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Antecedents of Sustainable Management Support for IT-Related Initiatives

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ABSTRACT

Having IT-related capabilities is not enough to secure value from IT resources and survive in today's competitive environment. IT resources evolve dynamically and firms must sustain their existing capabilities to continue to leverage value from their IT resources. Firm's human resources are an important IT-related capability, and an important source of their competitive advantage. Using a field survey, this study demonstrates that a dynamic end-user environment, a result of a coordinated change in complementary factors can help sustain firms' IT-related management capabilities. These factors include an appropriate organizational design to decision rights and work environment and a congruent reward system. This study adds an important dimension in understanding why some firms continue to perform better with their IT resources than others. For practice, this study suggests that a comprehensive approach to what constitutes valuable organizational resources is necessary.

Keywords

IT-capabilities, sustainable capabilities, human resources, resource-based view, dynamic capabilities

INTRODUCTION

Investment in information technology (IT) is important for businesses to survive in today's competitive environment. However, businesses cannot expect IT to provide sustainable advantage because they are readily available to all firms (Powell and Dent-Micallef, 1997). Rather, it is the way firms' IT-related capabilities leverage their IT resources that determine the extent of IT's contribution to business value (Wade and Hulland, 2004). Firms' IT-related capabilities are those resources that possess qualities of rarity, inimitability, and are valuable. These qualities enable these resources to achieve competitive advantage (Wade and Hulland, 2004). Extant research has conceptualized and empirically tested how organisations IT-related capabilities could source value from their IT resources (e.g., Bharadwaj, Bharadwaj and Bendoly, 2007; Ray, Muhamma and Barney, 2005). These studies, however, suggest firms IT-related capabilities as a source of value at a point in time. IT resources are dynamic and change at a rapid pace. Firms need to have a strategy of continuous investment in IT in a competitive environment. Firms can ensure sustainable IT-related value when they sustain their existing IT-related capabilities to take advantage of emerging IT-related opportunities that the modern technologies provide. This means that it is imperative to understand the environments that help to sustain firms' IT-related capabilities. Firms' human resource (HR) capabilities are one of their major sources of their competitive advantage (Bailey, 1993). Sustainable HR capabilities will mean that businesses will continue to capitalize on opportunities that the new IT resources provide. Understanding the conditions that sustain these HR capabilities, thus, is important.

Successful application of IT resources requires some level of fit within various organizational factors (Kearns and Lederer, 2003; Oh and Pinsonneault, 2007), but fit at the operational level of IT deployment is perhaps more significant. Fit at this operational level requires significant organizational changes (Jeffers, Muhamma and Nault, 2008). These changes need to happen in the complementary resources and the nature of change should be one that is difficult to imitate. Competitive advantage erodes quickly when changes are easily imitable. This study proposes that a dynamic IT-usage environment, a co-created higher-level product from relevant fit between complementary organizational resources, can sustain firm's IT-related

HR capabilities. This environment is the result of a fit between a decentralized organisational design relating to task allocation and teamwork, and a congruent reward system at the technology use level. The result of the synergy is a higher-level dynamic IT-usage environment of superior IT-related knowledge and understanding. This situation is because it can integrate, build, and reconfigure internal and external competences to better address rapidly changing environments (Teece, Pisano and Shuen, 1997). This environment is a source of sustainable advantage because the coherence in a coordinated change is difficult to mimic. This study tests this notion by understanding the relationship between the proposed higher-level IT-usage environment and two IT-related management capabilities of sustained top management commitment towards IT-related initiatives and sustained shared organisational knowledge between the IT and unit managers. The study finds a positive association between the suggested IT-usage environment and the two IT-related management capabilities. This is an important body of knowledge as it extends our understanding of how organisations could sustain their IT-related capabilities to continue to enjoy IT-related competitive advantage presented by modern technologies. The rest of the paper progresses as follows. The next section presents the theoretical framework and develops the hypotheses. The sections following this present the research design, present and discuss the results, state the contributions and directions for future research, and highlight the limitations of the research.

THEORETICAL FRAMEWORK

The resource-based view (RBV) of the firm establishes a firm as a critical unit of analysis. The RBV suggests that a firm constitutes of a bundle of resources, a subset of these resources enables them to achieve competitive advantage and a further subset leads to superior long-term performance (Barney, 1991). In the context of IT resources, the RBV argument postulates that the IT-related capabilities explain IT-related performance differences across firms. The RBV notion is especially pertinent in IS research because IS resources rarely contribute a direct influence on sustained business performance. Rather, information systems exert their influence on firms with complementary relationship with other assets and capabilities (Clemons and Row, 1991). Competitive advantage depends on firm's superior deployment of capabilities, as these capabilities embed to a firm, and are difficult to trade (Teece et al., 1997; Wade and Hulland, 2004). Resources and capabilities possessed by competing firms may differ (resource heterogeneity), and these differences may be long lasting (Mata, Fuerst and Barney, 1995; Teece et al., 1997). Firms' capabilities must possess attributes to achieve and sustain competitive advantage. To achieve competitive advantage, firms capabilities must possess attributes of value, rareness, and appropriability (Amit and Schoemaker, 1993). Once a firm attains a competitive advantage, resource attributes of inimitability, non-substitutability, and immobility help sustain the attained advantage (Amit and Schoemaker, 1993).

The RBV emphasizes that the firm-specific capabilities and the isolating and differentiating mechanisms are the fundamental determinants of firm performance (Barney, 1991). The RBV, however, does not explain the nature of the isolating and differentiating mechanisms that allow for these capabilities to be sustained (Teece et al., 1997). A dynamic set of resources can develop and enhance the firms' capabilities (Teece, 2007). Dynamic capabilities are difficult-to-imitate combinations of organisational, functional and technological skills that establish the foundations upon which distinctive and difficult to imitate advantages can be built, maintained and enhanced (Teece et al., 1997). A firm's capacity to renew competencies through innovative responses, appropriately adapting, integrating, and reconfiguring internal and external organisational skills, resources, and functional competencies will ensure its sustained performance advantage (Teece et al., 1997).

Past choices influence domains of competence, and at any given time, 'firms must follow a certain trajectory of competence development' (Teece et al., 1997 pg. 515). A firm can displace market-oriented organization because inside, the firm one can organise certain type of economic activities in ways one cannot using markets (Coase, 1937). Competencies and capabilities, which are organising and getting things done internally, is the key component in sustaining performance advantages (Teece et al., 1997). Internally, organisation takes place in a more multilateral fashion, with patterns of behavior and learning being orchestrated in a much more decentralized fashion (Teece et al., 1997). Three dimensions, processes, paths, and positions are classes of factors that will help determine a firm's distinctive competence and dynamic capabilities (Teece et al., 1997). The essence of competencies and capabilities are embedded in organisational processes of one kind or another and these processes through their evolutionary and co-evolutionary paths explain the essence of the firm's dynamic capabilities and competitive advantage (Teece et al., 1997). Processes have a level of coherence within them, and it is this coherence where the capabilities exist. This is because it may be difficult to replicate a cohesive set of inter-organisational linkages.

This study suggests that the cohesion between a set of related factors creates a higher-level resource that can establish an environment to sustain existing IT-related capabilities. This is because there is a hierarchy of capabilities where general and broadly defined capabilities are formed from an integration of more specialised capabilities (Grant, 2008). This integration is possible because of the existence of synergy between related resources. These theoretical perspectives form the basis of this study's hypotheses presented in the next section.

HYPOTHESES DEVELOPMENT

Human resources management (HRM) practices can help create a source of sustained performance advantage (Bailey, 1993). Effective HRM systems simultaneously exploit the potential for complementarities and synergies among HR practices (Arvanitis, 2005; Becker and Gerhart, 1996; Black and Lynch, 2001; Ichniowski, Shaw and Prennushi, 1997). These factors include employee skills and motivation, and organisational structures and designs that provide employees with the ability to control how they perform their roles (Bailey, 1993). Appropriate organisational design, which involves the specification of decision rights, performance evaluation and compensation systems are important elements that establishes the complementary factors (Jensen and Meckling, 1992).

Organizations have general and specific knowledge (Hayek, 1945). Specific knowledge is difficult to convey, and is more costly to transfer, because the specific feature of a knowledge stems from the fact that individuals know more than they can state (Jensen and Meckling, 1992; Polanyi, 1966). People have limited capacity as information processors, and highly specific information is likely to reside at lower levels of the organisation (Hitt and Brynjolfsson, 1997). Decision rights should be collated with necessary knowledge (Jensen and Meckling, 1992), thus in an environment surrounded with IT resources, organizations should be structured so that the 'actors' with specific knowledge should have the decision rights. This situation puts the knowledge and people together, and performance is broadly associated with a work system that includes a decentralised decision making authority (Hitt and Brynjolfsson, 1997). The contribution of a highly and motivated workforce will be limited if jobs are structured, or programmed in such a way that employees do not have the opportunity to use their skills to refine ways of doing their tasks (Bailey, 1993).

One of the powerful features of IT is its capacity to enable people to work efficiently in teams (Rockart and Short, 1989). IT can facilitate move away from traditional hierarchy and towards open organisation, and promotes a team-based structure (Powell, Lovallo and Caringal, 2006). This means that promoting an environment that encourages employees to interact and adopt a team-based approach is important for organisations. As work-based IT becomes more common, organisational performance may become increasingly affected by organizations' capacities to manage the team-based approach (Nolan and Croson, 1995). HRM practices that encourage participation amongst employees, and allow them to improve how they perform their work, can also contribute to sustained performance (Huselid, 1995). Such initiatives include cross-functional teams, job rotation, and quality circles (Huselid, 1995). To ensure a better synergy between task and human resources, a decentralised form of organisational design is critical. Such a design should promote employees with greater autonomy with their task, and nurture an environment that allows participation amongst employees to improve on how they perform their tasks. This study considers these two dimensions of human resource related organisational design issues as important in establishing a dynamic IT-Usage environment.

A decentralised organisational design may result in better use of operational level knowledge, but it can also exacerbate agency problems (Jensen and Meckling, 1992). In the absence of appropriate incentive systems, workers may not necessarily use their decision-making authority in the best interest of the firm (Hitt and Brynjolfsson, 1997). Appropriate incentive systems align the worker's goals to those of the organisation. Workers would seek appropriate compensation for their will to share knowledge. Firms' work policies should not be analyzed in isolation, but as part of a coherent incentive system (Baker, Gibbons and Murphy, 2002).

A coordinated change in these factors establishes a dynamic IT-usage environment with the potential to continuously create, extend, upgrade, and protect an organisations unique resource base. The level of coordination involved within this dynamic environment through continuous end-user involvement will seize emerging opportunities, and protect and reconfigure organisations existing capabilities. This suggested dynamic environment will nurture an effective IT-usage involvement, motivating them to adapt to changes in technological opportunities. These orchestration capabilities undergird an enterprises capacity to successfully innovate and capture sufficient value to deliver superior long term performance (Tece et al., 1997). Consistent with the above arguments, this study suggests that:

H1a: A decentralized organizational design establishes a dynamic IT-usage environment.

H1b: A team-based work environment establishes a dynamic IT-usage environment.

H1c: A congruent reward system establishes a dynamic IT-usage environment.

Top management commitment to IT-related initiatives requires top executives to act as business visionaries, supporting and articulating the need for IT, and communicating its functionality within the context of the organization's strategy, structure and systems (Henderson and Venkatraman, 1993). Top management commitment enhances IT success by making IT resources available, supports and guides the IS functions, integrates IT with business strategies and processes, and ensures continuity in IT investments over time (Powell and Dent-Micallef, 1997; Wade and Hulland, 2004). Lack of such support may see IS resources having little effect on performance, even when substantial investments are made to acquire or develop

such resources (Wade and Hulland, 2004). The suggested dynamic IT-usage environment, with closely-knit workforce would provide top management with continued assurance that particular IT initiative is beneficial to the organization as whole. This environment can galvanize management commitment, and sustain and increment that commitment, from which IT management including IS planning would benefit (Karimi, Bhattacharjee, Gupta and Somers, 2000). Effective IT management requires a coordinated effort in planning, organizing, controlling, and directing the deployment of IT within firms (Karimi et al., 2000). The role of the top management in promoting this coordination is crucial. A dynamic environment, by demonstrating a consistent IT-related vision, acts as an important catalyst sophisticating this IT management role. The dynamic environment will ensure that the top management has an overarching vision of the potential of IT-related resources. This vision can sustain top management commitment to ensure longevity and enrichment of their commitment. Consistent with the above arguments this study suggests that:

H2: A dynamic IT-usage environment will sustain top management's commitment towards IT-related initiatives.

Shared organizational knowledge between unit and IT managers determines the strategic use of IT (Boynton, Zmud and Jacobs, 1994; Ray et al., 2005). An organization's IT use is influenced by the presence of a mosaic of IT-related knowledge that binds the firm's IT and line managers (Boynton et al., 1994). Shared knowledge is an IT managerial capability that influences how IT resources support processes. A major component of the firm's IT capacity is represented by the combination of IT and business-related knowledge possessed and exchanged amongst the IT and line managers (Ray et al., 2005). This IT-related management capability enhances the performance of specific processes (Jeffers et al., 2008; Ray et al., 2005), and leads to increased operational and service performance of the IS groups (Nelson and Coopider, 1996). Shared knowledge also influences IT assimilation (Armstrong and Sambamurthy, 1999), and it also influences the level of IT-business alignment (Reich and Benbasat, 2000). A dynamic IT-usage environment will provide middle management with the assurance of appreciation by the IT-users for the introduced technology. This assurance ensures visibility of IT initiatives (Earl, 1989). This visible IT appreciation is important for management to realize the potential of IT in their organization, and is an essential driver for a proactive IT-adoption environment. As firms move towards greater IT sophistication, the assimilative capability of different types of management becomes essential. This is because an appropriate mix of business and IT executives helps ensure strategic alignment, a balanced portfolio of IT investments, and close coordination of business and IT in the organization. A dynamic IT-usage environment ensures visibility of flow of benefits from initiation of an IT-related project and appreciation of IT by the end-users at the process level. This visibility is an important vehicle to ensure congruence in the vision of unit and IT management on the role of the adopted technology. This visibility can eliminate individual unit-based values and promote a common vision of benefits of IT to the firm. The learning resulting from the interaction within the environment develops a capability of a unique understanding between the users and the managers of technology. The dynamism of the environment ensures visibility of the benefits, which will continue to stimulate proactive sharing of a common vision by unit and IT managers. A dynamic IT-usage environment is a vibrant and congruent environment of potential IT usage. This environment is an important and effective tool within mid-level management in sharing IT-related benefits. Consistent with the above arguments this study proposes that:

H3: A dynamic IT-usage environment will sustain the level of shared knowledge between IT and unit managers.

Figure 1 presents the research model developed in the previous discussion. Note that the dynamic end-user environment is a formative higher order construct using the repeated measures concept (Chin, Marcolin and Newsted, 2003).

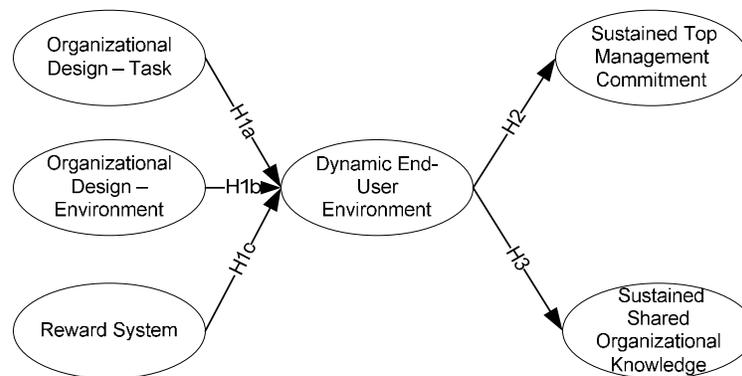


Figure 1: Research Model

RESEARCH DESIGN

This study employed survey research methodology, and a fully validated survey instrument obtained information about all the measures. The survey instrument validation included a pre-test, expert evaluation, and a pilot test. Table 1 provides details on the measures of the constructs and their original source(s). We obtained the respondents contact details from the ORBIS database. After careful evaluation, we selected 2215 firms to form the sampling frame. Dillman's (2007) methodology was closely followed in developing and administering the mail and online version of the research instrument. At the end of data collection, this study achieved a response rate of 13.16 percent (216 responses), which is comparable with other studies with senior executives as target respondents (e.g., Jeffers et al., 2008; Ray et al., 2005). We received responses from thirteen major industries, with a good representation of medium and large firms, with an average of 617 employees per firm. The Chief Financial Officers, Director of Management Information Systems, and Chief Information Officers completed most of the valid responses received. For diagnostics checks, we tested for non-response bias, test of bias in the mail and online survey, and common methods variance test using Harman's single-factor test. These tests did not reveal that the data quality was compromised by these biases and threats. There were no missing values in the data set. Descriptive statistics (not included due to word limit restrictions) of the data indicated that the skewness, kurtosis, mean and standard deviation were within normality range. Details can be obtained from the first author.

Construct	Items	Original Source(s)
Organizational Design - Task	The operational level management set the pace of the work. The operational level management schedule work. The operational level management distributes work among the workers. The operational level management decides how the tasks should be accomplished. The operational level management deals with difficult situations in their work environment.	Osterman (1986; 1994)
Organizational Design - Environment	The operational level management deals with customers in routine situations and/or their problems and complaints. Our business units use "self-managing teams" very heavily. Our business units use "employee involvement groups" very heavily.	Osterman (1986; 1994)
Reward System	Our organisation has an equitable incentive based reward system. Our organisation provides group incentives. Our organisation has performance-based promotion. Our organisation promotes team building. Our organisation promotes teamwork.	Bresnahan et al., (2002)
Sustained Top Management Commitment	Over the last five years: Our top executives have continually indicated their commitment to IT. Our top executives have continually championed IT within the organisation.	Powell and Dent-Micallef (1997)
Sustained Shared Organizational Knowledge Between Unit and IT Managers	Over the last five years: Our IT management team was continually informed about the business operations of each unit. Our IT management team was continually about the business strategies of each unit. Each unit's management team continued to strongly recognise IT as a competitive weapon. Each unit's management team continued to strongly recognise IT as a tool to increase productivity of clerical employees. Each unit's management team continued to strongly recognise IT as a tool to increase productivity of professional employees.	Boynton et al., (1994)

Table 1. Measurement Items

RESULTS

Assessment of the Measurement Model

We used Partial Least Squares (PLS), a components-based structured equation modeling technique to assess the measurement and structural properties of the data. Table 2 provides the results of measurement model assessment, including Cronbach’s alpha, average variance extracted, composite readability, and inter-construct correlations. The alpha coefficients of all constructs is higher than 0.70 (Nunnally, 1978). The more accurate composite reliabilities, which avoid the assumption of equal weightings, are above 0.80. The average variance extracted was all above 0.50. The square root of average variance extracted, which represents the average association of each construct to its measures, was higher than the correlations between the constructs. This suggests that each construct is closely relates to its own measures than to those of other constructs. Analysis of convergent and discriminant validities showed consistent results. Overall, this result supports the convergent and discriminant validity of the construct, and paves the way for assessment of the structural properties of the data.

	AVE	CRO	COM	REW	ODE	ODT	SOK	TMC
REW	0.72	0.90	0.93	0.85				
ODE	0.64	0.71	0.84	0.32	0.80			
ODT	0.66	0.88	0.91	0.31	0.39	0.51		
SOK	0.68	0.88	0.91	0.42	0.30	0.35	0.82	
TMC	0.84	0.82	0.92	0.34	0.39	0.39	0.54	0.92

REW - Reward Systems, ODE- Organisational Design - Environment, ODT - Organisational Design - Task, SOK - Shared Organisational Knowledge, TMC - Top Management Commitment, AVE - Average Variance Extracted, CRO - Cronbach's Alpha, COM - Composite Reliability (Note: Word limited restriction did not permit us to include to item loading and cross loading to demonstrate the discriminant validity.)

Table 2. Assessment of the Measurement Model

Assessment of the Structural Model

Figure 2 provides the result of the assessment of the structural model. We used a hierarchical approach to establishing the higher order factor of dynamic end-user environment. In this approach, a second-order factor is a direct measurement of the observed variables for all the first order factors. In summary, organization design – task, environment, and reward system contribute significantly in the formation of a higher-level dynamic end-user environment. There is a significant positive association between sustained top management commitment to IT initiatives and the dynamic end-user environment. There is also a significant positive association between sustained shared organizational knowledge and the dynamic end-user environment. Thus, the data supports all hypotheses (H1 – H3).

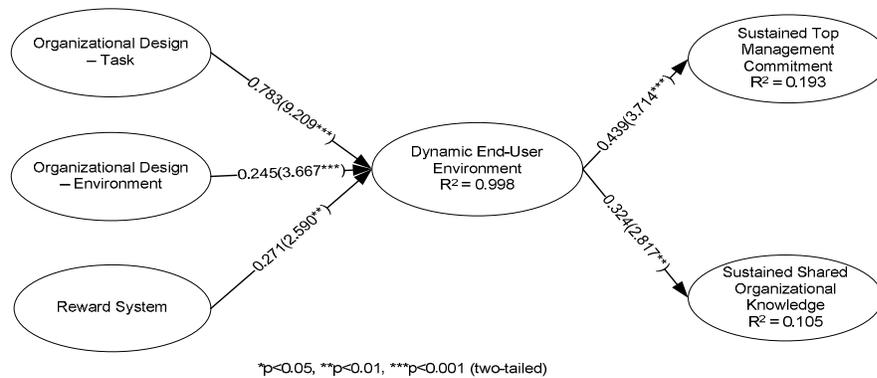


Figure 2: Structural Model

DISCUSSION

Firms' IT-related capabilities are the source of their IT-related business value. Since IT resources continually provide new opportunities and challenges, it is important to understand the factors that help firms to sustain their IT-related capabilities. This study's results suggest that a dynamic end-user environment can continually stimulate management thoughts and commitment on how best to leverage the IT resources to maximise their business value. Management support and understanding for IT-related initiatives ensures a good fit between IT and business strategies. This support serves as the foundation for effective utilization of IT resources. Identifying appropriate IT resources and realizing avenues to develop the IT-related capabilities are important for organizations to survive in today's competitive environment. There are many pitfalls to the strategy of IT deployment, which means it is important to have deeper level of understanding of the potential of the technology, and the ways of enhancing the unique organizational capabilities.

A dynamic end-user environment can provide the vision necessary to sustain management commitment for IT-related initiatives by demonstrating IT's continued benefits. Much of organisational knowledge resides at the lower level of the organizational hierarchy. To ensure proactive decisions regarding acquisition, implementation, and building capability regarding IT resources, nurturing this knowledge is crucial. This effort will require breaking the traditional barriers, the internal walls between users and providers of technology, and an appropriate cultural shift. This requires a coordinated change in a number of complementary factors. The result of this change is a higher-level resource, in this study's case, a dynamic end-user environment, which can afford sustained support to existing organizational capabilities.

A dynamic capabilities-based model provides a better approach to understanding how firms' value-generating resources can be developed and sustained. This approach relates firm's dynamic resource utilization efforts to their IT-promoting capabilities. The result is a more direct and agile path to understanding the ways in which firms can continue to secure IT-related competitive benefits. Theoretically, this study extends the resource-related approach to understanding how IT can contribute to business value by introducing a dynamic component to this framework. This sustainable resource-based model provides an opportunity to attain a deeper level of understanding on why some firms perform better with their IT resources compared to others. This understanding is important in an environment where there are continuous reservations on the value of IT to organisations.

IMPLICATIONS, LIMITATIONS AND CONCLUSIONS

This study demonstrates that establishing a successful organisational design is a complex process. Deriving value from firms' bundle of resources may not only occur at individual resource level, but also at higher levels. Generating this higher-level resource requires a deeper level of understanding of processes, resources, and designs. This study presents a combination of factors that is a catalyst for sustaining firms' IT-related capabilities. This effort required the need to understand the synergy between the complementary factors at the level of IT resource consumption. This study presents future research with an important theoretical extension in resource-centric approach to IT business value research. For decision makers, this study demonstrates that firms may need to be much more comprehensive in their quest to leverage the most from their IT resources. A holistic view of what constitutes important resources is necessary, as some resources may not provide incremental benefit on their own. Rather, some of these resources may be valuable through their complementary relationship with other resources. This study successfully demonstrates one such combination in the form of a dynamic end-user environment that can sustain firms existing IT-related capabilities.

This study has a number of limitations. A response rate of 13.16% is at the lower end of an acceptable range. We did manage to solicit responses from 216 respondents and detailed diagnostics of data did not reveal any issues on data quality and representativeness of the sample. The valid responses comfortably met the required dataset for assessing the structural model using a components based SEM tool. This study used a cross-sectional research design, and showed some important associations between different organisational resources. This means that the sustainability of our findings is limited. A longitudinal study would address the question of causality and sustainability. This study only considered a certain number of resources, but did demonstrate that perhaps all organisational resources, either on their own or in association with other resources may prove to be beneficial in realizing IT-related benefits. This understanding presents a promising avenue for future research to consider other organisational resources in different contexts.

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