



## IDENTIFICATION OF INFLUENTIAL FACTORS IN IMPLEMENTING IT GOVERNANCE: A SURVEY STUDY OF INDONESIAN COMPANIES IN THE PUBLIC SECTOR

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### ABSTRACT

Aim/Purpose	This study is carried out to determine the factors influencing the implementation of IT governance in the public sector.
Background	IT governance in organizations plays strategic roles in deciding whether IT strategies and investments of both private and public organizations could be efficient, consistent, and transparent. IT governance has the potential to be the best practice that could improve organizational performance and competency.
Methodology	The study involves qualitative and quantitative approaches, where data were collected through questionnaire, observation, interview, and document study through a sample of 367 respondents. The collected data were analyzed using Structured Equation Modeling (SEM) for validating the model and testing the hypotheses. Besides, semi-structured interview, observation, and document study were also carried out to obtain the management's feedback on the implementation of IT governance and its activities.
Contribution	The results of this study contribute to knowledge regarding good IT governance. Practically, this study can be used as a guideline for the future development and good IT governance.
Findings	The findings reveal that policy has a significant direct influence on system planning, the management of IT investment, system realization, operation and maintenance, and organizational culture. The existence of IT governance policies, the success of the IT process can work well.

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## Identification of Influential Factors in Implementing IT Governance

	Monitoring and evaluation processes also significantly affect system planning, management of IT investment, system realization, operation and maintenance, and organizational culture. It indicates the process of monitoring and evaluation required for indications of financial efficiency, infrastructure, resources, risk and organizational success.
Recommendations for Practitioners	It is important for organizational management to pay more attention to the organization's internal controls in order to create good IT governance.
Recommendation for Researchers	A comparative study between Indonesia and developing countries on the implementation of IT governance is needed to capture the differences between those countries.
Impact on Society	Knowledge of the factors influencing the implementation of IT governance as an effort to implement and improve the quality of IT governance.
Future Research	Future studies should look further at the policy and IT governance models, specifically in public organizations, besides other influencing factors. Moreover, the outcome of this study could be generated as a guideline for the advanced development of IT governance and as a point of improvement as a way to generate a better good IT governance. It is essential because such evidence is lacking in current literature.
Keywords	IT governance process, public organizations

## INTRODUCTION

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IT governance has emerged in public sectors of various countries. For example, it has been the main component in the Australian government (Chatfield & Coleman, 2011; Rozemeijer, 2007). It has also been used as the primary framework for the government to assess, govern, and monitor IT implementation in public organizations. IT governance is done to ensure effective and efficient actions are in place in improving the organization's operation through a structure that integrates process, resource, and IT information towards the organization's direction and strategy (Sarno, 2009). Further, the right governance enablers can ensure the transparency of IT supply and assists in decision making regarding the demands and priority in conveying values to organizations (ITGI, 2011).

IT governance in public organization is essential. ITGI (2008) and Weill and Ross (2004) argue that it has potentials to be the best practice in uplifting performance. Besides, it is required because organizations invest a large amount of money (greater than 4.2% of the income) in the IT field including estimated IT and hidden expenditure (Weill & Woodham, 2002). Overall, IT investment contributes to greater than 50% of the total organization's estimated capital (Weill & Woodham, 2002). Since IT investment is huge, IT governance is required to optimize its benefits. This could be achieved because IT governance could improve service quality, a mechanism that moderates and controls various information systems as well as technological infrastructure more efficiently (Gomes & Ribeiro, 2009). Relating to this, Pereira and Silva (2012) discovered that IT governance is a factor that overcomes the complexities of IT implementation.

Although studies regarding the roles and effectiveness of IT governance have been carried out in various countries, the understanding among organizations, especially in the public sector in Indonesia, on IT governance and its impact is still vague. In the aspect of leadership, there are weaknesses in IT leadership, lack of innovation, and inability in realizing innovation in the form of IT initiative into reality. The public organization's understanding of IT governance is also vague, which could be seen through the knowledge of good IT governance and IT process is highly lacking. This is until each unit of work tends to develop IT separately (Detiknas, 2011; Pemprov Gorontalo, 2008; Wibowo & Yuwono, 2009). There are various views on the weaknesses of IT governance in Indonesia. It is

caused by the weaknesses in formal IT planning (Wibowo & Yuwono, 2009). Hence, they propose that organizations incorporate best practices in IT governance.

However, the IT Governance Institute (ITGI, 2008) found that 80% of organizations have acknowledged the IT governance concept as a potential solution or the framework for implementing governance. It agrees with Bodnar (2006) and Lackovic (2013) who found that the benefits of IT governance is important in ensuring competency, improving services, ensuring returns on IT investment, and minimizing risks, which eventually reduces failures in IT projects. While those studies were carried out in various countries, this study is carried out in Indonesia, particularly in Gorontalo. Gorontalo, located in Sulawesi, is one of the provinces in Indonesia that has implemented IT governance in their practice. The purpose of this study is to identify the factors that influence the implementation of IT governance in public sectors in Indonesia. It is crucial because, currently, as far as the researcher is concerned, the study of the implementation of IT governance in Indonesia has received very little attention. Therefore, it is timely for such study to be carried out.

## **LITERATURE REVIEW**

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### ***DEFINITION OF IT GOVERNANCE***

IT governance is the ability of top management and IT management in strategizing and implementing IT strategies in supporting their organization (Van Grembergen, 2013). However, IT Governance has been defined by the ITGI (2007) that "IT governance is the responsibility of executives and the board of directors; it consists of the leadership, organizational structures, and processes ensuring that the enterprise's IT sustains and extends the organization's strategies and objectives". Furthermore, Van Grembergen (2013) defines IT governance as the organizational capacity exercised by the board, executive management, and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT.

IT governance provides a structural basis that integrates aspects of IT, e.g., process, resources, and the information required by an organization in implementing the designed strategy. The process of IT governance begins with establishing the objectives and direction of the organization. Preceding this process are examining the performance and comparing it with the aims, transference, and shifting the aims. Furthermore, an effective IT governance requires insight regarding a process that can be organized based on the domain of planning, transmitting, implementing, and monitoring (ITGI, 2007).

Although every definition differs in certain aspects, all definitions focus on the same issue, which is the role of IT in merging IT with organizational operations and minimizing risks. Overall, the aspect to be looked into is ensuring the IT system maintains and expands the organization's objectives and strategies. Thus, IT governance has been essential in governing organizations.

### ***IMPORTANCE OF IT GOVERNANCE***

IT governance has been applied in every sector, including in the economic sector. Research by Khadra, Zuriekat, and Alramhi (2009) on the banking sector in Yordania reveals that in the economic sector, IT governance should be considered to improve the organizational strategy. This is also echoing the results seen in Lemus, Pino, and Velthius (2010). In manufacturing industries, IT governance is applied to create the business value of the organization similar to what Tan, Eze, and Teo (2008) had conducted in the electronic industry in Malaysia. The results of the research reveal that IT governance is crucial in maximizing the profit and the growth of the organization in terms of aspects, such as cost efficiency, growth, asset utilization, and flexibility of the business. Regarding the public sector in Malaysia, Maidin and Arshad (2010) find that IT governance is able to support an organization to maintain its competitive advantages.

ITGI (2008) found that the majority of organizations (58%) in the global market have considered or in the process of considering the implementation of IT governance. Specifically, 18% of them have implemented IT governance, 34% are in the process of implementing, and 24% are considering it. ITGI also found that the maturity among organizations in implementing IT governance is 2.67 (using a scale between 0 and 5). Additionally, organizations in IT/telecommunication, finance, and public sector are highly positive in considering and implementing IT governance in their operations. This shows a positive sign for the future implementation of IT governance in organizations.

Besides, IT governance has drawn the attention of practitioners and researchers (Dahlberg & Kivi-jarvi, 2006; Nastase & Unchiasu, 2012). This could be seen through the ability in improving accountability in the use of IT resources and in the initiatives in ensuring IT benefits organizations, in line with their goals. This explains that a proper implementation of IT governance could be understood and defined as an important part of organizations, in which continuous improvement and achievement are their strategic goals. The understanding of IT governance is necessary because it determines appropriate functional boundaries and scope. This enables organizations to obtain better perspectives on activities in IT governance and further lead the attention of their top management. Not only low-level managers but also senior executives and top management need to be clear about IT governance in enabling them to develop their IT infrastructure and further use them together.

### ***FACTORS AFFECTING THE IMPLEMENTATION OF IT GOVERNANCE***

In ensuring that the implementation of IT governance is successful, it is necessary to study the implementation of IT governance (Lee, Lee, Park, & Jeong, 2008). Accordingly, ISACA (2012) recommends organizations determine the influence of certain factors, especially the framework, policy, process, organizational structure, and organizational culture, in supporting the implementation of a comprehensive system in governing IT and managing it.

Pereira and da Silva (2012) argue that, in the current literature, few researchers have proposed a set of contingency factors that organizations should put into consideration before an IT governance implementation. These factors are organizational culture, organizational structure, size, industry, regional differences, maturity, strategy, ethical, and trust. Moreover, Control Objectives for Information and Related Technologies (COBIT) 5.0 defines a set of triggers for supporting the implementation of comprehensive governance and management of an organization. The term “triggers” refers to a factor that individually or collectively determines whether an implementation runs accordingly. Such a factor consists of principle, policy and framework, process, organizational structure, culture, ethics and behavior, information, service, infrastructure and application, people, skills, and competition. In addition, the factor affecting the implementation of IT governance based on the Peterson model (2003) refers to the combination of structure, process, and mechanism of communication. Each of the elements is essential to determine the success of the implementation of IT governance framework in the organization.

### ***THE NATURE OF IT GOVERNANCE IN INDONESIA***

According to Kominfo (2011), IT governance of the public sector in Indonesia has been a necessity and the requirement of every public service institution; this is because the contribution of IT is crucial for improving the quality of the service in achieving better governance. This is supported by the Regulation of the Ministry of Communication and Informatics No. 41/Per/Men.Kominfo/11/2007 through the establishment of IT governance guidelines for public organizations. Nugraha, Surahyo, and Yuwono (2007) argue that, in Indonesia, IT governance in the public sector has never been applied as an agenda of IT development. This is due to factors, such as:

- a) The aims of organizations can change due to elements, e.g., leadership, policy, and regulations that are also attached to the initial arrangement of the organizational structure.
- b) The lack of supporting factors for a government organization to head towards a better change.

- c) Investing in the IT sector rarely considers the elements of the effectiveness of the cost; it also lacks understanding regarding the theory of IT governance and an exceptional IT process.
- d) The lack of supporting factors and the necessity to develop IT properly and regulations controlling the development.

The recent policy and issue of IT governance in the communication and information sector is partially implemented and not integrated (Kominfo, 2010). In response to the increasing complexity of the communication and information sector, which requires attempts to anticipate the problems and fulfillment of the needs, a policy focusing on the safe distribution of information is essential (Kominfo, 2010). In Indonesia, IT governance is focused on the management of IT processes by directing, monitoring, and evaluation mechanism. This governance mechanism involves a policy to set the goal and the limitation of IT processes. These processes comprise of system planning, the management of IT investment, system realization, as well as system operation and maintenance. All the processes would go through a monitoring and evaluation stage to ensure feedback is given regarding the management of IT; that is, the expected performance achievement.

### ***HYPOTHESES***

The implementation of IT governance in Indonesia, specifically Gorontalo, has been a major concern in public services. Regarding that, Kominfo (2011) finds that this has been an important factor in public services, especially those that serve others, since the role of IT is getting more and more important in improving the quality of service in government agencies. This is supported by some legal acts in regulation Minister of Communication and Information of the Republic Indonesia (No.41/Per/Men.Kominfo/11/2007) that outline some guidelines for IT governance in public organizations. Referring to Depkominfo and Detiknas (2007), to support the objectives of the government, it is necessary to pay attention to the proficiency of the effectiveness of resource usage and risk management, which leads to the critical implementation of IT governance.

The use of IT in government departments in Gorontalo is equipped with a reference center that caters to the planning for a structured and continuous IT infrastructure and its development. It not only focuses on technology usage but also human capacity development as well as the procedure in utilizing the infrastructure. To ensure it works, a policy has been made available as the foundation for all planning and utilization works in the province. Such policy refers to the regulation Minister of Communication and Information of the Republic Indonesia; it will lead to the implementation of good governance that ensures a transparent, efficient, and effective public service of government (Depkominfo and Detiknas, 2007).

According to Depkominfo and Detiknas (2007) and Pemprov Gorontalo (2008), the policy in IT governance in Indonesia is the decision by the leaders who also set the direction and boundaries including expected achievement. Although in Gorontalo, a decision by leaders provides guidance direction and boundaries on IT resource management. It includes the procedures of managing IT resources, particularly on planning, maintenance, and operation. The policy includes the alignment of IT strategies, risk management, and resource management. However, the governance of resource management focuses on the management of IT processes through a mechanism for directing and monitoring and evaluating IT governance.

According to Depkominfo and Detiknas (2007), the process in IT governance includes processes to ensure that the goals of IT governance are achievable; these processes are related to the accomplishment of an organizational goal, resource management, and risk management. This agrees with ITGI (2007) explaining that IT governance begins with determining the organizational goals, followed by performance assessment to determine whether the objectives have been accomplished, and rearrangement of the goals appropriately. Further, effective IT management requires certain knowledge regarding the process normally utilized and organized in line with the planning, delivery, implementation, and monitoring. Generally, IT governance process as mutually understood by ITGI

(2007) and Depkominfo and Detiknas (2007), consists of system planning, the management of IT investment, system realization, system operation and maintenance, and organizational culture.

Policies regarding IT governance process are imposed to ensure all IT governance process in public organization follow the rules and method related to IT. Accordingly, it is necessary to monitor and evaluate regulatory compliance management requirements in IT governance (Depkominfo & Detiknas, 2007; ITGI, 2007). Further, Gheorghie (2010) also found that monitoring and evaluating focuses on continuous performance assessment. Through this process, the weaknesses in the internal control are determined and analyzed for sustainable and better improvement. The monitoring and evaluating in the implementation of IT governance is essential in enabling organizations to determine whether their IT management is effective in maximizing the benefit to the society in addition to minimizing the risks (Lorences & Ávila, 2013). Hence, the relationship between monitoring and evaluating in the IT process, including systems planning, the management of IT investment, system realization, system operation and maintenance, and organizational culture, must be monitored and evaluated periodically. This is important in gaining the benefits of IT, guaranteeing the quality of service, as well as ensuring that the strategic plan is achieved (Gomes & Ribeiro, 2009; Grewal & Knutsson, 2005).

In this study, four domains of COBIT (plan and organize, acquire and implement, deliver and support and monitor and evaluate) are adapted. The factors affecting IT governance have been merged with COBIT to support the requirement of this study. The proposed hypotheses of this study are as follows:

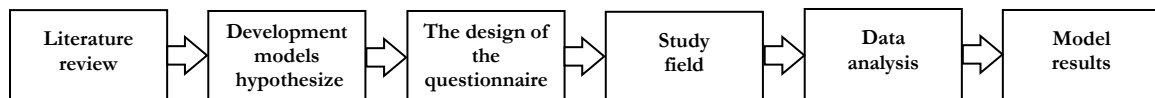
- H1: The implementation of policies significantly contribute positively to system planning process.
- H2: The implementation of policies significantly contribute positively to the management of IT investment process.
- H3: The implementation of policies significantly contribute positively to system realization process.
- H4: The implementation of policies significantly contribute positively to system operation and maintenance process.
- H5: The implementation of policies significantly contribute positively to organizational culture process.
- H6: Monitoring and evaluating process significantly contribute positively to system planning process
- H7: Monitoring and evaluating process significantly contribute positively to the management of IT investment process.
- H8: Monitoring and evaluating process significantly contribute positively to system realization process.
- H9: Monitoring and evaluating process significantly contribute positively to system operation and maintenance.
- H10: Monitoring and evaluating process significantly contribute positively to organizational culture process.

## **METHODOLOGY**

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### ***STUDY PLAN***

As a strategy, this study combines quantitative and qualitative approaches (mixed methods strategies). Quantitatively, this study examines the achievement in the implementation and survey of IT governance. Meanwhile interview, observation, and document study were used to verify the implementation of IT governance qualitatively. The general procedure of this study is shown in Figure 1.



**Figure 1. Research procedures**

### ***POPULATION AND SAMPLE***

This study utilized nonprobability sampling, using saturated sampling technique. Non probability sampling with saturated technique was selected because each element was coincidentally selected and it could satisfy other factors that have been planned earlier. Besides, the results of the study could also be generalized with very slim mistakes (Dooley, 2001; Sekaran & Bougie, 2013). The population of this study consisted of the staff of all 135 public organizations in Gorontalo. For every organization, three (3) senior managers who are responsible for IT department in their organizations were eligible to participate in this study. Having considered the non-probability sampling using the saturated technique, a sample of 405 respondents was involved in data collection.

### ***DEVELOPMENT AND PROCEDURE OF THE INSTRUMENT***

Each question was measured by using a Likert scale, between 1 (the least score) and 5 (the highest score). In ensuring the validity and reliability of the instrument (questionnaire), a pilot study had been carried out as recommended by Zikmund (2003). The questionnaire has been distributed in two rounds. The first round involved some experts to improve the contents and the clarity of the questionnaire. At the end of this round, the instrument had been verified by experts in IT fields. Furthermore, the pilot study was carried out to determine the reliability of the instrument in the second round. SPSS version 16 was utilized in testing the gathered data. In the end, it was found that the Cronbach's alpha for all variables is greater than 0.8.

Further, SEM had been used to analyze the gathered data in Analysis of Moment Structure (AMOS) and SPSS version 16. Procedures in SEM were followed through, including (a) testing on data normality, (b) determining outliers, (c) testing on multicollinearity, and (d) testing on convergent and discriminant. Sekaran and Bougie (2013) emphasize this procedure to ensure that the data are complete, true, and fit for advanced analysis. Further, data were analyzed to gather (e) index value or Goodness of Fit index (GOF) to determine the fitness of the model, (f) testing on the significant value or factor loading to determine the relationship between the indicators and variable, and (g) testing the hypothesized model in SEM.

## **FINDINGS**

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### ***TEST OF DATA***

Data analysis in SEM requires data to be normally distributed; this is to ensure the results are bias-free. The skewness value must be less than 3 and kurtosis less than 10 (Kline, 2011). Mahalanobis distance is used to test for the outlier at alpha  $p < 0.001$  (Tabachnick & Fidell, 2007) although multicollinearity with a standard tolerance of greater than 0.10 and Variance Inflation Factor (VIF) of less than 10 are good values (Sekaran & Bougie, 2013). For this study, the results show that the gathered data satisfy all conditions. This explains that the data are good for further analysis.

### ***MEASURE OF VARIABLE FITNESS***

SEM is used to analyze the results that involve the overall structured model. This analysis is carried out by analyzing the measurement model and structured model as recommended (Hair, Black, Babin, & Anderson, 2010). According to Hair et al. (2010), the difference between measurement model and structured model can be identified in the Confirmatory Factor Analysis (CFA) model. For measurement model, all constructs are related with each other, but in the structured model, the correlation

relationship is switched with determination relationship either directly or indirectly. Since this study adapts the COBIT framework, which is combined with the theoretical framework of IT governance in Indonesia, the CFA analysis is used in assessing the measurement model. The results of analysis and testing of CFA over the variables in this study reveal that the measurement model for each variable has good GOF index. Besides, the CFA also reveals good indicators that every variable has good convergent validity, in which their factor loading are at average greater than 0.50.

***VALIDITY AND RELIABILITY TEST FOR MEASUREMENT MODEL***

According to Awang (2012), after CFA measurement, this study needs to prove a high validity and reliability before proceeding to correlation analysis. Awang (2012) and Hair et al. (2010) add that besides factor of loading, other measurements for construct validity are construct-reliability and discriminant validity. The test for construct reliability is carried out by measuring composite reliability while discriminant validity is measured through Average Variance Extracted (AVE). The results are detailed in Table 1.

**Table 1. Summary of measurement scales**

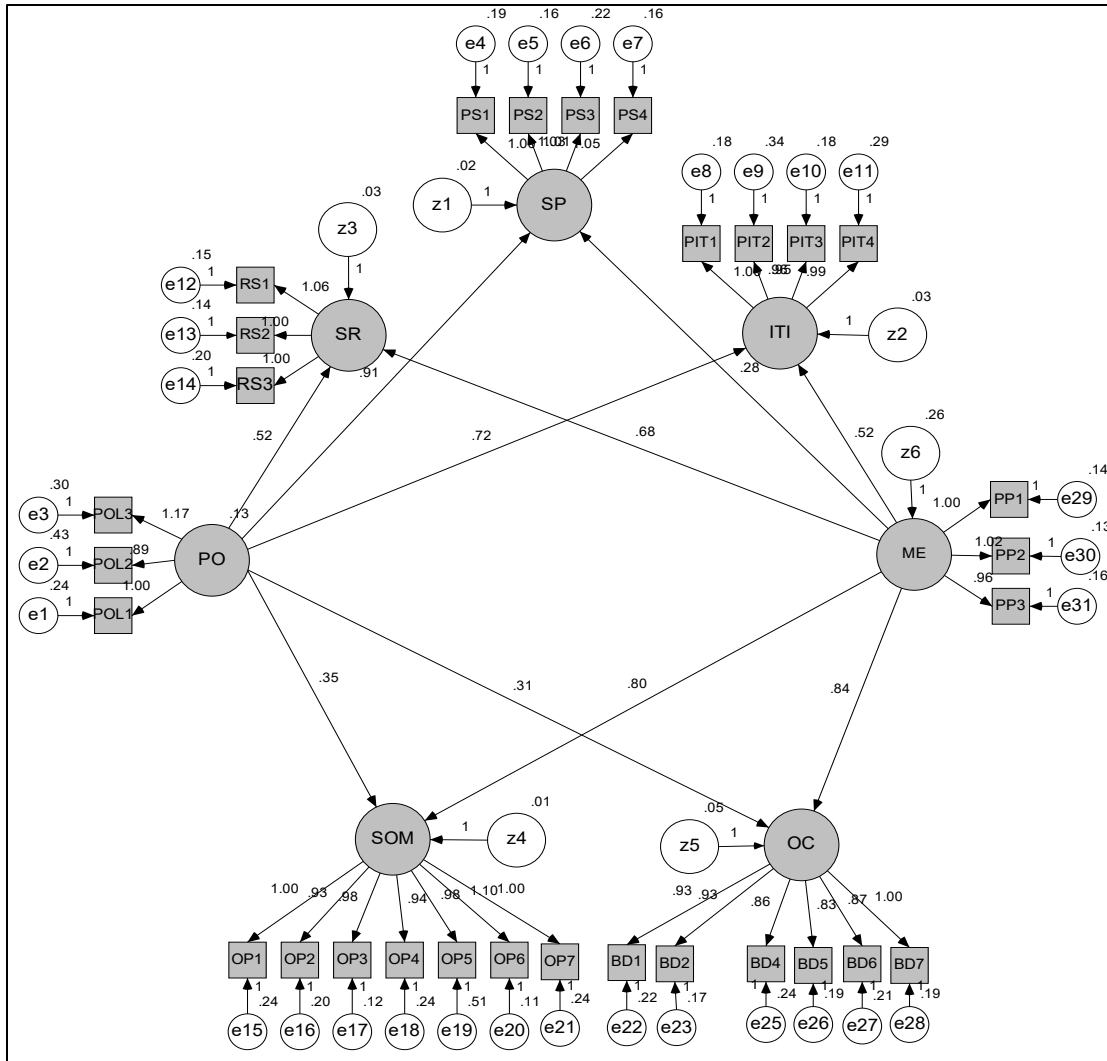
<b>Variables</b>	<b>CR (above 0.6)</b>	<b>AVE (above 0.5)</b>
Policy	0.794	0.565
System planning	0.874	0.635
The management of IT investment	0.855	0.597
System realization	0.890	0.730
Operation and maintenance	0.907	0.583
Organizational culture	0.903	0.607
Monitoring and evaluation	0.914	0.779

Having tested the convergent validity, construct reliability, and discriminant validity, each indicator represents all variables. For reliability testing, it is found that the average is greater than 0.8, in which according to Hair, Money, Samouel, and Page (2007) is very strong. Hence, each indicator can be trusted. Although, the results of validity tests show that each indicator is significantly correlated and valid.

***RESULT***

Figure 2 showcases the hypothesized model after CFA testing. It is constructed based on the measurement model of all variables with only indicators tested with CFA. In detail, the results show that the model fits the criteria, with chi-square = 747.464. Besides, GOF index is also good with Tucker-Lewis Index (TLI) = 0.934 and Comparative Fit Index (CFI) = 0.940. Although Good of Fit Index (GFI) = 0.885 and Normed Fit Indices (NFI) = 0.882, Marsh, Hau, and Wen (2004) recommend that values greater than 0.7 or 0.8 are sufficient for measuring a model. While Root Mean Square Error of Approximation (RMSEA) = 0.050 is far smaller than the cut-off value ( $\leq 0.08$ ), the Minimum Sample Discrepancy Function (CMIN/Df) is also similar with 1.892 (cut-off value is  $\leq 5$ ). Besides, Adjusted Goodness of Fit Index (AGFI) value ( $>0.8$ ) also satisfies the condition. Based on these conditions, this study indicates that the hypothesized model for IT governance in public organizations fits the data nicely.





PO: Policy, SP: System Planning, ITI: the management of IT investment, SR: System Realization, SOM: Operation and Maintenance, OC: Organizational Culture, ME: Monitoring and Evaluation

**Figure 2. The results of research model**

The results of hypotheses testing (H1, H2, H3, H4, H5, H6, H7, H8, H9, and H10) support that all hypotheses are significant. This indicates that in both situations, the effect of policy on the IT processes and the effect of monitoring and evaluation over the IT processes are significant. Referring to the results of the study in Table 2, the policy significantly positively contributes to the systems planning, the management of IT investment, system realization, operation and maintenance, and organizational culture at  $p < 0.01$  significant level with respective Critical Ratio (C.R) 8.411, 7.324, 6.541, 5.734, and 4.521. On top of that, it also explains that monitoring and evaluation significantly affect systems planning, the management of IT investment, system realization, operation and maintenance, and organizational culture at  $p < 0.01$  significant level with C.R 6.246, 10.230, 11.890, 13.152, and 13.733 respectively.

**Table 2. The results of hypothesis testing**

Hypotheses	Var	Path	Var	C.R.	p-value	Result
H <sub>1</sub>	SP	<--	PO	8.411	0.001	Supported
H <sub>2</sub>	ITI	<--	PO	7.324	0.001	Supported
H <sub>3</sub>	SR	<--	PO	6.541	0.001	Supported
H <sub>4</sub>	SOM	<--	PO	5.734	0.001	Supported
H <sub>5</sub>	OC	<--	PO	4.521	0.001	Supported
H <sub>6</sub>	SP	<--	ME	6.246	0.001	Supported
H <sub>7</sub>	ITI	<--	ME	10.230	0.001	Supported
H <sub>8</sub>	SR	<--	ME	11.890	0.001	Supported
H <sub>9</sub>	SOM	<--	ME	13.152	0.001	Supported
H <sub>10</sub>	OC	<--	ME	13.733	0.001	Supported

Further, the weight ( $\beta$ ) regression value for policy over systems planning, the management of IT investment, system realization, operation and maintenance, and organizational culture are exhibited in Table 3, which are 0.845, 0.634, 0.432, 0.289, and 0.228. They are paired with respective effect size, which are 0.714, 0.402, 0.187, 0.084 and 0.052. This indicates that 71.4% of the change in the systems' strategic planning, 40.2% of the change in the management of IT investment, 18.7% of the change in system realization, and 8.4% of the change in operation and maintenance, and 5.2% of the change in organizational culture could be explained by policy (the independent variable).

**Table 3. Standardized regression weights**

Variables	Path	Variables	Estimate
System planning	<---	Policy	0.845
The management of IT investment	<---	Policy	0.634
System realization	<---	Policy	0.432
Operation and maintenance	<---	Policy	0.289
Organizational culture	<---	Policy	0.228
System planning	<---	ME	0.361
The management of IT investment	<---	ME	0.645
System realization	<---	ME	0.797
Operation and maintenance	<---	ME	0.918
Organizational culture	<---	ME	0.865

On the other hand, the weight value for monitoring and evaluation over systems planning, the management of IT investment, system realization, operation and maintenance, and organizational culture are 0.361, 0.645, 0.797, 0.918, and 0.865 with effect sizes 0.130, 0.416, 0.635, 0.843, and 0.748 respectively. This indicates that monitoring and evaluation are highly credible in explaining the changes in systems planning, the management of IT investment, system realization, operation and maintenance, and organizational culture. The ability to explain changes in monitoring and evaluation in terms of system planning is 13.0%, the management of IT investment is 41%, system realization is 63%, operation and maintenance is 84.3%, and organizational culture is 74%.

Interview and observation were conducted to collect complete data regarding the process, monitoring, as well as governance of IT in public organizations. A total of six senior managers were involved in the interview. The interview data reveal that there is an influence on the process of system strategy planning, management of IT investment, system realization, operation and maintenance, and organization culture for IT governance policies. Similarly, the monitoring and evaluation process is also influenced by the process of system strategy planning, management of IT investment, system realization, operation and maintenance, and organization culture for IT governance policies. It can be concluded that the management of senior executive of the organization acknowledges and agrees that

several elements, e.g., IT governance policies as well as monitoring and evaluation of IT processes are necessary to determine the effect such mechanisms. The researcher used open observation to collect the data; this is to inform the stakeholders that the research is in progress.

## DISCUSSION

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The results explain that the implementation of IT governance is affected by the policy, systems planning, the management of IT investment, system realization, operation and maintenance, organizational culture, as well as monitoring and evaluation. Additionally, the most affecting factor in policy over IT governance implementation process is systems planning ( $\beta=0.845$ ). It is followed by the management of IT investment ( $\beta=0.634$ ), system realization ( $\beta=0.432$ ), operation and maintenance ( $\beta=0.289$ ), and organizational culture ( $\beta=0.228$ ). Still, the most affecting factor in monitoring and evaluation of the IT governance implementation process is operation and maintenance ( $\beta=0.918$ ). It is followed by organizational culture ( $\beta=0.865$ ), system realization ( $\beta=0.797$ ), the management of IT investment ( $\beta=0.645$ ), and systems planning ( $\beta=0.361$ ).

The above result is described as follows:

- H1: The result reveals that the implementation of the policy contributes to the process of designing system strategy positively and significantly ( $\beta = 0.845$ ;  $p < 0.01$ ). This is in accordance with ITGI (2007) that policy in designing the IT system strategy is essential to manage, arrange, and direct all personnel involved based on the priority and operational strategy of the organization. This is also echoing to the results seen in Haron, Sabri, and Zolkarnain (2013) that the planning of system strategy has been an important management issue for an organization to continue competing with others.
- H2: The analysis of policy implementation contributes to the IT investment management process ( $\beta = 0.634$ ;  $p < 0.01$ ). Furthermore, the significant influence of the policy implementation on the IT investment management has been explained by Kundra (2010). According to Ward and Pappard (2003), the assessment and priority of IT investment are among the major concerns of the IT investment management policy. Therefore, preparing and maintaining the framework is required for managing the management of IT investment program; this includes cost, benefits, priority for the estimation of the budget, process, and the appropriate cost management (ITGI, 2007).
- H3: The result reveals that the implementation of the policy contributes to the process of designing system realization. This shows a significant influence of the policy implementation on the system realization ( $\beta = 0.432$ ;  $p < 0.01$ ). The finding is in accordance with the information by Depkominfo and Detiknas (2007) that the policy establishing the system realization regulates the implementation of IT planning. This process begins with the selection of IT system all the way to the post-evaluation of the implementation. This is in line with the result seen in Turban, Jay, and Ting-Peng (2005) that one of the important decisions in a system is the process of system selection among the best system alternatives, determining the aims of the action by considering the criteria based on the goals all the way to the implementation of the plan.
- H4: The policy implementation contributes to the operation and maintenance of the system ( $\beta = 0.289$ ;  $p < 0.01$ ). The result resonates to the explanation of Depkominfo and Detiknas (2007) that the influence of the policy on the operation and maintenance of the system results in a policy that sets the service of IT governance. It is aimed at identifying and defining the IT service appropriately to achieve an expected IT performance for the sustainability of the IT organization.
- H5: The implementation of the policy impacts the process of designing system realization positively and significantly; this hypothesis is supported by sufficient evidence. Statistically, the significant stage process that is produced is ( $\beta = 0.228$ ;  $p < 0.01$ ) meaning that there is a strong influence

on policy and organization culture. According to Gibson, Ivancevich and Donnely (2000), the implementation of the policy and organization culture is interrelated. This is because the culture organization is a system value, while trust and norm are the product of the interaction between the function and characteristics of the organizational management. On the other hand, the implementation of the policy impacts the culture in which Ali, Green, and Parent (2009) find out that condition might result in better organizational governance. This affects all the effectiveness of IT governance as well.

- H6: Monitoring and evaluation process contributes to the process of designing system strategy positively and significantly. This is based on the empirical results where ( $\beta = 0.361$ ;  $p > 0.01$ ). The result shows that a good system strategy planning is involved in monitoring and evaluation. Furthermore, the result resonates to the research by David (1991); the research reports that these processes are crucial for the cycle of system strategic planning. According to Basahel and Irani (2009), strategy system planning requires monitoring and evaluation process by the decision-maker.
- H7: The result reveals that monitoring and evaluation significantly affect the IT investment management. Furthermore, the results provide empirical evidence which is sufficient to support this hypothesis ( $\beta = 0.645$ ;  $p > 0.01$ ). Ward and Peppard (2003) agree with this finding that the IT investment management requires the above processes as long as it can serve a purpose as a guideline in determining and establishing the investment priority. Similarly, Ningsih, Sembiring, Arman, and Wuryandari (2013) also argue that IT investment management must be effective and efficient. In addition, a schedule to measure, monitor, and evaluate the advantage of IT investment is necessary.
- H8: Both monitoring and evaluation positively and significantly impact the system realization process where the significant rate ( $\beta = 0.797$ ;  $p > 0.01$ ). This resonates to what Depkominfo and Detiknas (2007) have reported that the continuous mechanism of enhancement, monitoring, and evaluation in system realization will provide feedback regarding all the governance process. Jenner (2010), Zwikael and Smyrk (2011) also find the similar situation about the influence of monitoring and evaluation towards the system realization. They argue that the processes are essential to analyze the actual achievement or the failure of a project.
- H9: The monitoring and evaluation process plays a major role in the operation and maintenance mechanism where the significant rate ( $\beta = 0.918$ ;  $p < 0.01$ ). This echoes the results seen in Khan (2003) that all of these processes are connected. This is crucial to manage and evaluate the requirement for preventing the excessive system loads, system failures, and even organizational budgets. This is also in line with the information by Depkominfo and Detiknas (2007) where the indicator of achievement of each governance process, including operation and maintenance, is the main objective of monitoring and evaluation.
- H10: There is a significant influence on the process of monitoring and evaluation with the cultural organization ( $\beta = 0.865$ ;  $p < 0.01$ ). This shows that the two processes positively impact the organizational culture. According to Khan (2003), well-functioned monitoring and evaluation can drive the performance of the organization in developing its work while its acceptance is based on the decision to associate such a performance as the part of the organizational culture. On the other hand, Sebedi (2014) finds out that these two processes are directly connected to the organizational culture and, therefore, it significantly influences the factor. Khan (2003) and Sebedi (2004) agree that a strong organizational culture along with the monitoring and evaluation process will contribute to efficient performance and efficient service delivery.

The results of interviews, observation, and document study also find that the IT governance model in public organization fits the implementation of IT governance. This explains that the IT governance model is evident in the public organizational context and that the model could be adapted in any government agencies that implement IT governance. This finding is in line with BUMN (2013)

that the IT governance policy is critical in organizational IT implementation in which the detailed IT policy could be generated into standards or procedures. This indicates that policy implementation significantly affects IT processes. ITGI (2007) and BUMN (2013) further state that the compliance level will increase when the cycle of IT implementation is in place (policy). This could further explain that when an IT process has no policy, the compliance level will not fulfill the concept of IT governance and, as a result, the IT implementation will not be effective for the organization. Hence, it is critical that the policy regarding the management of IT investment requires firm commands and direction from the top management.

According to Oltsik (2003), IT governance is part of the policy, process or activity, and procedure in supporting IT operation so that it works in line with the organizational strategy and operation. This agrees with Sambamurthy and Zmud (1999) that IT governance is a form of policy on IT activity/process. This trend, among others, builds up the policy and the management of IT infrastructure, the effective use of IT for the users, and effective management. This means that the policies on IT activities/processes such as systems planning, the management of IT investment, operation and maintenance, and organizational culture are related with organizational strategy, resource management, and risk management. However, according to ITGI (2007), effective IT management requires certain knowledge regarding IT processes, which are commonly managed to suit the planning, delivery, implementation, and monitoring domains.

Henderson and Lentz (1996), Luftman and Brier (1999), and Weill and Broadbent (1998) further add that IT process involves the formation of cases of IT business, priority, justification, permission from the IT investment, the implementation of IT monitoring and evaluation, as well as IT performance. Consequently, ITGI (2007) and Simonsson, Johnson, and Ekstedt (2010) address that all IT process needs to be evaluated periodically to ensure the quality and suitable with the control mechanism. In fact, Hewitt and Michael (1986) recommend that monitoring is made an internal activity to determine the feedback on each progress including all advantages and drawbacks. This agrees with Mockler (1970) who analyzes what has been achieved, assesses, and implemented so that the objectives are achieved.

Evaluation refers to the process of achieving objectives and the programs or related issues to provide feedback on improvement of the program or the quality of performance (Hewitt, 1986). Furthermore, evaluation is closely related to the monitoring process. This is because the data used in the evaluation are from the results of monitoring.

On the contrary, Simonsson, Johnson, and Wijkström (2007) argue that most of the IT processes require adequate understanding to support IT governance as well as monitoring and evaluating the performance of IT, yet it is difficult to grasp the essence immediately. The argument by Simonsson is correct if it is seen from the perspective of control objectives developed by Zhang and Fever (2013). According to Zhang and Fever (2013), there are a number of incompatibilities among control objectives, IT process, and the needs of the business organization. However, almost all of the processes of IT, including its responsibility, its relation, and its feedback within the model are not determined.

Regarding the IT governance model, the direct effect of policy on IT processes is high. This shows that the policy compliance level has met the condition and that the implementation of IT governance is effective. Previous findings (e.g., BUMN, 2013; Oltsik, 2003; Sambamurthy & Zmud, 1999) also support that policy in IT process is very important in the implementation of IT governance in organizations, and it occurs if it satisfies the current roles. Still, monitoring and evaluation process significantly affects the whole IT processes. Frankel and Gage (2007), Gosling (2010), and Khan (2003) believe that each program should be monitored and assessed. It is important in gathering data to ensure the program is well-developed and effective besides improving the management aspect, decision making, and planning for a future resource.

## CONCLUSION

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Aspects, such as IT governance policies, IT governance process development programs, as well as sustainable and coordinated monitoring and evaluation programs, are indispensable to support the implementation of IT governance in public organizations effectively. Coordination between work units, top management, and executive management is a necessity. This also needs support from the development team to define IT development policies, strategies, and priorities so as to produce IT that matches the organization's priorities and strategies. Implementation of policies in IT governance will be more effective if the stakeholders have a better understanding regarding the factors related to the application as well as organizational characteristics.

The understanding of all the IT governance process (e.g., system strategy planning, investment, system realization, operation and maintenance, and organizational culture) in the organization are aimed at directing the programs and activities to the implementation and a better quality of IT governance. This can be done by improving further research and surveys focusing on the scope of IT governance and broadening the discussion in the developing the options of the policy. The monitoring and evaluation process is conducted to provide input to policymakers in developing other short-term and long-term programs and activities. Some implementation issues, such as program implementation and activities that are inconsistent with the needs, weaknesses of program planning and other issues can be assessed systematically to ensure the quality of further implementation of IT governance policies.

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## Identification of Influential Factors in Implementing IT Governance

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