The Influence of IT Investment Goals on IT Investment Governance: A Contingency Perspective

Syaiful Ali  
School of Business, University of Queensland, Brisbane, QLD, Australia., s.ali@business.uq.edu.au

Peter Green  
Business, University of Queensland, Brisbane, QLD, Australia., p.green@business.uq.edu.au

Alastair Robb  
UQ Business School, The University of Queensland, Brisbane, QLD, Australia., a.robb@business.uq.edu.au

Follow this and additional works at: http://aisel.aisnet.org/amcis2012

Recommended Citation
http://aisel.aisnet.org/amcis2012/proceedings/StrategicUseIT/25

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2012 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
The Influence of IT Investment Goals on IT Investment Governance: A Contingency Perspective

Syaiful Ali
UQ Business School
The University of Queensland
Saint Lucia, 4072, Queensland, Australia
Email: s.ali@business.uq.edu.au

Peter Green
UQ Business School
The University of Queensland
Saint Lucia, 4072, Queensland, Australia
Email: p.green@business.uq.edu.au

Alastair Robb
UQ Business School
The University of Queensland
Saint Lucia, 4072, Queensland, Australia
Email: a.robb@business.uq.edu.au

ABSTRACT
Delivering IT-business value from IT investments has been the focus of IT professionals and researchers for decades. For instance, IT investment consumes a substantial amount of organisational resources, IT investment can be relatively high risk in nature, possibly adversely impacting on organisations if not being managed adequately, and the rapid progress of IT has opened new business opportunities as well as new business threats. Given these reasons, IT investment, therefore, requires careful consideration by organisations. Based on contingency theory, this study examines a potential factor which may influence the effectiveness of IT investment governance, namely, IT investment goals. This study uses results of a survey of 231 participants from senior-level management within Australian organisations to examine hypothesized relationships between IT investment goals and IT investment governance. This study found organisations with more focused goals for IT investments were significantly positively related with higher levels of IT investment governance.

Keywords
IT strategic choice, IT investment goals, IT investment governance, contingency theory, Discriminant Analysis, ANOVA, Australia.

INTRODUCTION
Information technology (IT) has become an increasingly important factor in business organisations. This phenomenon is reflected in the increasing amount of money spent on IT (WITSA, 2010, Gormolski, Grigg, and Potter, 2001), pervasive use of IT in organisation (Gormolski et al., 2001; Kohli and Devaraj, 2004), and the potential new business opportunities that IT brings (Weill and Vitale, 2002; Weill and Ross, 2004). WITSA (2010) estimated that in 2010, IT spending was greater than $3.6 Trillion and in 2012, it will amount around $4.5 trillion. IT investments, therefore, require careful consideration by organisations.

Despite its importance, few prior studies have comprehensively investigated factors affecting the establishment and implementation of effective IT investment governance. Prior IT investment studies mainly focused on the links between the amounts of money spent on IT with corporate performance, rather than how IT generates business-value for organisations (Barua, Kriebel, and Mukhopadhyay, 1995; Bresnahan, Brynjolfsson, and Hitt, 2002; Brynjolfsson, Hitt, and Yang, 2002; Melville, Kraemer, and Gurbaxani, 2004). Furthermore, Sherer (2007, p.44) also points out that: “many IT processes do not have standard operating procedures. Management develops its own internal processes for IT investment. Since benefits realization depends upon these processes, a better understanding of the factors that influence them could help generate greater value from IT investments.”

IT investments have certain issues that need to be addressed with careful consideration. Bacon (1992) highlighted two issues in IT investments that are: (1) how do organisations decide their IT investments and (2) how should they decide. Similarly, Weill and Ross (2004) posit three issues relative to IT investments. The three issues are: (1) how much to spend, (2) what to
spend it on, and (3) how to address different stakeholders’ interests. Failure to address the issues effectively may result in suboptimal performance of IT-business value delivery (e.g., see, Melville et al., 2004). Focusing on one of the issues in IT investment (i.e., how much to spend), this study examines a potential factor, namely, IT investment goals, which may influence the effectiveness of IT investment governance.

This study is organised as follows. Section 1 discusses the Introduction and Section 2 explains the background of this study. Model and Hypothesis Development is explained in Section 3, whereas the Research Methodology is presented in Section 4. This is followed by the Results and Discussion (Section 5). This study ends with Conclusions, Limitations and Future Studies (Section 6).

BACKGROUND

IT Investment Goals

The ways organisations manage and incorporate IT in supporting/enabling the business strategy reflects the relative importance of IT for the organisation. Bowen, Cheung, and Rohde (2007, p.195) contended that "no single “best” IT governance arrangement exists because IT needs to respond to the unique environments within which it operates.” Contingency theory suggests that organisations will systematically adjust their structure and practices relative to their environments, for example, size and production technology, according to their contextual requirements (Weill and Olson, 1989). More specifically, Kobelsky, Richardson, Smith, and Zmud (2008, p.964) reported that “environmental, organizational, and technological levels help determine the combination of organizational structure and processes that yields optimal performance levels”. Consistent with the contingency theory argument, prior IS studies showed that organisations selected management practices that aligned with their goals for IT (Tallon, Kraemer, and Gurbaxani, 2000; Strassman, 1997).

Moreover, Kobelsky et al. (2008, p.960) pointed out that “the problem of matching investment decisions with strategy is explored in contingency research (Slagmulder, 1996). It suggests that budget should vary with environmental and organisational characteristics. Organisations are expected to adjust systematically their structure and practices (including budgets) to align contextual requirements arising from the environment with other less malleable organisational characteristics, including size and core production technology…Subject to contextual needs and constraints and their associated competitive implications, managers set budget levels consistent with strategic objectives to improve future firm performance.” Kobelsky et al. (2008, p.991) reported in their study that “industries using IT primarily to automate or transform business processes have higher IT budget levels than those that use IT primarily to informate decision processes. This confirms that firms requiring robust technology platforms to enable business operations and/or having regularly to “reinvent” these platforms must spend more on IT than those that instead focus on capturing, analysing, and providing access to data about business activities.” Tallon et al. (2000) found that organisations with more focused goals for IT made greater use of IT investment evaluation.

IT Investment Governance

Adapting the definition provided in Val-IT 2.0, this study defines IT Investment Governance (ITIG) as: The set of structures and processes within an organisation exercised by the board, executive management, and IT management to control both the decision-making, and the monitoring of the performance of IT investments. IT investment governance is within the responsibilities of boards of directors including top management team members, whereas IT investment management is mainly the responsibility of management within its hierarchy. In line with this position, Weill and Ross (2004) argue that “governance determines who makes the decisions. Management is the process of making and implementing the decisions. For example, governance determines who holds the decision rights for how much the enterprise invests in IT. Management determines the actual amount of money invested in a given year and the areas in which the money is invested.” (p.8).

Frameworks of the IT investment governance construct currently exist, such as Val-IT 2.0, and IT Investment Management (Government Audit Office, 2004; ITGI, 2008). These measurements arose out of best practices developed in the business world and public sector organisations, without either a rigorous research methodology or empirical evidence supporting their final measures. Using a rigorous construct development methodology, this study develops the IT investment governance construct, by adapting and supporting the existing frameworks (i.e., Val-IT 2.0, and IT Investment Management) with prior empirical studies.

MODEL AND HYPOTHESIS DEVELOPMENT

In relation to the Background discussion, this study argues that IT investment goals may reflect the “how much to spend” concerns of IT investment, whereby companies with more focused goals for IT tend to spend more resources on IT investments, which, in turn, requires higher levels of IT investment governance. Specifically, this study intends to examine the contribution of the IT investment goals variable on the level of effective IT investment governance (Figure 1). The study
uses the IT investment goals classification used by Tallon et al. (2000) and Tallon (2007). In those studies, IT investment goals were classified into four groups: unfocused, operation focus, market focus, and dual focus.

Hypothesis Development

Contingency theory suggests that organisations will systematically adjust their structure and practices according to their contextual requirements, such as size and production technology relative to their environments (Kobelsky et al. 2008). Prior IS studies in the context of contingency theory reported that “environmental, organizational, and technological levels help determine the combination of organizational structure and processes that yields optimal performance levels” (Kobelsky et al. 2008, p.964).

Tallon et al. (2000) using IT investment goals as a contingency factor, examined IT investment goals relationship with the type and thoroughness of IT evaluation techniques. They found that organisations with more focused IT goals engaged in more extensive use of planning and appraisal exercises during IT investment evaluation compared to organisations with unfocused IT goals. A more recent study by Kobelsky et al. (2008) reported that IT budget levels have positive associations with contextual factors such as environment, organisation and technological factors. They found that “industries using IT primarily to automate or transform business processes have higher IT budget levels than those that use IT primarily to informate decision processes” (Kobelsky et al. 2008, p.991).

In line with the discussion, this study argues that the contingency factor such as IT investment goals’ will have a positive relationship with the level of IT investment governance. It is when an organisation perceives IT as a strategic factor in attaining business goals, “there is an even greater need for these investments to undergo routine, systematic, and recurring” (Tallon et al., 2000, p. 154) governance evaluation. Specifically, in an organisation with more focused IT goals, the board of directors and top management team will require there to be more comprehensive IT investment governance practices, such as more comprehensive IT investment value governance, IT investment value monitoring, IT investment appraisals and portfolio management. Thus:

Organisations with more focused goals for IT investments will significantly and positively influence higher levels of IT investment governance

RESEARCH METHODOLOGY

Survey Administration

An online questionnaire was sent to a panel of respondents administered by an Australian based survey panel vendor. Members of top management teams within Australian for-profit organisations were the target respondents of this survey. The use of perceptual data from top management members has been widely used in prior IT management research (Tallon 2007). Prior literature indicates that results from panel surveys do not differ significantly from those collected from random mail samples (Dennis 2001; Pollard 2002; Skinner et al. 2009). Moreover, previous IS literature has used survey panel vendors with reliable results (Kaye and Johnson 1999; Lee, Shin, and Lee, 2009; Wetzels, Odekerken-Schroder, and van Oppen, 2009; Bulgurcu, Cavusoglu, and Benbasat, 2010). Survey panel vendors ensure only eligible respondents participate in the survey by having control measures such as unique login IDs and respondents’ background profiles. The online questionnaire itself also had several screening questions (e.g., job-title, type of industry) to ensure that only eligible and appropriate participants took part in the survey.
Two hundred and thirty-one (n=231) valid responses were collected from the survey. The highest percentages of respondents were from property/business services and retail/trade industry (e.g., 13.4%, and 13%, respectively). 45% of respondents were managing directors and 17.7% were general managers. 36% of respondents had 0-5 years work experience and 34.6% respondents had 5.1-10 years of experience. The average sales for the respondents’ organisation was AU$1.24 billion per year which is broadly comparable with prior Australian studies (Elbashir, 2006).

**Variable Measurements**

All the variables were measured using seven-point Likert-type scales. In case any item in the survey was not applicable to the respondents’ organisation, ‘N/A’ (not applicable) was provided as an answer option.

**IT Investment Goals**

The questionnaire items for measuring this variable are derived from Tallon et al., (2000). There are four seven-point Likert-type scale items to measure IT investment goals within organisations. Based on the respondents’ responses to these items, organisations were categorised into one of the four classifications shown in Table 1. Following Tallon et al. (2000), respondents who rated each of the items as four or less on the Likert-type scale, were classified as “unfocused” group. Respondents who rated the first two items as five or above and rated the second two items as four or less were classified as “operational focus”. Respondents who rated the first two items as four or less and rated the second two items as five or above, were classified as “strategic focus”; and respondents who rated four items as five or above were assigned as “dual focus” group.

<table>
<thead>
<tr>
<th>Operation Focus</th>
<th>Dual Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current goals for IT focus on cost reduction, improving quality and speed, and enhancing overall firm effectiveness.</td>
<td>Current goals for IT are a combination of both operations and market focus.</td>
</tr>
<tr>
<td>Unfocused</td>
<td>Market Focus</td>
</tr>
<tr>
<td>IT is not critical to any aspect of the business strategy; Current goals for IT lack focus and direction.</td>
<td>Current goals for IT focus on extending market/geographic reach and changing industry and market practices.</td>
</tr>
</tbody>
</table>

Table 1. IT Investment Goals Classification (Adapted from Tallon et al., 2000)

**IT Investment Governance (ITIG)**

ITIG was measured using 16 item measures that was self-developed and validated for the purpose of this study. A formative-second order factor was used to measure the ITIG variable. Consistent with prior IS studies, this study also argues that IT investment governance is a higher-order construct consisting of four first-order constructs: IT value governance, IT investment valuation monitoring, and IT investment project management (see, Table 2) (ITGI, 2008; Van Grembergen, De Haes S, and Guldentops, 2004; Weill and Ross, 2004; Jarvis, Mackenzie, and Podsakoff, 2003). Exploratory factor analysis was performed on the measures items. There were four factors explaining 69.99% of variance. All factors’ loadings were greater than 0.50. Subsequent to the factor analyses, a reliability test was performed for the extracted factors. None of the factors’ alpha is lower than 0.6 (see Table 2). Consequently, these factors provided a reliable and consistent measure of the intended ITIG construct. A detail of the construct development of ACAP-ITG is explained in Ali, Green and Robb (2011).

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT Investment Governance (2nd order)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT Investment value governance (6 items)</td>
<td>The degree to which the organisation applies set of formal structures and processes in governing the value of its IT investment throughout IT investment full cycle (life time).</td>
<td>0.912</td>
</tr>
</tbody>
</table>
IT Investment Value Monitoring (4 items) The degree to which the top management in an organisation use set of structures and processes in evaluating and monitoring the value of IT investment. 0.861

IT Investment Appraisals (3 items) The degree to which the top management in an organisation applies set of processes in appraising the value from IT investment initiatives. 0.884

IT Investment Project Management (3 items) The degree to which the IT management in an organisation use set of processes in managing the value from IT investment project. 0.798

<table>
<thead>
<tr>
<th>Focus type</th>
<th>N (N=231)</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfocused</td>
<td>27 (11.7%)</td>
<td>2.9444</td>
<td>1.90875</td>
</tr>
<tr>
<td>Operation-focused</td>
<td>93 (40.3%)</td>
<td>3.1075</td>
<td>1.65780</td>
</tr>
<tr>
<td>Market-focused</td>
<td>7 (3%)</td>
<td>3.2714</td>
<td>1.87236</td>
</tr>
<tr>
<td>Dual-focused</td>
<td>104 (45%)</td>
<td>4.0875</td>
<td>1.53962</td>
</tr>
</tbody>
</table>

Table 3. Statistics Descriptive – IT Investment Goals

To validate the classification of the organisations into the four focus types, discriminant analysis was used on the four IT investment goals. The discriminant analysis results (Table 4) show that 93.1% of the firms were being correctly predicted, thus, supporting the initial classification of this study. This percentage is comparatively higher than Tallon et al.’s (2000) study.

<table>
<thead>
<tr>
<th>Focus type</th>
<th>Actual</th>
<th>Predicted</th>
<th>Correct</th>
<th>Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfocused</td>
<td>27</td>
<td>21</td>
<td>21 (77.8%)</td>
<td>6 (22.2%)</td>
</tr>
<tr>
<td>Operations-focused</td>
<td>93</td>
<td>96</td>
<td>93 (100%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Data Preparation
Tests were conducted to ensure the collected data satisfied certain multivariate assumptions such as normality, homoscedasticity, linearity, multicollinearity, and singularity, non-sample bias, and common methods variance. The tests performed indicated that the data-set satisfied the multivariate assumptions.

RESULTS AND DISCUSSIONS
To determine the influence of IT investment goals on the level of IT investment governance, this study used a univariate data analysis, discriminant analysis and one way ANOVA.

Discriminant Analysis
Discriminant analysis was used to help predict group memberships of IT investment goals (i.e., unfocused, operation focused, market focused and dual focused). Tabachnick and Fidell (2007, p.23) state discriminant analysis “tends to be used when all IVs are continuous and nicely distributed.” The results of discriminant analysis were used to validate the operationalisation of IT investment goals variable.

Using the criteria explained in the Variable Measurement section, the 231 data were grouped based on the organisations’ IT investment goals (e.g., unfocused, operation-focused, market-focused and dual-focused). Of the 231 participants’ organisations in this study, 27 (11.7%) were classified as unfocused, 93 (40.3%) were classified as operation-focused, 7 (3%) were classified as market-focused, and 104 (45%) were classified as dual-focused (see, Table 3). Based on the classifications, dual-focused emerges as the dominant goal of IT investment, followed by operation-focused. Interestingly, only 7 organisations were classified as market-focused.

<table>
<thead>
<tr>
<th>Focus type</th>
<th>Actual</th>
<th>Predicted</th>
<th>Correct</th>
<th>Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfocused</td>
<td>27</td>
<td>21</td>
<td>21 (77.8%)</td>
<td>6 (22.2%)</td>
</tr>
<tr>
<td>Operations-focused</td>
<td>93</td>
<td>96</td>
<td>93 (100%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>
### One-Way ANOVA Analysis

Tabachnick and Fidell (2007, p.38) state that analysis of variance (ANOVA) is “a set of analytical procedures based on a comparison of two estimates of variance. One estimate comes from differences among scores within each group; this estimate is considered random or error variance. The second estimate comes from differences in group means and is considered a reflection of group differences or treatment effects plus error.” One way ANOVA analysis was used to determine the influence of organisational IT investment goals (i.e., unfocused, operation focused, market focused and dual focused) on the level of IT investment governance.

One-Way ANOVA analysis was used to examine whether the IT investment goals influence IT investment governance. Furthermore, if the IT investment goals influence IT investment governance, this study seeks to determine if there is any significant difference among the IT investment classifications relative to their influence on IT investment governance. Table 3, above, shows that organisations with dual focused IT goals showed the greatest IT investment governance (M=4.087, S.D=1.53). The analysis’ results in Table 5 show significant differences between the groups (F=6.982, p<.001).

<table>
<thead>
<tr>
<th>IT Investment Governance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>13.233</td>
<td>3</td>
<td>4.411</td>
<td>6.982</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>143.409</td>
<td>227</td>
<td>.632</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>156.642</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 5. One-Way ANOVA Results**

After ANOVA analysis was conducted, to further examine the different influence of each of the IT investment goals, this study performed a Post-hoc Scheffe test (see Table 6).

<table>
<thead>
<tr>
<th>IT Investment Goals (I)</th>
<th>IT Investment Goals (J)</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfocused</td>
<td>Operation-Focused</td>
<td>-0.095</td>
<td>0.174</td>
<td>.960</td>
</tr>
<tr>
<td></td>
<td>Market-Focused</td>
<td>-0.166</td>
<td>0.337</td>
<td>.971</td>
</tr>
<tr>
<td></td>
<td>Dual-Focused</td>
<td>-0.556*</td>
<td>0.172</td>
<td>.016</td>
</tr>
<tr>
<td>Operation-Focused</td>
<td>Unfocused</td>
<td>0.095</td>
<td>0.174</td>
<td>.960</td>
</tr>
<tr>
<td></td>
<td>Market-Focused</td>
<td>-0.070</td>
<td>0.312</td>
<td>.997</td>
</tr>
<tr>
<td></td>
<td>Dual-Focused</td>
<td>-0.460*</td>
<td>0.113</td>
<td>.001</td>
</tr>
<tr>
<td>Market-Focused</td>
<td>Unfocused</td>
<td>0.166</td>
<td>0.337</td>
<td>.971</td>
</tr>
<tr>
<td></td>
<td>Operation-Focused</td>
<td>0.070</td>
<td>0.312</td>
<td>.997</td>
</tr>
<tr>
<td></td>
<td>Dual-Focused</td>
<td>-0.390</td>
<td>0.310</td>
<td>.665</td>
</tr>
</tbody>
</table>

**Table 6. Post-hoc Scheffe Test**
Discussions

One Way Analysis of Variance was used to determine whether levels of IT investment governance in organisations diverge among different IT investment goals (e.g., unfocused, operation focused, market focused and dual focused). The analysis results showed significant differences among the group (F=6.982, p<.001). Organisations with dual focused of IT goals showed the greatest IT investment governance (M=4.087, S.D=1.53). Post-hoc Scheffe tests showed that ‘Dual Focused IT’ goals differed significantly from Unfocused and Operation Focused IT goals (p-value < 0.05). But the difference between Dual Focused and Market Focused IT goals was not statistically significant. This may be due to the small number of organisations that implemented Market Focused IT goals. The size of the effect is moderate (0.291). This result supported the hypothesis indicating organisations with more focused goals for IT investments are significantly positively and related with higher levels of IT investment governance. The result is also consistent with prior studies by Tallon et al. (2000) and Kobelsky et al. (2008).

CONCLUSIONS, LIMITATIONS, AND FUTURE STUDIES

This study found that firms’ objectives for IT investments significantly and positively influence IT investment governance. The result is consistent with contingency theory whereby organisations with more focused goals for IT investments will require higher level of IT investment governance. Organisations in which IT is used as the main support for operations and market objectives require higher levels of IT investment value governance, value monitoring, investment appraisals and IT project management.

As with other research, this study has several limitations. First, the IT investment governance construct is a subjective and indirect measure (based upon respondents’ perceptions) and, hence, is not necessarily as strong as direct objective measures. Second, further empirical testing of the ITIG construct is recommend to enhance its validity in IT investment research. Third, respondents participated in this study were limited to the panel group that agreed to work with the survey firm. This limits the sampling frame of this study. However, the use of comprehensive screening questions to facilitate selection of participants helps to avoid any representativeness problems. Readers should consider the context of this study when interpreting the study’s results (Lee et al., 2009). For future studies, addressing this study’s limitations may improve the validity of the study’s results.

REFERENCES
