

MANAGEMENT COMMITMENTS THAT MAXIMIZE BUSINESS IMPACT FROM IT

Completed Research Paper

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Abstract

A long-standing question for both IT research and management practice has been: how can IT be used in organizations to increase firm performance? IT researchers have provided many candidate capabilities that impact business and financial performance, including enterprise architecture, IT governance, IT metrics, top management engagement, IT-business alignment, and business and IT unit capabilities. However, based on a series of case studies, we propose that a limited number of enterprise commitments are key to maximizing business value from IT. We demonstrate, via a survey of 221 respondents in publicly traded firms, that these commitments are positively correlated to Business Impact from IT, which in turn correlates with higher financial performance.

Keywords: Business value of IS/value of IS, Case study/studies, Survey research, Firm performance, Commitment

Introduction¹

Managers frequently ask: how can we use IT in our organization to increase firm performance? Information Systems researchers have found many candidate capabilities that impact business and financial performance, ranging from technology resources such as critical infrastructure capabilities or adoption of specific systems, to organizational capabilities such as alignment of IT with business strategy, management of internal and external relationships, strategic IS planning and investment, or processes enabling cross-functional collaboration and knowledge sharing (for reviews, see e.g., Bharadwaj 2000; Devaraj and Kohli 2003; Kohli and Grover 2008). Not surprisingly, studies sometimes contradict one another (Liang et al. 2010).

Although business value from IT—and business performance, in general—is a complex phenomenon, we sensed that it was possible to develop a more parsimonious conceptual framework explaining the business impact of IT. With that objective in mind, we did a two-part study. First, we analyzed twenty in-depth case studies to create a model of how different firms pursuing different management initiatives and strategic objectives generated business value. Then we tested that model with a survey of 221 IT and non-IT senior executives representing publicly traded firms from around the world.

The case study analyses revealed a set of four management commitments that, we hypothesize, significantly explain the impact of IT in organizations. These commitments encompass broad management practices and initiatives that are not just centered in the IT unit. These are: (1) how management defines a strategic vision incorporating the role of IT; (2) what IT and business process capabilities an organization builds, (3) how an organization uses IT to work differently, and (4) how the impact of IT-based initiatives is measured. The survey analysis found that these commitments are positively correlated with business impact from IT. The relationship between commitments and performance is independent of industry and firm size, which suggests that this framework is generalizable across many types of organizations. We believe this research contributes a valuable new framework to the existing literature on how IT creates business value.

This paper is organized as follows: We begin with development of the construct of commitment based on analysis of our cases, and corroborated by synthesis of the research literature. We then develop a conceptual model of the relationship between commitments and firm performance. We then describe the methods we used for our survey development and testing procedures. Finally, we present our results, ending with discussion, limitations, and conclusion.

The concept of management commitment

How do IT investments support the realization of business value? A long history of research identifies many factors such as level of investment (Brynjolfsson et al. 2002), governance (Bernroider 2008; Mayer and Salomon 2006; Weill and Ross 2004), various management practices (Chang and King 2005; DeLone and McLean 1992), availability and use of specific resources (Wade and Hulland 2004), and IT capabilities (Feeny and Willcocks 1998).

To sift through the many possible factors creating business value from IT, we carefully examined 20 in-depth case studies developed between 1999-2010 as part of a broad range of research studies relating IT investments and performance. The cases encompassed a variety of industries, including energy, financial services, technology, and manufacturing, and they describe a variety of enterprise-level activities relating to information systems, including outsourcing, IT governance, shared services, enterprise architecture, evidence-based decision making, e-business initiatives, and IT-based business transformations (See Appendix 1 for a list of the companies and publicly available case write-ups). Most of the cases had reported on significant performance benefits. For example, 7-Eleven Japan has been the most profitable retailer in Japan for nearly thirty years; Campbell Soup reversed performance from industry laggard to a leader in ROE; Aetna survived a near-death experience to become a top performer in the healthcare

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insurance industry; UPS first matched, and then exceeded, FedEx's ability to rapidly introduce customer service innovations; ING Direct became the fastest-growing financial services institution in history. Procter and Gamble has consistently been a top performer in the fast moving consumer goods industry. In 2010 P&G achieved profit margins of 16.3% compared to an industry average of 4.6%. In all cases, management had attributed business success at least in part to the IT-based business initiatives that were the focus of the case study.

To develop hypotheses as to how these twenty firms had created business value from IT, the three members of the research team separately aggregated an initial list of 319 candidate practices and initiatives. We then worked together iteratively to consolidate and clarify the list, ultimately reducing the 319 items into four distinctive sets of management actions. Each set of actions represented a management commitment, which we defined as "an explicit, specific, high level agreement within an organization to operate in a given way." A commitment leads to a consistent pattern of behaviors. We noted that it was not the specific content of a commitment that led to success. Rather, it was the strength and scope of the commitment that led to firm-specific benefits. The four commitments that emerged from our case studies were (1) strategic choice-making, (2) development of digital platforms, (3) working smarter with information, and (4) action-oriented assessment.

The research team tested the four-commitment model by looking for alternative explanations of ongoing developments at the firms we had studied, both by reviewing the published cases as well as the original interviews and public company documents. Satisfied that the model produced valuable insights into how the case study firms had generated business value from IT, we introduced the model to 15 CIO's in a half day workshop. The CIOs analyzed their organizations in terms of the framework of commitments. This exercise helped validate the importance of the four commitments by highlighting the successes and challenges these firms faced both in making the commitments and in driving value from IT.

Theoretical Background on Management Commitments

Commitment has been defined and studied from both a strategic and economic perspective (in the context of dynamic capabilities) and from an organizational behavior perspective. Ghemawat (1991) conceives of commitment as a choice that has high impact, because the choice involves significant sunk costs, opportunity costs, lead times, or symbolism. He adds a strategic perspective to an economic one, noting that industrial economists have demonstrated that costly-to-reverse commitments to durable, specialized factors are necessary for competitive advantage.

Similarly, the dynamic capabilities literature (e.g., Teece et al. 1997) acknowledges the importance of irreversible commitments, whether explicit or implicit. They note that developing distinctive processes and mechanisms to coordinate and combine assets is both costly and difficult to imitate, but necessary to create and sustain a firm's competitive advantage. The cost and long term nature of these processes and mechanisms suggest they are the result of commitments made by firm managers.

In his seminal work relating commitment to organizational behavior, Salancik (1977) describes commitment as both a psychological and a social process, stating that the effect of commitment derives from the extent to which actions relating to it are binding; this is characterized by the explicitness, reversibility, volition, and publicity of the acts relating to the commitment. Although he focuses on the individual level, this definition readily applies to groups, such as an organization's management team.

This literature suggests that, in a digital economy, management commitments to how IT is positioned, managed, and used could have significant impacts on business performance. Additionally, the literature supports the potential importance of the specific commitments that our case studies revealed. We review each of the four commitments below.

Strategic choice making

Ghemawat (1991) discusses the potential impacts of making strategic choices, particularly around the types of investments an organization plans to make and where and how it will make them. In his case study of Nucor, he shows how commitment to specific strategic choices – namely, how USX's prior commitments to modernizing with conventional (thick slab) technology on existing sites allowed Nucor,

its competitor, to commit to, and successfully adopt and profit from new thin slab technology (Ghemawat 1993). In terms of the impact of IT investments on business value, strategic choices determine what a firm will do with IT, and by implication, what it will not do. To deviate from a strategic choice should require an explicit exception process.

Our case studies and IT management literature suggest there are at least four strategic choices relating to business value from IT: (1) which business processes will be standardized (Mooney et al. 1995; Ross et al. 2006), (2) what data will be shared across the enterprise (Smith and McKeen 2008), (3) how digital assets will be coordinated (Malone et al. 2006; Shin 2006), and (4) what activities will be outsourced (Koh et al. 2004; Lacity and Willcocks 1998)

All twenty of our case studies demonstrated management commitment to strategic choices. For example, UPS management made a commitment to standardize its package delivery process and to provide package data across the enterprise. These strategic choices enabled cost effective operations and rapid implementation of web-based customer services, which allowed UPS to grow. In contrast, Pacific Life chose to standardize only those processes related to business risks (i.e., business continuity, information security, compliance) while allowing its business units to develop their own operational processes and data stores. These strategic choices allow Pacific Life's business units to customize business processes to the unique needs of their business partners and customers.

BMW committed to a strategic choice that coordinated all the digital assets in the company (including CAD, robots, and in-car technology). This choice helped to deliver on the company's strategic goal of delivering custom cars in six days. Procter and Gamble made a choice in 1999 to partner with a set of service providers to deliver some of the company's shared services, which now number more than 170 IT, finance, HR and other business services. This choice has helped P&G rapidly scale its business to where it now serves over 4 billion consumers. P&G integrated the Gillette business in fifteen months with \$1.2 billion in savings from synergies delivered largely through shared services.

Development of a Digital Platform

Firms can build innovative applications that offer a short-term boost to performance (Piccoli and Ives 2005). However, both experience and research highlight the difficulty of sustaining those benefits when competitors can build a similar application (Johnston and Vitale 1988; Mata et al. 1995). In fact, the proliferation of one-off IT solutions creates a messy IT and business environment that invariably limits future business opportunities (Ross et al, 2006). By implementing digital platforms, rather than individual IT solutions, firms can improve business performance and enable future business opportunities (Barua et al. 2004; Bharadwaj et al. 2007)

Consistent with prior literature our cases revealed four types of digital platform initiatives: technology infrastructure (Weill and Broadbent 1998), digitized business processes (Bharadwaj et al. 2007), data (Eckerson 2009; Smith and McKeen 2008) and electronic linkages to external parties (Grover and Saeed 2007; Truman 2000). The development of platforms enables reuse of systems and processes, which both cuts costs and reduces time to market.

All twenty of our case study sites were building platforms and eleven of those firms had platforms in place that were having an impact on firm performance. For example, Cemex experienced rapid growth through acquisition by replicating its IT infrastructure and ERP platform. Similarly, Dow Chemical Company significantly reduced operating expenses through its ERP platform and standardized processes. Swiss Re enabled global, rather than regional, risk management through the visibility provided by its enterprise data platform. Seven-Eleven Japan extended its information systems to include its suppliers. This extended platform reduced the time from order to delivery and helped the firm accelerate inventory turnover, which the CEO claims is the firm's single most important success factor.

Working smarter with information

In our case studies, we found that an often under-exploited way to create value from IT was to work smarter with information. Only six of our case study firms were demonstrating significant benefits from working smarter. However, those six firms were building enterprise-wide capabilities and accelerating the

pace at which they could document benefits from IT-based business initiatives. For example, Allstate Insurance has made multiple commitments to working smarter with information available from its new integrated claims platform. Now that the claims platform is used to process 90% of claims, Allstate is building fine-grained business rules, based on past claims, that have reduced the time to process a claim from forty days to as little as one day.

PepsiAmericas used its data platform to calculate “suggested orders” for its customers that reduced store out-of-stocks from 14% to 3.7%. Aetna has leveraged its data platform to create a single source of truth for executive decisions that more scientifically segment customers. Seven-Eleven Japan, Swiss Re, and Campbell Soup all highlight how data can be used to empower operational level employees to make decisions. Those decisions reduce operating costs and enhance customer service.

The literature on business analytics and business intelligence describes how firms can embed analytics in (digitized) business processes, and empower decision makers to use the information available to improve the decisions they are responsible for making (Davenport et al. 2010). Researchers in Naturalistic Decision Making have also discussed the importance of embedding information in work processes to enable better judgment in complex environments (see, for example, Montgomery et al. 2005), as well as ways to capture human expertise to improve work processes and outcomes (Hoffman 2007). Research on organizational routines has also examined the relationship of IT and work routines (e.g., Volkoff et al. 2007), emphasizing the importance of integrating the two.

The approaches that indicate a commitment to working smarter were: 1) empowering operational decision makers with useful information; 2) empowering operational decision makers with clear business rules; 3) creating and revising business rules based on business analytics; 4) automating repetitive business processes; 5) making expertise easily available; 6) innovating via rapid strategic experiments; 7) providing external partners with timely access to information; and 8) relying on a single source of truth for data.

Action-oriented assessment

Twelve of our case study sites emphasized the importance of committing to assessment practices that generated desirable behaviors. We identified four types of action-oriented assessment: first was a commitment to a small set of business metrics that focused people throughout the firm on enterprise-wide goals; second was a commitment to incorporate incentives that balance enterprise and local goals; third was the use of feedback that help individuals understand how they are performing, and fourth was a reliance on clear metrics for assessing external partners' contributions. For example, Campbell Soup uses a single metric, Total Delivered Costs, to help individuals throughout the company find ways to use data from their ERP to cut operating costs. Seven-Eleven Japan provides feedback to salesclerks about the sales of the inventory items they were responsible for ordering. To encourage enterprise-wide integration, USAA pays bonuses exclusively for achieving firm-wide performance goals. Everyone receiving satisfactory performance ratings receives the same percentage bonus.

The importance of assessment to business success has been well documented by case studies and analyses of numerous firms that have implemented balanced scorecard principles (e.g., Gonzalez-Padron et al. 2010). The goal of the scorecard and similar integrated assessments is to use measurements of key processes and outcomes to provide a framework for new action and continuous improvement (Kaplan and Norton 1992; Kaplan and Norton 1996). A commitment to assessing is important because “what you measure, matters” and “you get what you measure” (Kaplan and Norton 1996).

Firms committed to action-oriented assessment relied on electronic data to track performance and provide feedback. Assessment had a greater impact when individuals received coaching or worked in teams to identify how to interpret performance data and how to use feedback to improve performance. Incentives encourage people to work to achieve goals and to make adjustment to the digital infrastructure, goals, or ways of working in order to improve performance (Capelo and Dias 2009). Lastly, it is important to be able to assess business partners who are outside the firm's boundaries (Miranda and Kavan 2005).

The complementarity of commitments

In our cases the four commitments were typically present in combination, suggesting that the commitments are complementary. When the commitments are present in combination, they become more effective in producing business value (Barua et al. 1996; Bharadwaj et al. 2007; Ravinchandran and Lertwongsatien 2005). That is, an organization performs better if the commitment level is uniform across the four commitments than if the organization scores high on one or two commitments, and poorly on the others. For example, in 2004, one organization committed to creating a digitized process platform without having committed to which business processes should be standardized and which data should be shared across the firm. The result was an over-budget, long-delayed project that was abandoned. In 2006 management started over, focusing on making strategic choices about the processes and data first, and has now implemented an effective systems for these shared processes and data.

Conceptual framework and hypotheses

Although the twenty case studies provided evidence of a relationship between the four commitments and business value from IT, we wanted to test this relationship on a larger sample of firms. Given the strategic role of IT in many organizations today (Sambamurthy and Bharadwaj 2003), we expect that organizations that have higher levels of commitments relating to IT will perform better. Specifically, because firms vary in their level of commitment, we expect to observe variations in their financial performance.

For the financial measure of firm performance we use Return on Equity (ROE). ROE is a measure of how well a company uses reinvested earnings to generate additional earnings. It is calculated by taking the after-tax income (after preferred stock dividends but before common stock dividends) and dividing it by book value. ROE is a general indication of a company's efficiency: i.e., how much profit is generated given the resources provided by stockholders. ROE incorporates both profitability and efficiency and is a commonly used broad measure of firm performance (e.g., Kaplan and Norton 1992; Rai et al. 1997; Shin 2006). Thus we hypothesize:

H1: Higher levels of commitments relating to IT are associated with better financial performance.

Defining Business Impact

In a single year, many factors—current and past—contribute to a firm's financial performance. Thus, to compensate for confounding factors we adopted a combination of perceptual and financial measures of impact. This dual perspective on performance has also been used in other studies (Tallon and Kraemer 2007). The combination of exogenous financial measures and directly reported perceptual measures helps provide a linking of evidence, going from IT investments via a firm's management capabilities (e.g., Muhanna and Stoel 2010; Tanriverdi 2006) to the perceptual impact of IT on important business goals and finally to the impact on financial performance. Prior research has also shown a significant correlation between perceptual measures of IT business value measures and financial performance (e.g., Tallon & Kraemer 2007) including ROA and ROE (Bharadwaj 2000; Wang et al. 2008) or Tobin's Q (Aral and Weill 2007; Hitt and Brynjolfsson 1996).

We define Business Impact from IT as the perception of the importance and contribution of IT to three broad business outcomes: business growth, asset utilization, and business agility. These measures are consistent with other research. Kohli and Grover (2008), in their call for expanded research in the area of business value of IT, note that IT value can manifest itself in many ways, including productivity improvements and profitability through efficient use of assets, the support of business growth, and increased business agility - the ability for a business to adjust to changing conditions. The importance of IT's contribution to asset utilization and growth have also been demonstrated by Ravinchandran and Lertwongsatien (2005) and Rai et al. (2006); IT's impact on agility has been shown by, among others, Sambamurthy and Bharadwaj (2003), Melville et al. (2004) and Fink and Neumann (2009).

Thus we hypothesize:

H2: Higher Business Impact from IT is associated with higher industry adjusted ROE.

If H2 is supported then we can more confidently use Business Impact from IT as a proxy for financial performance.

Relating the Commitments to Business Impact

In addition to testing the relationship between Business Impact from IT and financial performance, we chose to test the relationship between both the aggregated group of four commitments and the individual commitments and Business Impact from IT.

Given the strategic role of IT in many organizations today (Sambamurthy and Bharadwaj 2003), we expect that organizations that have higher levels of commitments relating to IT will perform better. Specifically, because firms vary in their level of commitment, we expect to observe variations in Business Impact from IT.

Thus we hypothesize:

H3: Higher levels of commitments relating to IT are associated with greater Business Impact from IT.

H3a: A greater commitment to making strategic choices increases Business Impact from IT.

H3b: A greater commitment to development of a digital platform increases Business Impact from IT.

H3c: A greater commitment to working smarter with information increases the Business Impact from IT

H3d: A greater commitment to action-oriented assessment increases the Business Impact from IT.

We also hypothesize the commitments are complementary in two ways. First, we hypothesize that there are synergies among the commitments, so that a higher level of one commitment leads to an even greater impact from other commitments. Second, we hypothesize that, for a given overall level of commitment, a uniform extent of commitment (i.e. moderate commitment to all four, rather than strong commitment to one and weaker commitment to the others) increases Business Impact from IT:

H4a: Commitments interact positively to further increase the Business Impact from IT (over and above the main effects).

H4b: Higher variance in the level of commitment across the four commitments is negatively associated with Business Impact from IT.

In summary, we expect that commitments will significantly relate to Business Impact from IT. Business Impact from IT, in turn, impacts the financial performance of business organizations (see Figure 1).

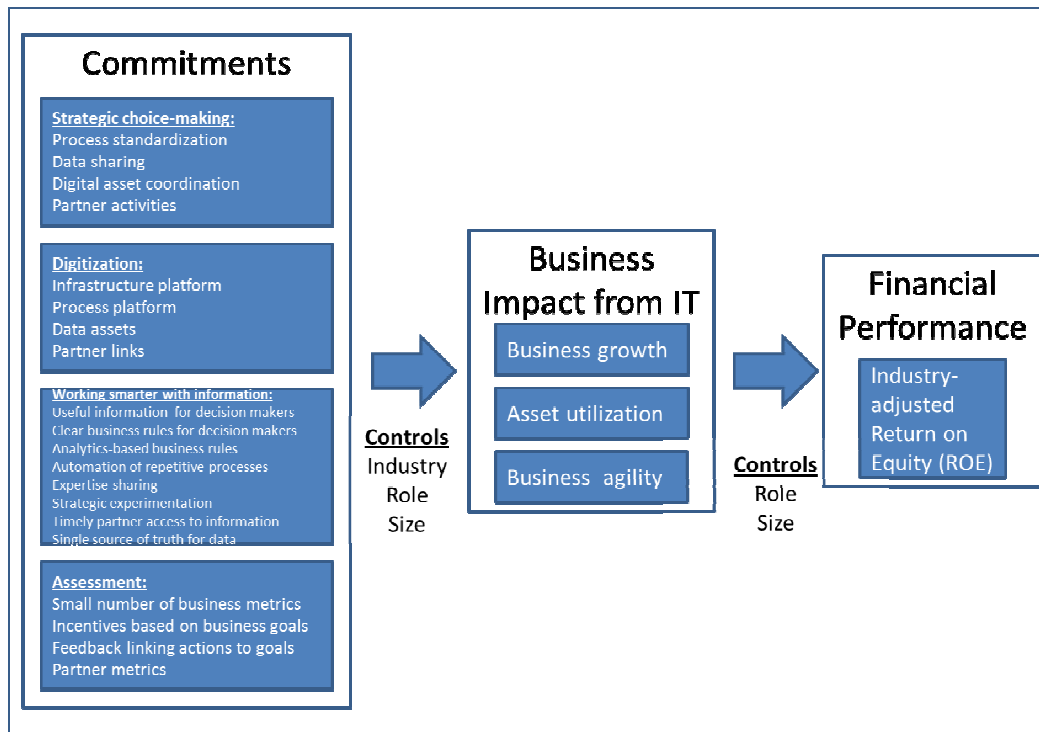


Figure 1: Management Commitments, Business Impact from IT and Financial Performance

Testing the Four Commitment Model

Model Development

Because commitment cannot be easily measured directly, we took a different approach. We conceptualize a commitment along three directly observable dimensions: (1) the extent to which an organization is committed, reflected in explicit, specific, and voluntary management practices, many of which may involve significant costs or effort from the organization’s employees; (2) the commitment’s stability over time, reflecting how easily it is changed or reversed; and (3) the buy-in to the commitment by stakeholders, reflecting both how public the commitment is among internal and external organizational stakeholders, and how widespread its acceptance is.

The choice and wording of questions about specific management practices relating to each commitment was based on our analysis of the case studies and prior research reports, and refined based on discussions with more than 30 executives from the industries represented by the cases at multiple research workshops. The survey instrument was pilot tested with 35 senior managers who attended a subsequent research workshop, and modified slightly to increase clarity. The final survey questions are in Appendix 2. We asked between four and eight questions about the extent of commitment; we also asked about the stability and buy-in of each of the four commitments.

Using perceptual measures to test this model is an appropriate method that has been successfully validated and applied in prior studies. For example, Tallon and Kraemer (2007) include an extensive discussion of this issue, showing that for studying Business Value from IT, perceptions are quite accurate.

Data and metrics

We surveyed senior non-IT (55%) and IT (45%) managers during the summer of 2010 about their organization’s commitments as reflected in specific management practices, and about the business outcomes from IT in their company. We included both IT and non-IT respondents because our model is

not just about the IT unit but impacts the entire organization. All respondents were from publicly traded firms. We used Compustat information to obtain performance and size data for 2009 for each respondent's firm (the most recent data available).

To control for industry differences in firm performance, we used an industry adjusted measure of ROE. We created 9 industry categories and calculated sample means for ROE by for each one. The industry categories were: financial services, insurance, IT & Professional services, digital services (e.g. media, telecommunications), digital products (electronics and high tech), health & medical (health care and pharmaceutical companies), industrial/infrastructure (e.g. automotive, energy, utilities), manufacturing (e.g. aerospace, chemicals), and consumer (including consumer products manufacturing, retail, and consumer services such as travel and hospitality) . We then created industry adjusted ROE for each firm by subtracting the sample mean ROE for the industry that the firm operates in from the firm's value.

Control variables

Two firm level variables (industry and firm size) and one respondent level variable (respondent role) were used to control for their effects on performance. We controlled for industry with dummy variables. We controlled for firm size using the logarithm of the number of employees.² We controlled for respondent variation by role: respondents self-classified as IT or non-IT.

Calculated variables

We analyzed the internal consistency of the survey questions relating to each commitment to determine if we could use a single average for each commitment. To do this, we first converted answers to the buy-in question from percentage to a Likert scale, with 1 being 0% buyin, 3 being 50% and 5 being 100%. For our sample, the Cronbach alpha for each set of questions associated with a particular commitment was 0.85 or higher, above the cutoff of 0.7, making it feasible to use a single value³. To create the four commitment variables used in subsequent analyses, we then averaged the individual responses for each question about the commitment to create the level of commitment, scaled from 1 to 5⁴.

To create the interaction variables, we centered each commitment by deriving Z scores, and took the product of each pair (Cohen et al. 2003).

To create the CommitmentVariance variable, we first defined a single overall commitment value by taking the average of the four commitments. We then subtracted each commitment value from this average to calculate a difference of each commitment from that average. We squared each difference to create a variance. We summed these squares to create a single commitment variance variable for use in the regression (Tabachnick and Fidell 2001).

Business Impact from IT was calculated from six items. Three items asked about the importance of IT to achieving three business outcomes: business growth, asset utilization, and agility. The remaining three items asked about the success the enterprise has achieved in using IT to create business value for each outcome. For each of the three areas, growth, asset utilization and agility, we multiplied the importance and success items. Then we averaged the resulting three values to measure Business Impact from IT (Weill 2004).

Model specifications

We tested the model in two parts. First we tested an ordinary least squares model regressing financial performance (industry-adjusted ROE) on the four commitments (H1), and on Business Impact from IT

² We also tested a control for past performance using 2008 return on equity, with no change in results.

³ Cronbach alpha ranged from .85 to .91.

⁴ For example, the strategic choice making commitment was calculated as the average of questions 1a, 1b, 1c, 1d, 2, and 3 (See Appendix 2 for the questions).

(H2). We included only firm size and role as controls, as financial performance is already adjusted for industry.

For H3 and H4 we tested the effect of commitments on the Business Impact from IT via an OLS model regressing Business Impact from IT on the four commitments. For H3 we performed a hierarchical regression, beginning with the industry, size and respondent controls, and adding the strategic choice making, development of a digital platform, working smarter with information, and action-oriented assessment commitments. To test H4 we also added the interactions among the significant commitment variables, as well as the CommitmentVariance measure.

Table 1: Descriptive Statistics (N=221)

| | Minimum | Maximum | Mean | Std. Deviation |
|------------------------------------|---------|---------|--------|----------------|
| Organization size (Log FTE) | 2.05 | 6.32 | 4.44 | 0.76 |
| Organization size (FTE) | 111 | 2.1 mm | 81,000 | 165,000 |
| role (Non-IT = 0, IT=1) | 0 | 1 | .45 | 0.50 |
| Strategic choice-making | 1.52 | 5.00 | 3.56 | 0.74 |
| Development of a digital platform | 1.13 | 5.00 | 3.51 | 0.90 |
| Working smarter with information | 1.28 | 4.87 | 3.38 | 0.73 |
| Action-oriented assessment | 1.07 | 5.00 | 3.48 | 0.87 |
| Commitment variance | 0.00 | 5.55 | 0.83 | 0.94 |
| Business Impact from IT | 1.00 | 5.00 | 3.09 | 0.85 |
| Industry adj. Return on Equity (%) | -149.6 | 92.70 | 0. | 22.8 |

Descriptive statistics are in Table 1. Respondents' organizations ranged in size from 100 to 2 million FTE. Questions for commitment and Business Impact from IT used a Likert Scale ranging from 1 to 5. Commitment variance can range from 0 to 16. Return on Equity is reported as a percentage.

An intercorrelation table of the key model constructs is shown in Table 2.

Table 2: Correlation table

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. Strategic choice-making | 1 | .658** | .618** | .504** | -.144* | -.166* | -.212** | -.182** | .440** |
| 2. Development of a digital platform | .658** | 1 | .643** | .513** | -.217** | -.265** | -.223** | -.225** | .526** |
| 3. Working smarter with information | .618** | .643** | 1 | .656** | -.252** | -.152* | -.248** | -.224** | .590** |
| 4. Action-oriented assessment | .504** | .513** | .656** | 1 | -.189** | -.228** | -.275** | -.234** | .460** |
| 5. Commitment variance | -.144* | -.217** | -.252** | -.189** | 1 | -.225** | -.179** | -.313** | -.292** |
| 6. Platform x Working smarter | -.166* | -.265** | -.152* | -.228** | -.225** | 1 | .732** | .763** | -.147* |
| 7. Working smarter x Assessment | -.212** | -.223** | -.248** | -.275** | -.179** | .732** | 1 | .792** | -.100 |
| 8. Assessment x Platform | -.182** | -.225** | -.224** | -.234** | -.313** | .763** | .792** | 1 | -.148* |
| 9. Business Impact from IT | .440** | .526** | .590** | .460** | -.292** | -.147* | -.100 | -.148* | 1 |
| 10. Industry adj. Return on Equity | .128 | .054 | .155* | .135* | -.059 | -.092 | -.153* | -.110 | .179** |

** . Correlation is significant at the 0.01 level (2-tailed).
 * . Correlation is significant at the 0.05 level (2-tailed).

Results

To test the relationship of commitment and firm performance (H1), we performed a hierarchical OLS regression, regressing performance (using Industry-Adjusted ROE) on the four commitments. As shown in Table 3, for Model 1, which uses only the control variables (size and respondent role), adjusted R² is .018 (p=.051). Adding the four commitments to the regression (Model 2) raises adjusted R² to .031, but this model is not significant. Thus H1 is not supported.

Table 3: OLS results for dependent variable: performance (Industry-adjusted ROE)

| Variable | Model 1 (controls) | Model 2 (H1) | Model 3 (H2) |
|--|-----------------------|-----------------|-----------------|
| Role (Non-IT/IT) | -.083 | -.084 | -.111+ |
| Organization size (Log FTE) | .143* | .128+ | .124+ |
| Business Impact from IT | | | .183** |
| Strategic choice-making | | .070 | |
| Development of a digital platform | | -.141 | |
| Working smarter with information | | .145 | |
| Action-oriented assessment | | .006 | |
| N | 221 | 221 | 221 |
| Model F change | 3.01+ | 1.736 | 7.445** |
| Adjusted-R2 | .018 | .031 | .046 |
| DF | 2 | 6 | 3 |
| Standardized coefficients are reported + = p<.1, * p<.05, ** p<.01 *** p<.001 | | | |

We also tested the effect of Business Impact from IT on performance (H2, Model 3 in Table 3), which resulted in an adjusted R² of .046 (p=.007), and Business Impact from IT is the most significant variable. The Model 3 results demonstrate that firm performance is associated with higher levels of Business Impact from IT, supporting H2. Although the variance explained seems small, this is typical for studies that try to relate IT and financial performance (see, for example, (Shin 2006)).

Support for H2 enables us to use Business Impact from IT as a proxy for firm performance in testing the remaining hypotheses relating to commitments.

Next, we tested the impact of overall commitment on Business Impact from IT using a hierarchical regression. As shown in Table 4, below, Model 4 consists of only controls, and its adjusted R² is 0.06 (p=.11). Adding the four commitments to the regression (Model 5) increases adjusted R² to 0.405 (p<.001). Thus H3 is supported: higher levels of commitment are associated with greater Business Impact from IT.

Table 4: OLS results for dependent variable: Business Impact from IT

| Variable | Model 4 (controls) | Model 5 (H3 & H3a-d) | Model 6a (H4a) | Model 6b (H4b) |
|---|-----------------------|-------------------------|-------------------|-------------------|
| 8 Industry dummies | ns | ns | ns | ns |
| Role (Non-IT/IT) | .127+ | .186** | .18** | .165** |
| Organization size (Log FTE) | .085 | .014 | .02 | .004 |
| Strategic choice-making | | .029 | .039 | .055 |
| Development of a digital platform | | .238** | .220** | .182* |
| Working smarter with information | | .324*** | .348*** | .312*** |
| Action-oriented assessment | | .144* | .159* | .142+ |
| Platform x Working smarter interaction | | | -.104 | -.114 |
| Working smarter x Assessment interaction | | | .228* | .247** |
| Assessment x Platform interaction | | | -.066 | -.151 |
| Commitment variance | | | | -.168** |
| N | 221 | 221 | 221 | 221 |
| Model F change | 1.604 | 34.427*** | 2.124+ | 7.546** |
| Adjusted-R2 | .027 | .405 | .415 | .433 |
| DF | 10 | 14 | 17 | 18 |
| Standardized coefficients are reported + p<.10 * p<.05 ** p<.01 *** p<.001 | | | | |

Interestingly, while Model 5 as a whole is significant, the impact of the commitment to strategic choice making is small compared to the impact of the other commitments, and H3a is not supported, while H3b, H3c, and H3d are supported; the standardized coefficients for development of a digital platform, working smarter with information, and action-oriented assessment are all positive and significant ($p < .05$)⁵.

We next tested H4a (model 6a) by including the pairwise interaction variables for the three significant commitments, to determine which, if any, were synergistic. Model 6a shows that there is a somewhat significant interaction effect, increasing R^2 by .01 to 0.415 ($p = .098$), and that the interaction between Working Smarter and Actionable Assessment was both significant and positive, suggesting that there is an additional positive impact when commitment to both is high, but a correspondingly lower impact when commitment to both is low. Other interactions were insignificant, while the significance of the main effects of each commitment remained essentially unchanged.

When testing H4 (model 6b), we found that including Commitment Variance, over and above the commitments and interaction terms themselves, increases R^2 by another 0.018 ($p < .05$). The coefficient for each of the commitments remains positive, showing that higher levels of commitment are associated with increased Business Impact from IT. The coefficient of commitment variance is negative ($p = .002$), supporting H4b, because higher variance implies that the commitment is less uniform. This allows us to conclude that organizations that commit evenly to all four commitments perform better relative to those that commit extensively to one or two and very little to the others.

Taking models 6a and 6b together, H4 on the complementarity of commitments is partially supported: specifically committing more to both Working Smarter and Actionable Assessment results in additional positive impact, and a uniform level of commitment in general also results in additional positive impact.

⁵ We ran multiple hierarchical regressions, in which we started with strategic choice making and added the other commitments. While strategic choice making on its own was significant, once any other commitment was added, strategic choice making became insignificant, with the final coefficients, once all commitments were included, as shown in Table 4, model 5.

Discussion, Limitations and Conclusions

Discussion

Consistent with prior research, business impact from IT is significantly correlated with financial performance. The contribution of this research is to conceptualize and test the impact of commitments on business impact from IT. Commitments are an explicit, specific, high level agreement within an organization to operate in a given way. Commitments permeate the enterprise, are well understood by all and reinforce important management practices that help increase business impact from IT. In addition, the relationship between commitment and Business Impact from IT was significant even when controlling for industry, suggesting that this construct may have broad applicability to many types of organizations.

However, the commitments are not all equally significant. In Model 5, in which we tested the relationship of each commitment to Business Impact from IT, strategic choice making was insignificant, while the other three commitments were all highly significant. This result initially seemed to contradict all of the case studies, which described how management made commitments prior to making platform investments, or changing how people work with information, or assessing the results. As we thought about this, we realized that the explanatory power of a commitment to making strategic choices is due to the extent that it is correlated with (or even leads) the other commitments.⁶ Making a strategic choice by itself, even if well understood and broadly bought into, does not impact business performance on its own. Commitments to development of a digital platform, working smarter with information, and action-oriented assessment all require much more investment in both effort (to implement systems, change many people's work practices, and perform assessments) as well as capital and operating costs, while a commitment to a strategic choice alone does not require nearly as many resources. In addition, this finding supports the prior work on commitment reviewed above, confirming that stronger commitments (as represented by irreversible investments) have a greater impact on business performance than ones that are more readily changed.

In all the cases except Cemex and Delta Air Lines, the research team has conducted interviews with IT leaders subsequent to the case studies to follow up on the events described in the case, making it possible to see the impact of the commitments over longer time periods. These interviews suggest that commitments continue to be important over time. We also learned that individual practices that are not supported by consistent, long term actions across commitments do not appear to be effective.

The construct of commitment is an attempt to try and unify the IT value literature towards an overarching concept that brings together many of the important management practices identified in previous work. For example, being committed to strategic choice making could be achieved in a number of ways, often including many of the management practices found important previously such as: top management steering committees that do effective planning prioritization (Bernroider 2008; Ravinchandran and Lertwongsatien 2005), or ensuring clear decision rights and accountability (Miranda and Kavan 2005). Similarly a commitment to development of a digital platform is instantiated by having effective infrastructure capabilities (Bhatt and Grover 2005), or by building electronic linkages with suppliers and customers (Barua et al. 2004; Rai et al. 2006). The purpose of this paper is to begin a conversation in the field about consolidating the many predictors of business value from IT to into a smaller and more manageable number. We suggest that these consolidated predictors are a set of four commitments: strategic choice making, development of a digital platform, working smarter with information and action-oriented assessment.

⁶ Bivariate correlations range from .51 to .67, as shown in Table 2. In the regressions, all variance inflation factors for the commitments are less than 3.0, well below the cutoff of 10 that would suggest a multicollinearity problem.

Limitations

There are a number of limitations to this study. First, this is a cross sectional model which does not take into account the important effects of time. We believe commitments are enduring: they take several years to nurture and last for many years. Our plan is to collect data from some of these firms in future years to start to tease out the impacts of time.

Second, we posit that commitments are a higher level construct that encompass many of the other variables found in the literature. In creating the measure for commitment we only considered the factors found in the 20 case studies. There may be other important factors such as culture, commitments by vendors, the impact of mergers, etc.

Third, in this paper we included only companies listed on stock exchanges so we could obtain independent performance data. A future analysis will include additional large firms, and focus on the relationship between commitment and Business Impact from IT.

Fourth, the same respondent rated both Business Impact from IT and commitment. We mitigated some of this risk by identifying a statistically significant relationship between Business Impact from IT and performance (ROE, which we obtained from public data). To test the construct of commitment more fully we suggest using multiple respondents in each firm, from various functions and geographies. This will help indicate how well the commitments are understood across the firm, mitigate respondent bias, and perhaps even suggest where managers should focus their attention to better make and keep commitments.

Fifth, there may also be endogeneity bias given the cross-sectional data. For example, it may be the case that financial performance drives business impact and may create the slack resources necessary to enable development and nurturing of commitments. To test this issue we plan to gather performance data for subsequent years, to see if commitments made in prior years impact future performance.

Conclusions

From this study we propose that commitments are an important addition to the literature on generating business value from IT. Commitments are an appealing construct as they are relatively simple: are we committed or not and do our actions demonstrate our commitment? The concept of commitment is also generalizable as it applied across all the industries we studied. Also, unlike environmental turbulence or technology innovations, commitments can be readily influenced by management. Thus the concept of commitment allows us to make descriptive and prescriptive statements about the relationship of IT and business value that are relevant for supporting practitioners, helping to answer the question: what can management do to increase the value from the organization's investments in IT?

These results suggest a fruitful avenue for further research to derive a more integrated perspective on the drivers of value from IT. The construct of commitment developed in this research allows us to ask additional research questions, such as, how do various management capabilities identified in prior IT research support an organization's ability to make and keep commitments? How does this affect how practitioners focus their investment in IT resource and capability development? And how do firms create and maintain commitments over time? For example, our case study analysis suggests that effective commitments require supporting governance mechanisms for reinforcement, as well as processes for project prioritization and management to support the investments that implement commitments.

We expect that the importance of these commitments will increase as the business world becomes more digital, and information technology plays an increasing role in all aspects of business operations.

Appendix 1 – Cases used for commitment cross case analysis

| Company | Industry | Research Focus | Reference |
|----------------|-----------|----------------------------------|------------------------|
| 7-Eleven Japan | Retail | Information-based business model | Nagayam and Weill 2004 |
| Aetna | Insurance | IT-enabled business | Gibson 2006b |

| | | | |
|--------------------|--------------------|--|------------------------------------|
| | | transformation | |
| Allstate | Insurance | Information-based decision making | Gibson 2006a |
| BMW | Manufacturing | IT unit transformation | Quaadgras and Weill 2009 |
| Campbell soup | Food and beverage | ERP and business transformation | Ross and Beath 2008 |
| Cemex | Manufacturing | ERP and business transformation | Chung et al 2005, Chung et al 2003 |
| Chevron | Energy | Outsourcing | Beath and Ross 2007a |
| Delta Air Lines | Transportation | e-business initiatives | Ross 2001a |
| Dow Chemical Co. | Manufacturing | Outsourcing | Ross and Beath 2005 |
| Dow Corning | Manufacturing | ERP and business transformation | Ross 1999 |
| ING Direct | Financial Services | e-business initiatives | Robertson 2003 |
| JM Family | Financial Services | Outsourcing | Beath and Ross 2006 |
| Pacific Life | Financial Services | Enterprise architecture and governance | Ross and Beath 2007a |
| PepsiAmericas | Food and Beverage | Enterprise Architecture and governance | Beath and Ross 2010 |
| P&G | Consumer products | IT and business shared services | Weill et al 2007 |
| Southwest Airlines | Transportation | Enterprise architecture and governance | Ross and Beath 2007b |
| State Street | Financial services | IT governance | Weill and Woodham 2002 |
| SwissRe | Insurance | IT-enabled business transformation | Beath and Ross 2007b |
| UPS | Transportation | e-business initiatives | Ross 2001b |
| USAA | Financial services | Enterprise architecture and governance | Ross 2004, Ross and Beath 2010 |

Appendix 2– Survey questions

1) To what extent has your enterprise made the following strategic choices: (1 = not at all; 5 = to a great extent):

- Specified which business processes should be standardized across the enterprise (*e.g., order to cash, marketing, supply chain, customer service, billing, risk management*)?
- Specified the classes of enterprise information (*e.g., customer, order*) to be shared across the enterprise?
- Specified how all digital assets (*e.g., business processes, digital products, data, CAD, process control, infrastructure*) will be coordinated?
- Specified the critical business activities to be performed inside the enterprise vs. by other firms?

2) The stability of these strategic choices over time is (1 = low, changes often; 5 = high, stable for many years):

3) Estimate the percentage of employees and partners who buy into these strategic choices: _____%

A **platform** is a coherent set of standardized, digitized business processes along with supporting infrastructure, applications, and data.

4) To what extent has your enterprise created the following platform elements (1 = not at all; 5 = to a great extent)?

- a) An efficient, reliable, scalable technology infrastructure
- b) A digitized platform(s) that supports the enterprise's key business processes
- c) A data asset specifying enterprise master data, transaction data, and historical data
- d) Standardized electronic links to external parties

5) The stability of the commitment to use and reuse this platform over time is (1 = low, changes often; 5 = high, stable for many years):

6) Estimate the percentage of employees and partners who buy into the commitment to use and reuse this platform: _____%

7) To what extent does your enterprise do the following (1 = not at all; 5 = to a great extent)?

- a) Empower operational decision makers with useful information
- b) Empower operational decision makers with clear business rules
- c) Create and revise business rules based on business analytics
- d) Automate repetitive business processes
- e) Make expertise easily available (*e.g., via access to internal experts, collaboration tools, a culture of knowledge sharing*)
- f) Innovate via rapid strategic experiments
- g) Provide external partners with timely access to information
- h) Rely on a single source of truth for data

8) The stability of the commitment to improving how people work in a digitized world over time is (1 = low, changes often; 5 = high, stable for many years)

9) Estimate the percentage of employees and partners who buy into the commitment to improving how people work in a digitized world over time: _____%

10) To what extent does your enterprise have the following (1 = not at all; 5 = to a great extent)?

- a) A small set of business metrics focused on enterprise-wide goals
- b) Incentives that balance enterprise and local goals
- c) Feedback that relates individuals' actions to the enterprise's goals (*e.g., scorecards, sales/profit reports*)
- d) Clear metrics for assessing external partners' contributions

11) The stability of the assessment process over time is (1 = low, changes often; 5 = high, stable for many years)

12) Estimate the percentage of employees and partners who buy into the assessment process: _____%

13) How important are the following business outcomes to your enterprise (1 = not important; 5 = very important)?

- a) Effective use of IT for business growth
- b) Effective use of IT to help the enterprise best use all its assets
- c) Effective use of IT for business agility

14) How successful is your enterprise at achieving these business outcomes (1 = not successful; 5 = very successful)?

- a) Effective use of IT for business growth
- b) Effective use of IT to help the enterprise best use all its assets
- c) Effective use of IT for business agility

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