Towards a Deeper Understanding of Information Technology Governance Effectiveness: A Capabilities-Based Approach

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Abstract

We examine the relationship between the effectiveness of IT steering committee-driven IT governance initiatives and firm’s IT management and IT infrastructure related capabilities. We test these relationships empirically by a field survey of 216 firms. Results of this study suggest that a firm’s effectiveness of IT steering committee-driven IT governance initiatives positively relate to the level of their IT-related capabilities. We also found positive relationships between IT-related capabilities and internal process-level performance, which positively relate to improvement in customer service and firm-level performance. For researchers, we demonstrate that the resource-based theory provides a more robust explanation of the determinants of firms IT governance initiatives. This would be ideal in evaluating other IT governance initiatives effectiveness in relation to how they contribute to building performance-differentiating IT-related capabilities. For decision makers, we hope our study has reiterated the notion that IT governance is truly a coordinated effort, embracing all levels of human resources.

Keywords: IT Governance, IT Steering Committees, IT-Related Capabilities, Internal Process-Level Performance, Improvement in Customer Service, Firm-Level Performance
Introduction

Given the substantial investment in IT, and the significant impact it has on organizational success (Weill and Ross 2004; Xue et al. 2008), considerable organizational resources are consumed to manage how IT is acquired and diffused in organizations. Termed IT governance, it is the responsibility of the board of directors and executives, and consists of leadership, organizational structures, and processes that ensure the enterprise’s IT sustains and extends the organizations strategies and objectives (IT Governance Institute 2007). The importance of effective management of organizational resources has been prevalent for a long time, but received renewed attention amid recent spectacular collapses, and spate of corporate scandals with the likes of Enron and WorldCom. The crises in confidence in the corporate sector resulted in unprecedented enactment of legislation, the Sarbanes Oxley Act the most notable. Management of IT resources has also seen its share of failures, collapses, and unfulfilled expectations. Major enterprise resource planning (ERP) systems were never completed, e-business initiatives were poorly conceived, and data mining experiments that generated plenty of data but few valuable leads (Weill and Ross 2004). Today, the corporate world, through mandatory requirements, and self-regulation, has moved forward in managing its resources, and as IT resources continue to claim a major portion of investment funds, its governance also consumes considerable resources to ensure its effective and efficient management. However, is this increasingly pricey venture effective, and if so, how do we measure it?

Recently, various arguments have been put forward to suggest which IT governance arrangements work best, (for example, Sambamurthy and Zmud 1999; Sia et al. December 2008; Weill and Ross 2004; Xue et al. 2008). Research regarding information systems structure and IT governance decisions rights (e.g. Brown 1997; Sambamurthy and Zmud 1999), and pre-decision activities (Xue et al. 2008), and the level of uncertainty and IT governance hierarchy (Xue et al. August 2008) greatly contributes to our understanding of how organizations control IT investment decision making. However, our understanding of the effectiveness of such initiatives is less concrete. Weill and Ross (2004) suggest assessing the level of effectiveness in delivering four objectives (cost, growth, asset utilization, and business flexibility), while compliance with legal and regulatory requirements has also surfaced in literature (Bowen et al. 2007). The perceived overall effectiveness of IT governance also assessed IT governance effectiveness (Goodhue and Thompson 1995). Recently, studies have also focused on the relationship between management knowledge, IT governance, IT governance misalignment and firm-level performance (e.g., Boritz and Lim December 2007; Gu et al. December 2008).

Recent information systems (IS) literature has embraced the concept of IT-related capabilities as the focal component that differentiates the value-creating potential of the acquired IT (Melville et al. 2004; Ray et al. 2005; Wade and Hulland 2004). Framed within the resource-based view of a firm, there is concurrence that the capabilities that firms accomplish from their IT resources are the source of their competitive advantage (Bharadwaj 2000; Wade and Hulland 2004). Thus, it seems appropriate that evaluation of any efforts to manage the IT resources in organizations be in terms of its relationship with the capabilities that a firm is able to develop. These capabilities are aimed at enhancing the business processes, a first focal point of IT impact (Barua et al. 1995; Tallon 2007), but as substantial financial resources are consumed in acquiring and managing IT resources, mapping process-level benefits to firm-level outcomes is essential (DeLone and McLean 2003).

Thus, the objective of this study is to increase our knowledge about the effectiveness of IT governance, by considering its relationship with IT-related capabilities, and their impact on process-level performance, and firm-level performance. Our results suggest that a firms’ effectiveness of IT steering committee-driven IT governance initiatives positively relate to their IT-related capabilities. We also found positive relationships between these capabilities and the internal process-level performance. Our results also support the conjecture that improvement in internal process-level performance positively relate to improvement in customer service, and both relate to firm-level performance. For research, we demonstrate that the resource-based theory provides a more robust explanation of the determinants of firms IT governance initiatives. For decision makers, we reiterate the notion that IT governance is truly a coordinated effort, embracing all levels of human resources, and their firm must consider their contribution in implementing IT governance initiatives. In the following sections, we first present an overview of the IT governance mechanisms based on extant literature. We then present the theoretical framework and hypotheses. Following that, we present and discuss the results. The final section of this paper discusses the theoretical and practical implications, limitations, and directions for future research.
Background, Theoretical Framework and Hypothesis Development

IT Governance, at an abstract level, is a subset discipline of Corporate Governance focused on information and IT assets (Weill and Ross 2004). Initially driven by compliance initiatives, such as Sarbanes-Oxley in the USA and Basel II in Europe, IT governance today demands a higher level of management involvement. IT capability can no longer be a black box, rather its governance implies a system in which all stakeholders, including the board, internal customers, and in particular departments such as finance, have the necessary input into the decision making process. Management need to understand the overall architecture of its company’s IT applications portfolio, and the board must ensure that management knows what information resources are out there, what condition they are in, and what role they play in generating revenue (Nolan and McFarlan 2005).

There are varying definitions of IT governance. Weill and Ross (2004) focus on specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT. The IT Governance Institute (ITGI) expands the definition to include foundational mechanisms in the form of the leadership, and organizational structures and processes that ensure that the organization’s IT sustains and extends the organization’s strategies and objectives (IT Governance Institute 2007). The AS8015, the Australian Standard for Corporate Governance of ICT, defines Corporate Governance of Information and Communication Technology (ICT) as the system by which one directs and controls the current and future use of ICT. This involves evaluating and directing the plans for the use of ICT to support the organization and monitoring this use to achieve plans. It includes the strategy and policies for using ICT within an organization. Within these narrower and broader definitions, the decision rights and the effective use and management of IT resources is a critical component. For the purpose of this study we define IT governance as ‘a coordinated approach to maintaining organizations capabilities for effective directing and controlling the use of IT to ensure that that IT helps achieve the organisations current and future strategies and objectives.’

In anticipation of the growing need of effective IT resources management, a number of supporting mechanisms guide the implementation of IT governance. The Control Objectives for Information and related Technology (COBIT) is an approach to standardize good information technology security and control practices by providing tools to assess and measure the performance of 34 IT processes of an organization (IT Governance Institute 2007). The ITGI is responsible for COBIT. Similarly, ISO/IEC 38500:2008, Corporate governance of information technology, provides a framework for effective governance of IT to assist those at the highest level of organizations to understand and fulfill their legal, regulatory, and ethical obligations in respect of their organizations’ use of IT. ISO/IEC 38500 is applicable to organizations from all sizes, including public and private companies, government entities, and not-for-profit organizations. This standard provides guiding principles for directors of organizations on the effective, efficient, and acceptable use of IT within their organizations.

The definitions and supporting mechanisms insinuate IT governance being composed of an IT-related decision making structure and methodologies to plan, organize, and control IT activates. Much of prior research has focused on the structure and organization of the IT governance mechanism (for example, Brown 1997; Sambamurthy and Zmud 1999; Weill and Ross 2004; Xue et al. 2008). These structures are categorized as centralized, decentralized, or federal (Sambamurthy and Zmud 1999), business monarchy, IT monarchy, Feudal IT duopoly, and anarchy (Weill and Ross 2004). These structures embed responsible functions for making IT decisions. The most prominent of these functions are that of the IT steering committees (Doll and Torkzadeh 1987; Karimi et al. 2000). The IT steering committee is a lateral organizational coordination whose organisation embraces human resources from all levels of organizational hierarchy for a coordinated approach managing organisations IT resources. The key role of the committee is to set policies and foresee organization-wide coordination of IT resources (Karimi et al. 2000). The IT Steering committee is a high-level team of representatives from multiple divisions or functions who are entrusted with the task of linking IT strategy with business strategy by setting a strategic direction, matching corporate concerns with technological potential, and building commitment to policies (IT Governance Institute 2007; Nolan 1982). Chaired by a top executive, and staffed by both IT and business executives, IT steering committees meet periodically to discuss IT direction, approve and rank projects, review performance, formulate or approve technology policies, determine resource levels, and perhaps recommend major initiatives (Earl 1993). A successful IT governance vehicle requires communication amongst all parties based on constructive relationships (Bowen et al. 2007; Johnson and Lederer 2005), an essential characteristic in the constitution of the IT steering committee. We propose to evaluate its success within the resource-based view lens, which we discuss next.
IT-Related Capabilities as a Measure of IT Governance Effectiveness – A Resource-Based Argument

Conventional frameworks like Porter’s competitive strategy framework (Porter 1985) view a firm as a bundle of activities, thus analysis is focused on the environment-performance relationship (Barney 1991). The resource-based view of the firm (Barney 1991; Mata et al. 1995; Wernerfelt 1984) views a firm as a bundle of resources, and focuses on the relationship between firm internal characteristics and performance. Rooted in evolutionary economics (Penrose 1959), the resource-based approach re-establishes the importance of the individual firm as a critical unit of analysis. This view argues that firms possess resources (including IT resources), a subset of which enables them to achieve competitive advantage and a further subset, which leads to superior long-term performance (Barney 1991; Dierickx and Cool 1989; Grant 1991; Wernerfelt 1984). This competitive advantage is possible because these capabilities may differ across firms, and may be sustainable (Barney 1986; Mata et al. 1995; Rumelt 1984; Wernerfelt 1984).

This notion is especially pertinent in IS research, as IS resources rarely contribute a direct influence on sustained business performance. Rather, information systems exert their influence on firms through a complementary relationship with other assets and capabilities (Clemons and Row 1991). More specific to IT, the resource-based view suggests that IT can influence the ability of processes within a firm to generate value, if these resources are valuable, rare, and costly to imitate. Hence, they will be the sole source of advantage, and these resources, per se are likely to explain variation in performance. Support for this resource-based view of the firm argument in IS research was first witnessed at the conceptual level (example, Andreu and Ciborra 1996; Mata et al. 1995; Ross et al. 1996).

Here, a number of IT-related capabilities and their nature of relationships to various measures of performance was suggested. Recently, empirical research has validated some of those conjectures (example, Bharadwaj 2000; Bharadwaj et al. 1998; Powell and Dent-Micalef 1997; Ray et al. 2005; Wade and Gravill 2003). This body of research has successfully demonstrated a positive link between the IT-related capabilities and various measures of business value.

Consequently, a true measure of any IT-related governance initiative is in its ability to contribute to IT-related capability building. The resource-based view of the firm provides an ideal opportunity to relate firms IT-related capabilities with resources consumed to establish IT governance structures. It puts the comparison at level terms and advocates a strong basis for existence of a relationship between the resources and structures. Employing the resource-based allows evaluation of firm’s governance initiatives to a set of resources ‘that matter’, their IT-related capabilities. Prior research has identified a number of IT-related capabilities that may be a source of IT-related business value, grouped into two broad categories of IT-related management capabilities, and IT-related infrastructure capabilities. Two IT-related management capabilities of top management commitment and shared organizational knowledge, and one IT-related infrastructure capability of flexible IT infrastructure has featured prominently in prior research that evaluate the implications of IT-related capabilities on firm performance. These capabilities focus on top-level and middle-level management, and on a firm’s IT infrastructure, thus embracing the key IT-related business elements. Respectively, we see it ideal to evaluate these IT-related capabilities against the firms IT steering committee driven IT governance initiatives, as described below.

Hypothesis Development

The extant literature (e.g., Wade and Hulland 2004) suggest a number of IT-related capabilities that could explain IT-related performance differences across firms. In this research, we attempt to demonstrate that if firms IT governance initiatives are effective, they should help build and sustain these IT-related capabilities. Our choice of IT steering committees as IT governance structure has a lot of management participation. Thus, we see it ideal to evaluate the effectiveness of this initiative with related IT-management capabilities. Essentially, we consider two direct IT-related management capabilities of Top Management Commitment and Shared Organizational Knowledge, and a ‘management-influenced’ IT-related capability of Flexible IT Infrastructure.

The IT-related capability of top management commitment suggests that successful IT requires top executives to act as ‘business visionaries’ and ‘prioritizers’, 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). IT-related top management commitment relates primarily to having commitment from top management for its IT-related initiatives of enhancing IT success by making IT resources available, supporting and guiding the IS functions. It also includes integrating IT with business strategies and processes, and ensuring continuity in IT investments over time (Armstrong and Sambamurthy 1999; Wade and Hulland 2004). The 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 effectiveness of the IT steering committee and the extent of its laterality would provide top management with the assurance of embracive consensus that a particular IT initiative is beneficial to the organization as whole. The IT steering committee has the potential to galvanize management commitment, from which IT management would benefit (Karimi et al. 2000). The key top management role of supporting IS planning also benefits from a proactive IT steering committee (Doll 1985; Raghunathan and Raghunathan 1989). Importantly, effective IT management requires a coordinated effort in planning, organizing, controlling, and directing the deployment of IT use within firms (Boynton and Zmud 1987; Karimi et al. 2000). The role of the top management in promoting this coordination is crucial, and the presence of IT steering committee drive IT governance initiatives would as an important catalyst sophisticating this IT management role. Thus, IT steering committee-driven IT governance initiatives should secure top management support for various IT-related initiatives. These arguments lead to the following hypothesis.

**H1:** The effectiveness of IT steering committee driven IT governance is positively associated with the level of top management commitment to IT-related initiatives.

The IT-related capability of shared organizational knowledge between unit and IT managers may determine the strategic use of IT (Henderson 1990). 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). Essentially, shared knowledge is an IT managerial capability that may influence how organisations use IT resources in support of a process. A major component of the firm’s capacity regarding IT is represented by the conjunction of IT and business-related knowledge possessed and exchanged amongst the IT and line managers (Ray et al. 2005). This IT-related management capability has been shown to enhance the performance of specific processes (Jeffers et al. 2008; Ray et al. 2005), and to increased operational and service performance of the IS groups (Nelson and Cooprider 1996). Shared knowledge is also seen to influence IT assimilation (Armstrong and Sambamurthy 1999), and it influences the level of IT-business alignment (Reich and Benbasat 2000), a key success factor long emphasized in the IS literature (Ray et al. 2005).

The presence of an IT steering committee provides the visibility of IT initiatives (Earl 1989), an essential tool for management to appreciate the potential of IT in the organization. As firms move towards greater IT sophistication, the assimilative capability of different types of management becomes essential (McFarlan 1984; Raho et al. 1987). Business unit leaders are critical in setting high-level architecture and acting as advocates for effective IT governance (Weill and Ross 2004). 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. The IT steering committee acts as the ideal vehicle to ensure congruence in the vision of unit and IT management on the role of adopted technology. Essentially, effective IT steering committees would ensure taming of individual unit values, and promote a common vision of benefits of IT to the firm. The learning resulting from this interaction develops a capability of a unique understanding between the users and managers of technology. Thus, the presence of effective IT steering committee act as ideal harmonizers of potential incongruence in the perceived objectives of IT and unit managers, and effectively act as an important tool within mid-level management in sharing IT-related benefits. These arguments lead to the following hypothesis.

**H2:** The effectiveness of IT steering committee driven IT governance is positively associated with the level of shared organizational knowledge within the IT managers and unit managers.

The third IT-related capability of flexible IT infrastructure can influence the firm’s IT resources’ ability to contribute to performance (Duncan 1995; Sambamurthy et al. 2003). IT infrastructure is a shared set of capital resources that provide the foundation on which IT applications are built (Duncan 1995), and it consists of hardware and operating systems, communication networks, critical shared data, and core data processing applications (Byrd and Turner 2000). A flexible IT infrastructure facilitates rapid development and implementation of IT applications that enable organizations to respond swiftly to take advantage of emerging opportunities (Ray et al. 2005). Alternatively, an inflexible IT infrastructure may impede the undertaking of important initiatives and limit the freedom of the organization in exploring opportunities (Ray et al. 2005). A flexible IT infrastructure is a complete set of technological resources, carefully planned and developed over time (Ray et al. 2005), and due to path-dependence, there can be significant differences across firms in how this infrastructure is constituted. The infrastructure differences could be long-term because infrastructure redevelopment is time consuming and costly.
An effective IT steering committee promotes agility and leadership in exploiting and managing IT (Earl 1993; Torkzadeh and Xia 1992). This agility results in dynamic resource allocation and exploitation (Thomas 1996). The result is a structure, flexible and intelligent enough to identify competitive opportunities, and capitalize on existing strengths (Thomas 1996). In addition, the laterally-structured IT steering committee encourages a shared vision that also aids in building this dynamics, and encourages managers to be agile, and vision how current IT structure could facilitate leveraging of potential opportunities (Karimi et al. 2000). Respectively, IT steering committees play an important role in establishing an IT infrastructure, whose flexibility is a product of its cooperative initiatives. These arguments lead to the following hypothesis:

**H3:** The effectiveness of IT steering committee driven IT governance is positively associated with the level of flexible IT infrastructure.

The conjecture that an effective IT steering committee promotes building of IT-related capabilities is the first stage of our endeavor to understand the effectiveness of an organization’s IT governance initiatives. Any IT-related capabilities nurtured say little about its effectiveness when considered in isolation. Decisions to acquire technology are rooted in the desire to enhance the organizations’ core processes (Alter 2003; Davenport 1990). Thus, ultimately, the effectiveness of IT-related capabilities, which may benefit from IT governance initiatives, must be visible in the organization’s business processes. The concept of business processes as a unit of measurement for effectiveness IT-related initiatives has been strongly advocated (Alter 2003; Davenport 1990), and ITs impact has been shown at this level (see for example, Mooney et al. 1996; Ray et al. 2005; Sambamurthy et al. 2003; Tallon 2007).

Similarly, the IT-related capabilities should improve the efficiency and effectiveness of the use of IT at this level. Recently, specific process measures in specific industries have been considered, the most common being the improvement in customer service (Jeffers et al. 2008; Ray et al. 2005). Such measures have proven to be appropriate for service processes, as experience of the customer is the critical competitive performance criteria. However, when considering firms across industries, such specific “quality of the output of the process” measures are not deemed as suitable as the first level of measure (Ray et al. 2005). Rather, common productivity measures are appropriate.

The resource-based perspective has strongly advocated that the IT-related capabilities explain performance differences across firms. Respectively, top management commitment enhances IT successes as they make IT resources available, support and guide the IS functions, integrate IT with business strategy and processes (Powell and Dent-Micallef 1997). Such initiatives ensure continuity in IT investments over time, thus ensuring availability of modern IT resources, and it is perceived to enhance the influence of the IT resources on performance (Armstrong and Sambamurthy 1999; Powell and Dent-Micallef 1997; Wade and Hulland 2004). Otherwise, an uncoordinated approach would contribute little to firm performance, even when substantial investments are made to acquire or develop such resources (Wade and Hulland 2004). Thus, top management commitment is an important IT-related capability in organizations to enhance IT resources ability to contribute to firm performance.

Similarly, a firm’s level of shared organization knowledge between IT and unit managers has shown to contribute to process performance. In a study of the customer service process, Ray et al., (2005) demonstrated a positive relation between generic use of IT in customer service and shared knowledge. He noted that the level of common knowledge understanding between the IT and line managers regarding how IT can be used to improve process performance is a critical factor in successful utilization of IT in the pursuit of business objectives. Nelson and Coopricher (1996) also found that an increasing level of shared knowledge between IS and line groups are linked with increased operational and service performance of the IS groups. Jeffers et al., (2008) found that the level of shared knowledge is an important IT management related capability, in that it is positively associated with third party logistics processes.

In the recent times, research posits the flexibility of a firm’s IT infrastructure as another capability that can influence its ability to use IT strategically (Armstrong and Sambamurthy 1999; Duncan 1995; Ray et al. 2005). This flexibility makes cost, pace, and value of IT-enabled innovation different for different firms (Broadbent and Weill 1997; Duncan 1995). As Ray et al., (2005) demonstrated, the flexibility of IT infrastructure allows firms to implement IT applications to support customer service more efficiently and effectively, and this explains differences in performance in the performance of customer service across firms. Similarly, we posist that a flexible IT infrastructure, in allowing firms to implement IT applications to drive the internal mechanics more efficiently and effectively, could explain differences in internal process-level performance. These arguments lead to the following hypotheses:

**H4a:** The level of top management commitment to IT initiatives is positively associated with internal process-level performance.
H4b: The level of shared organizational knowledge between IT and Unit managers is positively associated with internal process-level performance.

H4c: The level of flexible IT infrastructure is positively associated with internal process-level performance.

The relationship between customer satisfaction and productivity is a widely debated issue (Anderson and Fornell 1994; Anderson et al. 1997; Anderson and Sullivan 1993; Liao and Chuang 2004; Singh 2000). There is a widespread belief that firms should pursue superiority in both customer satisfaction and productivity. However, lack of congruence between the two could reduce the capacity (example, downsizing) as a tool for improving productivity. Such tools are expected to improve productivity in short-term, at the expense of a reduced level of customer service. Hartline and Ferrell (1996) highlight that while frontline employees’ significance for organizational effectiveness is uncontested, this is not achieved as these employees are typically underpaid, undertrained, and highly stressed.

The support of IT-related management capabilities and the platform of IT-related infrastructure capabilities would essentially promote automation of processes, improvement in existing technology, and reallocation of resources through changes in strategy, processes, and organizational structure. These are some of the key factors for enhancing productivity (Anderson et al. 1997; Stigler 1942). In essence, these organizational changes build organizational capacity, through enhancement of business processes and increasing the capacity of the employees, some of whom deal with customers. These enhanced business processes themselves become tools that employees can use to improve their service to their customers, and they would tame any apparent tension of satisfying the managements and customers expectations, a source of employee stress (Singh 2000). Therefore, any IT related initiatives would build employee competency and capacity to fulfill their core roles, including that of improved customer service. Interestingly, advocates of existence of trade-off between productivity and improved customer service suggest that appropriate applications of IT may improve both customer satisfaction and productivity simultaneously (Anderson and Fornell 1994). These arguments lead to the following hypothesis:

H5: Internal process-related productivity is positively associated with external process of delivery of customer service.

Substantial financial resources are required to acquire, manage, and implement IT related organizational resources. Thus, the monetary return on their IT investment is always of a concern. An organization’s firm-level performance depends on, amongst other factors, the effectiveness of these business processes in supporting its business goals (DeLone and McLean 2003; Ray et al. 2004; Ray et al. 2005). If the magnitude of increase in profitability is higher than that of the level of net investment in acquiring the related resources and implementing the organizational changes, it will result in improved firm-level performance. Importantly, mapping IT-related capabilities process improvements, and ultimately to firm-level performance establishes a clearer, and perhaps a tangible and complete path to realizing the benefits of IT governance initiatives. Organizations that effectively manage their IT, and are able to create IT-related capabilities, use these capabilities effectively and efficiently, should generate greater benefits at the process level, and this should be reflected in overall firm-level measure of business health (Barua et al. 1995; Davamanirajan et al. 2006; Melville et al. 2004; Mukhopadhyay and Kekre 2002; Subramani 2004). These arguments lead to the following hypothesis:

H6: Internal process-related productivity is positively associated with firm-level performance.

The level of customer service improvement is also a fundamental indicator of firms performance due to economic and behavioral consequential beneficial to the firm (Anderson et al. 1994; Anderson et al. 1997). Good customer service is of strategic importance (Cooper et al. 1997; Jefferis et al. 2008), and so is greater customer loyalty (Anderson et al. 1997; Bearden et al. 1984; Oliver et al. 1989). Loyalty secures future revenue, reduce costs and decrease price elasticities (Anderson 1996; Fornell 1992). Internally, this is reduces costs, owing to defective goods, and handling and managing complaints (Crosby et al. 1990; Garvin 1988). Satisfied customers also help attract new customers (Fornell 1992). Finally, improved customer satisfaction results in higher quality of economic returns (Anderson et al. 1997; Jefferis et al. 2008). Thus, Organisations that complement their IT and IT-related capabilities well, and use the IT resources efficiently will generate greater benefits, and this would contribute to overall business value (Davamanirajan et al. 2006; Subramani 2004). Thus, we suggest that:

H7: Improvement in customer service is positively associated with improvement in firm-level performance.

Figure 2 depicts the research model emerging from the previous discussion.
Research Methodology

Construct Operationalization

We designed a survey instrument to obtain information on all the measures. As far as possible, we used existing scales, but as we employed the measures in a different context, we conducted full testing of the instrument. The measures for effectiveness of the IT steering committee, a core IT governance mechanism, was adopted from an instrument developed by Karimi et al., (2000), and focused on the roles of the steering group, policy committee, and IT board. Top management commitment was measured using two items adopted from Powell and Dent-Micallef (1997), addressing executive commitment to IT. Five items measured shared organizational knowledge, sourced from Boynton et al., (1994), which focused on IS management’s understanding of business units roles, business unit management’s appreciation of IT as tool for competitive advantage and employee productivity. Flexible IT infrastructure measured platform compatibility issues, data standardization, and access interface, and these measures were adopted from Duncan (1995).

Seven items measured the relative performance related to customer service. The measurement dimension included promptness, availability, empowerment, commitment, and efficiency in serving the customers. The measures were adopted from Ray et al., (2005), and modified to resonance generic for suitability to a wider context. Internal process measures considered cost-related efficiencies and productivity. Four items measured these two dimensions, which were used extensively in prior research (e.g. Mitra and Chaya 1996). The firm-level measures were sourced from Powell and Dent-Micallef (1997), consisting of returns on assets, equity, and improvement in profitability. Such subjective measures were widely used in organization research (Dess 1987; Jeffer et al. 2008; Powell 1992), based on the assumption that senior executives are capable of assessing the performance of their firm. We controlled for firm size and number of years of IT investment, and industry representation to discount for rival hypotheses that may drive process level and organizational level performance. We anticipate that the length of time a business has engaged itself into its process, thus maturing in its capability, may see IT-related capabilities have a positive impact on their process performance. Similarly, we believe that number of years the firms have been investing in IT may have an effect on their process efficiencies and performance. Bigger firms have greater resource acquiring capacity and a better knowledge base, which could be positively associated with business process performance. Similarly, the level of ‘fit’ between IT resources, and IT-capabilities and the consumption of these resources at process level could differ across industries.

Instrument Validation

The quality of a survey instrument effectively determines the quality of self-reported data (Jeffer et al. 2008). As prior research applied the measures in different contexts, we conducted an extensive validation of the pool of measures. As the first approach, to assess the face validity, we adopted a hybrid of steps suggested by Davies (1989).
and Moore and Benbasat (1991). Davies (1989) provided construct definition and then asked the f to rank the items in relation to fit with construct definitions, and then asked judges, who are a panel of experts that evaluate the items, to sort items in construct categories. Moore and Benbasat (1991) did not advise the judges of the underlying constructs, but asked to provide their own labels for the constructs. We provided of panel of experts with an overview of the study, but the judges decided on the definition of the construct in the relevant context, and then assign measures to their defined constructs. This approach, while providing initial set of categories (constructs), left it to the panel to put a ‘meaning to the construct’ and choose measures that best matched the meaning. The inter-rater scores, the Cohen’s Kappa (κ), indicated that the inter-rater reliability for the judges was within the full agreement range (κ = 0.60 – 0.80) or within the almost perfect agreement (κ = 0.81 – 1.00). The refined measures were then subjected a second expert evaluation, before we developed the instrument for pilot testing on a group of firms from the sampling frame to identify any ambiguities in the way the measures were proposed. We performed preliminary factor analysis using component-based package to ensure data exhibit some of the desired measurement qualities.

Data Collection and Diagnostics

We obtained the contact details of target respondents from the ORBIS database, which is a comprehensive database of public and private companies worldwide. After careful evaluation of the database for inter-company relationships, and target respondent relationships, we chose 2215 firms for this study. Of these, 1417 had their email contacts in the database, and we sent then an email invitation that provided a link to the survey URL and the respondents could click the link to access instantly the online survey. As a number of email addresses were generic, concurrently, we mailed 2215 survey packages containing, the cover letter, the instrument, and self-addressed prepaid envelope to the selected respondents. Dillman’s (2007) methodology was closely followed in developing and administrating the instrument. Three weeks later, we emailed and posted the first follow-up letter. Both version of the letter contained a survey URL to complete or download the survey. After three weeks the second follow-up letter, we emailed and posted our second follow-up letter, which was similar to first. Overall, we achieved a response rate of 13.16 percent (216 responses) based on Dillman’s (2007) formula. This response rate is comparable to other studies involving senior executives (Jeffers et al. 2008; Ray et al. 2005; Sabherwal and Chan 2001; Venkatraman 1989).

The organizations represented thirteen major industries, with the most number of valid responses received from the retail/wholesale/distribution sector (25.46%), followed by the mining and banking and finance sector (9.26%), and the Transport and Logistics sector (8.33%). Thirty-five percent of firms had less than 200 employees, whereas 28 percent of firms had more than 100 employees, with an average of 617 employees per firm. Eighty percent of the firms had a dedicated IT department, and 62% of the firms that responded have had invested into IT for between 10 to 30 years. About 8% of the firms had invested into IT for more than 30 years, and 35.19% of the firms had investment into IT for less than 10 years. Most of the valid responses received were completed by the Chief Financial Officer (41.67%), followed by the Director of Management Information Systems (15.74%), and Chief Information Officer (15.74%). Close to 91% of the respondents were above 35 years of age, 5.09% (11 respondents) were aged between 25 and 30 years, with the average age of the respondents of 49 years. Nearly 87% of respondents had more than 10 years of work experience, and 39% had more than 25 years of work experience.

The issue of non-response bias is a concern when data is collected using a survey. We used the first and the last thirty responses to test the non-response bias, representing 27% of the total valid responses. A t-test of the two independent, but equal, samples, which included the measures of constructs, the control variables and the demographic variables showed no significant differences on any of the variables (p<0.05). We used two methods, the mail and online survey, to gather data, and this could potentially introduce ‘multiple-method’ bias. We ran a t-test of the two independent samples with all measures and did not find any significant differences in any of the above variables in the mail and internet surveys. We presume to obtain a dataset in this study from one respondent, thus the variance in the data may be due to source of data rather than intended variables or constructs. Such disparity is known as common method variance (Buckley et al. 1990; Malhotra et al. 2006). We used Harman’s single-factor test (Malhotra et al. 2006; Podsakoff et al. 2003; Podsakoff and Organ 1986), where we subjected all the items (the measures of the constructs) to Exploratory Factor Analysis (EFA). More than one factor emerged from un-rotated factor solutions, and more than one factor explained majority of the variance, suggesting that data was not subjected to common methods variance (Podsakoff and Organ 1986). We also had a small number of responses that contained missing data. We used Little’s MCAR test, and the p-value for this test was not significant (p=0.354), thus the data was assumed to be MCAR (missing completely at random). Maximum likelihood estimation (MLE), implemented
by the EM (expectation maximization) algorithm in the SPSS Missing Values option, was used to impute the missing data.

**Results**

**A Components-Based Approach to Estimation**

We used partial least squares (PLS), a structural equation modeling package that uses a component-based approach to estimation. PLS models the theoretical relationships amongst latent variables (structural path) and the relationship between latent variables and its indicators (measurement paths). Importantly, rather than assuming equal weights for all indicators of a scale, the PLS algorithm allows for each indicator to vary in how much it contributes to the composite score of the latent variable (Chin et al. 2003). We chose PLS for data analysis for the following reasons. First, for application and prediction, a PLS approach is often more suitable as suggested by Chin et al., (2003). This approach assumes that all the measured variance is useful explained variance. Because the approach estimates the latent variables as exact linear combinations of the observed measures, it avoids the indeterminacy problem and provides an exact definition of component scores (Chin et al. 2003).

Second, while there is little agreement on what is an ideal sample size, Chin et al., (2003) suggest that PLS can work with a smaller sample size. Based on prior literatures’ conception of an appropriate sample size, we deem our sample to be of medium size. As a standard rule of thumb, Chin and Newsted (1999) suggest that it be equal or larger than ten times the number of indicators for the scale with the largest number of formative (i.e., causal) indicators, or ten times the largest number of structural paths directed at a particular construct in the structural model. Tabachnik and Fidell (2007) suggest even a weaker rule of thumb for a multiplier of five times the largest number of structural paths directed at a particular construct in the structural model. Our main effects model has eight structural paths directed at the internal business process performance construct, and the interaction effects model has fourteen structural paths directed at the internal process performance construct. This would require a minimum sample size of \((14 \times 10) = 140\). Thus, the data set comfortably satisfies the more stringent ‘10 times’ guidelines suggested above. Finally, PLS places minimal demands on measurement scales, and distributional assumptions (Chin et al. 2003; Falk and Miller 1992; Fornell et al. 1982; Marcoulides et al. 2009; Marcoulides and Saunders 2006).

**Assessment of Measurement Model**

As a first step to evaluating the measurement properties, we performed confirmatory factor analysis (CFA) to seek to determine if the number of factors and the loadings of measured variables on them conform to the findings of prior literature, and our subsequent validation of the instrument. With CFA, a researcher makes a *à priori* assumption that each latent variable is associated with a specified subset of manifest variables. The analysis revealed that the measures load highly on their designated constructs. Table 1 provides the factor loadings for constructs, showing that the measures load highly on their designated constructs. A rule of thumb of a loading of 0.70 or above is suggested as ideal, as it indicates that at least 50% of the variance in the manifest variable is accounted for by the construct (Hair et al. 2008). All measures have a factor loading of 0.70 or above (2 decimal places). The t-values indicated that all the loadings are significant \((P<0.05)\). Further, analysis of the cross-loadings, indicated that the manifest variables load highly on the desired latent variable and cross loadings of items are not an issue. Table 2 provides 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, were above 0.90. The average variance extracted were all above 0.50 level (Chin 1988; Fornell and Larcker 1981). Importantly, the square root of average variance extracted, which represents the average association of each construct to its measures, is higher than the correlations between the constructs. This requirement suggests that each construct closely relate to its own measures than to those of other constructs. Additional analysis of convergent and discriminant validities showed consistent results. These results support the convergent and discriminant validity of our constructs.
Assessment of Structural Model

Figure 3 provides the result of the assessment of the structural model. Higher levels of IT-related capability of top management commitment is positively associated with effectiveness of IT steering committee driven IT governance initiatives (path coefficient - 0.392, t-value 6.283***), with effectiveness of IT steering committee driven IT governance initiatives explaining 15.4% variance in top management commitment. Similar relationship was also seen with shared organizational knowledge (path coefficient - 0.230, t-value – 3.396***), with effectiveness of IT steering committee driven IT governance initiatives explaining 10.5% variance in shared organizational knowledge. The relationship between effective IT steering committee driven IT governance initiatives and flexible IT infrastructure is also favorable (path coefficient - 0.459, t-value – 8.271***), with an explained variance in flexible IT infrastructure of 21.1%. Thus, data supports hypotheses 1, 2, and 3. The three IT-related capabilities of top management commitment (path coefficient - 0.237, t-value 2.667**), shared organizational knowledge (path coefficient - 0.171, t-value – 2.587**), and flexible IT infrastructure (path coefficient - 0.256, t-value – 2.685**) are positively and significantly related to internal process-level performance. Together, the IT-related capabilities explain 32.3% variance in internal process-level performance. This supports hypotheses 4a, 4b, and 4c.

<table>
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<th>Variable</th>
<th>Factor Loading</th>
<th>Standard Error</th>
<th>T-Value</th>
</tr>
</thead>
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<tr>
<td>IT Governance 1</td>
<td>0.892</td>
<td>0.013</td>
<td>70.855</td>
</tr>
<tr>
<td>IT Governance 2</td>
<td>0.710</td>
<td>0.037</td>
<td>19.288</td>
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<tr>
<td>IT Governance 3</td>
<td>0.841</td>
<td>0.019</td>
<td>43.877</td>
</tr>
<tr>
<td>IT Governance 4</td>
<td>0.884</td>
<td>0.019</td>
<td>45.796</td>
</tr>
<tr>
<td>IT Governance 5</td>
<td>0.727</td>
<td>0.034</td>
<td>21.266</td>
</tr>
<tr>
<td>IT Governance 6</td>
<td>0.895</td>
<td>0.019</td>
<td>47.855</td>
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<tr>
<td>IT Governance 7</td>
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<td>30.101</td>
</tr>
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<td>0.820</td>
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<td>Shared Organizational Knowledge 3</td>
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<td>Flexible IT Infrastructure 4</td>
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<td>Flexible IT Infrastructure 5</td>
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<td>Improvement in Customer Service 1</td>
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<td>28.389</td>
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</tr>
<tr>
<td>Internal Process Performance 2</td>
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<td>Internal Process Performance 3</td>
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<tr>
<td>Internal Process Performance 4</td>
<td>0.893</td>
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<td>44.171</td>
</tr>
<tr>
<td>Firm--Level Performance 1</td>
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<tr>
<td>Firm--Level Performance 2</td>
<td>0.958</td>
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<td>78.184</td>
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<tr>
<td>Firm--Level Performance 3</td>
<td>0.924</td>
<td>0.021</td>
<td>43.926</td>
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<tr>
<td>Firm--Level Performance 4</td>
<td>0.965</td>
<td>0.013</td>
<td>72.586</td>
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</table>
Improvement in internal process-level performance is positively and significantly related to external process performance of improvement in customer service (path coefficient – 0.400, t-value – 4.975***). Improvement in internal process-level performance explains sixteen percent of variance in improvement in customer service. The relationship between improvement in internal process-level performance and improvement in firm-level performance is positive and significant (path coefficient – 0.813, t-value – 20.446***). Similarly, improvement in customer service also positively relates to improvement in firm-level performance (path coefficient – 0.139, t-value – 2.481***). Improvement in internal and external process-level performance explains 67.8% of the variance in improvement in firm-level performance. Thus, data also supports hypotheses 5, 6, and 7. The control variables did not explain any significant variance in internal process performance.

**Table 2. Measurement Properties**

<table>
<thead>
<tr>
<th></th>
<th>AV</th>
<th>CA</th>
<th>CR</th>
<th>CS</th>
<th>FP</th>
<th>FI</th>
<th>PP</th>
<th>IG</th>
<th>SO</th>
<th>TM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS</td>
<td>0.79</td>
<td>0.95</td>
<td>0.96</td>
<td>0.89</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>FP</td>
<td>0.91</td>
<td>0.97</td>
<td>0.98</td>
<td>0.44</td>
<td>0.95</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>FI</td>
<td>0.78</td>
<td>0.93</td>
<td>0.95</td>
<td>0.26</td>
<td>0.31</td>
<td>0.88</td>
<td></td>
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</tr>
<tr>
<td>PP</td>
<td>0.76</td>
<td>0.89</td>
<td>0.93</td>
<td>0.40</td>
<td>0.81</td>
<td>0.37</td>
<td>0.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IG</td>
<td>0.70</td>
<td>0.93</td>
<td>0.94</td>
<td>0.30</td>
<td>0.33</td>
<td>0.23</td>
<td>0.34</td>
<td>0.84</td>
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<tr>
<td>SO</td>
<td>0.72</td>
<td>0.90</td>
<td>0.93</td>
<td>0.47</td>
<td>0.47</td>
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</tr>
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<td>TM</td>
<td>0.90</td>
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<td>0.95</td>
<td>0.46</td>
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<td>0.36</td>
<td>0.52</td>
<td>0.38</td>
<td>0.65</td>
<td>0.95</td>
</tr>
</tbody>
</table>

Note: AVE – Average Variance Extracted, CA – Cronbach’s Alpha, CR – Composite Reliability CS -- Customer Service (CS), FP -- Firm--Level Performance, FI -- Flexible IT Infrastructure, PP -- Internal Process Performance, IG -- IT Governance, SO -- Shared Organisational Knowledge, TM -- Top Management Commitment.

**Figure 2. Structural Model**

*p<0.05  **p<0.01  ***p<0.001 (two-tailed) ns= not significant
Discussion

We proposed that, because it is IT-related capabilities that explain variance in business value across firms (Barney 1991; Mata et al. 1995), the ideal way to understand the effectiveness of any IT governance initiatives is to evaluate its relationship with these capabilities. Further, we proposed that as investment in IT targets on improving the business processes, any IT-related capabilities developed from effective IT governance initiatives should positively relate to business processes. Once this intent is successful, overall firm-level improvements should be evident. Results of this study indicate that an effective IT steering committee indeed helps develop IT-related capabilities. Higher levels of executive management support for IT-related initiatives ensures a good degree of fit between IT and business strategies, which then serves as the foundation for effective utilization of IT resources. Maintaining a flexible and agile IT infrastructure is critical for effective functioning of business process. As firms deeply immerse in the electronic era, accurate identification of IT resources and realizing avenues to develop IT-related capabilities is vital for their sustenance. As IT deployment history has taught us, there are many pitfalls to the strategy of IT deployment than what one may anticipate. Hence, a deeper level of understanding of the potential of the technology, and more importantly, the potential of generating unique capabilities from these IT resources is critical. IT steering committees can provide this linkage by bringing the IT and business units together, and promoting a shared understanding of each other for common organizational good.

Organisational knowledge and ‘know-how’ resides at all levels within the organizational hierarchy. To ensure proactive decisions regarding acquisition, implementation, and capability building with regard to IT resources, bringing this knowledge together is crucial. This requires breaking of traditional barriers, internal walls between users and providers of technology, and IT-related cultural change in firms. Our finding that IT steering committees help in overall harmony in IT usage, and resultant capability building is important in demonstrating that IT governance is an organization-wide responsibility. Importantly, we proposed that a firm’s IT governance initiative driven IT-related capability building is fruitless if it does not promote efficiency and effectiveness of the firm’s business processes. Any IT governance initiative must ensure that the mechanics of IT deployment and capability building is in alignment with the firm’s core operations. Our results demonstrate that effective IT steering committees driven IT-related capabilities’ benefits flow-down to the business processes. Thus, firms who want to ensure that their IT steering committee has a vertical focus must ensure a lateral representation of members of the organization. This will ensure that the IT-related decisions cover all facets of the firm, and this will assure benefits at process and firm level. This is evident in our results, as the benefits at internal process-level have resulted in improvement in customer service, and improvement in firm-level performance.

Our IT-capabilities-based IT governance effectiveness model provides an ideal approach to linking firm’s mechanisms for managing their IT resources to a set of resources that are deemed to be source of IT-related value. In doing so, we relate firms resource management efforts to level-unit of measure, their capable resources, thus suggesting a more direct and agile path to assessing their IT resource management efforts. Our research also provides greater credibility to the resource-based perspective, and demonstrates its lateral explanatory power that goes beyond that of explaining the relationship between resources and performance to one of IT resource nurturing. In addition, our lateral model also provides an important path to linking a firm’s IT resource management efforts to the desirable end-product of achieving firm-level benefits. We envisage that our resource-based theoretically backed model provides an opportunity to attain a deeper level of understanding on the effectiveness of IT governance initiatives within organizations, a much needed venture, amid an environment where there are continuous qualms on the role of IT in organizations (see for example, Carr 2003).

Limitations

Like any research, our study is also not immune to limitations. A response rate of 13.16% is at the lower end of measure of acceptable response rate. However, we managed to solicit responses from 216 firms, and our detailed diagnostics did not reveal any issues on data quality and representativeness of the sample. We comfortably met the required dataset for our structural model. Second, we used a cross-sectional research design, and our study has showed important associations between IT steering committee, IT-related capabilities, internal process-level performance, improvement in customer service, and firm-level performance. However, we were unable to address the question of causality, and the sustainability of our findings is limited. A longitudinal study would address the questions of causality and sustainability. Third, this study focused specifically on the effects of the IT steering committee on IT-related capabilities. There are potentially several other variables related to IT steering committees -
such as their size, experience level, and representation of business units that can conceivably impact IT-related capability building. Our findings encourage future research into examining how other steering committee variables affect organizations IT-related capability building. Further, while we made every conceivable effort in validating the research instrument, potential demand bias may exist in responding to items relating to IT steering committee effectiveness. Future research, perhaps by adopting alternative methodologies, could obtain information regarding size and composition of the committee, and the times they meet during a given period for a better understanding of the effectiveness of governance initiatives. Fourth, our model focuses on the nature and direction of association between steering committee roles and IT-related capabilities. However, we did not examine contingent factors such as organizational size, presence of dedicated IT departments, which may mediate the proposed effect. Future research should examine the type and effect of mediating factors affecting the association between steering committee roles and IT-related capabilities.

**Research Contribution, Future Research, and Conclusion**

This study has endeavored to advance our understanding of the effectiveness of IT steering committees in leveraging the most from IT resources within firms. Specifically, we found that higher levels of effectiveness of IT steering committee driven IT governance initiatives exhibit higher levels of IT-related capabilities. We also found that higher levels of IT-related capabilities demonstrate higher levels of improvement in internal process-level performance. This improvement in internal process-level performance influenced improvement in customer service, and overall improvement in firm-level performance. This study offers a robust model with theoretical linkages for understanding the effectiveness of a firm’s IT governance initiatives. Although prior have identified the IT governance arrangements that may work best, measurement of the effectiveness of the arrangements has been relatively sparse. One of the significant contributions of this research is introduction of IT-capabilities as a resource against which to evaluate the effectiveness of IT governance initiatives. These capabilities have strong backing as a source of value from resource-oriented theoretical lens. Respectively, our application of the resource-based theory provides a more robust explanation of determinants of measures of a firm’s IT governance initiatives. We encourage researchers to consider this theoretical lens when evaluating other IT governance initiatives effectiveness in relation to how they may contribute to building performance-differentiating IT-related capabilities. We also encourage researchers not to stop at this juncture, but to map capability generation at process level where IT resources are consumed and eventually at the firm level.

For decision makers our study has reiterated the notion that IT governance is truly a coordinated effort, embracing all levels of human resources. Our results of the evaluation of a lateral system of IT governance initiative against top and middle-level management roles and capabilities is indicative of the importance of this embracive management position on IT resource management. We have also given decision makers with some insights on the potential resources that they may wish to target as benchmarks against which they may evaluate their governance efforts. We envisage that our study would allow top and middle management to appreciate the important IT-usage knowledge that reside with subordinate level IT users, and that their input is valued when contemplating on a strategy of IT management and deployment. Finally, we have offered insights using a capabilities-based approach to understanding IT governance effectiveness, and the importance of mapping this IT governance and IT-related capabilities relationship at process and firm level. However, as suggested, much more research will be vital in building this body of knowledge. More studies need to look at different IT governance mechanics, different IT-related capabilities, and contingent factors to strengthen our understanding of the mechanics of IT governance that results in IT-related capabilities that provides benefits at process and firm levels. We hope our resource-centric approach will encourage other researchers to innovate their explorations of a deeper understanding of IT governance effectiveness, a much-needed fuel to drive continued confidence in IT resources in organizations.
Appendix 1 – Measurement Items

**Information Technology Governance** - Please indicate the extent to which you agree or disagree with the following in relation to your organisation’s IT Steering Committee (0 – No basis for answering, 7 – strongly agree).

In our organisation:
- The IT steering committee is charged with steering IT activities that are in line with the strategic direction of the organisation.
- The IT steering committee is appointed to wrest control of the technology from IT specialists.
- The IT steering committee makes resource allocation decisions in the areas of system development and/or recruitment for the IT function.
- The IT steering committee is created to increase visibility and/or for revamping of IT.
- The IT steering committee provides a mechanism for keeping and sustaining necessary reserved servers centrally.
- The IT steering committee provides a mechanism for IT coordinating requirements and practices.
- The IT steering committee is formed to solicit the support of top management for IT activities.

**Top Management Commitment** - Please indicate the extent to which you agree or disagree with the following issues relating to organisational top management commitment in the use of IT in business units (0 – No basis for answering, 7 – strongly agree).

- Our top executives have clearly indicated their commitment to IT.
- Our top executives have championed IT within the organisation.

**Shared Organisational Knowledge** - Please indicate the extent to which you agree or disagree with the following that relate to IT management and Unit management sharing their knowledge with each other (0 – No basis for answering, 7 – strongly agree).

- Our IT management team is very well informed about the business operations of each unit.
- Each unit’s management team strongly recognise IT as a competitive weapon.
- Each unit’s management team strongly recognise IT as a tool to increase productivity of clerical employees.
- Each unit’s management team strongly recognise IT as a tool to increase productivity of professional employees.

**Flexible Information Technology Infrastructure** - Please indicate the extent to which you agree or disagree with the following that relate to the flexibility of your organisation’s IT infrastructure (0 – No basis for answering, 7 – strongly agree).

- Our organisation has established corporate rules and standards for hardware and operating systems to ensure platform compatibility.
- Our organisation has identified and standardized data to be shared across systems and business units.
- Our organisation can access all data pertinent to a customer through a single interface.
- Our organisation has a high percentage of standardized corporate data.
- Our organisation has a high percentage of corporate data that is currently sharable across systems and business units.

**Improvement in Customer Service** - Please indicate the extent to which you agree or disagree with the following that relate to the use of IT and its relation to improvement of customer service in your organisation (0 – No basis for answering, 7 – strongly agree).

- The customer service unit gives customers prompt service.
- Customer service representatives are never too busy to respond to customers.
- Customer service representatives are empowered to solve customers’ problems.
- When the customer service unit promises to do something for a customer by a certain time, they fulfill their promise.
- When a customer has a problem, the customer service unit shows sincere interest in solving it.
- The customer service unit performs the service accurately the first time.
- Customer service representatives understand customers’ specific needs.

**Improvement in Internal Business Processes** - Please indicate the extent to which you agree or disagree with the following statements (0 – No basis for answering, 7 – strongly agree). Over the last three years:

- Our selling cost per employee has reduced significantly compared to our competitors.
- Our labour cost has reduced significantly compared to our competitors.
- Our operating expenditure has reduced significantly compared to our competitors.
- Our sales revenue per employee has been outstanding compared to our leading competitors.

**Improvement in Business Performance** - Please indicate the extent to which you agree or disagree with the following statements (0 – No basis for answering, 7 – strongly agree). Over the last three years:

- Our gross profit has improved much more than that of our competitors.
- Our return on investment has been outstanding compared to our competitors.
- The increase in our total revenue has exceeded our leading competitors.
- Our return on equity has been outstanding compared to our competitors.
References


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