IT Value and Interpretation Bias

By

Dowan Kwon

and

Stephanie Watts

Dowan Kwon
John Molson School of Business
Concordia University
1455 de Maisonneuve Blvd. W.
Montreal, Quebec, Canada H3G 1M8
Phone: (514) 848-2424 Ext.2767
Fax: (514) 848-2824
Email: dkwon@jmsb.concordia.ca

Stephanie Watts
Boston University School of Management
595 Commonwealth Ave.
Boston, MA 02215
Phone: (617) 358-2330
Fax: (617) 353-5003
Email: swatts@bu.edu

*Both authors contributed equally to this manuscript.*
Abstract

IT executives create value for their organizations in various ways. Two widely adopted paradigms for doing so are applying IT to increase process efficiencies, and informing the organization by using IT’s knowledge management (KM) capabilities. Research has demonstrated that there is value to be achieved through both these strategies: Practitioners have been advised to implement KM projects in order to be able to respond flexibly to environmental turbulence. Yet recently the value of IT for reaping process efficiencies has resurfaced as an important investment avenue. Practitioners are not entirely clear which of these paradigms to follow as they allocate IT resources, and this study addresses this need. We investigate IT value creation by IT managers in the field, using the theoretical perspective of sensemaking to describe a system of biases held by some senior IT managers regarding IT value creation. We empirically assess this theoretical model using a two-phase research approach, in which qualitative interviews were followed by a cross-sectional survey of 116 IT executives.

Results broadly support the model-driven hypotheses—those IT leaders that value IT primarily for its efficiency-based effects are prone to the system of interrelated interpretation biases described by our model. Interestingly, managers who emphasize the value of KM are less likely to have such biases and tend to be more realistic about their IT performance. By understanding where interpretation biases are most likely to appear, IT managers can be mindful about avoiding them and ensure that they IT resources are allocated wisely and effectively.
Keywords: Cognitive bias, IT executive, Knowledge Management, Efficiency, IT value, Hostile External Environment
Introduction

Information technologies (IT) can enhance organizational performance (Bharadwaj, et al., 1999; Kohli and Devaraj, 2003) and enable dynamic response capability (Mendelson, 2000). An important role of IT executives is to interpret environmental events and design IT initiatives and innovations for responding to them (Li and Ye, 1999; Mendelson and Pillai, 1998; Swanson and Ramiller, 2004; Weick, 1990). In order to perform this role effectively, IT leaders need to be able to assess their environments accurately. However, this is not an easy task, nor are all IT executives equally adept at it. IT executives are trained to identify characteristics of the external environment and respond to them with applications of information technology, in hopes that they will ultimately maximize organizational performance. However, managers are subject to interpretation biases such that they tend to emphasize those events that are most salient (Kiesler and Sproull, 1982), and IT managers are no exception. And highly salient environmental events do not necessarily reflect the broader condition of the external environment. When IT managers pay disproportional attention to certain aspects of their organizations’ external environments, the importance of these aspects is exaggerated and accurate environmental assessment is impeded. Without an accurate picture of the external environment, suboptimal resource investments can occur. For IT practitioners making resource allocations and investment decisions, an accurate assessment of the external environment is imperative.

This paper presents empirical evidence that some IT leaders hold inaccurate perceptions of their external environments, perceptions that can drive inappropriate resource allocations and investments. We present a theoretically grounded model of
several potentially maladaptive interpretations, based on the fact that one environmental characteristic—external hostility—is particularly salient to managers in general (Thomas and Trevino, 1993), IT managers not excluded. According to the model, IT managers are likely to respond to hostile environments with actions that emphasize cost controls and process efficiencies. Those that are biased toward interpreting the environment as hostile are hence likely to engage in efficiency-based actions, whether they are warranted or not. Their perceptions of the environment as hostile serve to justify these actions. By understanding where interpretation biases are most likely to appear, IT managers can be mindful about avoiding them.

**Background**

The extent that information technology can provide value to organizations has long been a crucial issue. At the industrial level this issue has largely been resolved: The more homogenous and ubiquitous a technology becomes, the lower the likelihood that it will make a distinctive contribution to the performance of any particular firm or organization, since most similar organizations will also adopt it (Brynjolfsson, 1993; Clemons, 1986; Roach, 1991). This research tradition views IT value as a causal outcome of various IT inputs, such as IT expenditure levels (Bharadwaj, et al., 1999), types of IT functions (Cron and Sobol, 1983), resource and process enhancements (Grover, et al., 1998; Melville, et al., 2004), and alignment between strategy and technology (Henderson and Venkatraman, 1999). While these studies have generated an array of prescriptions for deploying IT to improve organizational performance, they tend to overlook the agency of human IT managers themselves. Senior managers make
investment decisions regarding which of the various prescriptions to apply, and beneficial outcomes of these investments are manifest the actions of individual managers. In order to make appropriate investment decisions, executives interpret issues in terms of their potential for value creation, and redefine and reinterpret value creation opportunities as conditions change (Thomas, et al., 1993). Hence organizations respond differently to environmental events because their decision makers identify and interpret strategic issues differently (Dutton and Duncan, 1987).

IT executives play a critical role as interpreters of potential business value, an interpretation that then frames how they influence and educate other groups regarding technology strategy (Boland and Tenkasi, 1995; Orlikowski and Gash, 1994; Ross and Feeny, 2000). Perceptions that IT executives have concerning how best to capitalize on potential IT value tend to permeate throughout the managerial ranks of their organizations (Ross and Feeny, 2000). These leaders frame issues as critical or not as they interpret environmental events and then sell the critical issues to non-IT executives. For this reason senior IT managers’ interpretation processes are highly influential, both within their own departments and throughout their entire organizations. Hence it is important to understand the potential for suboptimal interpretation processes by senior IT leaders. To this end, we begin to develop our model of suboptimal interpretation processes by clustering information technology strategies into two main domains—efficiency-based and KM-based.

**IT Value**
IT executives have followed two broad trajectories for designing IT initiatives to enhance organizational performance. The first of these harnesses the efficiency gains that IT-based automation enables. IT managers that value IT as a substitute for human labor, for automating value chains, and for lowering exchange and coordination costs emphasize the efficiency gains that IT can engender (Hammer and Champy, 1993; Mukhopadhyay, et al., 1995). The second trajectory leverages the value of IT for informating the organization through knowledge management and innovation. Since the early 90s, this perspective has focused attention on ways that IT can enable agility and dynamic capability in the face of turbulent environments (Daft and Lewin, 1993; Mendelson and Pillai, 1998; Prahalad, 1998; Sambamurthy, et al., 2003; Thomas, et al., 2001). We refer to this trajectory as the knowledge management \((KM)\text{-based}\) perspective on IT value in organizations. The efficiency and KM-based trajectories are not mutually exclusive. Indeed, the notion that organizations should strive for gains from both efficiency \textit{and} from learning and innovation is an enduring precept of organizational theory and a central paradox of organizational design (Cameron, 1986; Daft and Lewin, 1993).

In practice, however, there seems to be little consensus regarding the deployment of these two trajectories for reaping IT value. On the one hand, theoretical and empirical evidence suggests that a KM positioning of IT can enable effective organizational response to environment turbulence and intense competition (Alavi and Leidner, 2001; Nonaka and Takeuchi, 1995; Sambamurthy, et al., 2003). Yet, and particularly since the evaporation of the dot.com bubble, efficiency-based IT prescriptions such as the utility and cost-center approaches have gained popularity (Carr, 2003). Deployment of IT for
efficiency gains and tighter cost-controls is increasingly favored as a means for responding to negative economic cycles (Burrows, 2001). Many practitioners have not adopted the KM perspective and continue to value IT primarily for its efficiency-enabling capabilities. In the field, some highly successful IT executives are deploying IT for both its efficiency-based value and for its KM-based value (Lundberg, 2002). Practitioners of both camps see their peers investing in ways that they are not. The magnitude of these investments is such that choosing the wrong trajectory bears considerable risk. And researchers continue to identify value stemming from both paradigms. Research is needed order to support the needs of IT executives as they make investment decisions in hopes of reaping IT value. We investigate this interrelated system of biases through the lens of managerial sensemaking processes, since these influence the strategic direction taken in response to environmental demands (Hambrick and Mason, 1984).

Managerial Sensemaking Processes

Sensemaking theory has been applied effectively to the problem of understanding how non-IT managers translate their interpretations of the problems and opportunities they face into organizational action (Maitlis, 2005; Thomas, et al., 1993; Weick, 1995). It is a perspective that is beginning to be applied to the IT context (Davidson, 2002; Swanson and Ramiller, 1997 and 2004). Since sensemaking has shed light on the interpretation processes and consequences of non-IT managers, it serves us well for understanding how IT managers do the same.

Sensemaking consists of the interrelated processes of scanning and interpreting the environment, and then acting on these interpretations (Weick, 1995). Interpretation
processes are those in which the meaning of new information is given meaning (Daft and Weick, 1984). During interpretation, new organizational issues are ‘labeled’ as a way to invoke common understanding and to enable discourse. For example, new situations may be labeled as a “threat” or an “opportunity”, as “strategic” or “political,” etc. (Thomas et al. 1993). This categorization influences executive reaction to these issues and hence subsequent organizational action (Chattopadhyay, et al., 2001). For example, organizations facing an environment they view as hostile are likely to strive to search for additional information or attempt to manipulate this environment (Daft and Weick, 1984).

Executives pay selective attention to key issues, and because they tend to act on the phenomena to which their attention is drawn, scanning is inextricably linked to evolving organizational actions (Daft and Weick, 1984; Hambrick and Mason, 1984). For example, organizational action is more likely to result on the basis of issues interpreted to be “urgent” than those that are not (Dutton and Duncan, 1987). In technology deployment, the way that the technology is framed affects the chances that it will be implemented (Orlikowski and Gash, 1994). In this way interpretation processes constrain and direct the actions of organizational leaders. The cumulative effects of these actions can alter organizational performance over time. Where interpretation processes are biased or inaccurate, organizational actions may be misguided, with consequent negative performance implications. Optimal long-term performance can be achieved by identifying interpretation biases that have the potential to impede rationality and learning (Weick, et al., 1999). Such mindful sensemaking can improve organizational performance, especially when it surfaces areas of potential inertia (Swanson and
Ramiller, 2004; Thomas, et al., 1993). In these ways, leaders’ interpretation processes affect the performance outcomes of their organizations, making accurate issue identification and interpretation important leadership capabilities. At the same time, managers are susceptible to the same interpretation biases as everyone else. Managers, like everyone, are limited in their ability to process information (Simon, 1955). This inherent limitation may result in maladaptive sensemaking, and low awareness of the environment (Starbuck and Milliken, 1988). And while managers are aware that biases exist in organizations, they may underestimate the extent that their own biases may affect their own interpretation processes and hence their apparent options for responding to the environment. Within the framework of sensemaking in general and managerial interpretation processes in particular, we apply findings from the social cognition and bias literatures to develop the hypotheses below.

**Hypotheses**

General economic performance indicators, competitor actions and regulatory changes all provide information to managers as they scan the environment. Adverse environmental events that are salient are likely to present themselves urgently and prominently to senior executives. The framing of these events as “threatening” will promote awareness of them (Weick and Daft, 1983) and lead executives to give discriminatory attention to them. This discriminatory attention reinforces this framing since it increases the salience of the information. In this way, adverse environmental conditions become highly salient as threats to positive organizational performance outcomes. When organizational performance is perceived to be poor by senior IT
managers, this cycle will ensue, since the situation is a threatening one. When IT leaders interpret the environment as hostile and also the organization’s performance as poor, both these issues will become highly salient. When two issues are simultaneously highly salient they are likely to be associated with each other via the phenomenon of illusory correlation (Crocker, 1981; Hamilton and Gifford, 1976). Thus IT executives will tend to associate a hostile environment with lower organizational performance:

\[ H1: \text{The more hostile the environment is interpreted as being, the lower organizational performance will be perceived to be.} \]

Top IT executives faced with what they believe to be external adversity will tend to see this as increasing the risk of negative outcomes. From prospect theory, we know that this heightened environmental uncertainty will increase their risk aversion (Kahneman and Tversky, 1979), particularly in the role of senior manager (Kahneman and Lovallo, 1993). And, faced with the risk of potentially negative performance outcomes, managers tend to choose safer options, follow collective norms, and take actions in domains over which they can exercise greater organizational control (Staw, et al., 1981). The more measurable the outcomes of their actions, the greater executives’ perceptions of control. And the shorter the amount of time between executive actions and their apparent effects—how soon their measures bear fruit or not—also increases perceptions of control. For example, executives often respond to perceived environmental adversity with internally directed initiatives such as cost-cutting and budget tightening (Chattopadhyay, et al., 2001; Staw, et al., 1981; Thomas, et al., 1993).
Efficiency-based IT initiatives tend to be more measurable, with shorter-term results, than knowledge management or learning-based IT initiatives.

In theory, adverse external environments demand heightened organizational learning capability (Daft and Weick, 1984; Nonaka and Takeuchi, 1995; Senge, 1990). However, hostile environments pose a threat to organizational viability, and in such situations mere survival, rather than competitive excellence, may be a sufficient accomplishment (Slevin and Covin, 1997). Organizations facing hostile environments often have limited financial resources available to them, which makes controllable and measurable IT investments—such as efficiency-based initiatives—a higher priority and an easier sell than KM-based ones that are often intangible and difficult to quantify.

For these reasons, IT executives that interpret their environments as threatening may be inclined to implement efficiency-based IT initiatives. At the same time, top IT executives are aware of the capacity of KM-based moves for enhancing agility and improving performance over the long term. If they are emphasizing efficiency-based actions, they are doubtless aware that they are sub-optimizing the long-term learning needs of their organizations. They can justify this if the environment is sufficiently hostile as to warrant undue emphasis on achieving measurable, short-term performance goals. Thus,

\[H2: \text{Senior IT executives that emphasize efficiency-based IT actions will interpret their environment as being more hostile than senior IT executives emphasizing KM-based actions.}\]
Executives tend to be optimistic in their estimation and forecasting and this optimism influences their outcome assessment (Durand, 2003; Kahneman and Lovallo, 1993). This bias is because managers overestimate the extent to which the outcome of their action are under their control (Langer, 1975). They have over confidence on their expertise and domains of their control, and this illusion of control is more likely in uncertain, complex and competitive environments (Duhaime and Schwenk, 1985). In this environment, executives are motivated to demonstrate that they recognize challenging external conditions and can manage them. In optimistic denial of uncontrollable uncertainty, they have a tendency to blame negative performance on externalities (Weiner, 1971), and attribute positive performance to actions they themselves have opted to take (Salancik and Meindl, 1984; Zuckerman, 1979). To the extent that senior managers deploying efficiency-based IT initiatives are more likely to view the environment as hostile than will managers emphasizing KM, they will be more likely to perceive their environment as uncertain and hence will be more susceptible to illusions of control. Since efficiency-based IT value is achieved through higher levels of control, these managers will tend to interpret their actions as meeting the needs of the environment for reduced uncertainty, and anticipate higher organizational performance as a result of meeting this need. For this reason, IT executives that emphasize the efficiency-based value of IT will be optimistic about IT value when faced with a hostile environment.

Yet prior research suggests that efficiency-based applications may not have this effect: Findings from IT productivity researchers suggest that deployment of routine IT applications does not necessarily lead to overall performance improvement (Landauer,
1995) because in a long-term, unexpected second-order side effects may occur. For instance, applications of automation can create additional coordination tasks that may increase overall labor work (Malone and Rockart, 1991). Often competitors can easily imitate routine IT applications, such that IT payoffs may accrue to the industry overall but not to individual organizations (Clemons, 1986; Mata, et al., 1995). For this reason, IT executives that emphasize efficiency may be overly optimistic, believing that their efficiency-based initiatives have positive performance outcomes when they do not.

**H3a:** Senior IT executives that emphasize efficiency-based actions are likely to be optimistic about the impact of IT action on firm performance.

However, relative to executives emphasizing efficiency, executives that emphasize KM are less likely to view the environment as hostile (see H2), in part because they are not motivated to seek information confirming the short-term, measurable performance impacts of their initiatives. For this reason, IT executives that emphasize KM-based action will be less susceptible to the illusion of control (Langer, 1975) than their efficiency-oriented counterparts, and hence be less likely to have overly optimistic interpretations of organizational performance. Thus, conversely to H3a,

**H3b:** Senior IT executives that emphasize KM-based actions are more likely to be realistic (accurate) about the impact of IT action on firm performance than senior IT executives that emphasize efficiency-based actions.

The attributional processes of managers are systematically biased toward outcomes that allow them to protect or enhance their self-esteem (Goerke, et al., 2004),
particularly when self-esteem is threatened, for example by the prospect of poor performance outcomes. We all tend to attribute success to our own actions as opposed to those of others (Zuckerman, 1979), and executives are no exception (Gioia and Sims, 1985; Ilgen, et al., 1981). When IT executives deploying efficiency-based initiatives in response to environmental hostility see immediate positive organizational performance, they are hence likely to attribute it to their initiatives. That is, whether their efficiency-based initiatives are actually mitigating the negative effects of hostility or not, these executives will believe that they are.

Managers are not only biased toward attributing positive outcomes to their own actions, these perceived positive outcomes also tend to strengthen the salience of information which supports their previous course of action, while reducing the salience of information that does not confirm the selection of the prior action (Duhaime and Schwenk, 1985) and generally lead to action choices that are less complicated, more manageable, and more narrowly framed ones than alternative options (Lovallo and Kahneman, 2003). Together, these common interpretation biases suggest that IT executives favoring efficiency-based IT value will tend to believe that their actions in this regard will reduce the negative effects of environmental hostility on their organizations:

H4a: Senior IT executives that emphasize efficiency-based actions interpret their actions as observably mitigating the negative effects of a hostile environment.

And, because IT executives know that KM-based IT initiatives have primarily long-term and intangible effects that are difficult to measure, they are less likely to
interpret observable, positive organizational performance as being the result of their own actions. In this way they will be less susceptible to the interpretation biases described above than will their efficiency-oriented colleagues. Thus,

\[ H4a: \text{Senior IT executives that emphasize KM-based actions do not interpret their actions as observably mitigating the negative effects of a hostile environment.} \]

We now describe the method used to empirically investigate these hypotheses.

**Methodology**

This study utilized a two-phase approach to the phenomenon of understanding IT executives’ perceptions of IT value: interview analysis followed by a cross-sectional survey. In the first phase, we examined transcripts of open-ended interviews of innovative CIOs for references to the two dominant modes of valuing IT – efficiency-based versus KM-based. We reasoned that if, among a sample of innovative CIOs across a variety of industries, both types of IT value were identified as important by different CIOs, that this would support our contention that there are divergent trajectories in the practice of innovative IT. This interview data had been collected previously by one of the authors. See XYZ (identifying information removed for review process) (2006) for details concerning this data collection process. These data were analyzed thematically to assess the extent that both paradigms of IT value were emphasized, and also the face validity of our theoretically-derived hypotheses. Results suggest that some CIOs (all of whom were selected on the basis of their being highly innovative) place a high degree of emphasis on efficiency-based initiatives, while others are very much in favor of KM-
based approaches. We have excerpted from these interviews below to lend context to our theoretical arguments above.

Quotations from highly innovative CIOs that emphasize efficiency-based IT value:

“You have to demonstrate continuous improvement in terms of internal processes to show...that you, in fact, are capable of doing the same kind of productivity improvement that you say the business unit should have.” (E9)

“For every one of the line applications…we determined an appropriate business measure...And so the user[s] knows what they’re going to spend.” (c29)

“I’m committed to...cutting costs and response time by half.” (F2)

Quotations from highly innovative CIOs that emphasize KM-based IT value:

“Don’t assume you know the answer, and don’t assume what you’ve done before will work [now].” (d13)

“I keep talking about learning organizations and that we’re trying to get to [be] a learning organization.” (P24)

“You [can] probably do more harm in overcontrolling, prohibiting something from happening, than allowing [it to happen]…You have to let people go, let them make mistakes.” (D19)

“Allow people to do things creatively--to not just coo-coo things but allow [things] to germinate beyond a certain level, to almost go into trial and error.” (K6)

Analyses of these interview data confirmed our hypotheses to the extent that we were encouraged to collect additional data, and so proceeded with phase two of the study, the cross-sectional survey. We then investigated IT executives’ perceptions of their practices and interpretations of their environments—as collected via survey and in conjunction with an objective organizational profit measure—to test the hypotheses developed above. The sample for the survey was drawn from companies in two North American countries (U.S. and Canada) by using Standard & Poor’s COMPUSTAT
database. The survey instrument was administered across two time periods in 2002 and 2003. In the first of these (February–June, 2002), approximately 1,100 questionnaires were sent to a top computer executive in U.S. companies with net sales exceeding $100 million. The second wave of data collection was performed over four months (February–May, 2003), and approximately 600 questionnaires were sent to top computer executives in Canadian companies with net sales exceeding 20 million Canadian dollars. A total of 58 responses were received from the U.S. sample—a response rate of 5.3%—and 67 responses were received from the Canadian sample, for a response rate of 10.8%. Given the workload and high rank of these top computer executives, these response rates were not surprising. Recent studies utilizing responses from executive and senior levels have reported similar response rates.

Descriptive characteristics of the organizations in the sample are shown in Table 1. A total of 125 responses constitute the data. The U.S. and Canadian samples were combined to generate a sample of sufficient size. In order to assess for potential sampling effects, equality of mean tests were performed on all variables between the two samples. With the exception of EF1, none of the variables exhibit statistically significant differences at the 0.05 level.

Table 1. Sample Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondents</td>
<td></td>
<td></td>
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<tr>
<td>CIO or equivalent</td>
<td>79</td>
<td>63.2 %</td>
</tr>
<tr>
<td>Senior IT manager</td>
<td>37</td>
<td>29.6 %</td>
</tr>
<tr>
<td>Non-IT senior manager</td>
<td>8</td>
<td>6.4 %</td>
</tr>
<tr>
<td>Unidentifiable</td>
<td>1</td>
<td>0.8 %</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>100.0 %</td>
</tr>
<tr>
<td>Revenues (US dollars)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 – 100 million</td>
<td>9</td>
<td>7.2 %</td>
</tr>
</tbody>
</table>
Measures

This study investigates relationships among three measurement domains: IT executive interpretation, action and organizational outcomes. To this end, the following four constructs are measured: efficiency-based IT action, KM-based IT action, hostility interpretation, and organizational performance. Perceptions of top IT executives and IT senior managers are used to operationalize these theoretical concepts. In addition, an objective organizational profit measure, EBIT margin (Earning Before Interest and Tax divided by Net Sales), is used to assess objective performance, in order to investigate discrepancies between perceived and actual performance. This methodological choice reflects the fact that the phenomenon under investigation—sensemaking—is perceptual to the extent that it reflects the interpretations, beliefs and frames of the managers we surveyed. Construct measures were adopted from previously validated studies with the exception of the KM-based action construct.

The items utilized for the four independent constructs in this study show reasonable internal reliability and discriminant validity. All values for Cronbach’s alpha are above or about the borderline of 0.7 rule of thumb (0.69 for efficiency items).
Regarding discriminant validity, five factors were identified in a factor analysis and all of these factors loaded as expected. For details regarding each scale item and the results of the factor analysis, please refer to Appendix 1.

**Hostility Interpretation.** Environmental hostility has been conceptualized in two ways in previous research. First, it has been based on hostile industrial conditions such as industrial threat, failure rate and viability (Slevin and Covin, 1997). Alternatively, it has reflected market competition such as competitive intensity and market dynamics (Miller, 1987). Since our theoretical model of IT-related environmental hostility is tightly coupled with the first concept (e.g. impact of economic downturn), we adapt and use Slevin and Covin’s (1997) previously validated industrial hostility scale.

**Efficiency.** We operationalize the construct of efficiency-based IT action by utilizing a previously validated instrument—the primary activity efficiency measure (PAE) from Sethi and King (1994). We adopt this scale because PAE reflects the goal-oriented action of reducing costs, consistent with those of innovative CIOs that emphasized efficiency-based IT value in our qualitative data. This construct consists of four items that these authors derived from the concept of Porter’s value chain (1985) and applied to the use of IT for diverse organizational activities such as logistics, operations, and marketing,. In order to capture the action, the items are formulated to capture retrospective IT efforts for achieving these efficiency goals.

**Knowledge Management.** In order to operationalize the KM-based IT action, a five-item scale was developed. Previously validated items were not available for assessing the extent that innovative CIOs emphasize KM-based IT value. Similar instruments, e.g. the business resources scale (Powell and Dent-Micallef, 1997), were
reviewed but deemed inappropriate, thus it was necessary to develop items to measure this construct. Items were designed to represent the role of IT for cross-functional linkage and integration, since these are essential for the internal organizational capacity of knowledge absorption (Cohen and Levinthal, 1990). Items were initially identified and reviewed by both academics and IT executives. An item sorting exercise was carried out to improve the face validity of the construct and the scale was refined during a pilot test. Similarly to efficiency items, the items are formulated to capture retrospective IT efforts for achieving KM goals.

**Organizational performance (perceptual):** The dependent variable of this study is organizational performance. Both perceptual and objective (financial) performance measures are used for this purpose. IT business value at the organizational level has been assessed in previous studies by measuring the impacts of IT on various aspects of company business performance. We follow this strategy, utilizing three items to represent multiple aspects of company profitability, growth, and financial performance. Specifically, we utilize the previously validated instrument by Powell and Dent-Micallef (1997) to this end.

**Objective organizational performance (financial):** An objective organizational profit measure, EBIT margin (Earning Before Interest and Tax divided by Net Sales), is used to measure performance. EBIT margin is a typical measure of organizational financial performance. Since it excludes the interest and tax portions of earnings, it measures business specific profitability. In our data, it is also the closest financial measure in the correlation ($\gamma = .396$, $p < .01$ in Table 2) with the perceptual organizational performance measure. Since not every company responding to our
questionnaire was identified, we had to drop 9 responses from the original company samples to apply this measure. The findings reported below employ objective data and hence reflect a total sample of 116 rather than 125.

**Table 2.** Correlation Matrix of perceptual and objective organizational performances (n=116)

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>S.D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Perceptual organizational</td>
<td>4.224</td>
<td>1.821</td>
<td>.396**</td>
<td>.357**</td>
<td>.348**</td>
<td></td>
</tr>
<tr>
<td>performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. EBIT (earning before interest</td>
<td>7.880</td>
<td>13.255</td>
<td>1.0</td>
<td>.803**</td>
<td>.640**</td>
<td></td>
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<tr>
<td>and tax) margin</td>
<td></td>
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<td></td>
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<td>3. OPI (operating income before</td>
<td>14.412</td>
<td>13.034</td>
<td>1.0</td>
<td>.427**</td>
<td></td>
<td></td>
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<tr>
<td>depreciation) margin</td>
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<tr>
<td>4. ROA (Return on Investment)</td>
<td>-.024</td>
<td>9.856</td>
<td>1.0</td>
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</table>

n =116
* p < .05 (2-tailed)
** p < .01 (2-tailed)

**Control variables:** Additional control variables are included for the purpose of hypotheses testing in further regression analyses. These five control variables are IT intensity, total asset, technology change, industry, and respondent position. *IT intensity* is captured directly from questionnaire by respondent perceptual assessment of percentage ratio (IT investment /growth revenue). *Total asset* is collected from COMPUSTAT database. *Technology change* assesses the speed of technological change in the company, based on one questionnaire item (i.e. the changes your company experienced have been rapid for technology). *Industry* is coded as service vs. non-service industries. First two digits of Standard Industrial Classification (SIC) code (60–88) are used to categorize the service industry.
Findings

Table 3 shows the overall correlation matrix of ten variables (five model variables
and five control variables). Five main theoretical variables are first shown (perceived
performance, objective performance, hostility interpretation, Efficiency-based IT action,
KM-based IT action) and additional five control variables are added for the purpose of
further hypothesis testing.

Table 3. Correlation Matrix among variables in the study

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>s.d.</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>8</th>
<th>9</th>
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<tr>
<td><strong>Model</strong></td>
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<td></td>
</tr>
<tr>
<td>1. Perceived</td>
<td>4.22</td>
<td>1.82</td>
<td></td>
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<tr>
<td>2. Objective</td>
<td>7.87</td>
<td>13.26</td>
<td>.396**</td>
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<tr>
<td>3. Hostility</td>
<td>4.87</td>
<td>1.18</td>
<td>-.23*</td>
<td>-.305**</td>
<td></td>
<td></td>
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<tr>
<td>Interpretation</td>
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</tr>
<tr>
<td>4. Efficiency</td>
<td>4.98</td>
<td>0.92</td>
<td>.276**</td>
<td>.081</td>
<td>.225*</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>5. KM action</td>
<td>4.88</td>
<td>0.97</td>
<td>.318**</td>
<td>.209*</td>
<td>.066</td>
<td>.360**</td>
<td></td>
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<tr>
<td><strong>Control</strong></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>6. IT intensity</td>
<td>0.03</td>
<td>0.07</td>
<td>-.08</td>
<td>.023</td>
<td>.003</td>
<td>-.10</td>
<td>-.05</td>
<td>-.04</td>
<td>-.03</td>
<td>-.02</td>
<td>-.01</td>
</tr>
<tr>
<td>7. Total asset</td>
<td>13864</td>
<td>71929</td>
<td>-.131</td>
<td>.035</td>
<td>.122</td>
<td>-.104</td>
<td>-.053</td>
<td>-.016</td>
<td>.021</td>
<td>.124</td>
<td></td>
</tr>
<tr>
<td>8. Technology</td>
<td>5.20</td>
<td>1.49</td>
<td>.129</td>
<td>.031</td>
<td>.153</td>
<td>.257**</td>
<td>.101</td>
<td>.221*</td>
<td>.124</td>
<td></td>
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<tr>
<td>change</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Industry</td>
<td>0.23</td>
<td>0.42</td>
<td>.149</td>
<td>.161</td>
<td>-.109</td>
<td>-.030</td>
<td>-.066</td>
<td>.336**</td>
<td>.120</td>
<td>.143</td>
<td></td>
</tr>
<tr>
<td>10. Respondent</td>
<td>0.66</td>
<td>0.48</td>
<td>.076</td>
<td>.078</td>
<td>.035</td>
<td>-.028</td>
<td>.183*</td>
<td>-.041</td>
<td>.078</td>
<td>-.143</td>
<td>-.30</td>
</tr>
<tr>
<td>position</td>
<td></td>
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<tr>
<td>n =116</td>
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</tr>
</tbody>
</table>
* p < .05 (2-tailed)
** p < .01 (2-tailed)

The overall correlation statistics are generally congruent with the hypotheses. In
support of H1, perceptions of environmental hostility are negatively correlated with
perceptual organizational performance (\( \gamma = -.234, p < .05 \)). Table 4 below presents
results of regression analyses for testing H2—that managers emphasizing efficiency tend
to interpret the environment as highly hostile. The sample size is 115 because one respondent was dropped due to missing data.

Table 4. The effects of hostility interpretation on IT-based action (H2)

<table>
<thead>
<tr>
<th></th>
<th>Efficiency-based action</th>
<th>KM-based action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td><strong>Independent variable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hostility Interpretation</td>
<td>.204 *</td>
<td>.045</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT Investment intensity</td>
<td>-.022</td>
<td>-.121</td>
</tr>
<tr>
<td>Company Size</td>
<td>-.159</td>
<td>-.093</td>
</tr>
<tr>
<td>Technological change</td>
<td>.251 *</td>
<td>.159</td>
</tr>
<tr>
<td>Industry (dummy: service, non-service)</td>
<td>-.022</td>
<td>-.029</td>
</tr>
<tr>
<td>Position (dummy: CIO, non-CIO)</td>
<td>.013</td>
<td>.209 *</td>
</tr>
<tr>
<td><strong>Model significance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>.126</td>
<td>.076</td>
</tr>
<tr>
<td>F-value</td>
<td>2.591 *</td>
<td>1.486</td>
</tr>
</tbody>
</table>

n = 115
* p < .05 (2-tailed)
** p < .01 (2-tailed)

The first model uses efficiency-based action as its dependent variable. It indicates that hostility interpretation is positively associated with extent of efficiency-based IT action (β = .204, p<.05). That is, there is a significant association between efficiency-based IT action and interpretation of the environment as being hostile. Note that there is no such significant association between KM-based action and perceived environmental hostility, as model 2 shows. These two results support hypothesis 2, since they indicate that those executives that emphasize efficiency also interpret their environments as being hostile, while those that emphasize KM do not. Of the control variables, technology
change is positively ($\beta = .251$, $p<.05$) associated with efficiency-based IT action.

Overall, model 1 is significant ($R^2 = .126$, $F = 2.59$, $p < .05$), but model 2 is not.

Additional t-test analyses were conducted on split samples to further assess hypothesis 2 (Table 5). We undertook this additional analysis because, while efficiency-based managers tend to interpret the external environment as being hostile, this interpretation might be the result of extraneous factors such as firm performance or industrial and managerial factors, rather than biases due to salience effects or previous actions. We split the sample at the median into the two sub-groups of high and low efficiency-based managers. Interestingly, the results indicate that, regardless of the levels of subjective and objective organizational performances, high efficiency-based managers interpret their environments as significantly more hostile than others ($p<.01$). Between the two groups, there are no significant differences in either perceptual (the first t-test, n.s.) or objective firm performance (the second t-test, n.s.), but the group of high efficiency-based managers interpret their environments as being significantly more hostile than non-efficiency managers (the third t-test, $p<.01$).

<table>
<thead>
<tr>
<th>Sub-groups</th>
<th>mean</th>
<th>s.d.</th>
<th>t</th>
<th>d.f.</th>
<th>sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptual org. performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency managers (n=58)</td>
<td>4.33</td>
<td>1.916</td>
<td>.664</td>
<td>114</td>
<td>.521 (n.s.)</td>
</tr>
<tr>
<td>Non-efficiency managers (n=58)</td>
<td>4.11</td>
<td>1.731</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objective org. performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency managers (n=58)</td>
<td>7.94</td>
<td>12.138</td>
<td>.046</td>
<td>114</td>
<td>.964 (n.s.)</td>
</tr>
</tbody>
</table>
Additional t-tests were conducted to investigate potential effects of managerial, industrial and organizational characteristics (KM management, industry, size). Results show that these factors are not associated with variations in hostility interpretation. This suggests that hostility is evenly distributed throughout the sample, with the exception that efficiency-based managers view their environments as significantly more hostile than KM-based managers. Taken together, these results support our hypothesis that efficiency managers view their environments as hostile, regardless of their managerial, industrial and organizational characteristics.

In order to investigate H3, two multiple regression analyses were performed (Table 6). The first model uses perceived organizational performance as the dependent variable and the second model uses objective organizational performance (EBIT margin) as the dependent variable. Both the models use three independent variables—efficiency-based IT action, KM-based IT action and hostility interpretation. Overall, both models are significant ($R^2 = .213, p < .01; R^2 = .152, p < .01$ respectively). Hostility interpretation
is negatively associated with organizational performance in both models ($\beta = -.306, p < .01; \beta = .337, p <.01$ respectively). These results support hypotheses H1, affirming the negative association between IT executives’ hostility interpretation and their perceptions of organizational performance.

Table 6. The effects of IT action on organizational performance

<table>
<thead>
<tr>
<th></th>
<th>Perceptual organizational performance</th>
<th>Objective organizational performance (EBIT margin)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1 (n= 125)</td>
<td>Model 2 (n=116)</td>
</tr>
<tr>
<td><strong>External interpretation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hostility interpretation</td>
<td>-.306 **</td>
<td>-.337 **</td>
</tr>
<tr>
<td><strong>Internal IT actions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency-based action</td>
<td>.261 **</td>
<td>.085</td>
</tr>
<tr>
<td>KM-based action</td>
<td>.238 **</td>
<td>.201 *</td>
</tr>
<tr>
<td><strong>Model significance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.213</td>
<td>.152</td>
</tr>
<tr>
<td>F-value</td>
<td>10.917 **</td>
<td>6.677 **</td>
</tr>
</tbody>
</table>

* $p < .05$ (2-tailed)  
** $p < .01$ (2-tailed)

As hypothesis 3a predicts, efficiency-based IT action is positively associated with perceptual performance ($\beta = .261, p < .01$), but not with objective organizational performance ($\beta = .085, n.s.$). Thus executives that emphasize efficiency-based actions tend to be overly optimistic in their interpretations of organizational performance. In comparison, as predicted in hypothesis 3b, there is no inconsistency between perceptions of organizational performance and actual performance as interpreted by executives emphasizing KM-based actions. Both perceptual ($\beta = .238, p < .01$) and objective ($\beta =$
.201, p < .05), performance measures are significantly and positively associated with
KM-based actions. Taken together, these results support H3.

Mediation analyses were undertaken to assess H4a and H4b. If IT executives that
emphasize efficiency believe that doing so mitigates the negative effects of a hostile
environment, then we should find that efficiency actions mediate interpretations of
hostility. The following Figure 1 depicts only significant paths (p<.05):

![Diagram](image.png)

**Figure 1. Mediation analyses results**

We calculated the t-statistics of the mediation effect (Sobel, 1982; Venkatraman,
1989) and found the mediation to be positive and significant (t = 1.76, p < .05 one-tailed),
indicating that perceptions of environmental hostility are mediated in part by efficiency
action. That is, the direct effect of hostility on performance is both significant and
negative. This effect is both significant and positive when it is mediated through efficiency-based IT action. An emphasis on efficiency-based IT action seems to have the effect of reducing the negative effects of a hostile environment on organizational performance. Note that this effect is not apparent in relationship to actual performance outcomes, only to perceived ones. These results support H4a. H4b investigates whether an emphasis on KM-based IT actions is also interpreted as mitigating negative environmental influences. As Figure 1 above illustrates, KM-based actions do not mitigate negative environmental effects. It seems that executives that place strong emphasis on KM-based actions also have positive perceptions of performance, but this performance is not interpreted as having been achieved through actions buffering the organization from the environment.

**Discussion**

Technologies alone are not likely to add value to any single organization, since they are relatively easy to imitate by competitors or can be acquired from the market (Clemons, 1986; Mata, et al., 1995) as a utility (Carr, 2003). In order to achieve sustainable advantage, organizations must complement their technologies with other valuable resources. One such valuable resource is mindful sensemaking (Swanson and Ramiller 2004, Thomas, et al. 1993). This study develops a theoretically-grounded hypotheses that together suggest a model of three interrelated interpretation errors that senior IT executives are likely to make when they perceive the external environment to be threatening, and they emphasize efficiency-based IT actions as a way of mitigating that threat. First, IT executives emphasizing the efficiency-based value of IT tend to
interpret the environment as highly hostile. Second, they tend to believe that their efficiency-based actions mitigate the negative effects of a hostile environment. And finally, they have overly optimistic IT performance interpretations, in part because they have previously enacted efficiency-based IT initiatives. We go on to describe empirical work, presenting both qualitative and quantitative evidence in support of this theoretical model.

Regardless of the emphasis of their IT actions, the executives in this study do associate a hostile external environment with negative organizational performance. The difference between the two modes of IT action is that those emphasizing KM-based actions do not perceive their actions as serving to mitigate negative environmental forces. Interestingly, their actions may in fact be doing this, since in this study we found that the greater the emphasis on KM-based IT actions, the greater the actual organizational performance, as measured by EBIT. Certainly there are many other factors not measured in this study that also affect organizational performance, yet KM-based IT action was significantly associated with increased EBIT while efficiency-based IT action was not. However, the focus of this paper is on executive sensemaking, not on confirming causal linkages between the value-driven actions of IT leaders and subsequent organizational performance.

So, why do executives with an efficiency emphasis tend to be overly optimistic in their performance assessments? It is possible that, because they believe that efficiency-based IT action can mitigate the negative effects of a hostile environment, and because they are taking such actions, that their assessments of organizational performance are simply consistent with this particular theory-in-use. If so, their emphasis on efficiency-
based IT actions reinforces their interpretation bias toward optimistic performance assessments.

An emphasis on efficiency-based action is also significantly associated with interpretations of environmental hostility. That is, the more hostile the environment is interpreted as being, the greater the emphasis on efficiency-based IT actions. We hypothesized this to be the case, based on theory suggesting that under high levels of threat, both organizations and individuals attempt to increase control as a means for addressing the threat. So it makes sense that IT executives that emphasize efficiency would interpret their environments as being hostile, since this may in fact be motivating their actions. Alternatively, they may actually be facing more hostile environments than the IT executives emphasizing KM-based actions, which would then explain why these organizations had lower EBIT. However, this seems unlikely given the variety of industries across which these organizations are spread (see Table 1), and the fact that we were unable to find significant associations between industry types and hostility perceptions. Thus it appears that, within this sample, executives with an efficiency perspective not only over-estimate the effects of these actions on organizational performance and the degree to which they help offset external hostility, they also overestimate the extent of this hostility in the environment (see Table 5).

This study presents evidence for the existence of a self-reinforcing system of interpretation biases on the part of IT executives emphasizing efficiency – they view their environments as more hostile than the environments actually are, which justifies a focus on efficiency-based IT actions, since they (erroneously) believe these actions mitigate the negative effects of a hostile environment. And their inaccurately optimistic assessments
of IT performance serve to confirm their perspective that an efficiency-based focus is a good course of action. However, continued emphasis on short-term, measurable gains runs counter to the need to improve the longer-term capabilities of learning and KM at their organizations. To the extent that they acknowledge this need, they may in fact continue to interpret the environment as hostile in order to justify their relative neglect of these longer-term IT organizational needs, and the cycle repeats itself.

One limitation of this research is the lack of panel design. That is, statistically speaking, we did not take account of the time after these executives completed our questionnaire for their actions to result in organizational outcomes. Since the questions were worded in the past tense—that is, respondents were asked about the efficiency or KM-based actions they had performed in the past—we were able to investigate current performance outcomes in terms of these prior actions. For this reason, we are confident that our objective performance measure takes account of the actions that IT-executives report having undertaken in the past.

This study relies primarily on IT executives’ perceptions, but in real organizations it is likely that the interpretation of how to reap value from IT in response to external events emerges dynamically from the relationship between IT executives, top management and other stakeholders. This dynamic, emergent process is beyond the scope of this study, since the focus here is on understanding potential sensemaking biases among IT executives. Additional field studies are needed to understand the sources of these biases and to identify how and where they originate (e.g. collective norms and value among the top management team, innovative climate, etc.). With additional insights, we
expect to be able to design processes for aiding IT executives in overcoming such bias, or minimizing their emergence in the first place.

One methodological concern of this study is the potential for response bias. For the survey, we needed to be able to identify the respondent companies in order to collect the secondary financial measures, and our request for the identity of these organizations may have artificially lowered the survey response rate. In order investigate this possibility, we compared our data with the population of US and Canadian companies that we targeted initially, as the population of interest. A comparison of various organizational measures of sizes (net sales, total asset, number of employees) and performance (return of asset, EBIT margin) did not reveal any significant differences. Thus we were able to provide indirect evidence that the respondents are reflective of the target population (Sethi and King, 1994).

In the information systems literature, the role of the top IT executive has received much research attention, particularly how influential these leaders are on technology strategy and on the business itself (Ross and Feeny, 2000). IT executives need to be proactive business visionaries. At the strategic level, they provide thought leadership to other top-executives (Enns, et al., 2003), detecting new ideas and mobilizing resources around these issues to sell them to other top managers (Dutton, et al., 1997; Maitlis, 2005). They are expected to help other senior executives understand IT-based opportunities and business implications, influence processes that are especially important for organizations facing ‘hypercompetitive’ environments (Dutton, et al., 1997; Wooldridge and Floyd, 1990). As innovators and business partners (Ross and Feeny, 2000), IT executives are instrumental in developing a clear organizing vision for
innovation strategy, and work to legitimize and institutionalize this vision (Swanson and Ramiller, 1997). For all these reasons, they play a central role in creating organizational value. For this reason, any ‘blinders’ that IT executives might be wearing can have adverse organizational implications, and so need to be understood by researchers and practitioners of the IS community.

For IT practitioners facing resource allocation and investment decisions, the findings of this study suggest that they reflect on their IT value paradigms and the relationship of these paradigms to their perceptions of the external environment. Does the environment appear extremely hostile? Are there a number of different indicators that confirm this or is this the general perception of senior management? Is external hostility threatening the organization to the extent that cost controls and efficiency measures seem to be the only option for creating IT value? Will the implementation of such initiatives really meet the demands of the hostile environment or will other important environmental demands go unmet. This study should provide some food for thought to senior managers—IT and non-IT as well—regarding the need to balance short-term payoffs with the longer term needs of organizational learning and innovation. Organizations need to ensure that they are not supporting the interrelated system of biases reflected in our model, since the mindless sensemaking that it reflects can impede effective IT value creation.
Appendix 1. Factors are loaded as expected in the factor analysis.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loading</th>
<th>Eigenvalue (VE(^a), %)</th>
<th>Item-to-item Correlation</th>
<th>Cronbach alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficiency-based IT action (four variables)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EF1. Has reduced the cost of handling inputs such as receiving and storing.</td>
<td>.599</td>
<td>1.192 (7.45%)</td>
<td>.385</td>
<td>.692</td>
</tr>
<tr>
<td>EF2. Has reduced the cost of transforming inputs into final products.</td>
<td>.678</td>
<td></td>
<td>.393</td>
<td></td>
</tr>
<tr>
<td>EF3. Has reduced the cost of customer-related activities such as processing orders and distributing products.</td>
<td>.506</td>
<td></td>
<td>.381</td>
<td></td>
</tr>
<tr>
<td>EF4. Has reduced the cost of services that maintain the value of the product, such as installation, training and repair.</td>
<td>.457</td>
<td></td>
<td>.325</td>
<td></td>
</tr>
<tr>
<td><strong>KM-based IT action (five variables)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KM1. Has increased learning synergies across different groups and divisions in your company.</td>
<td>.499</td>
<td>2.858 (17.86%)</td>
<td>.414</td>
<td>.789</td>
</tr>
<tr>
<td>KM2. Has enhanced employees’ learning about various aspects of the business.</td>
<td>.662</td>
<td></td>
<td>.489</td>
<td></td>
</tr>
<tr>
<td>KM3. Has enhanced your company's ability to coordinate the different skills and expertise of employees.</td>
<td>.617</td>
<td></td>
<td>.446</td>
<td></td>
</tr>
<tr>
<td>KM4. Has enhanced employees’ understanding of various business processes of your company.</td>
<td>.913</td>
<td></td>
<td>.514</td>
<td></td>
</tr>
<tr>
<td>KM5. Has increased cross-functional efforts to explore business opportunities.</td>
<td>.612</td>
<td></td>
<td>.403</td>
<td></td>
</tr>
<tr>
<td><strong>Hostility Interpretation (four variables)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOS1. The failure rate of firms in your industry has been high.</td>
<td>.505</td>
<td>1.751 (10.94%)</td>
<td>.379</td>
<td>.718</td>
</tr>
<tr>
<td>HOS2. Competitive intensity has been high in your industry.</td>
<td>.410</td>
<td></td>
<td>.325</td>
<td></td>
</tr>
<tr>
<td>HOS3. Severe price wars are characteristic in your industry.</td>
<td>.811</td>
<td></td>
<td>.454</td>
<td></td>
</tr>
<tr>
<td>HOS4. The industrial climate for your company has been hostile.</td>
<td>.710</td>
<td></td>
<td>.439</td>
<td></td>
</tr>
<tr>
<td><strong>Organizational performance (three variables)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORP1. Over the past 3 years, the financial performance of your company has been outstanding</td>
<td>.959</td>
<td>4.165 (26.03%)</td>
<td>.851</td>
<td>.936</td>
</tr>
<tr>
<td>ORP2. Over the past 3 years, the sales growth of your company has been outstanding.</td>
<td>.818</td>
<td></td>
<td>.781</td>
<td></td>
</tr>
<tr>
<td>ORP3. Over the past 3 years, the profitability of your company has been outstanding</td>
<td>.961</td>
<td></td>
<td>.858</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)VE: Variance Extracted
REFERENCES


