product/service quality, delivery dependability, production/service rapidity, product innovation rates, customer satisfaction and loyalty, service adaptability, time-to-market, product/service innovation rates and process flexibility (Bhatt & Grover, 2005; McEvily & Marcus, 2005; Rosenzweig, Roth, & Dean, 2003).

The cooperative capabilities of a firm (Tyler, 2001) are rooted in key social assets, such as reputation (Barney & Hansen, 1994) and knowledge sharing (Chow & Chan, 2008). They include intra- and inter-organizational cooperation capabilities (Sahay, 2003), which are usually modelled to include the three dimensions of communication, commitment and trust (Blomqvist & Levy, 2006).

Market performance

As for the dependent variable, this study adopts market performance in comparison with the competitors (Ritala, 2012; Rivard, Raymond, & Verreault, 2006), which is a key expected outcome of superior firm capabilities from the RBV standpoint (Spanos & Lioukas, 2001). In addition, this indicator of firm performance is also consistent with both the strategic alignment (Bergeron, Raymond, & Rivard, 2004) and the organizational integration (Barki & Pinsonneault, 2005) literatures. Many authoritative scholars have stated that market performance is even a more interesting performance indicator for IS than efficiency or financial performance, because in today's scenario new technologies are expected to contribute not only to cost reduction, but also, and even more importantly, to strategic growth and competitive advantage

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Table 1 – Expected impacts and/or implications of the IT managers' and/or IT function's relationships according to the literature.

Publication	Type	IT people relations with:	Claims	Theoretical lens
(Bassellier & Benbasat, 2004)	Empirical – quantitative	Business units	Business competence of IT professionals (organizational overview, organizational responsibility, IT-business integration, interpersonal communication, leadership, and knowledge networking) significantly influences their intention to develop partnerships with their business clients.	Knowledge networks theory, social cognitive theories
(Bharadwaj, Bharadwaj, & Bendoly, 2007)	Empirical – quantitative	Business units	Superior coordination between manufacturing and IS functions leads to superior integrated IS capability, which in turn impacts manufacturing performance.	Theories of organizational coordination
(Bhatt & Grover, 2005)	Empirical – quantitative	Business units	Higher quality relationship infrastructures between IT and business units executives have a significant positive effect on the competitive advantage of the firm.	RBV
(Chan, 2002)	Empirical – qualitative	CEO – TMT; Business units	Informal organization structures play a far more important role than formal alignment in improving IS performance.	Business-IT alignment
(Day, 2007)	Empirical – qualitative	Business units	The strength of the relationship between the IT function and the internal customer reflects the degree of congruence between the common beliefs of the parties.	–
(Feeny & Willcocks, 1998)	Conceptual	Business units, IT providers	IT managers' interpersonal skills are key to success in four areas of core IS capability (relationship building, contract facilitation, leadership and IT buying).	–
(Feeny et al., 1992)	Empirical – qualitative	CEO – TMT	The TMT's CIO membership and an effective CIO-CEO relationship are important to maximising IT exploitation.	–
(Gupta, 1991)	Conceptual	CEO – TMT	The strategic partnership between the CEO and CIO is key to competitive advantage.	RBV
(Han, Lee, & Seo, 2008)	Empirical – quantitative	IT providers	The effectiveness of the relationship between the IT vendor and client organization influences outsourcing success.	RBV – social exchange theory
(Johnson & Lederer, 2010)	Empirical – quantitative	CEO – TMT	Communication frequency and channel richness positively influences CEO/CIO convergence, which in turn influences the financial contribution of IS to the organization.	Social exchange theories
(Karahanna & Preston, 2013)	Empirical – quantitative	CEO – TMT	IS alignment mediates the relationship between CIO-TMT social capital and financial performance.	Social capital – knowl. networks
(Lane & Lum, 2011)	Empirical – quantitative	IT providers	Trust and shared business understanding are the key drivers in the IT outsourcing relationship, ensuring that risks and benefits are shared, minimising conflict and leading to successful partnerships.	Social exchange theories

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Table 1 – (*Continued*)

Publication	Type	IT people relations with:	Claims	Theoretical lens
(Nelson & Cooprider, 1996)	Empirical – quantitative	Business units	Shared knowledge and mutual trust between IS groups and their line customers contribute to IS performance.	Social exchange theories
(Peppard, 2007)	Conceptual	Business units	The knowledge resources needed to successfully deliver business value through IT are distributed throughout the organization, presenting a challenge for the CIO.	RBV
(Piccoli & Ives, 2005)	Conceptual	CEO – TMT; Business units	The competitive advantage stemming from IT-dependent strategic initiatives is more difficult to erode if it is based on a friendly and trusting relationship between IT and the business.	RBV
(Ray et al., 2005)	Empirical – quantitative	Business units	Shared knowledge between IT and customer service units positively affects customer service performance.	RBV
(Reich & Benbasat, 2000)	Empirical – qualitative	CEO – TMT; Business units	Shared domain knowledge between business and IT executives positively influences IT implementation success. Communication and connected planning between business and IT influence alignment.	Theories of org. coordination Business-IT align.
(Ross, Beath, & Goodhue, 1996)	Conceptual	CEO – TMT; Business units	Firms must build and leverage IT assets to generate sustainable competitive advantage. IT assets include strong IT staff, a reusable technology base, and the partnership between IT and business management.	RBV
(Smaltz et al., 2006)	Empirical – quantitative	CEO – TMT	Business and strategic information technology knowledge, political savvy, and interpersonal communication are the capabilities that make CIOs effective.	Mintzberg's managerial roles
(Tai & Phelps, 2000)	Empirical – qualitative	CEO – TMT	Similar IT perceptions between business executives and IT executives may contribute to overcoming any resistance to technological changes.	–
(Tallon, 2011)	Empirical – quantitative	Business units	The effects of alignment on internal processes spill over to downstream processes, creating higher IT business value in those downstream processes.	Business-IT alignment

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(Rivard et al., 2006). Chen et al. (2010) identify and test a maturity model, according to which IT management starts from contributing to firm efficiency and finally gets to contribute to return on investments, sales growth and market shares. Therefore, the firm's market performance in comparison with the competitors can be considered a comprehensive performance indicator in the light of the theories adopted by this study.

Organizational integration between the IT function and the TMT

The literature on business-IT alignment (Reich & Benbasat, 2000; Ullah & Lai, 2013) complements the literature on organizational integration in providing sound and specific explanations for the importance of relationships between the CIO/top IT managers and the CEO/TMT (Johnson & Lederer, 2010). The literature on business-IT alignment assumes that top-down strategic planning and business-IT co-evolution are effective in designing and managing successful information systems, fitting the firm's business needs. Structured and effective relationships with the CEO and business executives allow business and IT strategies to be made explicit and reciprocally understood. These relationships also allow discussion, knowledge integration and learning among top managers, and these attitudes are likely to spread top-down in the organization (Naranjo-Gil et al., 2008). If these relationships prove effective, the IT managers are more likely to be involved in strategic challenges and to be informed of business needs and expectations (Reich & Benbasat, 2000). Meanwhile, the CEO and TMT are more likely to consider and understand the strategic potential of technology-based innovation and are less likely to consider IT as a mere cost thanks to the effective relationship with the highest-ranking IT executives. Consequently, such a relationship makes it more likely that IS will be considered an opportunity to build new competitive capabilities.

Moreover, the contribution of IS to cooperative capabilities will be positively impacted because the interaction with business-oriented subjects is likely to direct the IT managers' attention to the legitimation, commitment, communication, and reputational needs that the information system may support (Reich & Benbasat, 2000).

The cooperative and competitive capabilities that result from the organizational integration between the IT function and the TMT are likely to be strongly idiosyncratic to the firm and hardly imitable (Barney & Arikan, 2006; Lavie, 2006). Therefore, high levels of organizational integration between the IT function and the TMT are likely to enable high levels of IS-enabled and IS-supported competitive and cooperative capabilities, which in turn will positively influence the firm's capability to outperform competitors. In a nutshell, the alignment literature provides rich insights to explain the specific influence of organizational integration between the IT function and the TMT on the contribution of IS to organizational capabilities; the RBV confirms these predictions and explains the influence of the contribution of IT to organizational capabilities on market performance. These considerations lead to the formulation of the following hypotheses:

H1a. The organizational integration between the IT function and the TMT positively influences market performance, through the mediating effect of the contribution of IS to competitive capabilities.

H1b. The organizational integration between the IT function and the TMT positively influences market performance, through the mediating effect of the contribution of IS to cooperative capabilities.

Organizational integration between the IT function and the business units

The theory of organizational differentiation and integration (Lawrence & Lorsch, 1967) emphasizes the importance of achieving mutual understanding in order to avoid useless conflicts and solve operational problems in a way that is satisfactory for all involved actors. The IT function is in charge of providing the whole organization with tools enabling communication, coordination and collaboration (Moynihan, 1982). If these tools are co-designed by keeping into account the needs and views of the business units, and the actual evolution of core processes, these tools are much more likely to actually work as integrational mechanism at the organizational level. This view implies that effective integration-oriented relationships of the IT function with the business units will positively influence IS's contribution to cooperative capabilities (Swink, 2006).

The RBV and its sister theory, the knowledge-based view of the firm (Conner & Prahalad, 1996) not only allow to confirm this prediction, but also predict a positive impact for effective integration of the IT function and business units on IS's contribution to competitive capabilities. This view, in fact, emphasizes the importance of cross-fertilization, innovation and uniqueness in solutions emerging from effective operational relationships (Ray, Muhanna, & Barney, 2005). Therefore, a well-established relationship between the IT people and the firm's key users (i.e. the people involved in core processes) is likely to draw the IT managers' attention and efforts towards concrete competitive challenges, on the one side, and communication, commitment and reputational needs on the other. Like in H1a and H1b, also in this case both cooperative and competitive capabilities are developed through idiosyncratic, hardly imitable processes, and then, according to the RBV, are likely to result in competitive advantage, measurable through superior market performance (Lavie, 2006).

These considerations lead to the formulation of the following hypotheses:

H2a. The organizational integration between the IT function and the business units positively influences market performance, through the mediating effect of the contribution of IS to competitive capabilities.

H2b. The organizational integration between the IT function and the business units positively influences market performance, through the mediating effect of the contribution of IS to cooperative capabilities.

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Organizational integration between the IT function and the firm's customers

The RBV and all knowledge-based theoretical approaches state that key knowledge resources are embedded in customer relationships, as clearly expressed, for example, by the concept of 'customer capital' or 'relational capital', developed in the intellectual capital literature (Delgado-Verde, Navas-López, Cruz-González, & Amores-Salvadó, 2011). The RBV and sister theories then suggest that effective relationships with customers provide the IT function with an extremely valuable source of information, information that becomes strategic in the case of e-business projects, new product development, new customer-centred innovative services and business-to-business collaboration and integration projects (Tallon, 2007, 2011). Therefore, effective relationships with customers are likely to enhance the IT people's awareness of both the competitive challenges of the firm and its strategic cooperative needs for communication, commitment and reputation.

Moreover, according to the theory of organizational differentiation and integration, if the IT function is systematically committed to interact with the customers, this will help the IT people keep in touch with the problems and needs of other important functions that continuously deal with the firm's customers, such as the marketing function and the sales function. In fact, according to Lawrence and Lorsch (1967), interacting with the same external parties is an important enabler of common language and mutual understanding between organizational sub-systems.

In other words, the joint predictions emerging from the RBV literature and the theory of organizational integration strongly support the statement that high integration between the IT function and the firm's customers will result in greater IS contributions to both competitive and cooperative capabilities for firms. Stemming from a complex network of long-term effective relationships, these capabilities are likely to be idiosyncratic and imperfectly mobile (Lavie, 2006). Therefore, according to the RBV, these are likely to result in sustained competitive advantage, measurable through market performance. In conclusion, we can infer the following hypotheses:

H3a. The organizational integration between the IT function and the firm's customers positively influences market performance, through the mediating effect of the contribution of IS to competitive capabilities.

H3b. The organizational integration between the IT function and the firm's customers positively influences market performance, through the mediating effect of the contribution of IS to cooperative capabilities.

Organizational integration between the IT function and the non-IT suppliers

The RBV explicitly mentions the importance of the firm's relationships with value chain partners. RBV holds that this relationship is a valuable, rare, inimitable and non-substitutable resource, likely crucial to sustained competitive advantage (Barney, 1991). IT managers play a pivotal role in this relationship, because of the growing relevance of e-business and supply chain automation to firm performance (Amit & Zott, 2001). If a reliable integration is achieved, the suppliers may become key partners for product, process and business model innovation, which is growingly important in today's turbulent business scenario (Hult, Ketchen, & Arrfelt, 2007; Rai, Patnayakuni, & Seth, 2006; Roper & Crone, 2003; Squire, Cousins, & Brown, 2009).

From the point of view of Lawrence and Lorsch's theory (Lawrence & Lorsch, 1967), effective relationships between the IT function and the firm's suppliers are certainly important because the IT managers will collect elements to adapt the firm's IS to the ever-evolving coordination needs between intra- and inter-organizational key partners. Moreover, systematic interaction with the suppliers will indirectly facilitate the intra-organizational integration with the functions that more strictly interact with the suppliers, i.e. the operations functions of the organization.

Effective relationships with suppliers may also provide the IT managers with a valuable source of information. This information becomes strategic during supply chain integration projects and when key suppliers are involved in product/service innovation processes (Bardhan, Whitaker, & Mithas, 2006; Klein & Rai, 2009). Effective relationships with suppliers contribute to enhancing the IT managers' awareness of the competitive environment and of ICT's role in supporting strategic communication, commitment and reputational needs. Also these integration processes (similarly to those described in H1, H2 and H3) are likely to result in idiosyncratic, hardly imitable capabilities (Lavie, 2006). Therefore, we can infer the following hypotheses:

H4a. The organizational integration between the IT function and the firm's non-IT suppliers positively influences market performance, through the mediating effect of the contribution of IS to competitive capabilities.

H4b. The organizational integration between the IT function and the firm's non-IT suppliers positively influences market performance, through the mediating effect of the contribution of IS to cooperative capabilities.

Organizational integration between the IT function and the IT providers and outsourcers

Today, software solutions are increasingly standardised, while the traditional concerns about in-house hardware infrastructures are often replaced by a portfolio of outsourced solutions (Chun & Mooney, 2009), growingly accessed through cloud computing (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011). The performance of the firm's IS often depends, then, on the IT providers and outsourcers. These subjects can act as business partners and provide an important contribution to innovation and competitive advantage (Smaltz, Sambamurthy, & Agarwal, 2006). However, similar to what happens in all knowledge networks, they can also be a source of risk, conservatism and resource waste. Therefore, an effective integration between the IT function and the IT providers/outsourcers is essential to enhance the potential and control the risks of such a relationship. Given the growing role of IT providers in IS quality, this dimension of

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the organizational integration of the IT function is likely to impact the concrete contribution of IS to competitive capabilities. Moreover, the successful adoption of outsourced, popular and legitimated best-practice software solutions (such as the leading ERPs) enhances the firm's reputation and ability to successfully communicate with business partners (Hertwig, 2012; Liang, Saraf, Hu, & Xue, 2007). Therefore, successful integration with the IT providers can indirectly improve the firm's options to develop internal cooperation and external partnerships. Ultimately, the literature strongly supports the idea that effective organizational integration between the IT function and the IT outsourcers and providers will result in more, and more idiosyncratic, IS contributions to both competitive and cooperative capabilities.

These considerations lead to the formulation of the following hypotheses:

H5a. The organizational integration between the IT function and the firm's IT providers and/or outsourcers positively influences market performance, through the mediating effect of the contribution of IS to competitive capabilities.

H5b. The organizational integration between the IT function and the firm's IT providers and/or outsourcers positively influences market performance, through the mediating effect of the cooperation of IS to cooperative capabilities.

Overall, these ten hypotheses lead to the conceptual model depicted in Fig. 1.

Method

Variables and scales

To test our research model and hypotheses, we conducted a two-stage field study to collect survey data from top managers, including CIOs, CEOs and other executives directly reporting to the CEO or general manager. The questionnaires contained extant valid measures adapted to our research needs. The organizational integration of the IT function was measured thanks to an adapted version of the scale described in Zardini, Ricciardi, and Rossignoli (2015), which, in turn, builds upon Delgado-Verde et al. (2011). This scale uses IT managers' connectedness (Jansen et al., 2009) as a key proxy of the organizational integration of the IT function. As for the contribution of IS to competitive and cooperative capabilities, we adapted the constructs and scales proposed by Chen et al. (2010) and Blomqvist and Levy (2006); we also took into account Tallon's scale of perceived effects of IT (Tallon, 2011). In order to measure the dependent variable, i.e. market performance, we adapted the measures of market performance proposed by Rai (2013) and included perceptual measures of the degree to which competitors have been outperformed as for sales, market shares, and profitability (Ritala, 2012; Venkatraman & Ramanujam, 1986; Wade & Hulland, 2004).

We created and tested the scales of the independent variables, mediators and dependent variable through standard instrument development methods (Bagozzi, Yi, & Phillips, 1991). We administered a pilot questionnaire to 14 managers, which led to a reduction in the number of items. The managers participating in the pilot expressed unanimous concern for the survey's confidentiality. Because the questionnaire included potentially awkward relational questions, the respondents said that they would not feel free to answer sincerely unless the questionnaire was completely anonymous. We discussed this issue and eventually decided to follow the managers' advice and to administer fully anonymised questionnaires, thus eliminating the possibility of conducting matched analyses (by comparing the questionnaires of managers belonging to the same organization) and financial statement analyses, in favour of higher response reliability and lower self-selection bias. As a consequence, a perceptual measure was adopted to assess market performance (see e.g. Brouthers, Brouthers, & Werner, 2007; Pavlou & Sawy, 2010). Prior studies demonstrate statistically significant correlations between perceptual and corresponding objective measures of performance (Rosenzweig et al., 2003; Ward, Leong, & Boyer, 1994; Ward, McCreery, Ritzman, & Sharma, 1998).

In the second stage of the process, we statistically assessed the scales' properties using the survey data. For all our scales, we provide a summary of definitions and measures, along with the results of confirmatory factor analyses, in Appendix A.

Sampling and survey

As described above, the target respondents of our survey include both IT managers and top business executives. Our population of interest consisted of members from three Italian managers' associations (Club TI, Federmanager, and AICA), associations identified by our focus group as particularly representative and distinguished. Through email, these managers were invited to fill out our questionnaire, which was available online and fully anonymised for the reasons described above. Our respondents consisted of 1799 top managers from companies located in Northern Italy. This list included all managers enrolled in at least one of the two most important Italian CIO associations, managers enrolled in an important Italian top managers' association, and managers participating in conferences and meetings organized by one of the most important Italian business schools in 2012. The questionnaire collection process began in July 2012 and concluded in February 2013, at which point 261 questionnaires had been collected. The response rate was 14.51 per cent. Only completed questionnaires were considered for data analysis ($n = 236$, 90.42 per cent of received questionnaires). Appendix B contains descriptive statistics about the respondents, firms and industries. The managers were invited to fill out the questionnaire via e-mail from the associations' presidents. This email included the URL of the online survey questionnaire, the study's aim and significance, and the privacy protection policy. The system automatically checked the IP of each respondent in order to exclude duplicate submissions. In order to test non-response bias, the respondents were split into two response waves: early repliers (within two months) and late repliers (more than two months). The results showed that early respondents and late respondents were not significantly different with respect to age, organizational role, years' experience, industry and all other independent variables. Moreover, we conducted a Mann–Whitney *U* test (see Appendix C), and,

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on the basis of these results, it is possible to conclude that non-response bias should not be a concern (Bagozzi et al., 1991).

Results

Independent variable

Following Cudeck (2000), we conducted an explorative factor analysis with a Varimax rotation to statistically test the soundness of the construct 'organizational integration of the IT function'. Then, we conducted a confirmatory factor analysis (CFA) (Di Stefano & Hess, 2005; Hair, Black, Babin, Anderson, & Tatham, 2010). The results soundly confirmed that the independent variable can be divided into the five sub-dimensions shown in Fig. 1.

The correlation matrix of the 10 items of the scale (see Appendix D) shows that 44 of the 45 correlations (approximately 97.78%) are significant at the 0.01 level, thus providing an adequate basis to perform a factor analysis for each item and for the overall construct. As a first step, we tested common method bias using Harman's single factor test, the most widely-used method in the literature. Using exploratory factor analysis, we evaluated the unrotated matrix with a unique factor. The total variance explained value (initial Eigen values % of variance) was 40.662%, (i.e. less than 50%), as expected. We analysed the common latent factor (CLF) through IBM AMOS before comparing the standardised regression weights from this CFA model to the standardised regression weights of a model without the CLF. The results show that the values are similar (the difference is less than 0.2), as expected.

We utilised IBM AMOS in order to perform the CFA. According to Brown (Brown, 2012), the main indices used in IBM AMOS are Chi-square/df (or CMIN/df), *p*-value, CFI, GFI, RMSA, AGFI and SRMS; previews indices are sufficient for model validation. The results of this confirmatory factor analysis are available in Appendix A.

Mediators

In order to statistically test the soundness of the construct utilised as a mediator (the contribution of IT to competitive and cooperative capabilities of the firm), we conducted an explorative factor analysis using a Varimax rotation, following Cudeck (2000). We then conducted a confirmatory factor analysis (CFA) (Di Stefano & Hess, 2005; Hair et al., 2010). The results revealed that the two expected dimensions of the mediator are further divided into factors: the contribution of IS to competitive capabilities is divided into three factors, while the contribution of IS to cooperative capabilities is divided into two factors.

We found that the five factors identified by the CFA are consistent with the dimensions of competitive and cooperative capabilities suggested by the literature. The first factor (M1) includes the items assessing IS's contribution to face market challenges, such as increasing sales/market shares and improving service rapidity/time-to-market. The second factor (M2) includes the items assessing IS's contribution to customer orientation, such as increasing customer loyalty and customer satisfaction. The third factor (M3) includes the items assessing IS's contribution to strategic innovation, such as increasing competitive strategy reactivity (i.e., the capability to adapt price and/or differentiation strategies to evolving market contexts) and improving product/service innovation performance. The fourth factor (M4) includes the items assessing IS's contribution to intra-organizational cooperative capabilities, such as the contribution to organizational climate and commitment, employees' knowledge sharing and effective communication. The fifth factor (M5) includes the items assessing IS's contribution to inter-organizational cooperative capabilities, such as effective supply chain collaboration and the firm's reputation and trustworthiness.

The complete list of the items on this scale is available in Appendix A, along with the scale adopted for the independent and dependent variables and the results of the confirmatory factor analysis. We then decided to test our research model by separately considering each of these mediating sub-dimensions. This was undertaken to achieve a more granular assessment of the mediating effects we hypothesised.

Model testing

Following Hayes and Scharkow (2013) and Henseler et al. (2014), we decided to adopt the bootstrapping method (a non-parametric method); it is 'the best test, as it is most trust worthy in the conditions [...] when an indirect effect exists and the focus is on detecting a nonzero effect rather than on interval estimation' (Hayes & Scharkow, 2013, p. 7). The trustworthiness of this method is also highlighted by Henseler et al. (2014, p. 198) who claim that 'the percentile bootstrap confidence interval is a good compromise'. Moreover, Zhao, Lynch, and Chen (2010) note that the 'Sobel test is very low in power in comparison with newer bootstrap tests'. Hayes and Scharkow (2013) have further extended and improved the bootstrap test method.

To analyse the multiple mediation models, we used the software IBM AMOS. Adopting Shrout and Bolger's approach (Shrout & Bolger, 2002), we used bootstrapping (5000 times) to test the indirect and total effect of the independent variables. The remaining effect (or direct effect) was obtained by subtracting the indirect effect from the total effect (total effect = direct effect + indirect effect). Following Hayes and Scharkow (2013, p. 7), we used the bias-corrected bootstrap CI. We also tested the influence of three classical control variables: industrial sector, firm size (employees) and firm size (revenues). We found none of these factors to be significant. We also controlled for the CIO's organizational role (measuring whether the CIO reported directly to the CEO or not), and even this factor was found to be insignificant. The data on the control variables are shown in Appendix E. These results confirm all of the ten hypotheses (Table 2). Finally, we compared the total effects of the five sub-dimensions of the independent variable on firm performance in order to compare and contrast the contributions of each dimension of organizational integration of the IT function. The results of our analysis reveal that the total effect of the independent variable on market performance are the following: integration with the TMT = 0.368; business units = 0.501; customers = 0.353; non-IT suppliers = 0.344; and IT providers = 0.396 (see Fig. 2).

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Table 2 – Overview of results of mediation models.

Code	Description	Results
Hp 1a	Integration with the TMT → Competitive capabilities → Market performance	**Supported** for all the dimensions of the Mediator
Hp 1b	Integration with the TMT → Cooperative capabilities → Market performance	**Supported** for all the dimensions of the Mediator
Hp 2a	Integration with the Business Units → Competitive capabilities → Market performance	**Supported** for all the dimensions of the Mediator
Hp 2b	Integration with the Business Units → Cooperative capabilities → Market performance	**Supported** for all the dimensions of the Mediator
Hp 3a	Integration with the Customers → Competitive capabilities → Market performance	**Supported** for all the dimensions of the Mediator
Hp 3b	Integration with the Customers → Cooperative capabilities → Market performance	**Supported** for all the dimensions of the Mediator
Hp 4a	Integration with the non-IT Suppliers → Competitive capabilities → Market performance	**Supported** for all the dimensions of the Mediator
Hp 4b	Integration with the non-IT Suppliers → Cooperative capabilities → Market performance	**Supported** for all the dimensions of the Mediator
Hp 5a	Integration with the IT Providers/Outsourcers → Competitive capabilities → Market performance	**Supported** for all the dimensions of the Mediator
Hp 5b	Integration with the IT Providers/Outsourcers → Cooperative capabilities → Market performance	**Supported** for all the dimensions of the Mediator

Therefore, we can conclude that that all of the construct's dimensions are more or less equally relevant to performance, with a slightly major effect for the relationships with the business units.

Discussion, limitations and further research steps

Drawing on the RBV, the literature on business-IT alignment and the theory of organizational differentiation and integration, this study hypothesises that the contribution of IS to organizational capabilities and firm performance would be influenced by the organizational integration between the IT function and the whole range of key actors in the intra- and inter-organizational systems in which the IT function operates.

This study shows that the three theoretical approaches listed above complement each other in explaining the importance of the organizational integration of the IT function. The literature on business-IT alignment traditionally focuses on the importance of top-level relationships, such as those with the TMT; the literature on organizational differentiation and integration traditionally focuses on operational-level relationships, such as those with the business units and the suppliers; the RBV and sister theories highlight the value of all relationships, and particularly those with the customers; in addition, the RBV identifies organizational capabilities as the key mediator between relational effectiveness and performance. This study integrates these views and then provides an original, comprehensive insight on the importance of all the different dimensions of the organizational integration of the IT function.

Our analysis shows that every type of key relationship of the IT function (with the TMT, business units, customers, suppliers and IT providers) has a relevant and similar impact on performance. This empirical outcome is completely novel and original, confirming that the dimensions of IT function's organizational integration that have been overlooked by empirical research to date (i.e. the relationships with the firm's customers and supply chain partners) deserve as much attention as the most widely-studied relationships with the top executives and internal users throughout the business units.

The geographical limitation of our sample is a possible issue for the generalisation of this study's outcomes; however, northern Italy (where most respondents work) is sufficiently representative of the situation in western developed countries. Our descriptive statistics reveal an over-representation of the manufacturing industry, but the industrial sector was included as a control variable and proved insignificant. Perhaps the most relevant methodological limitation of this work is that we decided, due to our respondents' confidentiality concerns, not to conduct a matched survey; this decision meant that we could not compare questionnaires from managers working in the same firm. Nonetheless, our focus group and pilot survey convinced us that this choice would permit more sincere responses and lower self-selection bias.

This study opens new possible research paths. For example, interesting links may emerge between the organizational integration of the IT function and organizational learning, organizational agility, and dynamic capabilities. Further, it would be interesting to explore whether and how the organizational integration of the IT function co-evolves with the whole organizational system's integration; longitudinal studies would be particularly suited to pursue this research goal. More generally, we hope that our study stimulates further research into how cross-boundary organizational integration contributes to firm performance in today's networked economy.

Managerial implications

This study soundly corroborates the idea that IS, far from being just a cost or a means to increase efficiency, can support the strategic capabilities of an organization and can positively affect the firm's financial and market performance. In order for this to occur, it is important that the organizational

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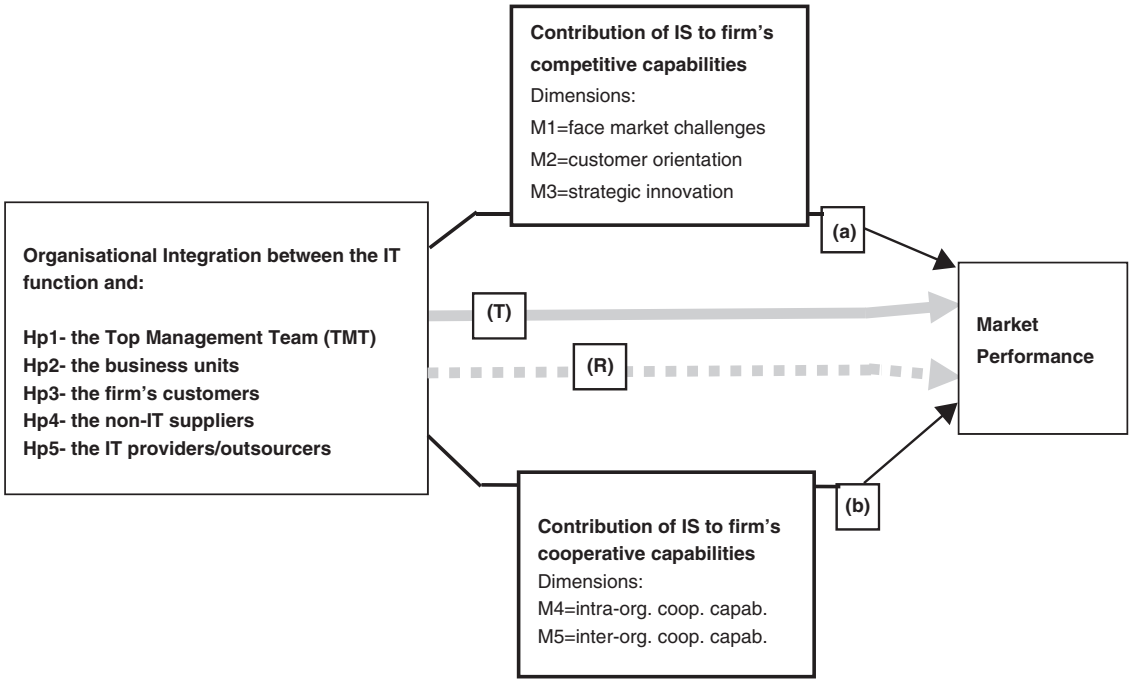

Indirect effects of the Organisational Integration between the IT dept. and:	Path	Through M1	Through M2	Through M3	Path	Through M4	Through M5
The TMT	**(a)**	0,575 (***)	0,544(***)	0,531(***)	**(b)**	0,517 (***)	0,574(***)
The Business Units	**(a)**	0,589 (***)	0,553 (***)	0,534 (***)	**(b)**	0,566 (***)	0,616 (***)
The Firm's Customers	**(a)**	0,572 (***)	0,534 (***)	0,518 (***)	**(b)**	0,512 (***)	0,575 (***)
The non-IT Suppliers	**(a)**	0,569 (***)	0,554 (***)	0,536 (***)	**(b)**	0,569 (***)	0,607 (***)
The IT Providers / Outsourcers	**(a)**	0,075 (***)	0,563 (***)	0,556 (***)	**(b)**	0,610 (***)	0,222 (***)

Total and Remaining Direct effects of the Organisational Integration between the IT dept. and:	Total (T)	Remaining (R)
The TMT	0,368	**0,04**
The Business Units	0,273	**0,01**
The Firm's Customers	0,353	**0,03**
The non-IT Suppliers	0,344	**0,05**
The IT Providers / Outsourcers	0.396	**0.00**

Fig. 2 – Results of the analysis of the mediation model, with indirect and direct effects.

design, culture and incentives encourage the IT managers to develop a rich network of purposeful relationships with both internal and external subjects, such as the TMT and business units as well as the firm's customers, suppliers and IT providers.

The measurement items we developed provide executives with guidelines to assess their IT managers' relational capabilities; moreover, executives can exploit the insights provided by our work to assess and improve the organizational conditions influencing the effectiveness of the IT function's organizational integration. More specifically, both our qualitative research (interviews and focus group) and our survey suggest that the following organizational conditions are relevant to firm performance:

- Well-structured and regular interactions (e.g. meetings) are scheduled between the top IT manager(s) and the top executives, including the business unit directors;

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- Following well-established policies, the board and TMT involve the top IT manager(s) in strategic decisions;
- The interaction between the IT managers and the business units is hard-wired into the organizational design—specifically, it is integrated through a matrix organizational chart, so that people working in the business units and core processes keep the IT managers continuously informed, in detail, on business needs;
- The IT managers are involved in the task forces created for product and process innovation;
- A well-structured, constructive IT audit service is available, to continuously inform the IT managers about the internal users' satisfaction;
- The IT managers are encouraged to interact directly with the firm's customers and suppliers, especially in relation to e-business projects.

We suggest that these organizational conditions are important for getting the most out of IT managers and IS; these conditions will allow both competitive and cooperative capabilities of the whole organizational ecosystem to develop for improved firm performance.

Appendix A.

– Scales adopted for the dependent variable, independent variable, and the mediator.

Dependent variable

Code	Item
Market performance	The market performance of our firm is better than our key competitors' as for: (a) Sales (b) Market shares (c) Profitability

Confirmatory factor analysis of the independent variable – model fit value

CMIN/df	p-close	CFI	GFI	AGFI	SRMR	RMSA	PCLOSE
1.927	0.06	0.976	0.957	0.906	0.046	0.066	0.160

Independent variable: organizational integration of the IT function

Dimensions	Code	Items
Integration with the TMT	TMT1	Frequent and in-depth interactions occur (for example, through periodic meetings) between the IT management and the top management in our organization.
	TMT2	The IT management's opinions about feasibility, costs, risks and opportunities are taken into consideration for strategic decision making in our organization.
Integration with the business units	BU1	The IT management interacts very strictly with the business lines and/or with the production functions in our organization.
	BU2	Sound audit processes are established to systematically assess IT users' satisfaction and IT breakdown management in our organization.
Integration with the customers	CUS1	The IT managers and those in charge of the core business (for example, the managers of the business lines) actively cooperate for process/product innovation in our organization.
	CUS2	Our IT management effectively interacts with our organization's clients and/or dealers, for the development of specific projects.
Integration with the non-IT suppliers	SUP1	Our IT management effectively interacts with our non-IT suppliers to share information, advice, complaints, etc.
	SUP2	Our IT management effectively interacts with our non-IT suppliers to develop specific projects.
Integration with the IT providers	PROV1	Sometimes, I perceive the relationships with our IT providers/outsourcers as an oppressive accumulation of long-term constraints and established routines, hindering innovation. [**Reverse Item**]
	PROV2	Taking care of the relationships with our IT providers/outsourcers is a priority for our IT management.

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Appendix A – (*Continued*)

Confirmatory factor analysis of the mediators – model fit value

CMIN/df	p-close	CFI	GFI	AGFI	SRMR	RMSA	PCLOSE
1.774	0.051	0.986	0.961	0.913	0.031	0.061	0.255

MEDIATOR: contribution of IS to organizational capabilities

Dimensions	Code	Item
Competitive capabilities	M1-1	Our information systems have concretely contributed to increase sales and/or market shares in the last three years.
	M1-2	Our information systems have significantly contributed to our firm's reactivity and flexibility in the last three years.
	M2-1	Our information systems have significantly contributed to increase customer loyalty in the last three years.
	M2-2	Our information systems have allowed us to cut our prices and/or to increase our margins in the last three years.
	M3-1	Our information systems have supported or allowed changes in our firm's competitive strategies in the last three years.
	M3-2	Our information systems have supported or enabled the development of new products and/or services in the last three years.
Cooperative capabilities	M4-1	Our information systems have supported/enabled significant improvements in internal cooperation, knowledge sharing and/or communication quality in our organization in the last three years.
	M4-2	Our information systems have supported/enabled significant improvements in employee motivation, employee engagement and/or organizational climate in the last three years.
	M5-1	Our information systems have supported/enabled significant improvements in the interactions with supply chain partners (e.g. suppliers, distributors) in the last three years.
	M5-2	Our information systems have supported/enabled significant improvements in our firm's reputation and/or image in the last three years.

Appendix B.

– Descriptive statistics.

Descriptive statistics

Valid (listwise) = 236 (all records)

Organizational role	**CIO**	**CFO**	**CEO**	**Sales/MRK director**	**Business line**	**COO**	**Other**
	29.9%	18.9%	18.3%	10.6%	9,5%	8.4%	4.4%
Tenure (years)	**less than 1**		**between 1 and 3**		**more than 3**		
	1.2%		15,6%		85%		
Age (years old)	**less than 35**	**35-44**	**45-54**	**55-64**	**65 or more**		
	5.4%	22.1%	35.7%	33.3%	3.5%		
Industry	**Manufacturing**	**ICT**	**Bank and Insurance**	**Logistic**	**GDO**	**Services**	**Public admin.**	**Others**
	45.1%	10.3%	4.6%	12.5%	12.7%	10.4%	2.6%	1,8%
Number of employee (number)	**less than 9**	**9-15**	**16-50**	**51-100**	**101-300**	**301-500**	**501-1000**	**more than 1000**
	3.5%	4.8%	13.8%	6.7%	35.1%	5.6%	10.2%	20.3%
Turnover (million Euro)	**less than 5**	**5-50**	**51-200**	**201-500**	**501-1000**	**more the 1000**		
	8,8%	28.6%	32.3%	18.4%	5.5%	6.4%		

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Appendix C.

– Mann–Whitney U.

	Test statistics[a]													
	TMT1	TMT2	BU1	BU2	PROV1	PROV2	CUS1	CUS2	SUP1	SUP2	Organizational Role	Gender	Age	Industry
Mann–Whitney U	3598.00	3122.50	4322.00	3799.50	3920.00	3287.00	3616.50	3710.50	4100.00	3380.00	3619.50	4385.50	3960.50	4205.50
Wilcoxon W	5251.00	4775.50	5975.00	5452.50	5573.00	4940.00	5269.50	5363.50	5753.00	5033.00	5272.50	6038.50	5613.50	16295.50
Z	−2.21	−3.39	−0.27	−1.67	−1.35	−3.00	−2.13	−1.86	−0.82	−2.85	−2.04	−0.18	−1.21	−0.56
Asymp. Sig. (2-tailed)	0.27	0.17	0.29	0.10	0.18	0.27	0.33	0.25	0.41	0.44	0.41	0.86	0.23	0.57

[a] Grouping variable: time response (0 = first wave; 1 = second wave).

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Appendix D.

– Correlation matrix for the independent variable.

	TMT1	TMT2	BU1	BU2	CUS1	CUS2	PROV1	PROV2	SUP1	SUP2
TMT1	1									
TMT2	0.677**	1								
BU1	0.373**	0.437**	1							
BU2	0.363**	0.383**	0.683**	1						
CUS1	0.483**	0.562**	0.442**	0.478**	1					
CUS2	0.415**	0.307**	0.445**	0.428**	0.611**	1				
PROV1	0.219**	0.294**	0.268**	0.323**	0.304**	0.185**	1			
PROV2	0.335**	0.406**	0.421**	0.450**	0.529**	0.577**	0.712**	1		
SUP1	0.426**	0.577**	0.422**	0.384**	0.409**	0.576**	0.150*	0.444**	1	
SUP2	0.431**	0.590**	0.443**	0.395**	0.459**	0.453**	0.206**	0.398**	0.732**	1

* Correlations significant at the 0.05 level.
** Correlations significant at the 0.01 level.

Appendix E.

– Effects of control variables.

Control variables	Effects on the mediators on the contribution of IT to:					Effects on the dependent variables:
	Face market challenges	Customer orientation	Strategic innovation	Internal social capital	External social capital	Financial & market performance
Industrial sector	0.625	−1.099	−0.628	−0.258	−0.645	0.34
Firm size (revenues)	−0.009	−0.032	−0.037	−0.063	−0.064	−0115
Firm size (employees)	0.568	−1.159	−0.663	−0.257	−0.624	−0.076
CIO reporting structure	0.624	−0.014	−0.478	−0.235	−0.396	−0.035

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