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Information Technology Governance (ITG): A Cross Comparisson in Public and Private Sectors

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Today, Information Technology (IT) has been widely utilized by organizations in both public and private sectors. With the IT utilization being so pervasive, greater focus has now been placed on the implementation of various IT solutions. The evidence from literature, however, suggests that while the implementation has offered the organizations with numerous benefits, very often the goals are unattained or even there are some undesirable outcomes. This happens when an IT system was successfully developed but was then abandoned after a year or so. In some cases, the literature also reported that the organizations encountered various problems, or the newly-developed IT system did not work properly which made the implementation utterly failed. This, in particular, highlights the need for assuring the IT governance in both public and private organizations. Although researchers have studied the IT governance for many years, the different practices and approaches taken by organizations in both public and private sectors have not been much reported in the literature. This study, therefore, provides multiple case studies of IT governance practices in seven organizations (three public and four private sectors). Using COBIT 4.1 framework, first, it examines the empirical evidence on the maturity level and then compares the different practices of IT governance focus area in those organizations. Analysis of the findings reveals that there are differences between the maturity level, underlying issues, the influence of the practices, the challenges, and the different environment shaping the IT governance practices between organizations in public and private sectors.

Keywords: IT Governance, public and private sectors, COBIT 4.1.

1. INTRODUCTION

Information Technology (IT) has been an integral part of any organizations in both public and private sectors. For instance, in the public sector, IT has been used to assist government bodies in delivering goods and services to the citizens[1]. Similarly, many IT systems have been developed to enable enterprises in private sector to reach the new market, streamline the process and gain competitive advantages [2]. While the pervasive use of IT has resulted in the development of new IT system became so prevalent. However, there is also overwhelming evidence of the failures especially when it comes to the utilization. This, in turn, suggests that it has never been critical than now to implement good IT governance practices to avoid the failure and at the same time realize the expected benefits of IT use.

There exist various definitions of IT governance and perhaps the most widely cited is provided by IT Governance Institute (ITGI), a research branch of Information Systems Audit and Control Association (ISACA). The ITGI[3] defines IT Governance (ITG) as "the responsibility of board of directors and executive management. It is an integral part of corporate governance and consists of the leadership and organizational structures and processes that ensure that organization's IT sustains and extends the organization's strategies and objectives". Drawing from this definition, ITG refers to a range of management-related activities relating to IT strategic vision development, IT risk management and control of IT investment[4].

Research into ITG has gained an increased amount attention, but, the key development in the literature suggests that more research is needed to make a contribution to the current body of knowledge [5, 6]. This is because IT use subjects to constant development and changes; indeed, the discussions of different ITG practices continue to progress. This study at hand, therefore, aims to contribute to the current body of knowledge by investigating and then comparing the ITG

practices in both public and private sectors. It also aims to show the value of scholars in this area go beyond the dominant research on ITG framework and determinant factors for successful implementation.

2. RELATED WORK

A great effort has been devoted to the study of ITG. Historically, in the late 1990s, researchers used various terms such as "IT decision making"[7]; "IS organizational structures"[8] and "IT principles"[9], in their seminal works, to describe the ITG practices. ITG then has been the subject of study in the private sector especially after the passage of the Sarbanes-Oxley Act became law on July 30, 2002, in the US which imposed, through legislation, the corporate to adopt a more stringent and transparent framework into their overall corporate governance structures including IT investment and utilization[10]. Therefore, much of earlier research has been focused to introduce and understand various frameworks, standards along with the maturity level evaluation in the private sector which could be adopted into corporate governance[11-14]. Due to the complex nature of IT implementation and the different business environment, researchers generally agree that there is no single one fit framework for all corporate governances. A considerable effort has also been made previously to understand the underlying factors and issues influencing arrangements, processes, and outcome of ITG process[15-17].

Study of ITG practices by organizations in the public sector has also started receive considerable attention. There is a large amount of scholarly and popular literature written on this area[16, 18, 19]. Much of these empirical studies tend to focus on determinant factors that have influence and impact on the adoption of ITG within an organization in public sector. Generally, researchers came a cross with a set of determinant factors such as lack of enforcement; funding; political influence; insufficient staff members; and inadequate IT skills and competency. In addition, researchers have also reported the ITG practices and then sought to understand the underlying issues which may contribute to the success and failure of IT governance practices[20, 21].

The review above clearly shows that there has been extensive research on the ITG in both public and private sectors. Nevertheless, no empirical study comparing the different practices between public and private sectors. Two exceptions[6, 22] found in the literature, but the studies are conceptual in nature and thus no empirical evidence can be found relating the ITG practices in both sectors. Only one empirical study[5] found in the literature which provided an analysis and comparison of ITG practices in public and private sectors. This study, however, offered limited insights since the data collected only from one public and one private hospital. Also, the findings may not be generalized or applicable to other cases because the study was focused only on one sector, hospital.

Drawing from the review above to date, there is limited knowledge can be extracted from literature relating to the ITG practices in both public and private sectors and how it may differ. This in particular suggests the need for more detailed investigation. In other words, it highlights the opportunity for this study to contribute to the current body of knowledge by investigating and then comparing the different practices of IT governance in both sectors.

3. RESEARCH METHODOLOGY

Since this research is interested in understanding the different ITG practices by public and private organizations, the "how" and "what" aspects are likely the major inquiries guiding the investigation. Also, because ITG is inherently process-oriented, this research considers case study has the potential of providing an in-depth investigation into this issue which can be regarded as "contemporary phenomenon within its real-life context"[23, p. 13]. To address the research aim, this study needs to collect rich information from many cases which could significantly enhance the comparison of IT governance practices in public and private sectors. For this reason, this study was designed as multiple case studies because it is the most suitable research strategy. Finally, to identify relevant public and private organizations as participants, a series of follow-up calls and contacts with key staffs within each organization was made. A total of seven organizations (three public and four private sectors) from different area were identified and agreed to take part in the study as summarized in Table-1

Table.1. Summary of Case Study Participants.

Sector	Name	Description
Public	Public_ A	Planning and Development Agency1 uses IT provided by central government for creating long and short term development Plan in District1.
	Public_ B	Population and Civil Registration Agency which uses and manages in-house the IT systems for population administration.
	Public_ C	Planning and Development Agency2 uses IT provided by central government for creating long term and short term Development Plan in District2.
Private	Private_ A	Telecommunication company branch at district level. It uses various IT systems and solutions to provide mobile services.
	Private_ B	Private hospital uses and manages a number of IT systems including healthcare, human resource and financial information systems.
	Private_ C	Publishing Company develops and uses some IT systems for accounting, marketing and technical supports.
	Private_ D	Private vocational school recently develops and uses Academic Information Systems.

4 DATA COLLECTION AND RESULTS

Following the identification of participants, two rounds data collection were run. Firstly, this study employed quantitative approach through survey aimed to assess the ITG maturity level in each organization. To address the need for assessing the maturity, this study mainly adopted The Control Objectives for Information and Related Technologies (COBIT) 4.1 framework as the basis for guiding the development of survey instrument. COBIT 4.1 was selected because it "has been developed as a generally applicable and accepted standard for good governance information technology (IT) security and control practices to provide a reference a reference framework for management, users, and IS audit, control and security practitioners" [24, p] through the implementation of 34 control objectives into four domains. These included Planning and Organization (PO), Acquisition and Implementation (AI); Delivery and Support (DO) and Monitoring and Evaluation (ME). To develop the survey instrument, all of 34 control objectives were assessed to determine their relevance for this study. Based on this preliminary process and previous studies, only 18 control objectives statements are found to be relevant for guiding the examination of the maturity level of IT governance as shown in Table 2 below.

Table.2. Selected Control Objectives[3]

Domain	Process
Plan and Organize (PO)	PO 1 Define a Strategic IT Plan
	PO 3 Determine Technological Direction
	PO 5 Manage the IT Investment
	PO 7 Manage IT Human Resources
	PO 8 Manage Quality
	PO 9 Assess and Manage IT Risks
	PO10 Manage Projects
Acquire and Implement (AI)	AI 2 Acquire and Maintain Application Software
	AI 5 Procure IT Resources
	AI 6 Manage Changes
Deliver and Support (DS)	DS 1 Define and Manage Service Levels
	DS 4 Ensure Continuous Service
	DS 5 Ensure Systems Security
	DS10 Manage Problems
	DS11 Manage Data
Monitor and Evaluate (ME)	ME 1 Monitor and Evaluate IT Performance
	ME 2 Monitor and Evaluate Internal Control
	ME 4 Provide IT Governance

For each of 18 selected control objectives, there are from 3 to 30 detailed statements. All the statements were assessed for its relevance and then used as survey questions. Each question was provided with multiple choice answers: not at all, a little, large or fully. Respondents were asked to give their opinion based on the choices and then mapped to the following values: 0, 0.33, 0.66, 1 respectively. Table-3 illustrated an example of respondent's answer along with the conversion.

Table.3. Example of Assessment of Survey Question

Questions for Level 0 IT Process PO1 Define a Strategic IT Plan					
Survey Questions	*Not at all*	*A little*	*Largely*	*Fully*	*Value*
1. Is IT as Part of the Organization's Long- and Short-Range Plan?	√				0
2. 2. Is management regularly developing IT long-range plans?				√	1
3. 3. Does management establish structured approach?			√		0.66
4. 4. Does management communicate IT long and short range plan?		√			0.33
5. 5. Does management establish a strategic plan for IT evaluation?	√				0
Total Value (A)					**1.99**
Number of Questions (B)					**5**
Maturity Level 0 Compliance Value (C_0=A/B)					**0.39**

Working the same way on the remaining maturity levels (1-5), this study then mapped and measured the answers of respondents from seven organization participants. All the maturity compliance values resulted from this iterative process were then further assessed to determine the maturity level of IT governance in each organization. This study, in particular, adopted the algorithm for measuring maturity level informed by previous work[25] as following:

1. Normalize Compliance value (N) for Each Level (i). It can be obtained by calculating each level's Compliance (C_i) divided with Total value of compliance as shown in this formula:

$$N = \frac{C_i}{\sum_i^5 C} \quad \text{……..…..(1)}$$

2. Contribution (C_o). It is multiplication of Level with Normalize for each level (Ni) as shown in this formula:

$$C_o = N_i \text{ x } i;\ i=\{0,1,2,3,4,5\} \quad \text{……..…...…….(2)}$$

3. Calculating the Level of Maturity (LM) is obtained by calculating Contribution (Co) for each maturity level statement as shown in the following:

$$LM = \sum_{i=0}^{5} Co \quad \text{…….……(3)}$$

Once the measurement was done for all level using the above formula, a summary of the maturity level of an IT process can be obtained as presented in Table 4.

Secondly, having completed analyzing the maturity level, a qualitative data collection approach was conducted through in-depth semi-structured interviews with similar respondent representatives of participating organizations. A set of interview questions, adopted from ITGI framework[3], was prepared for the interviews. The framework suggested five focus area of ITG

including strategic alignment; value delivery; manage resource; manage risk and manage performance. Table 5 summarized the key findings of the analysis from transcripts along with secondary data gathered during the interview.

Table.4. Summary of Maturity Level

Domain	Process	Public			Private			
		A	B	C	A	B	C	D
Plan and Organize (PO)	PO 1	1.47	2.50	1.45	4.54	2.76	3.23	1.78
	PO 3	1.20	2.49	1.32	4.25	2.65	2.9	2.56
	PO 5	0.43	2.43	0.49	4.44	2.87	2.65	2.32
	PO 7	1.93	2.65	1.87	3.74	2.85	2.67	2.21
	PO 8	2.10	2.52	2.00	4.34	2.98	3.00	2.54
	PO 9	1.45	2.52	1.52	4.34	3.00	2.68	1.98
	PO10	0.75	2.45	0.80	3.65	3.05	2.9	2.34
Acquire and Implement (AI)	AI 2	2.50	2.56	2.50	4.53	3.24	3.00	2.53
	AI 5	2.67	2.01	2.56	3.78	3.00	2.45	1.87
	AI 6	1.73	1.78	1.78	4.05	2.76	1.97	1.32
Deliver and Support (DS)	DS 1	1.87	2.34	1.90	3.54	2.89	1.43	1.33
	DS 4	2.45	2.56	2.34	4.55	3.20	2	1.56
	DS 5	1.90	1.67	2.00	4.85	3.20	2.67	2.01
	DS10	1.76	2.20	1.76	3.78	2.78	2	1,45
	DS11	2.32	2.00	2.32	4.23	3.00	1.97	1.32
Monitor and Evaluate (ME)	ME 1	2.01	2.67	1.98	3.86	2.75	1.75	1.12
	ME 2	2,32	2.72	2.21	3.98	2.80	2.31	1.21
	ME 4	2.43	2.50	2.32	3.54	3.00	2.54	1.45
Maturity Level		**1.83**	**2.37**	**1.84**	**4.12**	**2.94**	**2.46**	**1.85**
Category		**Repeatable**	**Defined**	**Repeatable**	**Managed**	**Defined**	**Repeatable**	**Repeatable**

5. ANALYSIS AND DISCUSSION

As shown in the Table-5, the analysis revealed that the maturity level of participating organizations ranges from level 2 (repeatable) to 4 (managed). Overall, the maturity level in private organizations is relatively higher than those in the public sector. This clearly indicated that organizations in the private sector generally have better procedures and arrangements in managing ITG practices compared to their counterparts in the public organizations.

A possible explanation of this outcome is because public organizations generally tend to have a bureaucratic culture in which the management style is more authoritarian based on the observance of hierarchies, top-down management and conformity. As a consequence, the organizations have less autonomy at decision making including planning, developing and later governing their IT resources to align with the organizations' goals or strategies. This can be seen from the survey result (see Table 4), the ITG processes related to the aligning IT with the organization business or goals (PO1, PO3 and PO5) generally are still at Ad hoc level. This means the ITG processes are performed incidentally without any proper standard. Also, the qualitative inquiry (see Table 5) shows that there is no initiative for developing and applying procedures to conduct ITG practices. Even if the there is little recognition of the need for ITG practices, nevertheless, the procedures or actions have not been well documented. Further, drawing from the data, it can be suggested that this area, especially in the public sector, needs to be given attention to improving the ITG practices and to achieve the expected level of maturity.

The analysis reveals that ITG practices in public and private sectors are likely to be different in some respects. For instance, the decision to adopt ITG practices in the private sector is mainly influenced by the need to ensure the IT investment is aligned with organization's objectives and cost-effective use to achieve the goals. In comparison to the private sector, the key motivation to adopt ITG in the public organization is primarily driven by the need for assisting the public policy implementation; provision of support services to other government agencies or provide public goods or services to citizens; supporting legal and regulatory enforcement. This discrepancy could be attributed to the fact that much of organizations' business processes in the private sector are dedicated for profit-making. Consequently, developing or procuring IT resources is seen as an investment in which the private organizations also need to have governance structures of proving the value of their investment-decision making over the need to respond to the market competition and the demand for the organization's services. Whereas organizations in public sector dedicated the IT utilization along with the governance structures for achieving stability, government regulations and policies.

Another key difference found in the case studies is that the dominant factors shaping the IT governance practices between the organization in public and private sectors. Analysis indicated that in private sector, despite the alignment of business and strategic IT plan, a number of factors influencing structures, processes, and outcome of IT governance process including active involvement of

top management level; flexible of the governance arrangements; clear benefits, incentives and rewards systems; optimal investment, use and allocation of IT resources (human resources, software or applications, hardware or infrastructure, and data); corporate culture and communication systems.

Table. 5. Summary of IT Governance Focus Area in Seven Participating Organization

	Strategic Alignment	Value Delivery	Manage Resource	Manage Risk	Manage Performance
Public_A	There is no initiative to develop IT strategy because most of the systems are provided by central government	No major outcome from the IT utilization except responding central government requests	IT resources were provided by central government, but limited human resources existed to provide higher level of services	There was procedure to conduct risk management, but it was provided by the central government	IT performance assessment was typically limited to technical measures and only within the IT function.
Public_B	There is recognition of the need for the linkage of business and IT plans but only for operational level	The IT utilization increased performance such as managing demographic data	There seems capability to manage IT resource but only at operational level	There is a risk management, but not formally and only embedded in the operation	The use of IT helps organization's operation such as better demographic data management.
Public_C	Similar with Public_A	Similar with Public_A	Similar with Public_A	Similar with Public_A	Similar with Public_A
Private_ A	IT practices are well aligned with business objectives and operations	IT investment has effectively enabled organization to grow by creating new market and improving customer satisfaction	There were adequate skills and ability to manage IT resources.	There is well documented IT risk mitigation planning and compliance to ascertain the operations.	IT resources could enable organization gains its objectives typically providing quality and reliable services
Private_ B	There is IT strategy with strong focus on supporting operations	A plan has been defined for use IT to help organization reduce clerical works.	The organization still has dependency on vendor in developing and providing IT system	There is defined internal controls and protecting the operation from IT-related risks	The IT has helped improve and made healthcare services to patients better and faster.
Private_ C	There is IT strategy roadmap but only in marketing, publishing and accounting areas.	The IT value added is improving time management and customer care	There was a small and flexible team to manage and expand current IT resources	There is internal control for risk management but focuses on operational	IT has enabled organization in the scheduling, ads payment, and customer care.
Private_ D	The IT strategic plan did not yet exist formally	The IT has improved the academic and administrative process.	There is still a simple structure team with less specialized tasks to manage IT systems	There is development of a risk management plan of IT use but at initial stage	The newly IT systems supported the academic services more efficient

In the public sector, by contrast, the analysis indicated that there are minimum conditions for implementing ITG, most important including leadership roles and top management involvement and commitment; adequate financial supports, staffs and IT-related capabilities; comprehensibility of the regulations; well-communicated IT strategies and policies; the transparency of IT decision making and cost; and better support division. These findings, while preliminary, suggest that the extent to which most significant factors underlying the structures, processes, and outcome of ITG practices, in public and private organizations, are not technology related, instead of environmental, organizational and governance-related factors.

6. CONCLUSION AND OUTLOOKS

This study was carried out as an integral part of an ongoing research to understand how ITG practices in public and private sectors and how these may differ. To address this aim, it examined the maturity of ITG using COBIT 4.1. It then sought to understand the underlying issues, the influence of the practices, the challenges, and the different environment shaping the IT governance practices based on multiple case study investigation in public and private organizations. The findings, therefore, will offer practical contribution and more specifically serve as a "snapshot" of the initial state of ITG practices by public and private organizations, which can be used for longitudinal comparison purposes as discussed above. Furthermore, this study identified several key constructs and findings empirical evidence, some of which have not been reported in the literature. An important contribution made by this study is thus the findings may offer a new avenue for researchers to understand the different IT governance practices in the public and private sectors.

While acknowledging this study is among the scarce research on comparing IT governance practices between public and private sectors, however, it is not free from limitations. First of all, since this is initial study, implication generated from the findings may be limited due to the inadequate data. A practical implication for further studies could be focused on gathering more empirical evidence for in-depth analysis. Secondly, the area where participating organizations operate from both public and private sectors are not similar. Therefore, it would be interesting for future research to identify and involve more than one public and private organizations work in the same area to provide more appropriate and equal context for cross-organizational comparisons. Finally, further works are needed to extend this study by testing and incorporating the findings generated in a more systematic work.

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