Identification of components for evaluation e-government governance framework according to regional government characteristics

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Abstract. At present, there are many frameworks used to evaluate IT governance in various organizations or institutions. But an organization certainly has unique characteristics by the goals and objectives of the organization to be achieved, besides the effective use of information technology with the involvement of all elements of the stakeholder can certainly help solve service problems in the community. This study aims to identify what components can influence to form a new framework that can later evaluate e-government governance in regional governments. Analysis of the formation of these components is carried out through various systematic literature by the characteristics of regional government. Hopefully, this research will contribute by providing a new framework for evaluating e-government by considering components that are relevant to the characteristics of regional government. This research has implications both in theory and practice. The theory of component identification can form a new framework specifically for regional governments. Practices and practitioners can be utilized for practice in evaluating e-government governance and other information technology-based services.

1. Introduction

E-Government is an information technology system developed by the Government to improve public services by giving choices to the public to get easy access to public information. These policies and strategies are regulated in Presidential Instruction No.3 of 2003 concerning Policies and Strategies for Developing E-Government in all levels of Government [1]. E-Government is a clear example of how ICT can improve efficiency, interoperability, privacy, and participation [2]. In addition it allows fast responses in real-time and overall to the perception of user needs [3].

The implementation of e-government is not easy to implement, it requires several factors including a complex structural and procedural framework that involves all relevant stakeholders, and action at the political and legal level, as well as the organizational, semantical, and technical levels [4], including cultural and historical factors [5]. On the receiving side of the information system, human factors can be considered, for example, elderly citizens for services [6] and about the social-psychological behavior of consumers [7]. The development of ICT infrastructure such as cloud computing as an alternative technology for implementing e-government services [8]. Based on this description, it is necessary to identify the factors or components that influence the implementation of e-government.

Governments widely use information systems to cut costs, improve accuracy, services, and enable
citizens to contribute to policy decisions. When citizens get increased access to information and capabilities, power shifts from government to citizens [9]. Information Technology (IT) governance has function to ensure that IT organizations use efficient resources, secure the organizational assets, maintain the integrity and security of organizational data, and achieve organizational goals effectively. IT is an important aspect of overall organizational governance. Good IT management will ensure efficiency and achievement of good service quality for organizational goals [10].

Evaluation of IT governance can be done by several methods such as the ISO 27000 framework, ITIL V.3, COBIT framework [11]. These methods have been used in the assessment of IT governance in Indonesia, for example the evaluating of implementation of e-Gov on major islands in Indonesia, for measuring e-readiness [12], measurement of maturity level in the use of IT Disdikpora [13], or on the use of non-governmental institution IT [14] and IT management in Gorontalo City government has not run according to the government's strategic plan [15]. These studies show some interesting things, namely that the models have been able to show a picture of differences in the level of goodness in IT governance in Indonesia, but it still allows inconsistencies to the reality, for example it is still possible that an implementation of IT governance is considered successful, but it does not provide results that meet expectations. For this reason, it is necessary to identify the components in developing a new framework, to evaluate e-government governance in accordance with the character of regional government organizations as the ultimate goal of this study.

2. Methods
The method used in this research is quantitative begins with a literature review on research related to IT governance both in Indonesia and internationally, research on IT evaluation models and their development, problems and especially those related to the general characteristics of IT governance in Indonesia. Analysis of the components used in the governance evaluation framework under the organizational structure of regional government is an aspect that influences the successful implementation of e-government. Then, do the collecting the data (observation, survey, interview, etc.) about the IT governance in Indonesia.

3. Results and discussion
Scott Morton [16], provides a new framework that can be used to evaluate an information system called the Human-Organization-Technology (HOT) FIT Framework. This model places an important component in information systems namely Human, Organization, Technology and the suitability of the relationship between them. The HOT-FIT Framework was originally developed from the merging of the IS Success Model [17] and the IT-Organization Fit Model proposed by Scott Morton [16], as a framework for evaluating the Health Information System (HIS). The IS Success Model is used to identify factors, dimensions and measurement indicators, while the IT Organization Fit Model identifies the relationship and conceptual fit between human, technological and organizational factors.

The model of research [18] is used to measure the implementation of information systems in the public sector, which is to measure the success of the Malaysian Government's e-government called the Project Monitoring System (PMS). Yusof and Yusuff [18] suggest that human, technological and organizational factors are important components in the implementation of information systems, where the impact of the system is evaluated through overall net benefits.
Figure 1. Human-Organizational-Technology (HOT) fit framework [16].

According to Yusof [16] the factors that form the HOT-Fit Framework are:

a) Human, the human component assesses information systems in terms of system use on the frequency and breadth of and breadth of functions as well as information system investigation. System use also relates to who uses it, the level of its use, training, knowledge, expectations, and attitudes to accept or reject the system. This component also assesses the system from the aspect of user satisfaction, which is the overall evaluation of user experience in using information systems and the potential impact felt from the use of information systems. User satisfaction can be related to the perception of the benefits and attitudes of users towards information systems that are influenced by personal characteristics.

b) Organizations, organizational components assess the system from aspects of organizational structure and organizational environment where information technology systems are implemented. The organizational structure consists of type, culture, politics, hierarchy, planning and controlling systems, strategies, management, and communication. Leadership, support from top management and staff are important parts of measuring the success of the system. While the organizational environment consists of sources of funding, government, politics, competition, inter-organizational relations, and communication.

c) Technology,

- System Quality, this factor is used to measure the quality of the information technology system itself. Several indicators that have been studied by Yusof [16] and Yusof [19] to measure the value of system quality are ease indicators which include: easy to use and easy to learn, efficiency indicators which include: response time and loading time, system reliability indicators which include: there is system technical assistance, there is an error warning, flexible if integrated with other systems, tested free from error and system security, completeness indicators include complete features and complete database contents.
- Information Quality, this factor is used to measure the quality of the output of the information system. Some indicators that have been studied [16] and [19] to measure the value of the quality of output information are content indicators that include: format according to needs, form and relevance of the information generated, completeness, indicators of usefulness which include: easy to read, concise, informative, important and the level of data reliability: data accuracy, timeliness, can be compared and can be verified.
- **Service Quality**, service quality focuses on the overall support received from system service providers. Service quality can be assessed by the speed of response, assurance, empathy, technical support, and follow-up services to system users.

- Net benefit are the benefits obtained from use of the system. Net benefits can be measured directly from system benefits (for example from information generated by the system) or from benefits such as the impact on performance, efficiency, and effectiveness of organizational activities.

DeLone and McLean [9], defining and measuring success has been a challenge for the field of IS, as information systems have become more complex, so has the evaluation of the effectiveness or successful of the system. In evaluating the success of an information system, it is very important to define success based on the context of the information system and its stakeholders. Evaluating the success of information systems has changed from initially focusing on speed and accuracy, which is a more quantitative and objective evaluation, currently considering the strategic and social impact of the system, which is a more qualitative and subjective evaluation.

Evaluating e-government that is successful in its application in the Regional government especially involving the public sector is certainly not an easy thing, so it requires identification following the characteristics of the Regional government organization. In the organizational structure, the Regional Government is led by the Governor, Mayor, Regent and their representatives who are called executives, whose partners are the House of Representatives called the legislative and regional apparatus organizations as technical organs. Based on the organizational structure, the factors or components needed to form a new e-government evaluation framework are:

- **Policies and Regulations**, in the form of a foundation for the development and implementation of e-government, the existence of policies and regulations contained in official documents that have legal strength, the existence of a master plan document on the direction/objectives, work programs, procedures or arrangements for development and implementation of e-government, the existence of documents in the form of decrees, regulations, guidelines or other forms of official documents as well as sufficient budget allocation to develop and implement Information and Communication Technology (ICT).

- **Organizations**, closely related to the existence of an organization that is authorized and responsible for the development and use of ICT, evaluations are carried out on the existence of a complete organizational structure, the existence of documents that provide a clear formulation of duties and functions, the existence of business process documents as a basis for service development information system, the availability of work units and their apparatus to support the use and development of ICT, there is sufficient authority so that the institution can carry out its duties and functions properly including the control and supervision functions of the development and implementation of ICT.

- **Planning**, documents on governance planning or management of ICT planning that are carried out in an integrated and continuous manner, evaluations are carried out on the existence of a planning process for the development and utilization of ICT in a real way (there are procedures, standardized and regular work mechanisms), there is a need assessment and implementation strategy ICT that contains a complete target, benefits, a description of current conditions, technology selection, resource requirements, approaches, determining priorities, costs and anticipating future needs, the implementation of decision making and the realization of development that refers to the ICT blueprint.

- **ICT infrastructure**, relating to facilities and infrastructure that support the development and use of ICT, evaluations are carried out on data centers, communication networks (LAN, WAN, internet access and bandwidth), hardware and software on users (desktops, notebooks, and others). Cloud-based service channels, web, telephone, SMS, e-mail and others, supporting facilities including special rooms, air conditioners, UPS, generators as well as other security facilities.
Application, related to the availability and level of application software usage that supports e-government services directly or indirectly, application evaluation is carried out on the availability and level of application of various applications that need to carry out e-government functions following the duties and functions agency, application group determination in the form of services, administration, legislation, finance, staffing, development, governance, community, territorial and so forth, consideration in the application in the form of conformity with priorities, conditions, effectiveness, and efficiency, ability to follow changes, agency independence in the sense minimal dependence on other parties.

Human Resources, relating to the regulation of competence, development and work culture in the operation, development, and implementation of ICT, an evaluation is carried out on the regulation of HR competencies in the operation of ICT, human resource development adjusted to the development of ICT, special treatment of apparatus work culture in service-based ICT on society.

Table 1. New framework for evaluating e-government governance.

| Components          | Sub Components and Attribute Determination                                               |
|---------------------|------------------------------------------------------------------------------------------|
| Policy and Regulation | Mechanism for Determining Policies and Regulation                                          |
|                     | Vision and Mission                                                                      |
|                     | Policy Implementation Strategy                                                          |
|                     | Regulations                                                                             |
|                     | Guidelines                                                                             |
|                     | Agency Decision                                                                        |
|                     | Priority Scale                                                                         |
|                     | Risk Management                                                                        |
| Organization        | The Existence of an Effective Organizational Structure                                   |
|                     | Task and Function                                                                       |
|                     | Business Process Availability                                                            |
|                     | Completeness of Work Units and Employees                                                |
|                     | Sufficient Authority to Control and Supervise in Carrying out Agency Functions            |
| Planning            | Planning System                                                                        |
|                     | Documentation                                                                          |
|                     | Implementation of the Master Plan                                                       |
|                     | Financing                                                                              |
| ICT Infrastructure  | Data Center                                                                            |
|                     | Data Network                                                                           |
|                     | Security                                                                               |
|                     | Supporting Facilities                                                                   |
|                     | Disaster Recovery                                                                       |
|                     | ICT Maintenance                                                                        |
|                     | ICT Equipment Inventory                                                                 |
| Application         | Website and Major Functional Applications                                               |
|                     | Functional Administration and General Management Applications                           |
|                     | Functional Application of Legislation Administration                                     |
|                     | Functional Application of Financial Management, Staffing and Development                 |
|                     | ICT Documentation and Inventory                                                         |
|                     | Application Interoperability                                                             |
| Human Resources     | Human Resources Competencies                                                             |
|                     | Human Resources Development                                                              |
|                     | Employee Culture                                                                       |
By the formation of a new framework base on the organizational characteristics of the Regional government, it is hoped that it can be used in evaluating e-government governance in a Regional Government so that the results can be used as a measure in the use of information and communication technology.

4. Conclusion
In this research, it was found that some of the components forming a framework that is tailored to the characteristics of regional government organizations by considering the goals and objectives to be achieved, in addition to the effective use of information technology by involving all elements of stakeholders is expected to help solve service problems to the public. By the arrangement of a new framework that is in line with the characteristics of regional government organizations, it is hoped that it can be used in evaluating e-government governance in regional governments so that the results can be used as a reference in the use of information and communication technology. Besides, it can contribute by providing a framework that can have implications for regional governments and practitioners and policymakers in evaluating e-government governance and other information technology-based services.

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References
[1] Presiden RI 2003 "Inpres No. 3 Tahun 2003 tentang Kebijakan dan Strategi Nasional Pengembangan E-Government," pp 1–14
[2] Patsakis C, Laird P, Clear M, Bouroche M and Solanas A 2015 Interoperable privacy-aware E-participation within smart cities Computer (Long Beach Calif) 48(1) 52–8
[3] Lv Z, Li X, Zhang B, Wang W, Zhu Y, Hu J, et al. 2016 Managing Big City Information Based on WebVRGIS IEEE Access 4 407–15
[4] Kovac M 2014 E-health demystified: An e-government showcase Computer 47(10) 34-42
[5] McKenzie R, Crompton M and Wallis C 2008 Uses Cases for Identity Management in E-Government IEEE Secur Priv 6(2) 51–7
[6] Phang C W, Sutanto J, Kankanhalli A, Li Y, Tan B C Y and Teo H H 2006 Senior citizens’ acceptance of information systems: A study in the context of e-Government services IEEE Trans Eng Manag. 53(4) 555–69
[7] Roman T, Vasilache S, Maxim E and Manolica A 2015 Factors that influence the behaviour of consumers of smartphone services in multinational companies Curr Sci. 109(6) 1038–46
[8] Mohammed F, Alzahraani A I, Alfarraj O and Ibrahim O 2017 Cloud Computing Fitness for E-Government Implementation: Importance-Performance Analysis IEEE Access. 6 1236–48
[9] DeLone W H and McLean E R 2016 Information Systems Success Measurement. Found Trends® Inf Syst. 2(1) 1–116
[10] Burdefira 2013 Evaluasi Terhadap Implementasi Tata Kelola Teknologi Informasi Berdasarkan Framework COBIT pada Pemerintah Kota Padang (Padang: Fakultas Teknik Universitas Negeri Padang)
[11] Syamsudin A and Lutfi E T 2014 Evaluasi Tingkat Kematangan Tata Kelola Teknologi Informasi Stain Kediri Menggunakan Framework Cobit 5 Semnasteknomedia 2(1) 165–70
[12] Nento F, Nugroho L E and Mada U G 2017 Pengukuran E-Readiness Provinsi Gorontalo Dalam Penerapan Smart Government Prosiding Seminar Nasional GEOTIK pp 176–87
[13] Oktarina T 2017 Tata Kelola Teknologi Informasi Dengan COBIT 5 J Informanika 2(3) 30–8
[14] Sibuea G H C, Napitupulu T A and Condrobimo A R 2018 An evaluation of information system using HOT-FIT model: A case study of a hospital information system Proc 2017 Int Conf Inf Manag Technol ICIMTech 2017 pp 106–11
[15] Bouty A A, Koniyo M H and Novian D 2018 New Model of Information Technology Governance
in the Government of Gorontalo City using Framework COBIT 4.1 IOP Conf Ser Mater Sci Eng. 306(1)

[16] Yusof M M, Paul R J and Stergioulas L K 2006 Towards a framework for health information systems evaluation Proceedings of the 39th annual Hawaii international conference on system sciences (HICSS’06) pp 95a–95a

[17] DeLone W H and McLean E R The DeLone and McLean Model of Information System Success Journal Management Information System 19(4) 9–30

[18] Yusof M M and Yusuff A Y A 2013 Evaluating E-government system effectiveness using an integrated socio-technical and fit approach Information Technology Journal 12 894–906

[19] Yusof M M, Kuljis J, Papazafeiropoulou A and Stergioulas L K 2008 An evaluation framework for Health Information Systems: human, organization and technology-fit factors (HOT-fit) Int J Med Inform. 77(6) 386–98