Assessing the Impacts of IS Strategy through the Development of Dynamic Capabilities

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ABSTRACT

Of central importance to the functioning of the IT department is its information systems strategy. While research attention has been copiously given to other areas relating to the strategic value of IS, fewer studies have assessed the impact of the IS strategy itself, which can be an important avenue through which firm performance may be realized. As such, drawing upon the dynamic capabilities perspective, we propose a model of IS strategy and its impacts. Responses from 271 CIOs were collected via an online-based survey to test the proposed model. Results suggest that while innovative strategies reinforce dynamic capabilities development, undefined strategies tend to prove detrimental to development, and conservative strategies tend to neither help nor hurt. The impact of strategy on performance is mediated through dynamic capabilities, with the IS Innovator leading in performance, followed by the IS Conservative, and lastly the IS Undefined, whose lack of strategy proves harmful.

Keywords

Information systems strategy, dynamic capabilities, absorptive capacity, agility, contribution to firm performance.

INTRODUCTION

Information systems (IS) are an important buttress for success in many organizations today. Recent interviews with Chief Information Officers (CIOs—leaders of IT departments) of major corporations such as Boeing, Coca-Cola, Intuit, and Lockheed Martin, indicated agreement among them that the future of both national and corporate competitiveness depends on firms' ability to innovate, and that this ability to innovate is tied intensely to new technologies (Bergstrand, 2011). Since the future of business depends on the internal and external connections that these new information technologies enable, the organization's IT department may be better equipped than other business units to execute the necessary changes for the technology-driven economy in the coming decades (Lundberg, 2006). As such, the functioning of the IT department can render significant contributions to a firm's overall performance.

Of central importance to the functioning of the IT department is the organization's IS strategy which delineates the perspective the organization takes toward IS and the general attitudes that reflect the organization's intentions regarding IS (Chen, Mocker, Preston, and Teubner, 2010). As business strategy is vital to the success of an organization, so IS strategy should be imperative to the success of the IT unit and IS's contribution to the organization's overall objectives. An IS strategy is believed to be a valuable source of stability for many IT departments (Mahoney, 2009) because it provides a focused strategic direction for the department notwithstanding fluctuations in economic cycles (Aron, 2009).

While research attention has been copiously given to the arena relating to the strategic value of IS, much of it focuses on three streams of literature: strategic information systems planning (SISP) (Galliers, 1991; Premkumar and King, 1994), strategic alignment (Chan, Huff, Barclay, and Copeland, 1997; Chan and Reich, 2007; Luftman and Kempaiah, 2007), and IS for competitive advantage (Mata, Fuerst, and Barney, 1995; Melville, Kraemer, and Gurbaxani, 2004; Wade and Hulland, 2004). Fewer studies have assessed the impact of the IS strategy itself, which can be an important avenue through which performance may be realized. Therefore, this study uses a recently reconceptualized typology of IS strategy that unifies prior conceptions and aims to fill some of the research gap in the literature as it relates to IS strategy and its impacts.

Drawing upon the dynamic capabilities perspective, we present a model of the performance impacts of IS strategy. However, strategy itself may not necessarily directly lead to performance gains. Alternatively, we contend that it is the IT business unit's consistent enactment of the IS strategy that aids the development of certain dynamic capabilities (e.g. absorptive capacity, agility) for the business unit, which in turn create gains in efficiency and effectiveness that contribute to the organization's overall performance.

BACKGROUND LITERATURE

We review the literature on the two concepts most central to this paper. First and foremost is the concept of IS strategy. Although the term 'IS strategy' is commonly used, it is not well understood (Chen et al., 2010). Recognizing the important impact an IS strategy has on the potential value IS brings to an organization's long-term performance and the need to better understand the concept of IS strategy, Mocker (2007) and Chen et al. (2010) conducted an extensive review of the literature with the goals of providing a definition of and delivering a typology that operationalizes IS strategy in a way that can be applied to an organization holistically. In our study, we adopt Chen et al.'s (2010) typology of IS strategy and define IS strategy as *the organization's perspective on how to invest in, deploy, use, and manage information systems as represented at the IT department level*.

The second concept central to the theory proposed is dynamic capabilities. Although an organization may have a well-defined IS strategy, a strategy alone may not guarantee superior organizational performance. Rather, according to the dynamic capabilities perspective, firms demonstrating the ability to provide flexible product innovations and timely responses in dynamic business environments will be the ones able to achieve competitive advantage in such settings (Teece, Pisano, and Shuen, 1997). We argue, in essence, that dynamic capabilities will mediate the impact of IS strategy on performance outcomes and therefore review the literature on dynamic capabilities.

IS Strategy Typology

The Chen et al. (2010) typology categorizes IS strategy into three types: IS Innovator, IS Conservative, and IS Undefined. An *IS Innovator* strategy is defined as an organizational view that continuously aspires to be innovative through new IS initiatives, i.e. this strategy seeks to *explore* new, uncertain alternatives. The goal of the IS Innovator is to be an IS leader in its industry by striving to be the first to respond to opportunities in which it can capitalize on IS innovations that will create value for the business. An *IS Conservative* strategy, on the other hand, represents an organizational perspective that strives to create value by gaining efficiency through effectively refining and improving existing IS practices and technologies, i.e. this strategy seeks to *exploit* existing organizational resources. Unlike the IS Innovator, the goal of the IS Conservative is not to establish itself as an IS leader. Instead, it seeks a more stable approach to IS by exploiting IS innovations only after they have been carefully evaluated and tested by other firms in the industry. This strategy allows the IS Conservative to avoid the risks involved in being early adopters of IS innovations. Lastly, an *IS Undefined* strategy is one that does not have an articulated approach or long-term goals for the firm to either explore or exploit the use of IS for strategic purposes. Furthermore, it does not follow a consistent behavioral pattern in its investment in, deployment, use, and management of IS. The firm with an IS Undefined strategy views IS strategy more as an afterthought rather than as a perspective to either explore or exploit IS to meet its organizational goals. It may initially seem farfetched that any organization would not have a defined strategy for IS, but according to a 2002 study by Cutter Consortium, 39 percent of firms surveyed had no formal IS strategy (Slater, 2002).

Dynamic Capabilities

Even if an organization had an IS strategy, that is, a shared perspective on how to invest in, deploy, use, and manage IS, such shared perspective does not alone guarantee superior organizational performance. For the firm to potentially sustain a competitive advantage, it must possess resources that are valuable, rare, inimitable, and nonsubstitutable (Barney, 1991). The IS resources that are most able to meet these attributes and likely to sustain a competitive advantage are the organization's managerial IS knowledge and skills (Mata et al., 1995). These skills are capabilities by which firms integrate and reconfigure competencies, especially to address rapidly changing environments, and become the source for retaining a firm's competitive advantage (Eisenhardt and Martin, 2000).

According to the dynamic capabilities perspective, an extension of the resource-based view, firms demonstrating the ability to provide flexible product innovations and timely responses in dynamic business environments will be the ones able to achieve competitive advantage in such settings (Teece et al., 1997). In other words, firms possessing dynamic capabilities will outperform those that do not. *Dynamic capabilities* refer to a firm's "ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997, p. 516). These capabilities evolve through various learning mechanisms, such as through repeated practice, learning from mistakes, the pace at which opportunities come about to learn, and market changes (Eisenhardt and Martin, 2000). As one example, firms that have the opportunity to repeatedly practice business acquisitions tend to accumulate both the tacit and explicit knowledge about how best to implement acquisitions in order to achieve superior acquisitions performance (Zollo and Singh, 1998). The various learning mechanisms all contribute to the development of dynamic capabilities in a firm.

The concept of dynamic capabilities originated from the strategic management literature (e.g. Eisenhardt and Martin, 2000; Teece et al., 1997) and as such, much of these capabilities are related to the firm level and may or may not necessarily

involve information technologies. For example, recognized in studies as different types of dynamic capabilities are: strategic flexibility—the ability to adapt to changes in the environment by continuously changing the firm's current strategic actions, asset deployment, and investment strategies (Nadkarni and Narayanan, 2007); strategic political management—the ability of firms to plan and act politically in order to maximize economic returns from the political environment (Oliver and Holzinger, 2008), strategy formation capability—the ability of firms to effectively and efficiently form its strategy (Slater, Olson, and Hult, 2006), and top management team (TMT) polychronicity—the extent to which TMT members engage in multiple tasks simultaneously or intermittently rather than sequentially and believe that this is the best way of doing things (Souitaris and Maestro, 2010).

Therefore, though an assortment of dynamic capabilities exist in the literature, we identified two capabilities based on the dynamic capabilities perspective that are especially related to the abilities created and enabled by IS and are thus particularly relevant to this study of the IT business unit. These are the IT unit's absorptive capacity and agility. *Absorptive capacity* refers to an organization's ability to acquire internal and external information, assimilate it, and apply the new gained knowledge to produce an organizational capability that can effectively respond to turbulent market and industry environments (Cohen and Levinthal, 1990; Tu, Vonderembse, Ragu-Nathan, and Sharkey, 2006; Zahra and George, 2002). *Agility*, on the other hand, refers to an organization's ability to continuously sense environmental change and respond to market opportunities with speed and surprise (Overby, Bharadwaj, and Sambamurthy, 2006; Sambamurthy, Bharadwaj, and Grover, 2003) and is considered to be essential for competitive success (Brown and Eisenhardt, 1997). Although absorptive capacity and agility are related, the divergence lies in what each is able to manage. Whereas absorptive capacity primarily refers to a firm's ability to manage *knowledge* and operates on a more continuous basis, agility refers to a firm's ability to manage *change* in the environment and applies more to episodic events resulting from these changes (Overby et al., 2006).

HYPOTHESES

Our overall research model is depicted in Figure 1. Two sets of hypotheses are presented—the impact of strategy on dynamic capabilities and the impact of capabilities on performance—and the reasoning for each hypothesis is discussed in this section.
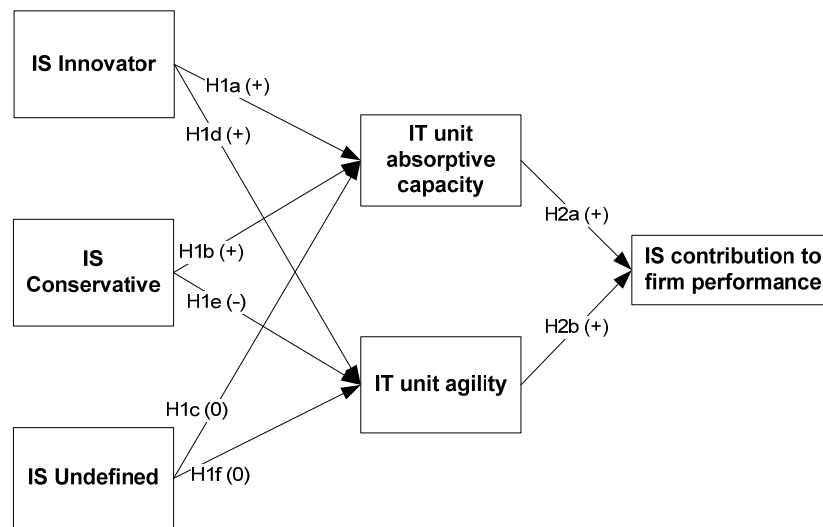
Figure 1. Research Model

Development of Dynamic Capabilities

IT Unit Absorptive Capacity

The IT unit's absorptive capacity refers to the IT department's ability to acquire information, assimilate it, and apply the newly gained knowledge to produce an organizational capability that can effectively respond to dynamic environments (Cohen and Levinthal, 1990; Tu et al., 2006; Zahra and George, 2002). Several types of factors can contribute to the development of absorptive capacity, including prior related knowledge (Cohen and Levinthal, 1990), knowledge scanning (Tu et al., 2006; Zahra and George, 2002), and experience (Tu et al., 2006; Zahra and George, 2002). Each can positively relate to a firm's learning, which aids the development of dynamic capabilities (Eisenhardt and Martin, 2000). Prior

literature suggests that the wider and deeper a firm's exposure to knowledge, the stronger is its inclination to explore new and related knowledge (Van Wijk, Van den Bosch, and Volberda, 2001), which subsequently improves the firm's absorptive capacity (Zahra and George, 2002).

In this manner, IT departments adopting innovative IS strategies are more likely to increase their absorptive capacity because they seek to explore new technological innovations to build business advantage. This exploration increases the breadth and depth of their knowledge exposure, which again strengthens their propensity to explore new knowledge in a cyclic pattern of continuous learning. While IT departments implementing conservative IS strategies can also learn from prior knowledge related to searching for proven technological concepts in the industry, it is less probable that their exposure is as far reaching on the knowledge spectrum as is IS Innovators' since the focus of IS Conservatives is on maintaining stability and exploiting existing IS resources rather than exploring new alternatives. As such, compared to the IS Innovator, the IS Conservative, while still able to develop absorptive capacity, would be unable to increase its absorptive capacity as much or as rapidly as would the IS Innovator. Nevertheless, the prior knowledge of both the IS Innovator and IS Conservative would build absorptive capacity because both are consistent in their approach to IS and therefore pursue information that complements their preexisting knowledge. Quite differently, the IS Undefined, due to its lack of long-term goals for IS and its inconsistent behavioral pattern regarding IS, would be least likely to have garnered the prior knowledge related to IS investments and built on this knowledge in organizational learning. Because of its reactive nature and its treatment of IS as an afterthought, the knowledge complementarity of the IS Undefined is likely to be low, thus bringing about an unrelated association between an undefined strategy and absorptive capacity.

Thus, defined IS strategies, such as the IS Innovator and IS Conservative, will lead to the development of an IT department's absorptive capacity, with the relationship being stronger for the IS Innovator than the IS Conservative. Undefined IS strategies, conversely, will be unrelated to the development of absorptive capacity. Formally, the following are hypothesized:

> *H1a: IS Innovator strategy is positively associated with absorptive capacity.*

> *H1b: IS Conservative strategy is positively associated with absorptive capacity, but this association is weaker than the association between IS Innovator and absorptive capacity.*

> *H1c: IS Undefined strategy is unrelated to absorptive capacity.*

IT Unit Agility

IT unit agility is defined as the IT department's ability to detect and garner the necessary resources to readily respond to environmental changes and market opportunities (Overby et al., 2006; Sambamurthy et al., 2003). IS can play an important role in enabling both the detecting and responding components of agility (Overby et al., 2006). To illustrate, IS can directly relate to agility because firms need to have an adequate level of IS capability in order to detect technological advancements that are relevant to their business. The responding component of agility is also impacted by IS because firms rely on these technology systems to support their relationships with their customers and suppliers, especially in IT driven industries, such as financial services, telecommunications, and hardware and software (Sambamurthy et al., 2003).

Not only can information technologies enable agility, but we postulate that a firm's IS strategy also has the potential to accentuate the development of the unit's agility depending on the approach the firm takes towards IS. Firms taking an innovative position to IS should expect greater agility than firms taking a more conservative or undefined approach. For the IS Innovator, research and development (R&D) efforts are central to its explorative and experimental nature. Such efforts in practice should increase a department's awareness and ability to sense technological and other changes in the environment because the department is constantly probing for novel ways to leverage technology to gain competitive edge. As such, exploration and experimentation, in effect, cultivate the detection component of a department's agility. Furthermore, due to its constant R&D efforts, the IS Innovator should also experience an improvement in the response component of agility. R&D activities are learning-by-doing methods of explorative learning, which have been suggested in prior literature as ways to gain experience and acquire knowledge (Cohen and Levinthal, 1990). This wide-ranging experience that is gained by the unit provides the IS Innovator a multitude of ways from which to respond to environmental stimuli, thereby augmenting its response agility.

Unlike that of the IS Innovator, the approach of the IS Conservative is less likely to lend itself to the development of agility. Because of its exploitative rather than explorative nature, the IS Conservative will likely have built systems of codified knowledge and routinized processes that increase the department's operating efficiency, but it would not have gained the experience of "explorative" learning in pursuing innovative IS initiatives. Although codification and routinization can assist in maintaining stability for the IS Conservative, they can also cause rigidity, which runs counter to agility (Seo and La Paz, 2008). Due to the narrow scope of exploitative learning and the rigidity caused by process codes and strict routines, the IS

Conservative would experience a low ability to detect and respond to environmental changes. While the IS Conservative can manage change on its own timetable by developing absorptive capacity, it would be less able to manage change on the timetable of contingency occurrences. Thus, not only is it dubious that the IS Conservative develops agility, but it is more probable that the conservative approach thwarts the development of agility. The relationships between IS Innovative and IS Conservative strategies and agility are therefore hypothesized as follows:

> *H1d: IS Innovator strategy is positively associated with IT unit agility.*

> *H1e: IS Conservative strategy is negatively associated with IT unit agility.*

The IS Undefined is different from both the Innovator and Conservative in terms of its relationship with agility. Since its approach to IS is inconsistent, there may be certain periods of time when it attempts to be innovative and other periods when it resorts to being conservative. This inconsistency in learning and pursuing a strategy is likely to cause lapses in its ability to sense and respond to environmental changes. These lapses warrant the IS Undefined strategy and agility to be unrelated. Therefore, the relationship between IS Undefined and agility is hypothesized as:

> *H1f: IS Undefined strategy is unrelated to IT unit agility.*

Impacts of IS Strategy through Dynamic Capabilities

We further draw on the dynamic capabilities perspective to explain the indirect impact of IS strategy on IS performance through the development of dynamic capabilities. IS performance is measured by the contribution that IS makes to the firm's overall performance. We propose to link IS strategy to IS performance through two dynamic capabilities (IT unit absorptive capacity and IT unit agility). The dynamic capabilities perspective postulates that dynamic capabilities will allow firms to build competitive advantage in turbulent environments (Cohen and Levinthal, 1990; Overby et al., 2006; Sambamurthy et al., 2003; Teece et al., 1997). However, information technologies have pervaded every sector of industry and marketplace, creating fast-paced, highly competitive, and globalized competition (Baskerville, 2006). Therefore, we posit that IT unit absorptive capacity and IT unit agility, both of which are dynamic capabilities, also will enable IS to contribute to the firm's gain in competitive positioning, almost notwithstanding industry sector.

As previously suggested, continuous pursuit of certain IS strategies can lead to the enhancement of the IT department's absorptive capacity, which contributes to its ability to innovate. This cycle of continuous improvement and innovation can potentially support the firm's achievement of sustained competitive impacts because the IT unit's absorptive capacity provides the firm with the degrees of freedom to adapt and evolve in its market environment (Zahra and George, 2002). For example, in a study of 143 biopharmaceutical firms involved in strategic alliances, George, Zahra, Wheatley, and Khan (2001) found that absorptive capacity, along with certain characteristics of alliance portfolios, worked jointly to enhance the firms' financial performance. Similarly, a study of international joint ventures found that firms' ability to apply knowledge, a component of absorptive capacity, significantly increased firm performance in terms of increasing business volume, increasing market share, achieving planned goals, and making profits (Lane, Salk, and Lyles, 2001). Likewise, we propose that the IT unit's absorptive capacity, generated from choice of its IS strategy, will be positively associated with IS contribution to the firm's performance.

> *H2a: IT unit absorptive capacity is positively associated with IS contribution to firm performance.*

Like IT unit absorptive capacity, IT unit agility is also a significant determinant of firm success, especially as environmental conditions become increasingly unstable (Overby et al., 2006; Sambamurthy et al., 2003). Sambamurthy et al. (2003) have argued that agility is an important factor to effectuating a firm's competitive performance by continually enhancing and redefining the firm's value creation. Agility spawns a multitude of options in a firm's repertoire that it can take to respond to market opportunities, which leads to competitive performance (Sambamurthy et al., 2003). For example, a study of 600 global manufacturing firms of durable goods showed that an increase in manufacturing agility was significantly and positively associated with market share increase (Ettlie, 1998). Thus, it is subsequently hypothesized that:

> *H2b: IT unit agility is positively associated with IS contribution to firm performance.*

METHOD

To empirically examine the research model, we conducted a survey-based study targeting CIOs and other senior IT executives as primary respondents. Data was collected using an online-based survey in 2011. Contact information for executives was derived using various online directories, such as state government directories, university system directories, and Dun & Bradstreet Million Dollar Database. A total of 3522 emails were successfully sent and a total of 289 survey responses were received for a response rate of 8.21%. This response rate is not unusual for studies involving high level executives and the rate is consistent with previous studies targeting similar respondents in which response rates ranged from

about 5% to 12% (e.g. Braunscheidel and Suresh, 2009; Pervan, 1998; Preston, Chen, and Leidner, 2008). All measures for this study were either adopted or adapted from prior literature and can be found in Appendix A.

After data cleansing, a total of 271 usable responses were retained for further analysis. Respondents included Chief Information Officers, Chief Technology Officers, and other senior IT executives. In fact, 82% of respondents identified themselves as the highest ranking IT executive in their organizations and therefore this sample provides an excellent representation of the target respondents for the study. On average, respondents had been in their current positions for 6 years and with their organizations for almost 10 years. The organizations represented in the sample are heterogeneous in size and industry, as shown in Table 1.

Organization Characteristics		
	Count	Percentage
Industry		
Manufacturing	49	18.1%
Colleges & universities	42	15.5%
Medical & health services	30	11.1%
Financial services	28	10.3%
Wholesale/retail trade and distribution	26	9.6%
Others	96	35.4%
Organization size (number of employees)		
1-100	14	5.2%
101-500	54	19.9%
501-1000	38	14.0%
1001-5000	67	24.7%
5001-10,000	31	11.4%
10,001-50,000	42	15.5%
50,001-100,000	12	4.4%
More than 100,000	11	4.1%
No response	2	0.7%
IT department size (number of employees)		
1-50	124	45.8%
51-100	33	12.2%
101-500	75	27.7%
501-1000	13	4.8%
More than 1000	23	8.5%
No response	3	1.1%

Table 1. Sample Characteristics

Data Analysis

The partial least squares (PLS) approach was used to analyze the proposed research model. PLS is the chosen technique for this particular study because it focuses on maximizing explained variance, that is, prediction of the constructs (Hair, Black, Babin, and Anderson, 2009), and is consistent with the objectives of this study. Prior to analyzing the research model, the following were tested, using PLS, as control variables to determine whether any were significant predictors of IS contribution to firm performance: job tenure, organization tenure, industry, organization size, IT department size, and annual IT budget. None of these variables was found to be significant predictors. In addition, since it can be argued that smaller departments may be more agile, the relationship of department size to the two dynamic capabilities was tested and was not found to significantly relate to either absorptive capacity or agility.

The measurement model was then validated following the approach outlined by Chin (1998) for reflective measures. Reliability and convergent validity were confirmed in two ways. First, all composite reliability (CR) measures were greater than .70, which provides support for acceptable internal consistency (Chin, 1998). Second, the average variance extracted (AVE) for each factor was greater than .50, indicating acceptable reliability and convergent validity (Chin, 1998; Fornell and Larcker, 1981). Table 2 lists the CRs and AVEs for each factor. Discriminant validity was also assessed in two ways. First, as illustrated in Table 2, the square root of the AVE for each factor was higher than the correlations with other factors, indicating that each factor shares higher variance with items in its own factor than with items in other factors (Chin, 1998). Second, as shown in Table 3, the cross-loadings indicate that each item loads higher on its own construct than on other constructs (Chin, 1998). In the process of achieving satisfactory reliability and validity, two items with loadings of less than 0.60 were dropped from the measurement model as noted in Appendix A.

	AVE	CR	IS Conserv	IS Innovator	IS Undefined	IS contrib to perf	IT unit ACAP	IT unit agility
IS Conservative	1.00	1.00	1.000					
IS Innovator	0.60	0.81	-0.183	0.773				
IS Undefined	0.72	0.89	0.116	0.094	0.850			
IS contrib to perf	0.51	0.88	-0.108	0.428	0.073	0.710		
IT unit ACAP	0.66	0.90	0.058	-0.443	-0.156	-0.398	0.809	
IT unit agility	0.65	0.88	-0.053	0.492	0.132	0.389	-0.412	0.803
Note: Diagonal shaded cells are the square roots of the average variance extracted (AVE) for each factor.								

Table 2. Measurement Validations and Correlations

	IS Conservative	IS Innovator	IS Undefined	IS contrib to perf	IT unit ACAP	IT unit agility
ACAP_1	0.122	0.408	-0.385	0.512	0.773	0.514
ACAP_2	0.084	0.416	-0.318	0.492	0.783	0.531
ACAP_3	0.099	0.429	-0.408	0.501	0.830	0.472
ACAP_4	0.094	0.390	-0.321	0.496	0.819	0.490
ACAP_5	0.128	0.391	-0.369	0.511	0.839	0.575
Agility_1	0.119	0.358	-0.295	0.545	0.481	0.757
Agility_2	0.086	0.460	-0.310	0.516	0.552	0.845
Agility_3	0.076	0.488	-0.289	0.538	0.573	0.858
Agility_4	0.032	0.278	-0.192	0.425	0.425	0.747
ISConserv_3	1.000	0.074	-0.158	0.132	0.131	0.101
ISInnov_1	0.033	0.809	-0.308	0.285	0.330	0.377
ISInnov_2	0.018	0.609	-0.134	0.064	0.211	0.225
ISInnov_3	0.095	0.878	-0.410	0.436	0.535	0.496
ISPerf_1	0.141	0.287	-0.328	0.779	0.448	0.509
ISPerf_2	0.019	0.279	-0.323	0.720	0.443	0.418
ISPerf_3	0.068	0.286	-0.256	0.741	0.469	0.470
ISPerf_4	0.098	0.252	-0.289	0.673	0.415	0.440
ISPerf_5	0.187	0.201	-0.254	0.674	0.398	0.385
ISPerf_6	0.078	0.289	-0.297	0.683	0.440	0.382
ISPerf_7	0.076	0.331	-0.311	0.698	0.470	0.526
ISUndef_1	-0.134	-0.311	0.860	-0.345	-0.357	-0.257
ISUndef_2	-0.106	-0.342	0.883	-0.322	-0.343	-0.272
ISUndef_3	-0.155	-0.361	0.805	-0.379	-0.422	-0.333

Table 3. Loadings and Cross Loadings

Model Results

The standard bootstrap resampling procedure was used to test the significance of the structural research model. Figure 2 illustrates the overall model results from the structural analysis, with explanatory powers (R^2) and standardized path coefficients (β).
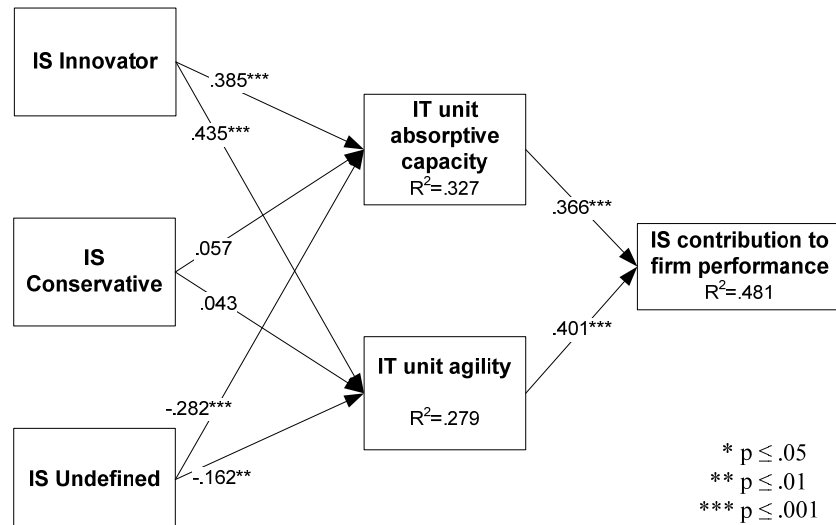
Figure 2. Overall Model Results

The results show that four of the hypotheses were supported being significant at the .05 level or better. Significant negative relationships—rather than no relationships, as hypothesized—were found for H1c (stated as: IS Undefined strategy is unrelated to absorptive capacity) and H1f (stated as: IS Undefined strategy is unrelated to agility). The IS strategies together explained 32.7% of the variance for absorptive capacity and 27.9% of the variance for agility. And the two dynamic capabilities explained 48.1% of the variance for IS contribution to performance. Table 4 summarizes the hypotheses results.

Hypothesis	Result
H1a: IS Innovator strategy is positively associated with absorptive capacity.	Supported
H1b: IS Conservative strategy is positively associated with absorptive capacity.	Not supported
H1c: IS Undefined strategy is unrelated to absorptive capacity.	Negative relationship found
H1d: IS Innovator strategy is positively associated with agility.	Supported
H1e: IS Conservative strategy is negatively associated with agility.	Not supported
H1f: IS Undefined strategy is unrelated to agility.	Negative relationship found
H2a: IT unit absorptive capacity is positively associated with IS contribution to firm performance.	Supported
H2b: IT unit agility is positively associated with IS contribution to firm performance.	Supported

Table 4. Summary of Hypotheses Results

Mediation Tests

Mediation tests were conducted to determine whether the dynamic capabilities were mediators between the IS strategies and IS contribution to firm performance. To establish mediation, the indirect effect of the independent variable to the outcome variable must be significant (Helm, Eggert, and Garnefeld, 2010). Independent PLS models were run and Sobel (1982) test calculations were applied. The resulting Sobel z-statistics were then assessed using the standard $p \leq .05$ criteria to determine the significance of the mediation. Table 5 provides the results of the mediation tests.

Full mediation through the dynamic capabilities was found for 3 of the 6 indirect relationships between the IS strategies and performance, and partial mediation was found for 2 of the 6 relationships. As shown, the VAFs (Variance Accounted For) are especially large for the indirect effects of the IS strategies on performance, mediated through dynamic capabilities. For example, approximately 94% of the total effect of the IS Innovator strategy on performance is explained by its indirect effect through either absorptive capacity or agility. This lends support to our contention that IS strategies themselves may not necessarily directly lead to performance, but rather performance is achieved through the development of dynamic capabilities by the consistent pursuit of IS strategies.

Mediating Relationship	Sobel z-Statistic	Sobel p Value	VAF	Direct Path p Value	Interpretation
IS innovator -> ACAP -> performance	5.226	0.000	0.936	0.414	full mediation
IS innovator -> agility -> performance	5.637	0.000	0.941	0.414	full mediation
IS conservative -> ACAP -> performance	1.962	0.025	0.510	0.162	full mediation
IS conservative -> agility -> performance	1.533	0.063	0.473	n/a	no mediation
IS undefined -> ACAP -> performance	-4.385	0.000	0.492	0.003	partial mediation
IS undefined -> agility -> performance	-4.050	0.000	0.482	0.003	partial mediation

Table 5. Mediation Test Results

DISCUSSION

The dynamic capabilities perspective was used to predict the outcomes of IS strategy in terms of its contribution to important outcomes, such as absorptive capacity, agility, and ultimately contribution to the organization's performance. Perhaps most intriguing is the unexpected finding that, rather than being unrelated, undefined IS strategies were in fact significantly negatively associated with both absorptive capacity and agility (results for H1c and H1f). In other words, having little or no definitive long-term goals or formally defined strategies for IS tends to prove detrimental to the IT department's dynamic capabilities development. One major reason for this negative impact might be that an undefined strategy is potentially indicative of a larger issue in the department or organization. For instance, departments without an IS strategy may simply reflect an unorganized department that has poorly defined policies and procedures or simply one that does not enforce its policies and procedures. For example, in a poorly organized department, after an IS solution is found for a non-routine problem, procedures are not taken to properly document the solution nor is the knowledge appropriately transferred within the department. As a result, valuable knowledge is lost. This scenario impedes capacities development because the department would need to practically reinvent the solution each time.

The hypotheses positing that IS Conservative will be positively related to absorptive capacity (H1b), but negatively related to agility (H1e) were likewise unsupported. While we expected the IS Conservative's rigid systems of routinization and codification to run counter to the development of agility, the study did not support this hypothesis. Rather, the IS Conservative is unscathed in terms of its agility development. This raises the question of whether IS Conservatives really develop systems and processes that are rigid, or whether rigid systems and processes are actually antagonistic to agility as suggested by Seo and La Paz (2008). We suspect that the IS Conservative does not have all its processes codified and routinized to the point of rigidity, and therefore the hypothesized relationship was not found.

Lastly, as we had denoted, IS strategy does not directly lead to performance gains, but rather it is the IT department's consistent enactment of its IS strategy that develops certain dynamic capabilities, which in turn create efficiency and effectiveness gains that contribute to firm performance. Indeed, we found empirical support for this assertion via the mediation test results. For the most part, the two dynamic capabilities either fully or at least partially mediated the relationships between the IS strategies and performance. And the mediation finding suggests that of the strategic IS approaches, the IS Innovator's ability to contribute to performance is almost fully dependent on its formation of dynamic capabilities. These capabilities are the factors really driving the performance gains for the IS Innovator.

The findings should be interpreted with an awareness of the study's limitations. Due to the cross-sectional nature of the data collected, no causal relationships can actually be confirmed. And as with any survey-based study, the accuracy of self-reported data is subject to the perspective of the individual participants responding to the survey. This is the case not only with surveys, but with interviews and other studies involving human subjects in which humans must make subjective judgments; these are nevertheless commonly accepted methods of research. In our case, since a single respondent was used to assess each department represented in the sample, the data would be internally consistent, which was confirmed in the factor analysis. Data that is internally consistent allows us to assess the degree or strength of the relationships among concepts and as such, self-reported data is appropriate for the method of data analysis used in this study.

In conclusion, the overall findings suggest that since dynamic capabilities are major assets to any organization, the pursuit of a strategy that helps enhance an organization's dynamic capabilities would be substantially advantageous to its performance capability. And one way in which dynamic capabilities can be developed and sustained is through the consistent implementation of innovative IS strategies. IT departments that strive to take an innovative approach to IS by consistently exploring and responding to IS opportunities would be in better positions to achieve continuous competitive advantage. Conversely, departments characterized by a predominantly undefined IS strategy or those that are ill-defined in major areas of their IS strategies must recognize the damaging nature of such a lack of strategy and quickly take action to remove themselves from the undefined state. CIOs of such departments should work steadfastly to draft a strategic IS approach, even

a conservative one, have it ratified, and follow through consistently to this approach even as a short-term solution until a longer-term solution can be arrived at.

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APPENDIX A

Construct Items and Sources

IT unit absorptive capacity [a] (Source: adapted from Pavlou and El Sawy 2006) 1. Our IT department is able to identify and acquire internal (e.g. within the department) and external (e.g. market) knowledge. 2. We are effective in developing new knowledge or insights that have the potential to influence product development. 3. We have effective routines to identify, value, and assimilate new information and knowledge. 4. We are effective in transforming existing information into new knowledge. 5. We can successfully exploit internal and external information and knowledge into concrete applications.
IT unit agility [a] (Source: adapted from Tallon 2008 based on Overby et al.'s 2006 definition and description of agility) 1. Quickly detect changes in customer demand. 2. Swiftly detect advances in technology that are relevant to the business. 3. Rapidly respond to advances in technology that are relevant to the business. 4. Promptly adjust to economic shifts that have the potential to impact the department.
IS contribution to firm performance [a] (Source: adopted from Preston et al. 2008) 1. Return on investment 2. Sales revenue increase 3. Market share increase 4. Cost savings 5. Operating efficiency 6. Process improvement 7. Customer satisfaction
IS Innovator [b] (Source: adapted from Chen et al. 2010a) 1. Our IT department strives to be a leading IS innovator in our industry. 2. Our IT department seeks to explore new IS initiatives even if not all of these efforts prove to be highly profitable. 3. Our IT department responds rapidly to early signals concerning areas of opportunity for IS.
IS Conservative [b] (Source: adapted from Chen et al. 2010a) 1. Our IT department mainly seeks to gain efficiency by refining existing IS practices and technologies. *[dropped]* 2. Our IT department adopts promising IS innovations once these initiatives have been proven in our industry. *[dropped]* 3. IS innovations are carefully examined before they are chosen by our IT department.
IS Undefined [b] (Source: adapted from Chen et al. 2010a) 1. Our IT department does not have definitive long-term IS goals. 2. Our IT department does not have an articulated IS strategy. 3. Our IT department does not have a consistent pattern of behavior regarding IS.

Scales: a: 5-point scale ranging from (1) no extent, to (5) very great extent; b: 5-point scale ranging from (1) strongly disagree, to (5) strongly agree