



TOWARDS GOOD MONITORING IT GOVERNANCE IN PUBLIC SECTOR ORGANIZATIONS

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ABSTRACT

IT governance in organizations has strategic roles and makes effective, consistent, and transparent decisions regarding strategies and IT investment. In Indonesia, IT governance has been a necessity, because organizations have been investing a big amount of money for IT. However, many IT projects failed and have not achieved their goals. To determine the level of achievement and the implementation of IT governance, the influence of IT processes over the monitoring and evaluation mechanism needs to be looked into and assessed. In regards to that, a model has been developed, and it is used to test the hypotheses. The findings show that IT governance processes involving the implementation of the outcomes of monitoring and evaluation have influenced especially on the operational, maintenance, and culture. Meanwhile, system planning, investment management, and system realization have not shown any strong influence. Through this research, an initial theoretical model of the factors that affect the IT processes over the monitoring and evaluation is a contribution.

Keywords: IT governance, public sector, monitoring.

INTRODUCTION

A survey by (ITGI, 2008) found that 93% of 749 companies worldwide believe that IT governance is important to deliver their business strategies, and they understand that their proper IT governance practice will make the IT governance management more efficient. Findings also show that public sectors are very strong in considering the IT governance implementation (61%). This shows a positive sign in IT governance every year. On the other hand, IT governance models by famous world-class organizations such as COBIT, Peterson, Togaf, COSO, AS-8015, and Weill and Ross explain that they provide clear foundation and best practice in IT governance in assisting and managing IT risks, which enable them to increase their performance in the organizations.

The use and implementation of IT by government as a public organization is sufficient to create relationship with the society, business partners, and other stakeholders. Accordingly, IT guidelines and practices are needed in accelerating the business that supports the optimization of IT usage in government. The understanding about factors influencing IT governance is very important in being competitive and maximizing the IT project delivery as outlined in the investment. This creates the necessities for guidelines in managing IT in organizations. Every organization needs its own specifications based on its culture and influencing factors that form the management and governance (Coen and Kelly, 2007).

In Indonesia, its IT governance has been stated in regulation (Inpres No. 6 of 2001), regarding the development and use of telecommunication and information in the country. In 2007, regulation of the Minister of Communication and Information of the Republic Indonesia (No.41/per/menkominfo/11/2007) has been decided the guidelines for IT governance in Indonesia. The guidelines have been standardized as the basic for implementation the good governance to ensure of transparency, accountability,

efficiency, and effectiveness aspects in their implementation.

As the profit of IT governance is highly significant to be competitive, to increase the service value, to maximize the return on investment, and to reduce risks (Lackovic, 2013), (Bodnar, 2006), (Kakabadse and Kakabadse, 2001), organizations need to plan properly for their investment, so that the possibility of unsuccessfulness is minimized. In 2008, a study by IT governance Institute found that 80% of the organizations believe that IT governance concept is the potential solution or the framework for appropriate governance. In fact, the implementation of IT governance as a basic implementation of IT management to establish a good governance, especially in Gorontalo province since 2008. However, the success of the programme could be noticed through the influences of the IT processes. In this regard, it influences the benefits of the implementation, and will lead to various problems before, during, as well as after the IT implementation.

THEORETICAL FOUNDATION

IT governance definitions

IT governance is the organizational capacity conducted by the board, IT management and executive management to control the formulation and implementation of IT strategy and that ensure IT is aligned with objectives and organizational strategy (de Haes and van Grembergen, 2004), (ITGI, 2003). In addition, IT governance combining best practices of IT planning and organizing, delivery and support, acquisition and implementation, and monitoring the performance of IT in the organization and ensure that information technology supports the organization's business objectives (ITGI, 2001).

IT governance is the responsibility of the board of directors and executive management. It is an integral part of enterprise governance and consists of the leadership and



organisational structures and processes that ensure that the organisation's IT sustains and extends the organisation's strategies and objectives (ITGI, 2003). According to (ITGI, 2003), although some existing definitions of IT governance are different in some aspects, but all focus on the same issue is that of how IT can provide value by adjusting the relationship between IT and the business and reduce the risk.

IT governance in public sector organizations

The implementation of effective IT governance has been very important for organizations. IT governance aims at increasing the use of IT sources effectively, as a very important success factor in organizations (Bodnar, 2006), (ITGI, 2003), so that it becomes a norm and preference in the future (Kakabadse and Kakabadse, 2001). When it is effective, IT governance helps ensuring that IT supports organizational goals, optimizes IT investment, and reduces risk.

It has to be realized that the difference in IT governance among public and private organizations is the basic needs for managerial principles in basic organizational information system (Bozeman and Bretschneider, 1986). According to (Rocheleau and Wu, 2002), the obvious difference between public and private organizations lies in the provision of 'public services' in the public organizations, not services for sale. In contrast, private organizations aim at making profit by selling everything including services, which makes them able to invest big as long as they foresee the profit and competitive advantage.

The trend is clear that the use of IT in public organization has evolved into every aspect as part of their efforts in improving their services. According to (Juiz et al., 2014), a good governance principles as a public asset should be included and implemented on IT governance practices. It is agreed by (Bermejo et al., 2014) who add that IT governance is a major resource to the aggregate value of the public service offered to the community. However, the IT governance model, framework, and techniques have been bound with hurdles and challenges. Hence, it strengthens the debates in approaching to investigate the governance of IT in public sector.

IT resource management

IT resources management are the optimal investment and management of critical IT resources such as applications, information, people and organizational IT infrastructure (Gheorghe, 2010). IT resources management are intended to provide direction for the allocation and utilization of IT resources, monitor the amount of IT funding, assess the ability of IT to work and ensure adequate infrastructure to support the needs of current and future business (Hardy, 2003). The important component of IT resources that can be used in IT processes are: applications; Information; people; and Infrastructure.

All criteria of IT resources were deemed essential to the process of IT to support organizational goals. IT resource management in governance practices must pay attention to the following 1) allocation of IT resources

associated with business priorities; 2) implementation of controls to identify things necessary to fulfil IT infrastructure and; 3) maintenance and expansion of investment in staff development, education and training in IT operations (Gheorghe, 2010). Organizations need to address infrastructure investments and capabilities and also ensure that IT resources are used wisely and in accordance with the methods and that adequate skills exist within the organization.

In Indonesia, IT resources management include technology infrastructure, information, applications, and human resources. The intended use of IT resource management is to ensure that IT resources can be empowered to support the achievement of IT activities efficiently and effectively in achieving government objectives. The basic principles of IT resource management in Indonesia (Depkominfo and Detiknas, 2007) are to ensure 1) IT planning synergy and convergence at the level of internal and national institutions; 2) the establishment of clear responsibilities at the level of IT in internal and national institutions; 3) the development and / or acquisition of valid IT; 4) IT operations go well, whenever needed, and; 5) continuous improvement with respect to organizational change management and human resources. In essence IT resource management is to ensure that the use of IT in the organization synergizes with the vision, mission, goals and values of the organization concerned.

IT resources management in Indonesia focused on the management of IT processes through the mechanism of guidance and monitoring and evaluation. It ensures that the use of IT supports the national implementation goals, and focusing on the effectiveness of resource management and IT risk management (Depkominfo and Detiknas, 2007), (Pemprov Gorontalo, 2008). The processes of IT governance that can be identified and contribute to the implementation of IT governance in accordance with the purpose of IT governance are as follows:

- 1) System planning is a process to establish a vision and IT architecture in relation to the needs of the organization and realization of the plan for the implementation of the vision and IT architecture. System planning is needed to manage and direct all IT resources in line with the strategies and organization's business priorities.
- 2) IT Investment is the process of managing the budget for spending purposes / IT investments, in accordance with the mechanism of the IT initiative project. set out in the project portfolio IT initiatives and the roadmap implementation The purpose of IT investment is to improve operational processes and ultimately enhance organizational performance.
- 3) Systems realization is a process that is intended to implement IT planning from choosing IT systems until to evaluate post-implementation. The realization of the system includes the definition purposes, consideration of alternative sources, assess the technology and feasibility, implementation of risk analysis and cost analysis, then the conclusion of a final decision to make or buy.



- 4) Operating system is an IT service delivery process, as part of the support to business process management to the parties who need appropriate predetermined specifications. Maintenance of the system is a process to ensure that all IT resources to function properly in order to support the optimal operation of the system.
- 5) Organizational culture is one success factor in IT governance that needs attention. Organizational culture that is as a system of meaning held by members that distinguishes the organization with other organizations (Robbins and Judge 2008). Organizational culture can support the relationship between technology acceptance and growth of the organization (Chatman and Jehn, 1994) and it can be a critical success factor in the development and implement of IS/IT (Indeje and Zheng, 2010).

RESEARCH METHODOLOGY

Literatures on IT governance have been reviewed extensively. As a result, a set of principles as the foundation of IT resource management have been found. They have been set as the basis for IT governance in Indonesia, coined with four domains in COBIT (Control Objectives for Information and Related Technology) framework, which are (1) plan and organize, (2) acquire and implement, (3) deliver and support, and (4) monitor and evaluate. COBIT framework, released by the IT Governance Institute of the Information Systems Audit and Control Association is a tool (based on best practices) that provides a method to help on the alignment of business with IT processes. The COBIT framework describes sub divides IT into four domains, 34 specific IT control and security processes that organizations can use to enhance the organization's ability to achieve its business goals and to improve internal control (Kerr and Murthy, 2007), (ITGI, 2007), (van Grambergen and de Haes, 2009). By constructing the research model as seen in Figure 1, that consists of independent and dependent variables, it enables this study to further test the hypotheses, which is described in the following section.

Research model and hypotheses

The IT policy in Indonesia has been formulated to ensure that IT governance in public organizations conforms to the rules and method regarding IT, which needs monitoring and assessment in its conformance management (Depkominfo and Detiknas, 2007). In regards to this, (Depkominfo and Detiknas, 2007) define IT governance policy as the processes to ensure that the main purpose of IT governance is accomplished, and that they are related to the accomplishment of the organizational goals, resource management, and risk management. Additionally, (ITGI, 2003) adds that IT governance process begins with the formulation of organizational goals, continued with performance measurement, comparison with the goals, and goals reformulation is necessary. The effective IT management needs that the knowledge to be processed is coordinated with the planned, delivered, implemented, and controlled domains (ITGI, 2007).

In a complementary, monitoring and evaluation are needed in ensuring that there are feedback for all IT governance processes, in achieving the expected performance. According to (ITGI, 2007), effective IT performance management needs monitoring and evaluation process. The reason for this is to monitor and assess the IT performance suitable with the business needs in terms of transparency, IT investment, benefits, strategies, policy, and service level as required by the IT governance needs (ITGI, 2007).

This model was constructed to determine the causal-effect relationship among the IT governance process variables in achieving the IT governance goals. With reference to Figure-1, the following hypotheses have been formulated and Table-1 depicts the components of research instrument. The research instrument is based on data collected from research and existing literature, primary sources and archives. Based on this research instrument will be developed questionnaire.

- H1: There is a positive relationship between system planning and monitoring and evaluation process.
 H2: There is a positive relationship between IT investment management and monitoring and evaluation process.
 H3: There is a positive relationship between system realization and monitoring and evaluation process.
 H4: There is a positive relationship between system operation and maintenance and monitoring and evaluation process.
 H5: There is a positive relationship between culture and monitoring and evaluation process.

SP: System Planning, ITIM: IT Investment Management, SR: System Realization, SOM: System Operation and Maintenance, CU: Culture, ME: Monitoring and Evaluation.

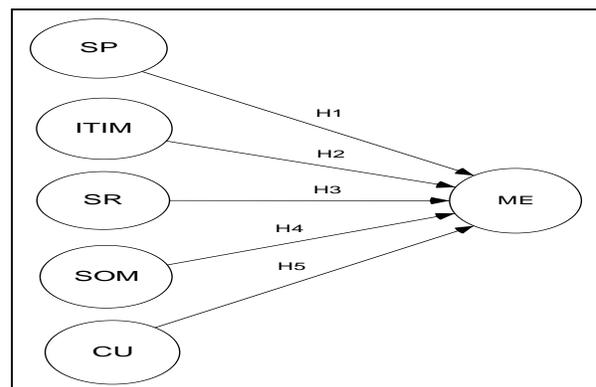


Figure-1. Proposed research model.

**Table-1.** The components of research instrument.

Variables	Elements	Items
System planning	Information architecture	15
	Application and infrastructure architecture	
	Organization and management	
	Approach and implementation roadmap	
IT investment management	Financial management framework	10
	Priority in budget	
	IT budget	
	Costs and benefits management	
System realization	Identification and selection system	11
	Realization of software applications and infrastructure	
	Realization of data management	
Operation and maintenance	Service Level Management	21
	Security and sustainability system	
	Software application and infrastructure management	
	Data management	
	Management of third party service	
	Software applications and infrastructure maintenance	
	Maintenance of data	
Culture	Innovation and risk taking	14
	Attention to detail	
	Outcome orientation	
	People orientation	
	Team orientation	
	Aggressiveness	
	Stability	
Monitoring and evaluation	Object monitoring and evaluation	10
	Monitoring and evaluation mechanisms	
	Compliance management	

RESEARCH APPROACH

Survey questionnaires and data collection

This study involves 135 public organizations in Indonesia, especially in Gorontalo province. Gorontalo

province has been selected, because as the pilot project to reform the bureaucracy in Indonesia. It is also, because it has participated in the implementation of IT governance. Respondents are among the leaders of all departments/agencies, the leaders of planning division and IT support division. Altogether, they total the sample up to 367. Data were gathered through a five-point Likert scale questionnaire.

Validity, reliability and data analysis

In this study, two experts were involved to validate the model and the instrument. The experts were selected based on their expertise in information technology field to refinement of the model. The pilot study was carried out to validate the instrument. In the study, the Cronbach Alpha value was greater than 0.9 which is reliable because it is greater than the threshold value 0.6 (Hair et al., 2010), (Sekaran and Bougie, 2013).

The measurement models were assessed based on the significance of each estimated coefficient or loading, the convergent validity and discriminant validity. All items loaded significantly on their latent construct ($p < 0.05$). Convergent validity was assessed using Composite Reliability (CR) and Average Variance Extracted (AVE). A commonly used threshold value for composite reliability is 0.6 whereas for average variance extracted is 0.5 (Hair et al., 2010), (Ghozali, 2011), (Awang, 2012). In this study, the CR value and AVE for all variables are within the acceptable locus, as exhibited in Table-2. Further, the data were analyzed using Structured Equation Modeling (SEM) using Analysis of Moment Structure (AMOS) and SPSS version 16 tools. Table-3 shows the results of the structural mode for Goodness-of-Fit (GoF) measures.

Table-2. Summary of measurement scales.

Variables	CR (above 0.6)	AVE (above 0.5)
System planning	0.874	0.635
IT investment management	0.855	0.596
System realization	0.890	0.730
System operation and maintenance	0.907	0.583
Culture	0.903	0.607
Monitoring and evaluation	0.914	0.779

Table-3. The Goodness-of-Fit (GoF) measurement model.

Fit indices	Fit Statistics	Recommended Fit criteria	Conclusion
Chisq	503.787	$P > 0.05$	Satisfactory
RMSEA	0.042	Range 0.05 to 1.00 acceptable	Satisfactory
Chi/df (Ratio)	1.630	≤ 2.00 or ≤ 5.00	Satisfactory
GFI	0.908	≥ 0.90	Satisfactory



NFI	0.914	≥ 0.90	Satisfactory
CFI	0.965	≥ 0.90	Satisfactory
TLI	0.960	≥ 0.90	Satisfactory

RESULTS

The testing began with data preparation for SEM analysis as shown in Figure-2 and Table-3. It was found that the model fulfills the criteria, followed with the overall goodness-of-fit (GoF) measures indicated an acceptable fit of the model using SEM analysis. It was found that the GoF for GFI is 0.908, NFI = 0.914, TLI = 0.960, and CFI = 0.965. This means that the overall average index is 0.90, which is significant. Meanwhile, the chi-square is 503.787, RMSEA = 0.042, and index value CMIN/Df is 1.6. As a result, the overall GoF values explain that the model fit the data.

The overall findings for the model in the above paragraph are shown through hypotheses testing. It was found that H4 and H5 contribute positively, meanwhile H1, H2, and H3 do not contribute positively. Direct influence have been used to determine the strength of the influence between independent and dependent variables. Particularly, variable that have the highest direct influence is operation and maintenance (0.687), while the lowest is system planning (-0.201).

The analysis reveal that operation and maintenance process and culture have significant influence over the monitoring and evaluation variable at significant level $p < 0.01$, in which the Critical Ratio (CR) values are 2.762 and 2.497 respectively. This suggests that the relationship variables are correct. Also, the analysis reveals that the coefficient of determination value (R2) for operation and maintenance process is 0.472. This explains that monitoring and evaluation process has been successfully explained (at 47.2%) by the change operation and maintenance as independent variables. Meanwhile, the influence of system planning, IT investment, and system realization processes

over monitoring and evaluation has no influence in the analysis. Further, Table-4 details the results.

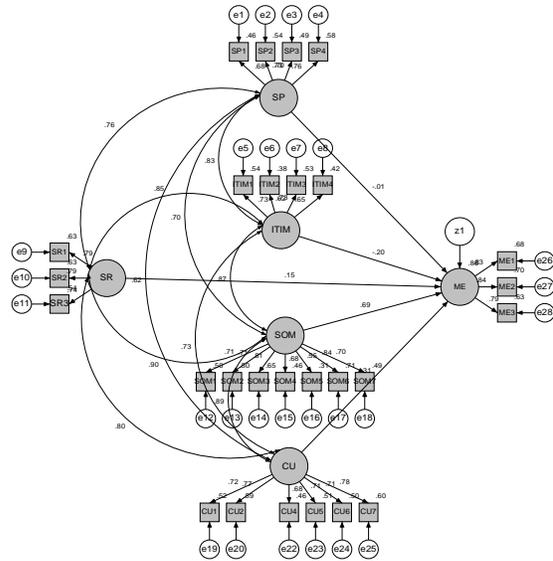


Figure-2. The results of research model.

Table-4. The results of hypothesis testing.

Hypotheses	Variables	Path	Variables	Estimate	C.R.	p-value	Hypothesis result
H ₁	Monitoring and evaluation	←	System planning	-0.018	-0.131	0.896	Not Supported
H ₂	Monitoring and evaluation	←	IT investment management	-0.230	-1.085	0.278	Not Supported
H ₃	Monitoring and evaluation	←	System realization	0.161	1.028	0.304	Not Supported
H ₄	Monitoring and evaluation	←	Operation and maintenance	0.752	2.762	0.006	Supported
H ₅	Monitoring and evaluation	←	Culture	0.304	2.497	0.013	Supported



DISCUSSIONS

According to (Henderson and Lentz, 1996), (Luftman and Brier, 1999), (Weill and Broadbent, 1998), IT governance process involves the introduction and drafting of cases/results of IT business, prioritization, justification, and endorsement of decisions on IT investment, and the implementation of the results of monitoring and evaluation of IT performance. The outcomes show that the situation agrees with that proven by (Depkominfo and Detiknas, 2007), that the achievement of each process governance including operation and maintenance has been the main objective in monitoring and evaluation activity. In fact, (Ojha, 1998) explained earlier that monitoring and evaluation a coherent process consisting data collection, process and information selection in project implementation, the progress of each project towards its impacts and effects. This means that the monitoring and evaluation of the operation and maintenance has been well-operated.

Besides, culture has been identified as an important success of a project that is involved in organizational change. This study found that it has a positive relationship with monitoring and evaluation. According to (Sebedi, 2014) that organizational culture has a direct and significant relationship to the monitoring and evaluation. The importance of a strong organizational culture together with the monitoring and evaluation process will contribute to the performance of an efficient and effective service delivery. Monitoring and evaluation of function properly and be acceptable to provide a big boost to the work and performance of the organization (Khan, 2003). Hence, (Robbins, 2008) address that the evaluation on the organizational culture is required to determine the leadership and perception orientations by the members in the organization on the organizational culture. Further, the outcome of the evaluation will be the reference for the planned change and for discovering the characteristics of the organization.

In addition, the outcome of this study also indicates that there is no influence of system planning, IT investment, and system realization over the monitoring and evaluation. In this case, the consideration that could realize the outcome includes the unavailable guideline for monitoring and evaluation on the IT process. Most organizational leaderships have not been cleared about the techniques to measure IT process, and have not been spelled-out technically. Anyway, regarding the general guidelines for IT governance, the findings in this study could be accepted as IT processes that needs monitoring and evaluation (the regulation of the Minister of Communication and Information of the Republic Indonesia, no.41/per/menkominfo/11/2007).

In conjunction, in ensuring that all IT run well, this study recommends that the management of the organizations come out with their guidelines for monitoring and evaluation besides the formation of Gorontalo ICT committee as a public institution led by the Gorontalo Governor. Their contributions are required in

monitoring and evaluation the activities in the organization. The ICT committee as a public institution has a vision to accelerate the ICT development in Gorontalo. It plays roles in reviewing the ICT implementation assessment to ensure the coordination with the planning. However, the effectiveness of the monitoring involving the ICT committee is up to the benefits of that mechanism, especially organizations that have IT department.

CONCLUSIONS

Monitoring and evaluation process is required for programmes and activities in every process, so that it helps every party to gain information about appropriate benefits of the initiated programmes. The guidelines for monitoring and evaluation in IT management are needed to fulfill the organization's specific necessity. Public organizations that have special specification in terms of culture and motivational factor, directly influence the management and good IT implementation and governance. Hence, this study could be evidence that monitoring and evaluation mechanism is needed for all IT processes in organizations periodically. It is a necessity if organizations want to ensure that their IT implementation is sufficient, and affect positively especially at the strategic level.

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