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A normative model for assessing SME IT

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A Normative Model for Assessing SME IT Effectiveness

Michael Curry
Washington State University, michael.curry@wsu.edu

Byron Marshall
Oregon State University, marshaby@bus.oregonstate.edu

Peter Kawalek
University of Manchester, peter.kawalek@mbs.ac.uk

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A Normative Model for Assessing SME IT Effectiveness

Michael Curry
Carson College of Business
Washington State University
USA
michael.curry@wsu.edu

Byron Marshall
College of Business
Oregon State University
USA
marshaby@bus.oregonstate.edu

Peter Kawalek
Manchester Business School
The University of Manchester
UK
peter.kawalek@mbs.ac.uk

ABSTRACT

Information technology (IT) is a key enabler of modern small businesses, yet fostering reliably effective IT systems remains a significant challenge. This paper presents a light weight IT effectiveness model for small businesses to assess their IT and formulate strategies for improvement. Employing an action research approach we investigate a mixed method analysis of 120 survey responses from small family businesses and user participation in 10 semi-structured interviews. We then conduct critical reflection to identify refinements which are validated using 72 survey responses from university students. The results present compelling evidence that employees' normative patterns (norms) are a significant driver of IT effectiveness in a second order PLS predictive model able to explain 26% of observed variance.

A norms-based approach to IT effectiveness helps fill a significant research and managerial gap for organizations unable or unwilling to adopt IT best practice frameworks used by large organizations. Our findings imply that comparing norms to IT best practices may offer a less technical approach to assessing IT operations, which may be well suited to small businesses. Although further investigation cycles are needed to systematically test this model, we encourage small business managers to: 1) anticipate IT risks and mitigate them; 2) identify measures of IT performance, and monitor them, and 3) review/synchronize business and IT goals.

Keywords: SME, IT effectiveness, IT governance, information systems, action research

INTRODUCTION

There are many approaches to *IT effectiveness*, which we define as attempts to assess and improve the contribution of IT to business goals. Large organizations often follow a "top-down" approach by adopting IT best practice frameworks such as COBIT, ITIL or ISO/IEC standards to guide their efforts. However, our experience suggests that IT best practice frameworks, are too technical and resource intensive for many small businesses. Therefore, we employed action research which is well-suited to developing practical knowledge through participatory investigation (Reason, 2003) in order to formulate change (Given, 2008). Specifically, we seek to formulate a new approach to IT effectiveness for organizations unable or unwilling to adopt formal IT best practice frameworks.

Our work posits a "middle out" approach which incorporates the participatory role employees' play in using IT systems to achieve IT effectiveness. Our novel approach to assess IT and guide improvement advocates comparing *IT effectiveness norms*, or employees' normative patterns, with IT best practices. We anticipate two important sources for IT effectiveness norms in organizations. First, employees may adopt normative practices when they are mandated by policies and procedures; simple compliance is all that is necessary for this norm to exist. However, an important second source is when individuals internalize the spirit of these IT practices and act accordingly.

For example, protecting the company's intellectual property (IP) is a common business IT goal. An IT enforced password policy ensures that logging into the system with a strong password becomes a routine pattern, or norm and is one effective step to protect IP. While compliance with the password policy is desirable, we argue that a better outcome is for employees to internalize the spirit of this policy and exhibit other behaviours which support the underlying IT policy of protecting IP. An employee who writes their password onto a note then tapes it to their monitor is not following the policy's spirit. In contrast, before releasing a report outside of the organization, an employee might decide to first review language describing IP with her supervisor to ensure its suitability. That action would demonstrate adoption of the belief system underlying the policy over simple compliance.

Our experience working with numerous small businesses suggests there is a pressing need for better approaches to managing IT. As action researchers with IS backgrounds, we have a vested interest in finding a solution. Our iterative process was informed by the IT best practices adopted in larger organizations, but we theorize that a less technical approach can still be effective. The current stage of our work seeks to incorporate rigour to demonstrate our theory is generalizable and extensible (Davison, Martindons, & KOCK, 2004) to small business. Once these goals are satisfied we anticipate deploying our approach across more organizations to identify common strengths and shortcomings.

This article narrates one investigative cycle (Davison et al., 2004; Altrichter, Kemmis, Mctaggart, & Zuber-Skerritt, 2002) and makes three important contributions. First, we review the literature to offer theoretical support for a norms-based approach to improving small business IT. Second we report on instrument refinements informed by our literature review, as well as the analysis of 120 survey responses and 10 semi-structured interviews from small family businesses. Third, we

validate our refinements and demonstrate both hypothesized sources of IT effectiveness norms are significant drivers of improved IT outcomes using 72 survey responses from University students, presented in a second order PLS predictive model able to explain 26% of observed variance.

A norms-based approach may allow small business management to more easily and informally assess their IT operations. These assessment results would be easier to interpret, and consequently easier to act upon. A norms-based approach may also help improve communication between IT professionals and small business management by offering an alternative less technical formulation for discussing IT operations.

State of SME IT Effectiveness and Investigation Goals

We begin, by summarizing the theoretical results of our previous cycle (Marshall, Curry, & Reitsma, 2011) which led to the formulation of our research model and hypotheses for investigation, as well as describing the goals for the current cycle.

IT effectiveness activities are processes or practices to manage IT assets in an organization for accomplishing business goals and strategy. These are the 'compliance' norms we described above. Most IT best practice frameworks focus on suggesting a set of activities that if adopted will result in better IT. However, they require technical expertise and resources to implement, assess, and interpret, which many small businesses lack (Albayrak, Gadatsch, & Olufs, 2009; Brown, Van Der Wiele, & Loughton, 1998).

Informal normative routines help shape culture (Keeble & Wilkinson, 1999) and guide the way an organization conducts its business (Deal & Kennedy, 2008; Rosch, 1999). While IT effectiveness activities are procedural (and often technical) steps to improve IT quality, norms shape attitudes by developing a shared set of values, beliefs and desires. *IT effectiveness subscription* then is an intellectual commitment to the spirit of IT effectiveness activities. This is the 'sprit' norms we described above. Because norms are such a powerful influence on organizational routines, we anticipate that when employees extrapolate beyond what practices suggest and independently act in a consistent manner then the organization will realize higher IT quality. Stated another way, our current investigation cycle examines whether the 'spirit' norms are a reliable method to assess IT practices and guide improvement efforts.

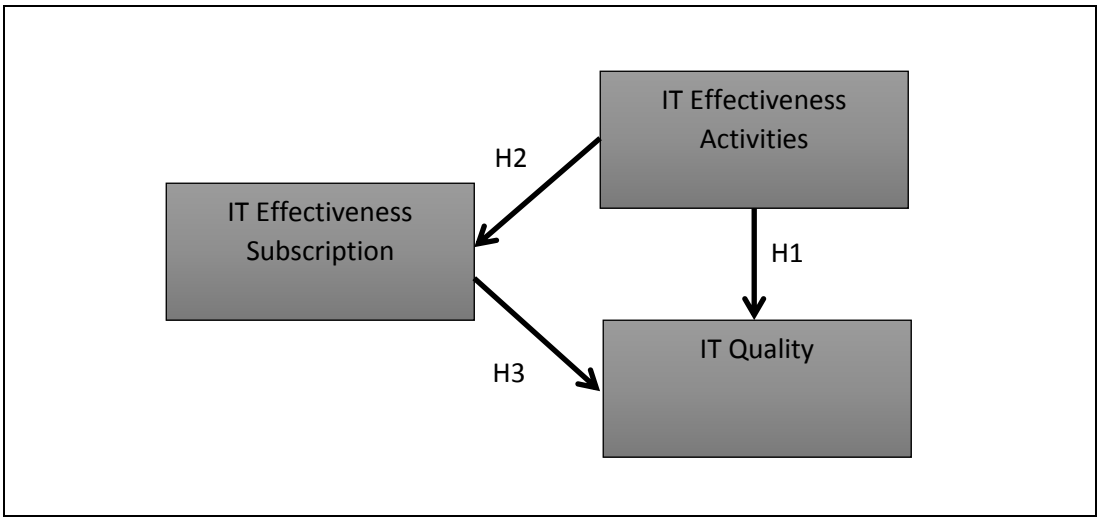


Figure 1. Research model to study the link between IT effectiveness and IT quality.

We theorize two pathways for IT effectiveness norms to improve IT quality as modelled in Figure 1. The first path is the well-known 'compliance' link between IT effectiveness activities and better IT quality, captured in our first hypothesis:

H1: IT effectiveness activities can improve IT quality.

IT effectiveness activities advocated in best practices such as COBIT have been shown to contribute to improved outcomes such as cost savings, productivity improvements, and better organizational efficiency (De Haes & Van Grembergen, 2008; Hardy, 2006; Parvizi, Oghbael, &Khayami, 2013). For example, a policy requiring regular data back-ups can help ensure key information is available to support operations. Large organizations may employ a dedicated IT staff who follow these IT best practices, and their efforts may be routinely audited to verify suitability. By contrast, small businesses frequently lack the resources and expertise to adopt IT effectiveness activities (Devos, 2007; Tagliavini, Ravarini, &Antonelli, 2001), and experience difficulty complying with available guidance.

Consequently, we also pursue the investigation of a second, more informal path to determine if IT effectiveness subscription, the 'spirit' norms, can influence IT quality. This is captured in the following hypotheses:

H2: IT effectiveness activities influence IT effectiveness subscription.
H3: Increased IT effectiveness subscription improves IT quality.

While H1 focuses on what practices are adopted, H2 anticipates that observing IT effectiveness activities will motivate behaviours consistent with the spirit of those practices. Put another way, employees usually want to "do the right thing" (Quinn & Spreitzer, 1997; Bowen & Lawler, 1995), and adopting a practice sets an example to shape their actions. H3 anticipates that this indirect

influence will lead to better IT quality. We posit that this indirect path may be very significant, especially in small, informally managed organizations with little or no dedicated IT staff. If so, this evidence would support our claim that norms may be capable of delivering many of the benefits that adopting IT best practice frameworks, such as COBIT, offer.

Our efforts necessitate identifying a set of IT effectiveness constructs sufficiently generic for use in most businesses. The exploratory work of our first cycle (Marshall et al., 2011) helped identify three principal IT effectiveness activities advocated by COBIT 4.1, the control objectives for business IT (COBIT), a well-regarded standard of IT best practices (IT Governance Institute, 2008, Simonsson & Johnson, 2006):

1. Risk/Control (RC): IT risks are assessed and controls that detect and or reduce problematic factors are implemented,
2. Measure and Improve (IMP): systematic measurement of IT processes facilitates improvement in IT operations, and
3. Business and IT Alignment (ALIGN): IT processes address organizational goals.

Testing these constructs using the research model of Figure 1 demonstrated a causal link between the first two norms (RC and IMP) on IT quality along the direct 'compliance' pathway. However we were not able to reliably differentiate the ALIGN construct, nor did we demonstrate a conclusive link between IT effectiveness subscription and IT quality. We set out to address both shortcomings in this investigation cycle.

BACKGROUND AND INITIAL INSTRUMENT DEVELOPMENT

A goal of our research is to develop a model suitable to small businesses. In this section we 1) review key literature used to support our claim that small businesses may find our norm-based approach more suitable than IT best practice frameworks, and 2) present the instrument for investigation adopted from our previous investigation while briefly reviewing the literature used for operationalizing items. Later sections will report results from two studies that use initial and refined versions of items that assess the levels of the constructs depicted in Figure 1 above.

Small Business Characteristics

Two distinctive characteristics of small to medium enterprises (SMEs) often noted in the literature are less formal management structures (Huang, Zmud, & Price, 2010; Costello, Sloane, Moreton, 2007) and access to fewer resources (Albayrak et al., 2009; Brown et al., 1998; Kyobe, 2004) than larger organizations. Resource-constraints and lack a staff of dedicated IT professionals frequently necessitates that some responsibility for IT administration be transferred to end users (Bayrak, 2013; Lee, & Kim, 2007).

One key advantage of an informal management structure is the ability to be highly flexible and innovative (Costello et al., 2007, Ramdani & Kawalek, 2008). SMEs often realize benefits from

IT faster than larger organizations, due in part, to their flexible and innovative nature (Hoffman, Parejo, Bessant, & Perren, 1998). However, one drawback of the informal management style is the lack of strategic planning (Andersen, Cobbold, &Lawrie, 2001; Knight, 2001). As we describe below, IT best practices frequently follow a plan-do-check-correct cycle, so a lack of strategic planning suggests SMEs may experience difficulty following those cycles.

IT Quality

The DeLone and McLean (1992, 2003) IS success model offers a key dependent variable to predict how IT effectiveness activities impact IT quality. Their work establishes user satisfaction with both IT and the IT contribution to organizational outcomes as a suitable proxies. Adopting their work, we define *IT quality* as the ability of IT to make effective organizational impact while also satisfying the users of those IT systems. Many researchers have validated DeLone and McLean (1992) constructs as statistically significant predictors of IT success (DeLone & McLean, 2003).

The items presented in Table 1 are used for assessing IT quality. Four of the items (OS_1 – OS_4) were adopted from Jouirou and Kalika (2004) who adapted Venkatraman's (1989) organizational performance assessment questions for the SME. IT user satisfaction (IS_1 and IS_2) has a long history as a dependent variable in IT evaluation studies (DeLone and McLean, 2003, 1992). These questions are similar to those used by other survey instruments.

OS_2	IT helps our organization better support the needs of our customers.
OS_3	IT helps our organization manage costs.
OS_4	Our IT has improved productivity in our organization.
IT Quality: Individual Satisfaction	
IS_1	I am satisfied with our organization's IT services.
IS_2	People in our organization are generally satisfied with our IT services.

[a.] All items used a 5 point scale from strongly disagree to strongly disagree.

Table 1: IT quality Survey Items [a.]

Norms as Drivers of IT Quality

Normative behaviours, or 'norms,' are shared values, beliefs, and desires, which serve to influence organizational behaviours (McNaughton, 1988; Smith, 1987). Over time, informal normative routines become part of an organizational culture (Keeble and Wilkinson, 1999). Norms can be more effective guides to employee activities than formal rules and procedures (Huang et al., 2010). Axelrod (1986) describes how norms transfer from a key individual, such as the manager, to become shared behaviours. Two key notions justify our claim that IT effectiveness norms may be an alternative approach for achieving IT quality, particularly in SMEs: first the recognition that

norms are powerful motivational forces for shaping behaviour and second, the frequent preference of SMEs for informal management over formal processes.

IT Effectiveness Norms

We now review material used to formulate a set of items for assessing IT effectiveness norms.

IT Governance Frameworks

IT governance frameworks are collections of IT best practices intended to improve IT reliability and predictability. These practices "reduce risk and ensure investments in IT resources add value" (Hall, 2010). The control objectives for business IT (COBIT) is one of the most widely adopted frameworks, has a strong business focus (IT Governance Institute, 2008; Simonsson & Johnson, 2006) and is often cited as authoritative in IT governance literature (IT Governance Institute, 2008, IT Governance Institute, 2007).

Other frameworks include the Information Technology Infrastructure Library (ITIL), developed by the UK government (Cartlidge, Hanna, Rudd, Macfarlane, Windebank, &Rance, 2007), and ISO/IEC standards (e.g. ISO/IEC 20000, ISO/IEC 38500 and ISO/IEC 27002) developed by the International Organization for Standardization. Despite substantial variation in their approaches, these frameworks have been shown to contribute to improved outcomes such as cost savings, productivity improvements, and better organizational efficiency (De Haes and Van Grembergen, 2008; Hardy, 2006; Parvizi et al., 2013).

COBIT

The COBIT 4.1 framework is broken down into a series of IT processes with recommended procedures, objectives, and metrics for organizations to follow. Adopting a control process and following the steps outlined in that processes offers some assurance that business will meet those goals and many negative risks can be avoided (IT Governance Institute, 2007), though as we have noted, SMEs rarely adopt COBIT. In our last investigative cycle (Marshall et al., 2011), we reviewed COBIT 4.1 for generic IT effectiveness norms which we summarized in Table 2.

Establish offsetting controls	COBIT 4.1 is divided into 34 IT processes, each made up of *control objectives.* Control objectives are designed to minimize risk.
Measure performance	Each IT process includes a set of *goals and metrics.* *Control objectives* encourage systematic process measurement.
Continuous improvement	*Control objectives* also encourage process review and improvement. COBIT is structured with a *Plan-Execute-Monitor* cycle.
Accountability	Identifying involvement for people is specified for each detailed control objective in a RACI (Responsible Accountable Consulted Informed) chart

Table 2: A Set of Effectiveness Norms Found in COBIT 4.1.

These norms were operationalized into items for assessing IT effectiveness activities presented in Table 3 (for an in-depth description of operationalization, see Marshall et al., 2011).

RC_1	Our IT systems and practices help us avoid making mistakes and/or prevent operational problems.
RC_2	We take action to try to avoid future IT-related problems.
RC_3	IT operations are organized to support the timing of key events on our organization's business calendar.
Measure/Improve[b]	
IMP_1	Our organization records specific events or activities to assess whether or not our IT is doing a good job.
IMP_2	Our organization routinely monitors the effectiveness of our IT systems.
IMP_3	Appropriate people in our organization receive and accept feedback on the effectiveness of our IT.
Business alignment[c]	
ALIGN_1	Our organization has a long-term IT plan.
ALIGN_2	Our IT plans are periodically checked against organizational goals.
ALIGN_3	In our organization, managers with responsibility outside of IT actively participate in IT planning.

[a.] All items used a 5 point scale from strongly disagree to strongly disagree.
[b.] Items from Marshall et al. (2011)
[c.] Additional items intended to operationalize alignment as expressed in IT effectiveness frameworks

Table 3: Items to Assess IT Effectiveness Activities [a.]

Strategic Alignment

Making IT resources and capabilities align with the strategic business goals has been a topic of serious concern by IT executives for over two decades (Luftman, Kempaiah, &Nash, 2005). Referred to as *strategic alignment* in the literature, many researchers have demonstrated that having a business strategy facilitates better tactical decisions about the acquisition and implementation of IT to meet those goals (De Haes & Van Grembergen, 2008; Jouirou & Kalika, 2004; Chan, 2002; Reich, & Benbasat, 2000; Henderson & Venkatraman, 1993; Chiang & Nunez, 2013).

The ALIGN items in Table 3 were developed from the identified themes from COBIT. In our last investigative cycle (Marshall et al., 2011), we described challenges associated with directly assessing alignment noting that other norms may be subsumed in a broad definition of alignment. As noted above, developing items to assess alignment are problematic in small businesses that rarely perform strategic planning. For example, Kyobe (2004) identifies a lack of skills and knowledge as inhibitors of SME strategic alignment. Put another way, even though key individuals such as the owner or manager have a vision for their business direction and IT needs, this is less likely to become a norm when employees lack sufficient skills to understand the vision, or simply

do not know about it. Still, acknowledging the wide acceptance of alignment as a key driver of IT quality, an effort was made to assess an alignment norm.

To better understand how alignment functions in the SME context, we reviewed the alignment literature and found that many researchers (for a review, see Chan & Reich, 2007; Benbya &McKelvey, 2006) argue alignment is an on-going process that should be frequently re-evaluated. For example, Burn (1997) proposed a cyclical model of alignment where IT alternates between leading and lagging business strategy (and vice versa), which must continually be balanced –an exercise the authors compare to "walking a tight rope." This suggests small business assessments of ALIGN might be improved by assessing whether the business makes attempts to align business goals and IT instead of a measuring levels of alignment as an end-state.

IT Effectiveness Subscription Construct

Items designed to measure IT effectiveness subscription (SUB) are presented in Table 4. While the previous items assess whether specific IT activities are performed, these items assess motivation and intellectual commitment to the spirit of those activities (e.g. "actively participate in the improvement of our IT"). All the items use direct references or clearly imply the intention to act consistently with a norm. These items were developed after informal conversations with several IT professionals who were asked to describe actions users take which suggest they willingly support IT operations. The COBIT, ITIL and ISO/IEC standards were also reviewed for descriptions of organizational practices consistent with the ideals expressed in those frameworks.

SUB_1	Non-IT people in our organization actively participate in the improvement of our IT systems.
SUB_2	People in our organization gladly comply with efforts to safeguard and improve our IT operations.
SUB_3	People in our organization recognize the need to have and safeguard strong passwords for access to IT systems.
SUB_4	People in our organization understand the need for and are willing to follow policies that restrict the use of computers.

[a.] All items used a 5 point scale from strongly disagree to strongly disagree (Marshall et al., 2011).

Table 4: Items to Assess IT Effectiveness Subscription [a.]

ISO/IEC 38500:2008

Although the IT effectiveness items are grounded in COBIT, we anticipate that other frameworks can suggest additional norms valuable for making refinements. One framework which was not factored into the original item formulation which stands out as being closely associated with our desire to develop less technical guidance is the standard for Corporate Governance of Information Technology, ISO/IEC 38500:2008, a high level advisory for senior managers and board level advisors (Chaudhuri, 2011; ISO/IEC, 2008). This standard includes 8 pages to discuss responsibility, 26 for strategy, 22 for acquisition, 30 for performance, 14 for conformance, and 10 for human behaviour. Another 40 pages are dedicated to the Evaluate-Direct-Monitor governance cycle. Our review identified many examples of normative behaviours using non-technical

language to describe IT best practices activities and outcomes. We will note specific excerpts from this framework when we present item refinements below.

In summary, we have highlighted distinctive characteristics of small businesses that suggest an alternative approach to IT quality, such as one based on IT effectiveness norms, may be more suitable that formal IT best practice adoption. We also presented an instrument for investigation and reviewed the literature sources used to operationalize IT quality, IT effectiveness activities, and IT effectiveness subscription constructs.

FIELD STUDY AND INSTRUMENT REFINEMENTS

In this section we report on a field study using data collected at two sites. Site one consisted of a mixed method study of small family businesses (AFBP) with 120 survey responses and 10 semi-structured interviews. One goal of this collection effort was to confirm our instrument's suitability to assess small businesses IT effectiveness and its drivers. A second goal was collecting qualitative data to validate that our instrument assessed the constructs we expected, and to inform item refinements.

After presenting the data, we conducted a reflective analysis and made several item refinements. We validate these changes at a second site that consisted of 76 survey responses from university students in a business information systems (BIS) course. Our formulation of a second order PLS predictive model explains 26% of the observed variance and offers confirmatory statistical evidence for both the direct and indirect pathways of IT effectiveness activities to improve IT quality.

Site one: Small Family Businesses

Survey participants at site one were primarily small, family businesses contacted through the Austin Family Business Program (AFBP, 2015). Of approximately 1500 invitations, about half were email invitations to a web-based survey while paper surveys were mailed to the rest for whom email addresses were not available. Two follow-up reminders were sent, three weeks apart. After nine weeks, 156 responses were obtained. Filtering incomplete and unusable responses left 120 cases.

Following the recommendation of (Podsakoff, Mackenzie, Lee, &Podsakoff, 2003), we checked for common method bias. Two tests were performed indicating that a single common factor did not account for the majority of observed variance. A correlation analysis indicated that the variance came from different theoretically supported factors. Therefore, we conclude that common method bias was not present.

PLS Analysis

The PLS model analysed in SmartPLS (Ringle, Wende, &Becker, 2014) depicted in Figure 2 shows both the direct and the indirect paths for IT effectiveness to influence IT quality are statistically significant. As foreshadowed in our discussion above, the internal consistency indicators of ALIGN items were insufficient for inclusion. Without ALIGN, the model explains 33% of the observed variance in IT effectiveness subscription, a 'medium' effect according to Cohen's (1988) guidelines, and explains 49% of the observed variance in IT quality, a 'large' effect according to Cohen's (1988) guidelines.

	AVE	Composite Reliability	Cronbach's Alpha
IMP	0.7	0.87	0.7
RC	0.65	0.85	0.74
SUB	0.5	0.8	0.66
IT Quality	0.5	0.85	0.79

Table 5: AFBP PLS Internal Consistency indicators.

The internal consistency indicators are presented in Table 5, with all measures at or above recommended values, though SUB and IT Quality are both at the margin of acceptability. A review of the outer loadings showed OS_1, OS_2 and SUB_1 fell below the recommended .7, although other items in these construct are above the recommended level and the AVE for IT Quality and SUB meet the recommended .5 level. This suggests that the constructs sufficiently explain model variance. Principal component analysis and linear regression and generated consistent results.

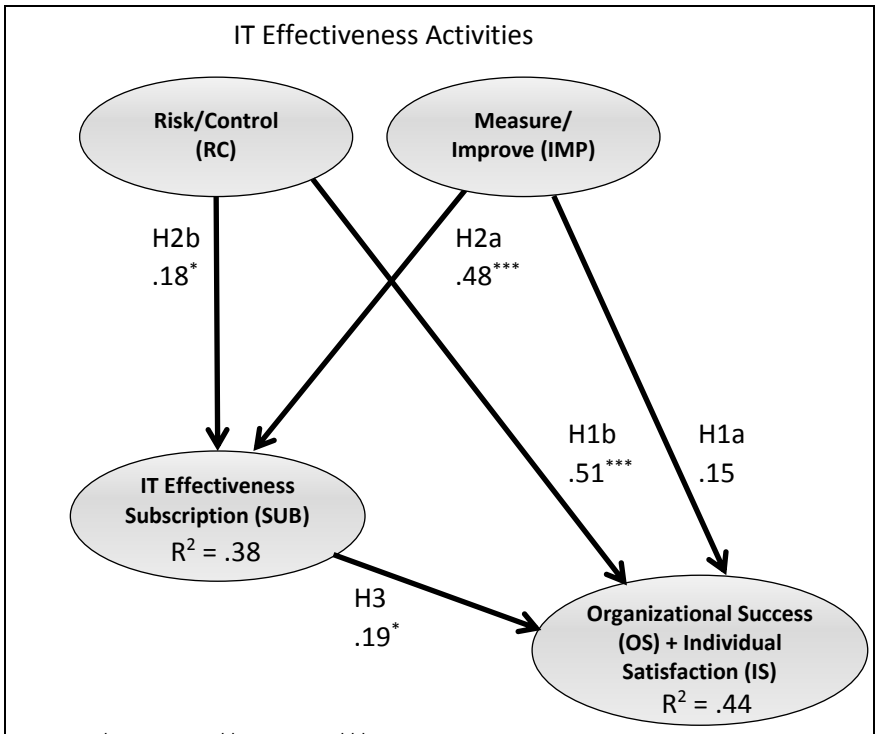


Figure 2: AFBP PLS Model Results.

Discussion of Survey Results

The AFBP data offers limited support for all three hypotheses. H1 theorized that IT effectiveness activities would impact IT quality. Only one construct, RC was significant, while IMP was not, and the ALIGN items were not evaluated in the model. H2 theorized that these activities would influence subscription and H3 theorized that subscription would influence IT quality. All interactions along these paths were shown to be significant although the contribution of IT effectiveness subscription to IT quality was small. Still this result offers credible support for our claim that IT effectiveness activities motivate subscription, and subscription can, in turn, influence IT quality.

Incorporating User Participation: Interviews

Action research is distinctive by employing a participatory process in collaboration with the subjects under investigation (Kemmis, Mctaggart, &Retallick, 2004; Given, 2008). We conducted ten interviews to validate items and collect qualitative data. Approximately 43% of respondents were willing to be contacted for follow up. Interview participants were selected based on proximity to the researcher and variation in IT quality assessments.

Interview questions were items drawn from the survey instrument, and scale responses were later compared with survey responses when possible. Follow-up prompts for each item were developed

to elicit a richer response than the scale offered. Transcripts of digital recordings were made for each interview. The objectives of our interview were:

1. Do survey items accurately assess the constructs we expect?
2. How does business and IT alignment impact IT quality?

Answering the first question helps offer evidence of instrument reliability (Straub, 1989), while providing further explanation of how IT effectiveness norms function. The second question was included because our ALIGN items did not effectively assess this construct. We sought further insight into how alignment becomes a norm by adding a prompt to invite discussion on how IT influenced organizational strategy and goals with interview subjects.

Interview Results

Table 6 lists excerpts from ten semi-structured interviews reviewed in light of our objectives.

Construct	Excerpt
Identify risks and establish offsetting controls (RC)	1. "We use software combined with physical inventories so we know we have accurate data." 2. "There are no checks of the video and blogs we post. So there is nothing in place to say 'woops that was wrong'." 3. "This new inventory management system has made the data less accessible to some people. It's more accurate, but also harder for them to find. I am of the opinion we need to make it simpler."
Continuous improvement through on going assessments of performance (IMP)	4. "We track order mistakes and their cost… Having orders standardized has helped reduce mistakes." 5. "We use website sales to measure the effectiveness of our promotional videos" 6. "IT allows us to see the growth levels and where we needed to focus." 7. "We constantly compare what the database reports versus what the staff who work in that area have to say"
Wilfully subscribe to IT effectiveness initiatives (SUB)	8. "I was directed to make the website easier to use. Now every time I making a change I ask myself will it make things better for the sales staff or for the customer?" 9. "The owner has expressly asked us to not use IT for personal use as much as possible, and there is strong culture here to follow that"
Individual satisfaction (IS)	10. "Our employees love working here and genuinely want to do what we ask them to do" 11. "I know we are doing a lot of good things with our IT, but I would like to see more" 12. "It gives me timely information at my fingertips" 13. "It took 30 steps to process an order [before], but now it's down to a fraction of that."
Organizational success (OS)	14. "You have to have accurate data in order to make business decisions, and IT lets us manage cash flow carefully right now while we are expanding our operations." 15. "Lowering inventory was another improvement resulting from changes in our website" 16. "Our IT has given us a fivefold increase in productivity" 17. "The technology enabled us to realign who does what."
Aligning business goals and strategy with IT capabilities (ALIGN)	18. "IT has allowed new directions in the company goals like making training videos of the products we sell" 19. "Our POS tells us what time of day is most profitable and what items were sold so we can staff and merchandise better to handle the expected business"

Table 6: Interview excerpts indicating items addressed intended constructs.

Discussion of Interviews

Respondent comments were used to validate our survey instrument and provide thematic insight. For example, when personally responding to the items used to assess RC (our risk/control norm) excerpts 1, 2 and 3 each identify risks associated with data inaccuracy. Excerpt 1 described an offsetting control (physical inventories) and excerpt 2 acknowledges the function of a useful but missing control. Excerpt 3 implies a need for user-focused evaluation which is a commonly recognized software development control objective. It seems therefore, that the open-ended answers validate that the RC questions surfaced ideas related to the construct's theoretical intent. IMP items were meant to assess continuous improvement through setting goals, measuring progress and making refinements. Excerpts 4 through 7 offer clear examples where respondents identified examples of reviewing data for the purpose of improvement. The PLS analysis showed IMP did not have a strong effect on IT quality, this was reflected in the interviews; while all four cases identified IMP as a norm, only one of those four had a strong positive assessment of overall IT quality. Given the correspondence between the apparent levels of IMP adoption we believe the survey items promise to assess the intended construct.

Our IT effectiveness subscription (SUB) items were intended to assess an intellectual commitment to behave in a manner consistent with IT effectiveness activities. Excerpts 8 through 10 document examples where respondents described norms (e.g. "[a] strong culture" and "our employees… want to do what we ask") for taking actions consistent with the spirit of IT effectiveness activities. In addition to validating our items, these examples offer further support for our claim that norms contribute to IT quality by influencing individual actions, even outside of the IT function. This qualitative evidence bolsters the limited statistical support observed in the quantitative data.

Finally, excerpts 11 through 16 present evidence that items were able to assess the two IT quality constructs: individual satisfaction (IS) and organizational success (OS). Excerpts 11 through 13 provide examples where respondents connected the IT contribution to organizational outcomes, even when they were not personally satisfied with the result, as in excerpt 11. This differentiation (satisfaction vs. success) somewhat validates our methodology of assessing IT quality variable in these two forms.

Interview Insights for Business and IT Alignment Assessment

The second goal of our interviews was to develop additional theoretical insight to refine our ALIGN items. In light of difficulties assessing alignment and specifying its function in small businesses we reviewed our transcripts for insights to better assess alignment as a normative IT effectiveness activity.

Excerpts 17 through 19 present evidence of alignment organized from general (17) to specific (18 and 19). Excerpt 17 is notable because the word "realign" is used, which suggests on-going efforts to align goals with IT capability. Eighteen is more explicit indicating that IT has opened up "new directions" not previously possible which can now be exploited. Nineteen is the most specific description of how IT impacted staffing and merchandising strategy.

ALIGN_1 and ALIGN_2 assess whether strategic planning was formally conducted. However, after reviewing the aforementioned excerpts, we note in the small family business context, alignment may be exhibited as an opportunistic capitalization on strategic capabilities once they become apparent, and not the result of a strategic plan. For example, excerpt 17 describes how "technology enabled," and eighteen notes that IT "allowed new direction in company goals." These observations are theoretically consistent with the SME literature reviewed, which describes how IT adoption allows smaller organizations to be flexible and innovative in exploiting new strategic directions. These observations imply a need to expand the scope of our ALIGN questions beyond their original focus on IT planning.

In critiquing the ALIGN items, originally informed by COBIT, we conclude that whether the organization has achieved a level of business and IT alignment maybe less important than whether there is a process for recognizing the contribution of IT and aligning these capabilities with strategic interests. Burn's (1997) description of IT alternating between leading and lagging business strategy seems to better fit with our interview excerpts, rather than COBIT's focus on levels of optimization.

Instrument Refinements

Action research encourages a critical reflection on previous assumptions in order to formulate stronger theory (Bell, 1998; Altrichter et al., 2002; Davison et al., 2004). Therefore, we performed additional statistical analyses, including principal component analyses (PCA) examining varimax rotated correlations between all IT effectiveness effort items on theoretically separated components. The Kaiser-Meyer-Olkin (KMO) measure, Bartlett's test of sphericity, analysis of Eigen values and component matrices all suggest our items correlated sufficiently in theoretically expected constructs. However, several items showed levels of cross-loading with other constructs, which suggests these items might benefit from refinements. In reviewing these items, we noted that when an item used complex wording (e.g. "timing of key events on our organization's business calendar") and/or asked for a complex assessment (e.g. the impact of "systems and practices" on "mistakes" and "problems") there tended to be more cross-loading. Consequently, our first refinements were focused at simplifying items.

Table 7 presents changes made to the RC items. We speculate RC_1 was ambiguous ("avoid making mistakes") which may have caused inconsistent assessments and was modified as item RC_1a ("avoid business mistakes") to more narrowly assess a norm of aligning IT and business operations. Likewise, RC_3 required a more complex value assessment about the consequences of IT operation scheduling and was replaced with two narrowly focused items: RC_4 assesses the norm of identifying risks ('threats'); and, RC_5 assesses the norm of adopting offsetting controls ('safeguards').

RC_1a	Our IT systems and practices are designed to avoid business mistakes and/or prevent operational problems.

RC_4	Our organization gives appropriate consideration to assessing new threats to our IT.
RC_5	Our organization establishes safeguarding measures to protect our IT from significant risks.

Table 7: Refinements to IT Effectiveness Effort: Risk/Control Items.

Table 8 presents changes made to the measure and improve items. Item IMP_1 asked for an ambiguous assessment ("records events or activities"), and was refined as IMP_1a to more narrowly assess a norm to "measure IT performance." Likewise, IMP_3, included complex wording ("receive and accept feedback") which may have caused inconsistent responses. This item was replaced with two narrowly focused items: IMP_4 assesses a norm to review IT effectiveness; IMP_5 assesses a norm to make improvement to IT.

IMP_1a	Our organization measures IT performance to assess whether or not IT is doing a good job.
IMP_4	Appropriate people in our organization review the effectiveness of our IT.
IMP_5	Appropriate people in our organization assess IT usage in order to make improvements.

Table 8: Refinements to IT Effectiveness Effort: Measure and Improve.

Table 9 presents refinements made to our business and IT alignment items. Two of the original items (ALIGN_1a and ALIGN_2a) were adapted based on insights learned from the interviews. These new items more clearly focus on assessing processes which consider IT capabilities in light of business strategy and vice versa. For example, ALIGN_1a focuses on a norm to conduct "periodic reviews;" ALIGN_2a focuses on a norm to "leverage IT" in new ways, and ALIGN_5, an entirely new question, focuses on "IT implications" of "new business plans." We also simplified ALIGN_4a asking if "organizational priorities" impacted "IT expenditures."

Business and IT alignment	
ALIGN_1a	Our organization periodically reviews our long term plans and current IT capabilities.
ALIGN_2a	Our organization looks for new ways to leverage IT.
ALIGN 4a	Our organizational priorities are considered in managing IT expenditures.
ALIGN 5	Our organization encourages proposals for innovative uses of IT to better accomplish goals and objectives.
ALIGN 6	New IT recommendations for our organization receive thoughtful and deliberate consideration.

Table 9: Refinements to IT Effectiveness Effort: Business and IT Alignment.

We also reviewed the ISO/IEC 38500:2008 standard for corporate governance to identify additional assessments of IT effectiveness norms. One example norm consistent with our theoretical view that ALIGN items should assess processes which contribute to alignment suggested leaders should "encourage the submission of proposals for innovative uses of IT that enable the organization to respond to new opportunities or challenges" (ISO/IEC, 2008, pg. 11). We infer from this guidance that a norm to encourage IT proposals and give them careful

consideration is a standard which can result in better alignment, which we adapted in items ALIGN_5 and ALIGN_6.

Table 10 presents refinements made to our IT effectiveness subscription items which are intended to assess whether individuals behave in a manner that suggests IT effectiveness norms may be desirable achieving IT outcomes. To address cross-loading item SUB_3 was refined in SUB_3a to only ask for one assessment ("to safeguard"). Cross-loading and respondent confusion identified in the interviews for item SUB_4 led us to refine it into item SUB_4a assessing whether there was a policy that "people gladly comply with." Cheerful compliance suggests subscription to the norm ideal.

The IT effectiveness subscription items used in the AFBP study attempted to operationalize and assess whether individuals subscribed to generic IT effectiveness activities (e.g. protecting passwords). Our intent was to develop additional assessments for this norms paradigm, and our review of ISO/IEC 38500:2008 identified guidance with obvious references to acting in a manner associated with an IT effectiveness norm. Three examples were used to develop new IT effectiveness subscription items:

- Business managers should be "assisted by IT specialists who understand business values and processes" (ISO/IEC, 2008, pg. 9). This was adapted into item SUB_5 replacing item SUB_1 which exhibited cross-loading.
- "All actions relating to IT [should] be ethical" (ISO/IEC, 2008, pg. 14), became item SUB_6.
- "Evaluate IT activities to ensure that behaviours… consider risks [which] should be managed" (ISO/IEC, 2008, pg. 15), was adapted in SUB_7.

SUB_3a	People in our organization recognize the need to safeguard their password
SUB_4a	Our organization has policies on the acceptable use of IT and people gladly comply with them.
SUB_5	IT specialists who understand our organization assist in accomplishing our goals and objectives.
SUB_6	Our organization follows ethical standards in its use of IT.
SUB_7	People in our organization take appropriate safeguards in light of existing threats.

Table 10: Refinements to IT Effectiveness Subscription.

Site two: Students in Business Information Systems Class

To test our revised instrument we surveyed undergraduate business students enrolled in a Business Information Systems (BIS) course. In contrast to the small business context of the previous dataset, this sample consisted of novice IT users. We have already noted the important role users who are required to accept some responsibility for managing IT play in small businesses. Therefore, validating our instrument with this demographic is an important benefit of collecting at this site. Most students were either in their third or fourth year of university study and participated in a group project documenting business processes and IT systems using Visio, SharePoint and

Microsoft Access. Working in small teams to complete project deliverables gave each student experience using university IT systems to accomplish shared goals. The instructions asked students to think of the university as "their organization," and informal discussions afterward suggested most students had little difficulty with this perspective.

Survey Results

We collected 86 responses; filtering out incomplete and unusable cases left 72. These were analysed with the goal of validating the instrument refinements and developing a richer model to better explain construct's interaction. Tests for common method bias were negative.

A second order PLS model is depicted in
3 showing all paths are statistically significant. An initial PLS model, similar to that used in AFBP, attempted to narrowly fit IT effectiveness interaction; low and non-significant regression weights indicated these paths did not accurately depict interaction. Therefore, Figure 3's refined PLS model uses higher order constructs to more broadly model generalized interactions (Wetzels, Odekerken-Schroder, &Van Oppen, 2009; Cenfetelli & Bassellier, 2009) between IT effectiveness activities. RC, IMP and ALIGN were included as formative indicators of a second order IT Effectiveness construct. The second order IT effectiveness effort construct measures the influence of the underlying IT effectiveness norms rather than being influenced by them (Cenfetelli & Bassellier, 2009). Importantly, we see nearly equal IT effectiveness activities and IT subscription regression path weights, suggesting a balanced contribution to IT quality. The overall explanatory value (R squared) of 26%, represents a 'medium effect' according to Cohen's (1988) guidelines. All internal consistency measures for constructs presented in Table 11 were at or above acceptable limits, although the cross loadings indicate that several items (RC_1, IMP_2, ALIGN_4, SUB_1, and SUB_5) were slightly below the .7 recommend levels.

	AVE	Composite Reliability	Cronbach's Alpha
IMP	0.59	0.85	0.77
RC	0.56	0.84	0.74
ALIGN	0.55	0.86	0.80
SUB	0.49	0.85	0.79
OS	0.68	0.87	0.77
IS	0.75	0.86	0.67

Table 11: ***BIS PLS Model Internal Consistency indicators.***

Discussion of BIS Site

The BIS site offers the most compelling data yet in support of our model. The theorized paths H1, H2 and H3 were all significant. A second goal of collecting data at this site was to test survey item refinements while also developing a better explanatory model of construct interaction. Although we still need to test our refined instrument in a small business context, we are encouraged by the reliability of our items in the model. The outer loadings of all items were at or close to the recommended .7 level, and the AVE of constructs in Table 11 meet the recommended .5 level.

We also reanalysed the AFBP results using the newly formulated second-order model. The direct path (H1) between IT effectiveness and IT quality remained significant (.58, $p<.001$), as did H2 (.58, $p<.001$), the path between IT effectiveness and IT quality. However the indirect path (H3) was not (.081, $p<.36$). Measures of explained variance, R squared were largely unchanged. Although we could attribute this difference between the two sites to the item refinements, we might also speculate that the reason AFBP's indirect path was insignificant in the second order model was because the SUB construct was not as differentiable. In the AFBP second order model, the 'small' effect made by subscription seems to have been lost in the 'large' effect of IT effectiveness activities.

One explanation for why IT effectiveness subscription's influence on IT quality is more significant in the BIS study than in AFBP is likely because our sample consisted of novice IT users. This group of students was motivated to behave in a manner consistent with the spirit of IT best practices, which they adopted in order to successfully complete their class. We might expect the same level of commitment to be exhibited by IT users in other organizations as well. Such an intellectual commitment to the normative spirit of IT effectiveness activities is consistent with the behaviour we anticipate in organizations that adopt IT processes consistent with IT best practices.

We sought to develop a less technical approach to assessing IT effectiveness and our results suggest that even novice IT users can offer valuable insights into organizational activities around the IT function. The instrument presented here has now been tested in increasingly refined forms to three different panels: one as presented in Marshall et al. (2011) and in the two described here with consistent positive results in predicting IT quality. It therefore appears to be sufficiently generic to facilitate assessments across a wide range of organizations.

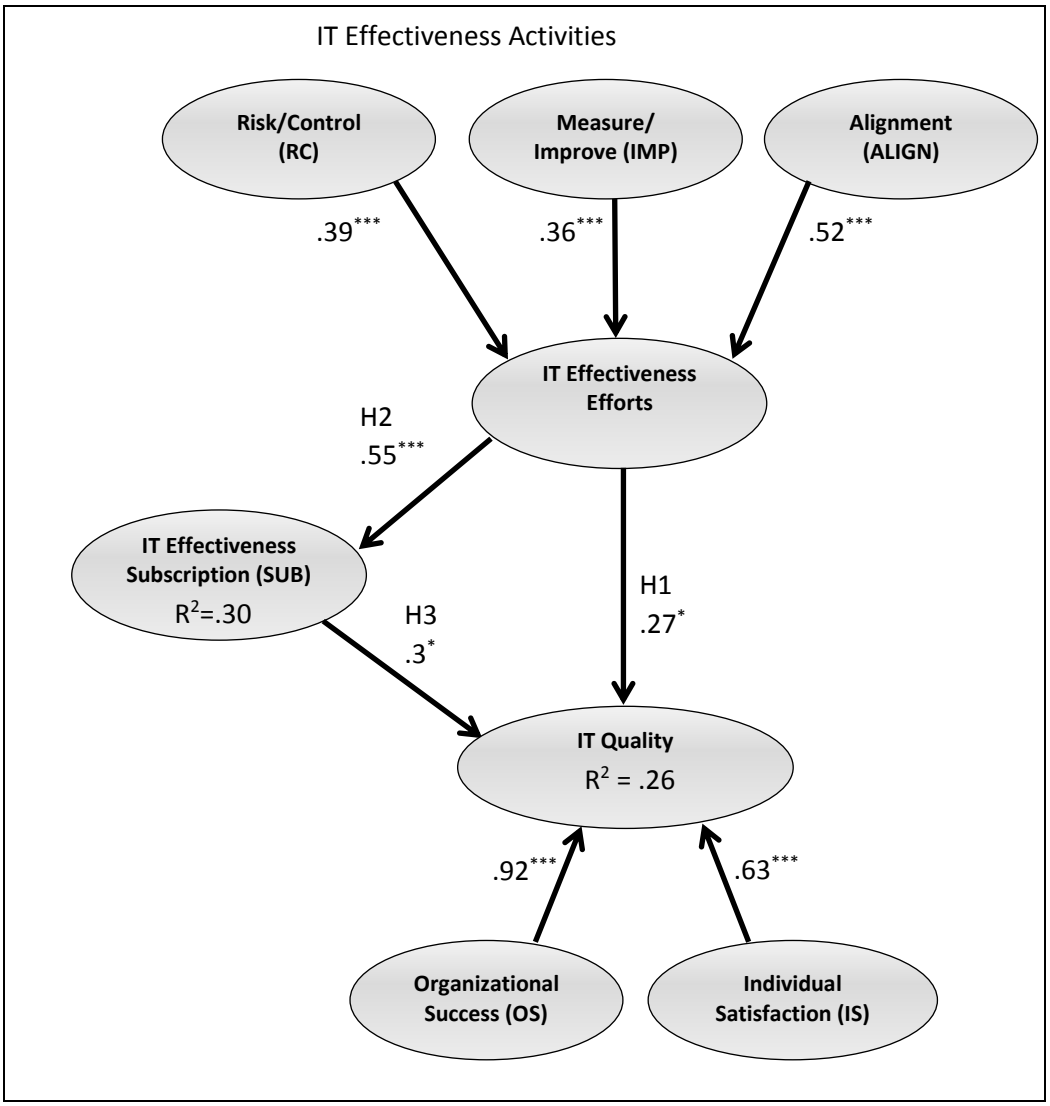


Figure 3: Second Order PLS Model for the BIS site.

IMPLICATIONS, LIMITATIONS AND FUTURE WORK

These studies offer evidence that both compliance with patterns of best practice and the subscription to the normative elements of those practices can contribute to IT quality. Employees are frequently coerced into compliance without understanding why a practice contributes to better outcomes. For example, a user knows an 8 character password, but the system requires 10. The user complies but compromises the password by writing it out. Therefore, in addition to IT best practices, we advocate organizational emphasis on the intellectual subscription of employees to behave in a manner consistent with those practices.

Data from both the AFBP and BIS sites offer support that IT effectiveness subscription is a significant contributor to better IT quality, so, promoting consistent normative behaviours will benefit organizations. Action research has been criticised for its lack of rigorous methods

(Altrichter et al., 2002; Baskerville, 1999; Brydon-Miller, Greenwood, & Maguire, 2003; Davison et al., 2004). But we have presented both qualitative and quantitative support for our claim that higher IT quality results when individuals internalize the spirit of norms beyond simple compliance with IT best practices.

The implications of our findings should be welcome news to organizations unable or unwilling to adopt IT governance frameworks, especially small businesses that may lack the resources needed for more systematic efforts. Managers should find it easier to support IT effectiveness subscription, since it relies on expressing a non-technical common set of values, beliefs, and desires. Based on analysis of widely adopted frameworks and our empirical evidence we suggest three norms:

- Anticipate IT risks and proactively mitigate them, for example, having routine discussions about potential threats, exposure, and precautionary steps. (Risk and Control)
- Identify measures that indicate IT does a good job (or not), and regularly monitor them, for example with user satisfaction surveys. (Measure to Improve)
- Review business and IT goals, and encourage innovative recommendations for IT use, for example by soliciting suggestions. (Align)

When IT effectiveness activities are part of the organizational culture, they serve to motivate actions because of employees desire to see better quality IT outcomes. Therefore, we also encourage IT professionals to frame issues in less technical normative language to support greater diffusion of best practices across the organization. Put another way, in addition to imposition of some technical standards, non-technical normative approaches to IT processes will encourage wider participation, and result in better IT outcomes.

We are encouraged by the results of this investigation cycle, but urge caution in applying our norms-based approach. While the BIS site helped confirm our instrument reliability, the applicability to small businesses may be limited by its university setting. This is a limitation we hope to address in the future.

Another limitation to our work is that it is currently limited to assessing and predicting. This is certainly a valuable contribution; however, a consistent theme in the feedback we gather from small businesses is their request for prescriptive guidance. Our goal for future investigation cycles is to begin cataloguing less technical, norms based guidance. We anticipate deploying our approach across more organizations to identify common strengths and shortcomings. To assist our efforts we hope to enlist the support of third party advisors, such as consultants, accountants and independent IT providers who can offer objective assessments.

Finally, we are interested in finding other effectiveness norms, even ones outside of the IT function, that contribute to better IT outcomes. We believe that this norms-based approach has great promise and seek to extend its capability into other areas of management practices.

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