



Validating & Assessing IT Objectives towards the development of an IT governance Assessment Framework (ITGaF)

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ABSTRACT

In this rapidly progressing information era, higher education institutions in Malaysia in general and universities in particular, are also playing their role for the provision of better educational services and remain competitive in a global knowledge industry. A lack of presence of a proper framework has been noticed, in many Asia-Pacific countries including Malaysia, to assess and evaluate IT governance in higher education sector. In this study a total of 18 objectives, which were earlier derived in accordance with the basic principles of ISO/IEC 38500 and its core controls and mapped with the other frameworks and research studies on IT governance, are validated for their importance. The same are also used to assess the initial performance of IT governance within universities of Malaysia. This research discusses the validation of these 18 IT objectives using Delphi method and also assesses the initial maturity of these objectives within HEIs of Malaysia. This study is based on an earlier research study by the authors and is part of a PhD research for developing an IT governance Assessment Framework (ITGaF) for universities in Malaysia.

INSPEC Classification : C60, C61, C72, D10

Keywords : IT governance, IT Objectives, Assessment framework, IT governance framework, Higher education.

1. INTRODUCTION

According to ISO/IEC 38500 "Corporate Governance of IT is the system by which the current and future use of IT is directed and controlled. Corporate governance of IT involves evaluating and directing the use of IT to support the organisation and monitoring this use to achieve plans. It includes the strategy and policies for using IT within an organisation" (ISO 2008).

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Other important and relevant definitions come from IT governance Institute (ITGI), Weill & Woodham (Weill, Woodham, and Research 2002), Van Grembergen (W. Van Grembergen 2000)

The definitions however conclude in some fundamental characteristics

- The responsibility of IT governance lies on the top management (board of directors and executive management).
- Alignment between the business strategy and IT strategy is the prime objective of IT governance
- IT governance includes strategies, policies, responsibilities, structures and processes for using IT within an organisation.
- IT governance and IT management are two different concepts.
- IT governance is an essential part of corporate governance.

According to some research studies by (Mcfarlan 2005; Dahlberg and Kivijarvi 2006) the perceived maturity level of IT governance in higher education sector is still lagging behind and there are some measures required for improving this low maturity level. Absence of relevant implementation and assessment frameworks is also believed to be the primary factor involving this low maturity. This creates a demand for an IT governance assessment framework, which can be used to help the higher education sector in assessment, benchmarking and improvement of their general standing. The primary objective of this PhD research projects is the development of an IT governance Assessment Framework (ITGaF).

This development of the proposed framework is based on the major principles of ISO 38500 (ISO 2008) and its core tasks. Other frameworks, standards, research studies on IT governance and assessment frameworks will also be used for the creation of this comprehensive framework, which will be very helpful for higher education industry in Malaysia and other Asian countries.

The proposed framework is going to have two parts i.e IT Objectives and IT Processes, which are essential for the assessment and benchmarking of IT Governance status within universities. The development of the first part i.e IT Objectives is based on ISO/IEC 38500 while the development of the 2nd part is based on the COBIT Framework of IT governance (ITGI 2007). This research study only focuses on the first part and validates the earlier derived IT Objectives for ITGaF and discuss the results, obtained with the help of an expert team selected from within HEIs in Malaysia.

2. RESEARCH SCOPE

The primary objective of this research is validation of IT Objectives, towards the development of IT governance Assessment Framework (ITGaF). The illustrated IT objectives, which are based and derived in the previous work of the authors and will be linked with IT processes in the next phase of this research. The construction of the cascade of 18 qualitative IT objectives is derived from most significant frameworks and studies i.e. JISC (Information and (JISC) 2007), Weilly Ross (Weill, Woodham, and Research 2002), Calder Moir (Calder 2008), EDUCAUSE (ECAR), Van Grembergen (W. V. Grembergen 2004) and COBIT (ITGI 2007). There are several frameworks available for assisting the organizations in the implementation of IT governance but they lack viewpoint and are considered complex, due to overlapping nature. Literature review shows that there is no evidence or material available showing the prior research in the domain of development of an IT Governance Assessment Framework. Prior to this research, an evaluation and mapping of the 18 IT objectives was carried out by the authors based on the existing frameworks and research studies on IT governance.

The basic motive behind this study is the validation of the illustrated IT objectives (Table 1), identified in the previous study, towards the development of an assessment of IT governance in universities, formed on the six principles of the ISO 38500 and its three core tasks that include Director, Monitor and Evaluate. One of the other motives of this research is to gain more insight by calculating the maturity of these IT objectives. This research is made within Higher Education Industry of Malaysia only because of the scope of the major research study towards the construction of An IT governance Assessment Framework (ITGaF) for universities in Malaysia. However, this research is not specific to universities in Malaysia only and will be extended to Pakistan and other Asian countries in the next phases, after the creation of the proposed framework.

This research is part of a PhD research project aimed at development of IT governance Assessment Framework (ITGaF) for universities in Malaysia. In previous research by the authors a strong list of important IT objectives was identified and mapped with the major studies and frameworks on IT governance. In this research the same list of 18 IT objectives, that were identified in the previous research, are validated by the selected panel of the experts and the same list is further used to assess the initial level of performance of IT governance in Malaysian universities. The list of earlier identified 18 objectives (Table 1) is based on the major principles and core tasks of ISO/IEC 38500.

The list of 18 identified IT objectives is derived from the basic principles of ISO/IEC 38500 which describe the most suitable behaviour for guidance of decision making. Although the description of each principle of this international standard clearly specifies what organizations should do for the implementation of IT Governance within their organizations but it doesn't describe how, when or by whom these practices should be implemented. The reason for this absence of description is because of the varying nature of the organizations which will be using these principles to implement IT Governance.

2.1 IT Objectives based on Principles & Core Controls of ISO /IEC 38500

Samuwai suggests that priority should always be given to the board, when developing any IT governance framework. This can be achieved with the help of ISO/IEC 38500 which is the most exclusive international standard. It presents six simple principles for 'good corporate governance of IT' and identifies the three main tasks of directors for governing IT. For a good governance of IT, ISO/IEC 38500 (ISO 2008) specifies following six principles:

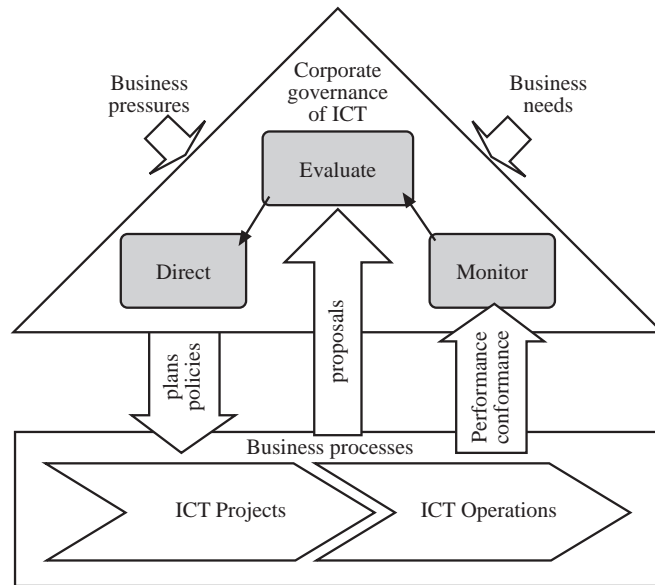
1. Responsibility
2. Strategy
3. Acquisition
4. Performance
5. Conformance
6. Human Behaviour

Ensuring the implementation of the ISO principles is the sole responsibility of the IT Directors of the organization. This process of implementation can be performed with the help of following tasks:

- o Evaluating the current and future use of IT.
- Directing the preparation and implementation of plans and policies to ensure that the use of IT is aligned with the business objectives.
- o Monitoring the conformance to policies, and performance against the plans.

The model proposed in ISO/ IEC 38500 for the tasks of the governing body of an organization, is shown in Figure 1. The model is based on three tasks for the 'governors': evaluate, direct, and monitor.

Figure 1
evaluate-direct-monitor cycle model of IT Governance. (ISO/IEC 38500)



Evaluating:

This important part of the control deals with setting targets. Senior managers in majority of organizations prefer to use strategic planning method to set out the targets and goals for the organization at strategic level. However, the Board is not involved for devising these strategic plans; instead the Board only evaluates them on the basis and views of the perceived pressures which help find out the ways and objectives of the organization.

Monitoring:

This part of the control deals with the measurement of the system's performance in relation to the targets of the organization. To be more specific, this part deals with the measurement of the possible performance of the systems in very near future and now. It monitors the possible deviation from the targets. Reporting of measurement of the performance at strategic level is done in concise format. Again at this stage, the Board is not involved in the direct measurement of the performance of the organization; instead the Board merely judges the performance of the management and their reports.

Directing:

This part of the control deals with measures related to the reaction of possible deflection from the comprehended targets. In order to deal with this and to remove the possible deflection from the target, actuators are involved which bring the resources back to target and make them work effectively. Here again, the Board is not involved for taking direct action for this possible deviation; rather directions are given to the managers to perform this task. The involvement of the Board here could mean a violation of the assigned duties of the governors and the managers.

The tasks of IT Governance are further represented by a total of eighteen IT Objectives reflected in Table 1. These IT Objectives will be used to assess the IT Governance of the HEI.

Table 1
List of IT Objectives

IT Objectives	ISO/IEC 38500 Principles
R1 : Ensure IT decisions and policies are the responsibility of formally constituted committee of appropriate executives.	Responsibility
R2 : IT management is headed by Directors; they devolve responsibilities to respective managers, which are fully cognizant of their responsibilities and follow well defined procedures.	
R3 : Managers submit regular performance reports and are responsible for achieving target outcome.	
S1 : Ensure Business strategy development understands University's current and future IT needs.	Strategy
S2 : Business and IT strategy are developed in tandem, as a single unit.	
S3 : Business activity levels are monitored and anticipate future requirements; and IT resources are capable of immediate supply of IT goods and quick solution of problems.	
P1 : Ensure well defined objectives for availability, performance and reliability of operational systems, and assessment of threats to organizational integrity.	Performance
P2 : Skilled IT personnel are selected for relevant jobs; and there are effective security protocols for the IT data protection and handling unpredicted problems.	
P3 : Threats against data and system are independently verified, and regular reports are presented on system performance including personnel.	
A1 : All requests for change in established system and new investment are subject to formal and full evaluation, considering appropriateness, feasibility, cost and value.	Acquisition
A2 : A formal plan for the purchase of IT goods (hardware and software) is implemented on the basis of competitive price, past performance and future needs.	
A3 : Major projects and systems are evaluated on the basis of current needs, relevance and market conditions.	
C1 : Ensure that system follows up-to-date regulatory and legislative protocols, and all personnel are fully cognizant of up-do-date protocols.	Conformance
C2 : All proposed changes are subject to the approval of stakeholders and all purchases are transparent and governed by well-defined contract.	
C3 : Formal process exists for detecting, assessing and dealing with breaches; and periodic independent checks are conducted for compliance level, frequency and nature.	
HB1 : New business plans take into account users' expectations and ensure that IT personnel are trained and their capabilities match the objective.	Human Behaviour
HB2 : Ensure that all stakeholders fully understand planned IT initiatives and appropriate communication programs are in place to educate IT use, and potential benefits.	
HB3 : Regular assessment of IT personnel demonstrates that their capabilities are used to optimum level and there are occurrences of acceptable deviations.	

The development of the 18 qualitative objectives is based on those found in the most significant frameworks and studies i.e. JISC (Information and (JISC) 2007) , Weilly Ross (Weill, Woodham, and Research 2002), Calder Moir (Calder 2008), EDUCAUSE (ECAR), Van Grembergen(W. V. Grembergen 2004) and COBIT(ITGI 2007).This circumstance may be confirmed in the mapping reflected in Table 2.

Table 2
Mapping of derived IT Objectives with industry standards and frameworks

	Objectives	JISC	WR	CM	ED	C	VG
1	R1	☑	☑	☑		☑	☑
2	R2			☑	☑		
3	R3	☑	☑	☑	☑	☑	☑
4	S1	☑		☑		☑	
5	S2	☑	☑	☑	q	☑	☑
6	S3	☑					☑
7	A1	☑	☑		☑	☑	
8	A2		☑	☑	☑		
9	A3			☑		☑	
10	P1	☑	☑	☑	☑	☑	☑
11	P2	☑	☑		☑		☑
12	P3		☑	☑		☑	☑
13	C1	☑	☑	☑	☑	☑	
14	C2	☑		☑		☑	
15	C3	☑	☑	☑	☑	☑	
16	HB1	☑	☑		☑		☑
17	HB2		☑	☑	☑	☑	☑
18	HB3	☑	☑	☑		☑	

JISC= JISC (United Kingdom)
WR = Weilly Ross, CM = Calder Moir
ED = EDUCAUSE (ECAR)
C= COBIT, VG = Van Grembergen

3. RESEARCH METHOD

The Delphi method is considered to be a mature, attractive and a very flexible research method used in many research arenas by researchers around the world. It is believed that "The Delphi method has proven a popular tool in information systems research for identifying and prioritizing issues for managerial decision-making" (Chitu Okoli and Pawlowski 2004). Researchers also consider the Delphi method "as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem" (Linstone, Turoff, and others 1976). According to the standard for a Delphi process, there is a prerequisite practice of using a structured questionnaire in the first round of the Delphi. The questionnaire to be used for the said purpose must be devised on an extensive literature review.

The primary reason for choosing this method is its ability to use it in such situations or research where obtaining of critical facts, usually using a list of questionnaires (restricting organized response), from the industry professionals is considered to be very important.

During this Delphi research, a team of experts from Malaysian Public & Private Sector universities was asked to validate, by using a ranking technique called Likert Scale. Survey form is based on pre-defined questionnaires where the experts can provide their feedback for each IT Objective, for its apparent significance and performance, within their universities. This feedback was collected with the help of a Likert Scale consisting value in between 1 to 5 - (where 1 shows the lowest importance and 5 shows the highest importance). Basic definitions and introduction of IT governance was also provided in the questionnaire for the general understating of the participants regarding the context of the survey.

The survey concluded after two rounds after finding a satisfactory agreement level between the participants.

This research started with the existing list of IT objectives, instead of asking the experts develop a list from scratch. In the first round, 25 experts out of 44 completed and returned their questionnaires, which represented 56 per cent response. In the second round, 18 out of 25 experts completed and returned their questionnaires, which represented 56 per cent response.

4. EXPERT TEAM SELECTION

The selection of appropriate experts is considered to be a key of success as the results of a Delphi are usually dependent on the knowledge and cooperation of the participants. In Delphi, non-representative, knowledgeable persons are needed whereas in a statistically based study, participants are assumed to be representative of a larger population.

Due to the scope of the research limiting to universities in Malaysia, it was decided to comprise an expert panel with those people who are believed to be experts in this sector. The objective of the research is to validate and assess maturity of IT objectives, implying that the group must contain people who can provide valid input to both domains. As a major source to identify experts, the online list of accredited Private and Public Sector universities, from Ministry of Higher Education Malaysia was used, who have their own websites. From their websites, IT experts were invited to participate, who were declared as IT managers at executive level.

The first round of the Delphi research started with a team of 25 experts from different Public and Private sector universities in Malaysia. In total, two rounds were performed with the help of the same expert panel.

5. RESEARCH PROCESS

This research is part of a PhD Research Project and the list of IT objectives, mentioned in this paper, is based on the previous related research work of the authors. Continuing on the previous research the identified IT objectives, which are derived from the major principles and tasks of ISO 38500 and mapped with the existing industry standards, frameworks and studies, were validated through the identified experts in Higher Education Sector (universities only) in Malaysia.

According to literature on Delphi methods for the minimum number of experts for the panel, expert panels having more than 20 members are suggested. In order to monitor the Delphi a team to undertake and monitor the Delphi was formed which included the authors and General Manager of Information Technology Department from University Kuala Lumpur. The existing list of 18 IT objectives was authenticated and assessed by the

participants. The result of this research produces a validated and ranked list which contains the most significant IT objectives, which will be used for the development of the proposed IT governance assessment framework (ITGaF).

The process of validation and assessment was accomplished in two different rounds. During the first round, the experts were asked to validate then assess. The list of IT objectives, given to the participants, was not ordered in advance; rather it was given in a category wise form, using the basic principles and tasks of the ISO/IEC 38500 (ISO 2008). In order to provide transparency and fairness, the experts were able to suggest any missing IT objectives and they were also able to provide their feed on any one of the list items. . The expert members were asked to validate the first list, by assigning a value between 1 (not important) and 5 (very important) (Table 2), then by suggesting a score between 1 (not influential) and 5 (very influential) for assessment purpose (Table 3). Two questions were asked to assess and validate the list of IT objectives: How important are the IT objectives in your institution, from 1 (not important) to 5 (very important)? And how influential is IT governance at your institution in achieving the IT objectives, on a scale from 1 (not influential) to 5 (very influential)?

In the second round the same team of experts was required to review and re-analyse their answers. The results of the validated IT objectives, during the 1st and 2nd rounds were only minor. The results of the both rounds have been discussed in Table 3 and Table 4 respectively. The calculation of Pearson product moment correlation between the performance and validation phase generated a positive value of 0.335. Due to the fact that the difference of results of validated IT objectives were only slight between round one and two, it was decided not to start a third round.

6. QUESTIONNAIRES

The questionnaires were pre-tested for proper wording (e.g., ambiguities, vagueness) and thus made simple and easy to understand and reply. The experts were asked to score a given list of IT objectives. In order to provide freedom to the experts during the 1st round, space was provided in the questionnaires to add any additional IT objective, according to their expert opinion or knowledge. There was provision of providing experts comments and feedback on all existing IT objectives in the presented list. In order to provide transparency, it was made sure that there was no direct communication between the researchers and the experts, at any stage, except when there was any confusion or ambiguity in the given list of IT objectives. The process of sending and receiving the questionnaire in the 1st round was performed via postal mail and pre-paid envelopes were provided to the experts. However, in the 2nd round, when the correct and verified email addresses of the experts were received, the process of sending and receiving the questionnaires was done via email. Pre testing of the questionnaires was done by a team of three experts of the Higher Education Sector.

7. RESULTS

IT Governance performance has been assessed by calculating the effectiveness of the chosen 18 IT objectives weighted according to their importance to the organization. A weighted average formula has been used and score out of 100 is calculated. Table 5 contains the question and formula to calculate governance performance so that we can assess the overall performance of IT governance in our selected universities. The average governance score in chosen universities of Malaysia has been found 29.90 out of 100, which clearly shows the poor performance of the IT governance in Malaysian universities.

Table 3
Validated list of IT Objectives

How important are the following IT Objectives at your institution, on a scale from 1 (not important) to 5 (very important)?	Round 1		Round 2	
	Population	Mean	Population	Mean
IT Objectives				
R2	25	4.84	18	4.90
R1	25	4.76	18	4.88
R3	25	4.76	18	4.78
S1	25	4.75	18	4.78
S3	25	4.72	18	4.78
S2	25	4.64	18	4.76
P3	25	4.64	18	4.72
P1	25	4.60	18	4.72
P2	25	4.60	18	4.72
A3	25	4.56	18	4.72
A1	25	4.56	18	4.61
C3	25	4.54	18	4.61
HB3	25	4.52	18	4.61
A2	25	4.52	18	4.56
C1	25	4.52	18	4.56
C2	25	4.52	18	4.56
HB1	25	4.48	18	4.50
HB2	25	4.44	18	4.50

The above list of IT objectives is derived and based on the previous related research work of the authors in Table 1

Table 4
Assessment of Performance of IT Objectives

How influential is IT governance at your institution in producing the following IT Objectives, on a scale from 1 (not influential) to 5 (very influential)?	Round 1		Round 2	
	Population	Mean	Population	Mean
IT Objectives				
R1	25	1.28	18	1.34
R2	25	1.56	18	1.60
R3	25	1.48	18	1.52
S1	25	1.56	18	1.62
S2	25	1.52	18	1.60
S3	25	1.48	18	1.54
P1	25	1.6	18	1.72
P2	25	1.44	18	1.56
P3	25	1.48	18	1.52
A1	25	1.4	18	1.48
A2	25	1.36	18	1.42
A3	25	1.4	18	1.50
C1	25	1.44	18	1.52
C2	25	1.52	18	1.64
C3	25	1.4	18	1.52
HB1	25	1.6	18	1.72
HB2	25	1.64	18	1.74
HB3	25	1.76	18	1.80
<i>The above list of IT objectives is derived and based on the previous related research work of the authors in Table 1</i>				

Table 5
Assessment of Performance of IT Governance

IT Objectives	How important are the following IT Objectives at your institution, on a scale from 1 (not important) to 5 (very important)?		How influential is IT governance at your institution in producing the following IT Objectives, on a scale from 1 (not influential) to 5 (very influential)?		
R1	4.88	X	R1	=	6.25
R2	4.9	X	R2	=	7.64
R3	4.78	X	R3	=	7.07
S1	4.78	X	S1	=	7.46
S2	4.76	X	S2	=	7.24
S3	4.78	X	S3	=	7.07
P1	4.72	X	P1	=	7.55
P2	4.72	X	P2	=	6.80
P3	4.72	X	P3	=	6.99
A1	4.61	X	A1	=	6.45
A2	4.56	X	A2	=	6.20
A3	4.72	X	A3	=	6.61
C1	4.56	X	C1	=	6.57
C2	4.56	X	C2	=	6.93
C3	4.61	X	C3	=	6.45
HB1	4.5	X	HB1	=	7.20
HB2	4.5	X	HB2	=	7.38
HB3	4.6	X	HB3	=	8.10
Importance Total	84.26			Total	125.96
<p>CALCULATE GOVERNANCE PERFORMANCE: $\frac{\text{Total}}{\text{Importance Total}} \times 20 = 29.90$</p>					
<p>The formula's numerator represents a total score that increases when either or both of the following are true: (1) the objective is important, and (2) the objective is achieved. To make sure the overall performance scoring is weighted toward the actual achievement of objective; we divide by the "total performance score". The multiplier of 20 is applied simply to adjust the rating scale so that the highest achievable performance score is 100.</p>					

8. CONCLUSION

The results presented in this paper provide a basis to build up a generic cascade of IT objectives and IT processes, which are essential for the assessment and benchmarking of IT governance status within universities. The list of validated IT objectives, developed here in this paper, will further be used to develop the proposed IT governance Assessment Framework (ITGaF). This research study is conducted in the higher education (universities only) sector, to initiate the construction of the list of IT objectives. Consideration to others sectors and countries would support the further validation of the currently created list of IT objectives. This research only focuses on the validation of the earlier identified IT objectives and initial assessment of the performance of IT governance in Malaysian universities. In next phase of this research, the same list will be used to create a mapping with the IT processes for the development of the proposed framework (ITGaF) by the authors.

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