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Correlation and Impact Between it Management and IT Governance

[1]Shaw Ruey-Shiang, [2]Cheng Che-Pin and [1]Shih Sheng-Pao
[1]Department of Information Management,
[2]Department of Management Sciences, Tamkang University,
Danshui, New Taipei 25137, Taiwan
[2]Department of Information Management,
Taipei Chengshih University of Science and Technology, Beitou, Taipei 11202, Taiwan

Abstract: Weill and Ross (2004) pointed out that enterprises which are leaders in business performance usually get 40% higher returns on their IT investments than do their competitors. The success of these enterprises lies in the implementation of effective IT governance to support and extend their strategies and goals. Using empirical methods, we verified the existence of significant correlations between IT management and IT governance. We also further discuss the influence of these relationships on the enterprise. Our results reveal that IT management correlates significantly and positively with the maturity level of IT governance on all four dimensions included in the study. Additionally, with a higher level of IT management, an enterprise will obtain a higher level of IT governance, making the enterprise more competitive.

Key words: IT management, IT governance, COBIT

INTRODUCTION

Information Technology Governance (ITG) is mainly concerned with achieving consistency between IT investments and the enterprise's strategic goals, thus building up the core competences (Weill and Ross, 2004). Enterprises which lead in business performance usually get 40% higher returns on their IT investments than do their competitors (Weill and Ross, 2004). Their success lies in the implementation of effective ITG to support and extend their strategies and goals. Effective ITG is the most predictor of the value enterprises obtain from IT (Weill and Ross, 2004).

The "Global Status Report on the Governance of Enterprise IT (GEIT)-2011" (ITGI, 2011) noted that 56.6% of the respondents had not yet implemented ITG and 53.9% or more of the respondents were engaged in jobs relating to Information Technology Management (ITM). Furthermore, a study by Shaw *et al*. (2010) indicated that nearly 80% of Taiwanese enterprises had not implemented ITG and up to 50% of the respondents were engaged in jobs relating to ITM. This showed that, at that time, international enterprises were more familiar to implement with ITM.

Since ITM is closely related to ITG and is more familiar to current enterprises, this study took ITM as the starting point and discussed the levels of ITM-related programs that corresponded to the maturity levels of ITG. This was so that, organizations could start from the ITM and programs with which they were more familiar and then advance to achieve success in promoting ITG.

LITERATURE DISCUSSION

Information technology governance: ITG has become an important topic in research and practice in recent years (De Haes and Grembergen, 2009). The recent research on what is now called ITG has focused mainly on (1) The locus of control and governance structures, (2) Contingency analysis and (3) The combination of these two streams (Lazic, 2011). Some scholars have started to pay attention to ITG and IT performance (Chu *et al*., 2011). Since then, the study of ITG has actually become a global trend.

De Haes and Grembergen (2004) noted that ITG refers to the organizational capacities that the Board of Directors, management team and information management team exercise to establish and implement IT strategies and guarantee the integration of IT and the enterprise. ITGI (2000) defined ITG as the responsibility of instructing departments and implementing organizations. ISACA-ITGI (1996) even proposed CobiT as the basic framework of ITG. This consisted of five elements: Strategy alignment, value delivery, resource management and risk management and performance measurement.

Corresponding Author: Cheng Che-Pin, Department of Management Sciences, Tamkang University, Danshui, New Taipei 25137, Taiwan

ITG effectively blends the best practices of all aspects of IT from the strategy perspective and enables the enterprise to obtain the maximum value from IT and grasp the opportunities and competitive advantages endowed by (ITGI, 2003). ITG is the effective way of realizing IT business value and mediating the risks of IT-a new challenge enterprises now face (Ji, 2010).

Information technology management: ISO/IEC 38500 (2008) divided the ITM cycle of an enterprise into four major management systems: strategy development, planning, implementation and operation.

Thorp (1998) proposed a proper model for key points of concern in ITM. The model clearly indicated seven major dimensions of enterprise ITM, as follows:

- **Strategy:** Enterprise strategy is the supreme guiding principle for achieving the future goals of an enterprise
- **corresponding enterprise architecture:** A good enterprise architecture has the capacity for designing an overall ITM system based on the specific conditions of an enterprise
- **IT portfolio:** The portfolio is applied in the systematic management of large-scale IT programs of an enterprise
- **Program management:** Program management is a structured portfolio of enterprise projects which is used to determine business results and profits
- **Project:** Projects are structured sets of activities that enable organizations to exercise explicit powers, assuming approved planning and budgets
- **Asset:** A useful or valuable quality, person, or thing; an advantage or resource
- **Operation:** Basic business-related actions taken by the enterprise

While *governance* pertains to the vision of an organization and translation of the vision into policy, *management* is all about making decisions for implementing the policies. Therefore, the interrelations between ITM and ITG are very important.

IT management and IT governance: Toomey (2009) pointed out that ITM aims to achieve credibility in the design and management of the infrastructure and architecture of the IT, as well as the management of the IT personnel. In contrast, ITG aims to achieve enterprise commitment by proving that IT is a strategic element that provides value to the organization.

While ITM is focused mainly on the effective and efficient delivery of everyday IT services and IT operations, ITG is a much broader concept which focuses on performance and on transforming IT to meet the present and future demands of the business and its customers. This, in particular, means that executive management members and corporate governance organizational bodies need to take responsibility for governing IT, thus making ITG a key executive function (Spremic, 2012).

Peterson (2004) provides another view of the differences between these two concepts. Whereas, the domain of ITM focuses on the efficient and effective delivery of IT services and products and the management of IT operations, ITG faces the dual demands of (1) Contributing to present business operations and performance and (2) Transforming and positioning IT to meet future business challenges.

Tu and Zhang (2008) noted that ITM is concerned with the information and information systems operations of an enterprise and determines IT goals and the actions that should be taken to achieve those goals.

RESEARCH FRAMEWORK AND METHOD

Research method: This study adopted the questionnaire method. The content of the questionnaire was confirmed with reference to the IT Governance Global Status Report-2008 (ITGI, 2008). Research respondents were asked to go online and answer the questionnaire which was posted online. Samples were analyzed via regression testing and independent tests. The study verified whether there are significant correlations between ITM and ITG in different corporations and determined these correlations.

Research framework and hypotheses: According to the Thorp (1998) model, four major management mechanisms (strategy, planning, implementation and operation) of an enterprise correspond to the seven major management items he proposed. The model completely integrated an information security mechanism into the scope of management (Fig. 1). The model also indicated that ITM and ITG were closely related but it did not describe this in detail nor did it verify the relationships and influences. Therefore, this study further examined the two dimensions of ITM and ITG.

With respect to the seven management items proposed by Thorp, as program management and project management were similar to each other in practical implementation, the study combined them as one.

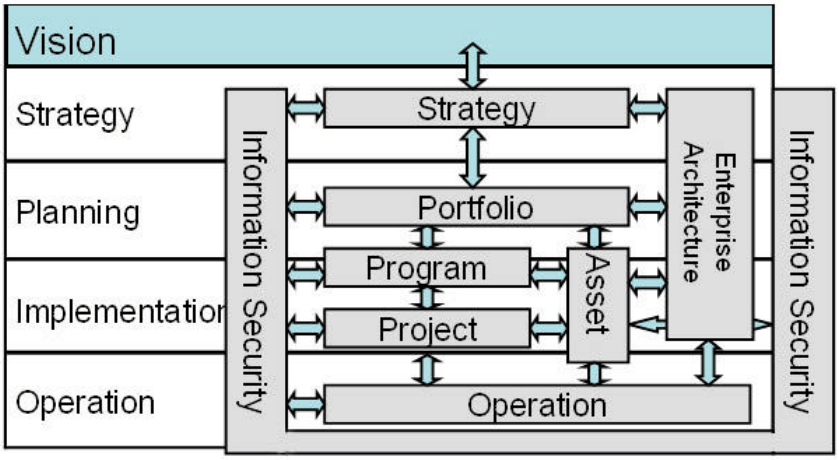

Fig. 1: Extended thorp model (Thorp, 1998)

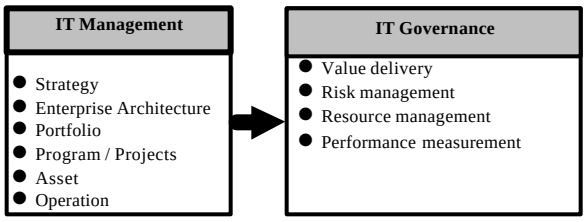

Fig. 2: Research Framework

Consequently, six management items were used as independent variables for the dimension of ITM. With respect to the dimension of ITG, the study adopted five items (strategy alignment, value delivery, resource management, risk management and performance measurement) for the basic framework for ITG in CobiT 4.1 (ITGI, 2007) as dependent variables. The research framework of this study is shown in Fig. 2.

According to the study objective and framework, the study proposed the following hypotheses:

H1: The higher the level of strategic planning for the enterprise's ITM, the higher the level of ITG there will be

H2: The higher the level of architecture design for the enterprise's ITM, the higher the level of ITG there will be

H3: The higher the level of resource portfolio for the enterprise's ITM, the higher the level of ITG there will be

H4: The higher the level of program/project management for the enterprise's ITM, the higher the level of ITG there will be

H5: The higher the level of asset management for the enterprise's ITM, the higher the level of ITG there will be

H6: The higher the level of operation management for the enterprise's ITM, the higher the level of ITG there will be

H7: The higher the level of overall ITM for the enterprise, the higher the level of ITG there will be

Research respondents and scope: The research respondents were employees of enterprises in Taiwan. The study received assistance from the Information Management Association (IMA) and the Taiwanese branch of ISACA. The academic study webpage of the IMA posted a link to this study's questionnaire. The Taiwanese branch of ISACA sent emails to all its members (about 410 people), asking them to answer the questionnaire. Emails were also sent to almost 300 enterprise managers found in The Manager Directory in Taiwan (China Credit Information Service, 2006). In all, 69 questionnaires were returned. Nine invalid questionnaires were eliminated, leaving 60 valid ones.

Questionnaire design:

- **Dimensions of the questionnaire:** This study's questionnaire design applied six dimensions of ITM that corresponded to five dimensions of ITG. As proposed by Thorp, the main body of ITM was specific management affairs. Thus, after considering the consistency of the correspondence between the dimensions and on the basis of questions listed in

Table 1: Results of reliability, correlation analysis, normality test and residual test of dimensions for itm

		Level of ITG		
Dimension	α	Pearson corr.	K-S test	Value of DW
1.Level of Strategic Planning	0.661	0.001**	0.003	2.045
2.Level of Corresponding Architecture	0.837	0.004**	0.001	2.032
3.Level of Resource Portfolio	0.663	0.119	0.041	1.923
4. Level of Program/Project	0.757	0.150	0.001	1.923
5.Level of Asset Management	0.820	0.006**	0.039	2.021
6.Level of Operation Management	0.827	0.013**	0.033	2.015
Level of ITM	0.875			

**Correlation is significant at the 0.01 level

the investigation report by ITGI, the study omitted several questions related to subjective consciousness perception. This ensured that the main body of the research framework was relevant to specific management affairs

- **Statistical description of the scoring of ITG levels:** With respect to all questions in the section on ITG, the study transferred all answers into proper scores and then totaled up all the scores to represent the level of ITG of the respondent's corporation. Furthermore, in accordance with the CGTF (2004), the study subdivided the level of ITG. The total score for ITG was divided into three levels based on the score range to represent the level of ITG of the respondent's corporation

DATA ANALYSIS AND RESULTS

Data analysis method: The study first conducted a reliability analysis on the data from all parts of the questionnaire. Then, after integrating the data, the study applied normality tests to each dimension and conducted descriptive statistical analysis and correlation statistical analysis.

Reliability, validity and correlation tests: With respect to the reliability of the six dimensions of ITM, the values of Cronbach's α for the strategic planning level and resource portfolio level were 0.661 and 0.663, respectively. According to DeVellis (1991), the acceptable minimum value of the α coefficient is between 0.65 and 0.70. The value of Cronbach's α of this questionnaire was 0.875 which indicated that the scale of this questionnaire had good reliability (Table 1).

With respect to the correlations between the dimensions of ITM and the level of ITG, Pearson correlation analysis indicated an insignificant correlation between the level of resource portfolio and the level of program/project. However, the correlations between the other four dimensions were all significant, as shown in Table 1.

In order to verify the construct validity of the scale of this study, a test on KMO value and the Bartlett Test of Sphericity were conducted. The value for this study was 0.819 and since KMO values between 0.8 and 0.9 are considered acceptable, construct validity was ensured.

Contextual information: The most common position held by respondents of this study was that of ordinary manager (27.8%), followed by the position of C-Level (25%) and IT manager (25%). The industry with the most representation was information technology/ telecommunications (51.7%), followed by the financial service industry (26.7%). Among the enterprises served by the respondents, 11.1% had less than 50 employees, 2.8% of them had 50 to 100 employees, 47.2% of them had 101 to 500 employees, 5.6% of them had 501 to 1000 employees and 33.3% of them had over 1000 employees.

Verification of hypotheses: The study verified hypotheses H1 to H7 using a simple regression approach. Regression coefficients obtained from the analysis results are shown in Table 2 and 3.

The individual levels of the six dimensions of ITM and the level of ITG were tested to prove the existence of significant differences. According to the analysis results, p-values for all four dimensions (strategic planning, corresponding architecture, asset management and operations management) were less than 0.05, achieving the level of significance. Thus, hypotheses H1, H2, H5 and H6 were supported. However, the P values for the level of resource portfolio and the level of program/project were both higher than 0.05, failing to achieve significance. Therefore, neither hypothesis H3 nor H4 was supported.

The level of ITM and the level of ITG were tested to prove the existence of significant differences. According to the analysis results, the p-value was 0.007 which was smaller than 0.05 and thus, significant. Therefore, H7 was supported.

Table 2: Regression Coefficients of the Influences of the Six Dimensions of ITM on the Level of ITG

Model	Unstandardized coefficient		Standardized coefficient			95% Conf. interval of regression coeff B		Correlation			Statistic of colinearity	
	Evaluated value of B	St. Error	Beta Al.	t	Signi-ficance	Lower limit	Upper limit	Zero-order	Partial	Part	Tole-rance	VIF
1.Level of Strategic Planning	1.441	0.129		11.157	0.000	1.182	1.699					
2.Level of Corresponding Architecture	0.100	0.030	0.397	3.295	0.002	0.039	0.160	0.3970.	397	0.397	1.000	1.000
3.Level of Resource Portfolio	1.498	0.132		11.337	0.000	1.233	1.762					
4. Level of Program/Project	0.086	0.031	0.340	2.754	0.008	0.024	0.149	0.3400.	340	0.340	1.000	1.000
5.Level of Asset Management	1.653	0.161		10.250	0.000	1.330	1.975					
	0.042	0.035	0.154	1.190	0.239	-.029	0.113	0.1540.	154	0.154	1.000	1.000
1.Level of Strategic Planning	1.678	0.158		10.619	0.000	1.362	1.994					
2.Level of Corresponding Architecture	0.043	0.041	0.136	1.047	0.299	-.039	0.124	0.1360.	136	0.136	1.000	1.000
3.Level of Resource Portfolio	1.499	0.139		10.761	0.000	1.220	1.778					
4. Level of Program/Project	0.088	0.034	0.321	2.582	0.012	0.020	0.155	0.3210.	321	0.321	1.000	1.000
5.Level of Asset Management	1.580	0.123		12.825	0.000	1.333	1.826					
	0.046	0.020	0.286	2.273	0.027	0.005	0.086	0.2860.	286	0.286	1.000	1.000

Table 3: Regression Coefficient of the Influences of ITM on ITG

Model	Unstandardized coefficient		Standardized coefficient			95% Conf. interval of regression coeff B		Correlation			Statistic of colinearity	
	Evaluated value of B	St. Error	Beta Al.	t	Signi-ficance	Lower limit	Upper limit	Zero-order	Partial	Part	Tole-rance	VIF
Level of ITM	1.398	0.163		8.558	0.000	1.071	1.726					
	0.017	0.006	0.345	2.802	0.007	0.005	0.030	0.3450.	345	0.345	1.000	1.000

DISCUSSION

Research results revealed a significantly positive correlation between ITM and ITG. This means that when an enterprise manages to implement good ITM, it will achieve a higher level of maturity in ITG.

Because senior management staff is usually involved in strategic planning when an enterprise has a higher level of strategic planning in ITM, the perception and significance of ITG will be promoted with their support and the ITG of the enterprise will achieve higher maturity (Shaw *et al*., 2010; Symons *et al*., 2005). Leberer and Gardiner (1992) also pointed out that top management participation and support is the most important factor affecting the success of strategic information system planning. It can be inferred that when IT managers are implementing ITG, they are greatly affected by strategies that affect the ITM of the enterprise. Consequently, the results of this study completely confirm the need for strategic alignment among the five architectural structures of ITG.

The study results indicated that when an enterprise implements organizational architecture planning with the corresponding rights and reliabilities, it means that the enterprise not only understands the concept of ITM but also puts it into practice, resulting in the achievement of comparatively mature results for ITG. This result is also supported by Roussey (2000) and De Haes and Grembergen (2004) definitions of ITG. Additionally, among the investigation items adopted based on "The IT Governance Global Status Report - 2008" (ITGI, 2008) and "The Global Status Report on the Governance of Enterprise IT (GEIT)-2011" (ITGI, 2011), the implementation unit and enterprise activities for ITM are also included in the investigation items of ITG, indicating that corresponding organizational architectures and the planning of ITM are definitely important factors influencing ITG.

In this study, the level of the enterprise's ITM resource portfolio had no significant influence on the maturity level of ITG. However, Symons *et al*. (2005) have pointed out that when the enterprise achieves high maturity in ITG, it will have a strong portfolio management process to ensure the optimization of IT investment decisions. Hence, this study rechecked the respondents' data regarding ITG maturity and found that almost all respondents worked for enterprises with low levels of ITG maturity (98% indicated medium or low maturity in this study). This may mean that, in this study, enterprises with low ITG maturity (i.e., still introducing or establishing their ITG systems) do not have enough ITM resource portfolio skill to effectively support ITG. In addition,

Pennypacker (2005) pointed out that the evolution of project portfolio management typically lags behind the development of other capabilities within a company. Not until the need becomes critical do organizations pay attention to improving their project portfolio management skills. Perhaps enterprises with low ITG maturity cannot easily obtain resources, thus failing to achieve the goals planned by ITG while simultaneously undermining the ability of ITM resource portfolio management to promote the maturity level of ITG.

In this study, the level of program and project management of ITM for an enterprise also had no significant influence on the maturity level of ITG. This is probably because program management and project management are broad in scope and emulate the properties of the main business of the enterprise. As a result, they have little impact on ITG. In addition, investing in a particular form of project management provides a specific type of benefit in a specific context (Crawford and Helm, 2009). In other words, it may be difficult to promote the maturity level of ITG when program and project management are focused on general ITM instead of focusing on ITG.

IT asset management is the means by which enterprises effectively manage and apply IT assets. Therefore, as proven by this study, a good level of IT asset management indicates good ITG. Brown (2006) pointed out that ITG addresses the organizational resources which control IT infrastructure, execute IT strategy and ensure that business IT assets fit with the business strategy. ITG is the extent to the rights for IT decision-making which is determined and shared between management and the processes of leadership in both IT and business enterprises that consists of IT priorities and IT resources distribution (Haider, 2011). Additionally, ITGI (2003) pointed out that ITG concerns two major cores: the value IT brings to the enterprise and the reduction of IT risk. Both require proper resources and measurements to guarantee positive effects. The results of this study confirmed the importance of IT resource management in ITG.

Operations management is specific management actually conducted by an enterprise. If the enterprise actually implements the management of operations, ITM can be explained as implemented ITG. Therefore, the study also found a significant correlation. ITGI (2003) pointed out that ITG should be conducted via many management related activities and operations and the results of these activities should be evaluated in light of the overall performance. Operations management focuses on the continuous development of best practices in all areas within a company and is supported by research showing links between the adoption of best practices and improved performance (Fullerton *et al*., 2003). Tuttle and Vandervelde (2007) pointed out that the success of a governance framework depends upon aligning business goals and IT operational processes to deliver value and an IT strategy while building internal efficiencies. This is accomplished via effective audit, control and management of IT and related resources in such diverse business aspects as operations, compliance, finance and IT risk. Therefore, the study results echoed the importance of operations management of the five major fields of (ITGI, 2000).

CONCLUSION

This study combined the ITG scope proposed by ITGI (2007) with the ITM scope proposed by Thorp (1998), established a research framework and further discussed the associations. The study results revealed that an enterprise with a higher level of ITM will obtain a higher level of ITG and become more competitive.

The study further integrated the seven major items of ITM proposed by John Thorp into six major dimensions and verified the significance of their correlations with ITG, in sequence. The study results indicated that in ITG, the levels of strategic planning, corresponding architecture, asset management and operations management had significant positive correlations with the maturity level of ITG. However, resource portfolio and program/project management had no significant correlation with ITG.

Although many factors might affect ITG, the results of this study showed that enterprises with a high level of ITM would have a higher ITG maturity level. Therefore, when enterprises aim to develop ITG and obtain a higher maturity level, they need to pay serious attention to the importance of ITM. The ITG of enterprises can be effectively promoted by implementing ITM.

Since ITG has only recently been initiated in Taiwan, many business owners do not know much about it. Furthermore, limitations of time and funds did not allow a larger scale investigation and interviews could not be conducted during this study. Consequently, the inability to conduct further discussion about certain problems concerning detailed planning is one limitation of this study.

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