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The Arrangement of the Information Technology and Communications Master Plan using PeGI Model (e-Governance Ranking Indonesia) to Improve District Government Services

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Abstract. Implementation of Information and Communication Technology (ICT) within the scope of government is one important aspect that needs to be developed. Implementation of ICT applications is expected to facilitate various activities quickly, precisely and accurately with the aim of improving productivity so that the quality of government performance can increase in service to the public and internal government. Many district governments in Indonesia have no reference in strategic planning in the context of ICT, so stakeholders find it difficult for decision-makers in ICT development. The impact of this problem also affects the level of implementation of the regional work units in the region area. It, therefore, has no guidelines for developing and utilizing ICT properly and appropriately. Master plan of information and communication technology for local government is a product of scientific research with PeGI model (ranking of e-government Indonesia) as measurement model of e-government system. Model PeGI takes measures on 5 (five) dimensions of the e-Government system: policy, institutional, infrastructure, application, and planning. The final outcome of the measurement will be used as a recommendation and policy in preparing the ICT master plan to support local government processes and management work. The Master plan of Information and Communication Technology is expected to realize district governance system that is able to bridge the various needs of ICT implementation in agency.

1. Introduction

Implementation and utilization of Information and Communication Technology (ICT) within the scope of government is one important aspect that needs to be developed. The application of ICT to the scope of government is expected to facilitate in conducting activities, improving performance, enabling various activities to be implemented quickly, precisely and accurately, with the aim of improving productivity so that the quality of the performance of governance activities increases and while improving the quality of services to the to the public and internal government [1-8]. However, government agencies or organizations can not indiscriminately invest in ICT implementation, this should take into account the costs and benefits it produces. Government organizations require a kind of blueprint often called the ICT Development Master Plan as a basis for ICT implementation for the short,

medium and long term in several stages of development that is comprehensive, realistic and measurable [9].

The ability of regions to develop, utilize and apply technological knowledge, especially ICT will be the key to the success of development that can be perceived benefit by society [10]. Therefore, the development of systematic regional innovation becomes very important and becomes the determinant of success towards the knowledge economy and knowledge of the community.

Based on the above description, the local governance considers the need for the Development of the Government Plan of ICT that can be used as guidance and reference for planning and development activities of ICT, so as to provide support to the achievement of organizational goals and government goals as well as overcoming the existing problems, threats, risks and challenges related to ICT planning and development in local governance. The main objectives of this research are:

- Identify general and specific ICT conditions prevailing in the existing district government, using methods including interviews, surveying the condition of IT across all regional devices and collecting data/documents related to vision, mission, strategic planning, tasks, other relevant documents.
- Defining ICT Architecture including business architecture, application architecture and infrastructure architecture.
- Determine the stages, priority scale of development and investment ICT refers to the priority needs, so the results have a big impact with minimal risk.

2. Development model of master plan of information and communication technology

The development model of the Master Plan of Information and Communication Technology describes the framework and components that will play a role in the implementation of e-Government. The Model Development of the Information Technology and Communications Master Plan of Regency refers to the dimensions of the Indonesian e-Government Rating (PeGI) issued by the Ministry of Communications and Informatics [4].

The Master Plan of Information and Communication Technology of the district can consist of several layers (figure 1), the first layer is the layer that will be the basis and reinforcement, a layer of organization that contains several components, namely institutional, policy, and planning. The second layer is a technology layer consisting of infrastructure and connectivity. The third layer is the application layer and content. The fourth layer is the system layer or integration, this part is the development of the application layer and content [4, 5]. (See figure 1)

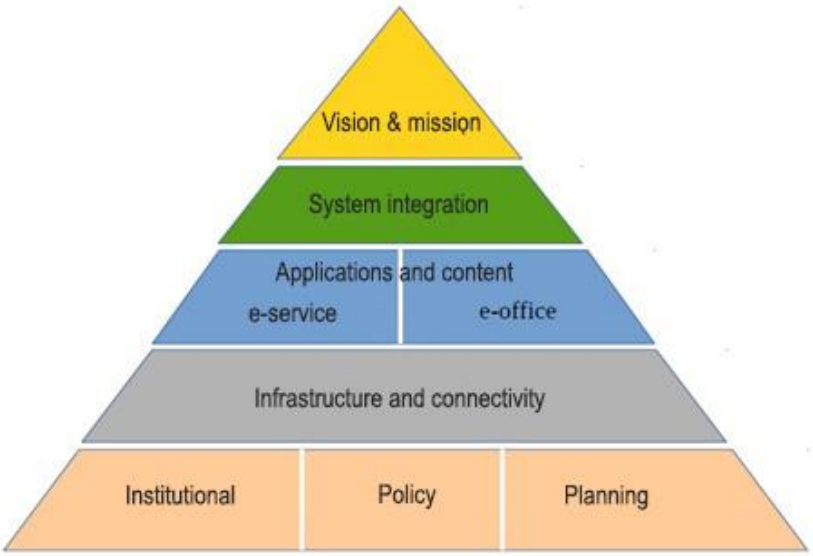

Figure 1. PeGI model of ICT master plan development.

3. Research method

The Research Method to be used for the Government Information Technology and Government Communication Development Master Plan is as figure 2. :

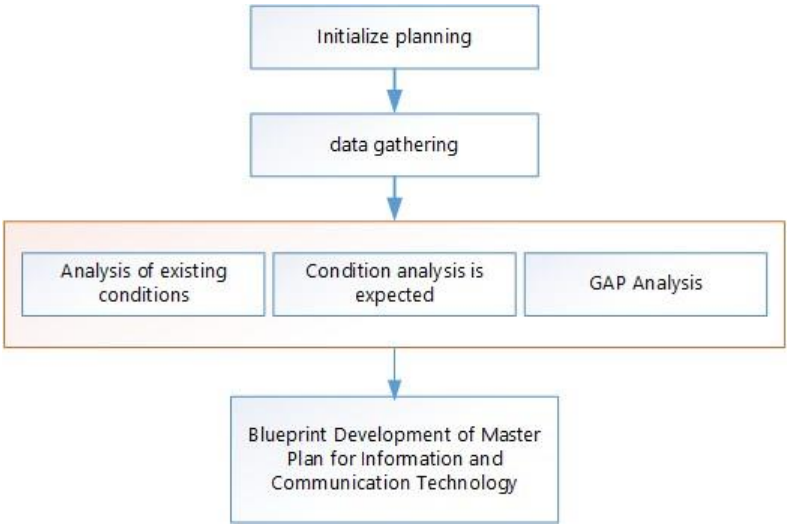

Figure 2. Research method.

3.1. Planning initiation

Planning Initiation is to recognize the scope of the study, the review literature, the determination of the methodology and framework to be used and the mapping of stakeholders who will be involved.

3.2. Data collection

Data collection was conducted to determine the level of maturity and readiness in the implementation of Information and Communication Technology. Methods the data collection used is a questionnaire with for existing system of the ICT implementation.

3.3. The expected conditions

The expected condition is to capture all the expectation, requirement, and potential of existing ICTs that can be developed in the future. The expected condition is a better condition and a solution to the current weakness of ICT.

3.4. Gap analysis

Between the reality of current conditions and expected conditions there will be gaps that become obstacles and challenges. In this gap analysis phase will be defined and mapped the various gaps in each component of ICT development as expected, then determined strategies to overcome various gaps or obstacles so that expected conditions can be realized [6, 9].

3.5. Arrangement of ICT development master plan

Each policies and programs that are part of the Information Technology and Communications Development district strategy will be translated into the design or blueprint for the development of the Master Plan for Information and Communication Technology Development.

3.6. Determination of strategic plan and road map

Strategy determination is an effort to determine policies and programs to address all kinds of gaps, obstacles, and challenges that have been mapped before, so that the expected conditions associated with the development of ICT in the district can be realized [7, 10].

3.7. Socialization of ICT development master plan

To realize and implement the Master Plan of Information and Communication Technology Development, every agency in the district must understand and care and give full commitment. Commitment can be realized if the ICT master plan is continually disseminated to all agencies within the district government.

4. Results and discussion

The research of arrangement the master plan of Information and Communication Technology is carried out in district in West Java province, Indonesia with the following conditions:

4.1. Institutions

Regional institutions whose main tasks and functions related to the management of information and communication technology in district are Communication, Informatics, Coding, and Statistics Agency. Based on the results of a survey conducted the number of employees who have a computer education background or informatics in district is as many as 45 Employees with ICT backgrounds are scattered or placed in various Regional Devices. Many of them are given task not directly related to ICT management, so their co-efficiency is not growing optimally. On the other, there are also many agency that do not have technical personnel who can handle ICT issues and look forward to applying to the Regional Personnel Agency to get additional employees with ICT backgrounds.

4.2. Policy

Based on the policy that has been made, none of the policies describe the phased obstacles and priority scale development of ICT Master Plan of district for a certain period of time. Similarly, there is no ICT governance mechanism aimed at conducting a comprehensive and coordinated evaluation of ICT development in district.

4.3. Planning

The Government of district currently does not have the ICT Development Master Plan which is the policy and technical basis for developing, developing and implementing ICT in all the Regional Devices in District. The only planning used is the strategic plan document 2016-2021 on aspects related to the utilization of ICT although it is still general.

If they refer to the main tasks and functions of Communication, Informatics, Coding, and Statistics Agency should ICT planning responsibilities and responsibilities exist for them, but so far this function has not been implemented due to resource constraints.

4.4. Application

Applications or software are widely owned and used in every agency of district scope with a variety of types and functions in accordance with the needs of each agency task. Each agency is allowed to conduct their respective applications without having to coordinate with Communication, Informatics, Coding, and Statistics Agency.

The Government of district has an official website managed directly by Communication, Informatics, Coding, and Statistics Agency. The general content of the web is information about government profiles, government resources, and news of daily government activities. The website does not contain information backed up by real-time back office applications. From several reports, it is known that the website has security vulnerabilities and has been detected as a malicious site.

4.5. Network infrastructure

Infrastructure networks for data interconnection between agency has not been built until October of 2017, but some Regional Devices already have local computer networks (Local Area Network) which are mostly used for data sharing, printer, and internet access.

Almost all the agency already have internet access with bandwidth ranging from 2 MB to 60 Mb according to their respective needs. Communication, Informatics, Coding, and Statistics Agency has opened public internet access services to the community.

There are no official and complete information security policies and standards for computer networks and data exchange between agencies of district. Each agency applies the information security system according to the needs and capabilities of agency as well as the individual capability of the management.

No Mitigation Policy and disaster recovery planning/ procedures/procedures. The new ICT disaster management is limited to performing backup and restores procedures against certain data and applications deemed important, such as the Electronic Procurement Service (LPSE) application.

For the maintenance of ICT infrastructure, most of the regional apparatus have the budget for ICT maintenance either directly or indirectly. Particularly in the governance of ICT infrastructure from the inventory side, it is currently managed generally through inventory procedures of goods/assets managed by their respective agency. There is no specific policy on ICT asset inventory and management. No specific policies and specific standards apply in full to the consolidated inventory and management of ICT assets, as well as the lack of knowledge about inventory and ICT asset management among personal and work units of ICT Device Manager.

4.6. Gap analysis

The gap analysis will depict in depth the conditions that must be realized or met to change the current state of the ICT implementation in the district against the expected or relevant realistic and future conditions [7]. The overall value of PeGI district is still very low. The results of data processing PeGI district can be explained in Table 1.

Table 1. Value of PeGI gap.

Dimensions	Present (2017)	Expected (<=2022)	GAP
Policy	1.25	2.61	1.36
Institutional	1.41	2.61	1.2
Infrastructure	1.31	2.61	1.3
Application	2.21	2.61	0.4
Planning	1.25	2.61	1.36

From the table above, it can be seen the value of the difference or the gap value that must be exceeded to achieve the expected value of PeGI. Of the five dimensions of PeGI, the three largest difference values that must be exceeded by district are in the Policy dimension (1.36), then the Planning dimension (1.36) and followed by the Infrastructure dimension (1,3). This means that in formulating policies and programs and developing e-government to obtain the expected PeGI rating, the district Government ideally in the early stages of development should prioritize ICT solutions related to the Policy dimension, followed by the Planning dimension, then the Infrastructure dimension. While other dimensions, namely Institutional and Application dimensions, must be built, because they are the dimensions included in ICT development, but with the current conditions achieved, efforts must be deployed to develop both dimensions, not as big as other dimensions of larger gap differences.

In the PeGI methodology, weights of 2.61. Within the framework of PeGI, as far as the literature goes, there is no detailed explanation of the conditions of ICT implementation in each dimension, for any given ranking weight. Therefore, to help map the expected conditions of ICT implementation on the 2.61 or "Good" weights, it is assumed that under these conditions most of the ideal attribute components needed are properly defined, functioning and well managed. Detailed description of the conditions of ICT implementation that must be submitted by the district to obtain a score of 2.61 or on the weight of Good can be listened in Table 1.

5. Master plan of information technology and communication district

5.1. Blueprint human resources

The organizational structure of ICT management unit in district government is located in Communication, Informatics, Coding, and Statistics Agency (Figure 3), especially in the field of Coding and Informatics consisting of 3 (three) sections, namely section of encryption, a section of infrastructure and ICT and governance section and informatics application (figure 3).

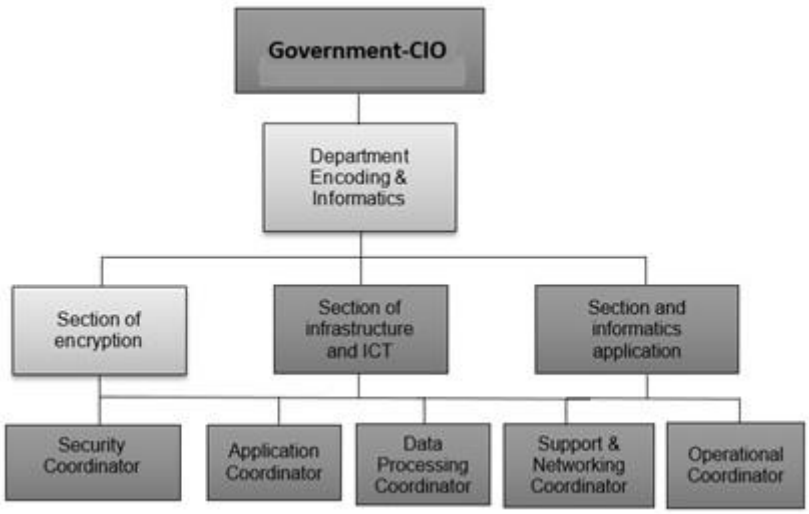

Figure 3. Organizational structure of ICT manager of district.

Figure 3 explains the general description of each position of the organizational structure of ICT managers in the district. Each position must have competence in carrying out its main tasks both technical competence in the form of basic skills of ICT, technical hardware and network and non-technical competence in the form of communication skills and interpersonal relationships.

5.2. Blueprint network infrastructure

Network configuration is structured based on several considerations, including:

- Geographical location.
- Hierarchy network which is the solution of the expected network load sharing does not occur traffic density resulting in the occurrence of a bottleneck on some network nodes
- Given the use of Fiber Optic (FO) is increasingly widespread in district, it is recommended to use the FO between the District and District Equipment while the village using Wireless Technology with a frequency of 5.8 GHz
- Backbone network, connecting Communication, Informatics, Coding, and Statistics Agency as the center of intranet network controller in district, both Local Device, District, and village. Communication, Informatics, Coding, and Statistics Agency also functioned as data center (data center) district.
- The network at Communication, Informatics, Coding, and Statistics Agency, other than as the center of the intranet network, also serves as the gateway to the global network (internet) via ISP. Links between Communication, Informatics, Coding, and Statistics Agency with ISPs can be used also FO or wireless separately, thus control of intranet network and the confidentiality of data of regency government no longer depend on by another party.

The macro topology of the intranet network describes the use of cables to form an intranet network connecting each building of the agency. Broadly speaking, cable media is used to connect adjacent buildings with distance. In this case Communication, Informatics, Coding, and Statistics Agency, being

the only one to be the gateway entrance to/from outside Government of agency including to internet through Internet Service Provider (ISP) with consideration of ease of network organization, management of data and information communication, network security management and only a few human resources are needed to handle it (figure 4).

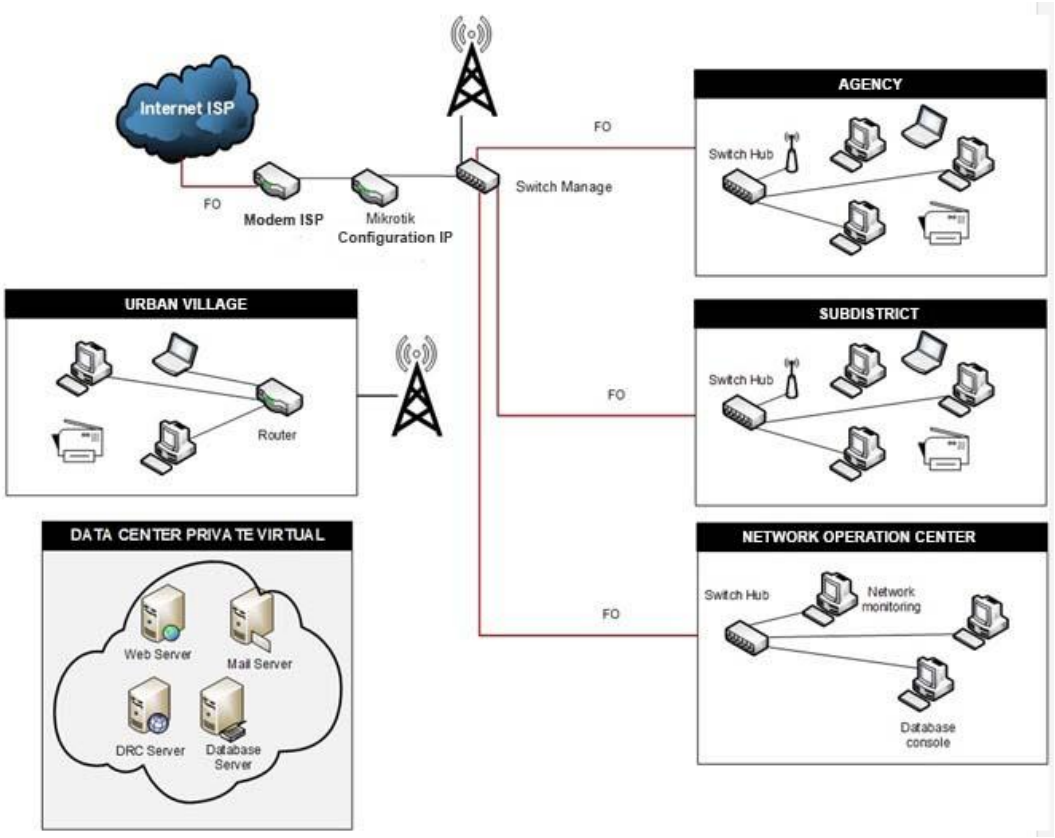

Figure 4. Network topology district.

5.3. Blueprint application

Blueprint Application will contain service functions of each agency based on the Main Tasks and Functions, not the translation of any existing applications or will be developed in the relevant institution. So there may be more than one agency that has the same module.

The services, administrative and institutional functions are then grouped into Function Block groups. Each Function Block group consists of 1 or more Function Modules that reflect groups of smaller functional units. Thus the Module is a component and is part of the Function Block.

With this approach, governance functions are then grouped into blocks of common basic functions (services, administration, management, development, finance, personnel) and other functions, particularly those related to official and institutional functions. Here is a table 2. About the list of agencies and the modules associated with each task (table 2).

Table 2. Requirements of application modules of each agency.

Agency	Existing Applications	Application Requirement
Agency for Regional Development	- e-Planning - SIMONEV	- Regional Potential System
Inspectorate	- e-LHKPN - SIPTL	- Supervision System - Publication of information
Secretariat Regional Broad of People's Representatives		- Publication of information Administrative System of Regional Broad of People's Representatives - Regional Electoral System
Education and Culture Agency	- Dapodik Application	- Education system - Publication of information
Tourism, Art and Culture Agency		- Tourism System - Youth and Sports System
Agriculture, Estate Crops, Food and Horticulture Agency	- SIMOTANDI - SIMONEV - e-Proposal	- Agriculture and Food Food and Horticultural Crop Protection Services - Food Crops and Horticultural Seeds Services - Certification Service of Food Crops and Horticulture
Marine, Livestock and Fishery Agency	- Upsus SIWAB	- Fisheries and Marine - Livestock
Transportation Agency		- Facilities and infrastructure - Transportation Roads and Bridges - Community Complaint Terminals and Ports
Labor and transmigration Agency	- SI Employment Stock	- Employment System - Transmigration System
Population and Civil Registration Agency	- SIAK - E-KTP	- Publication of information
Population Management, Woman Empowerment and Child Protection agency		- Population (related to data of women and children)
Health Agency		- Health services
Social Services Agency	- SLRT - SIM PKH - SISKADA	- Population (related to social security and health data)
Cooperatives and Small and Medium Enterprise Agency		- Commerce Small and Medium Industry
Agency for Promotion, Investment and One-Stop Licensing Service	- SIMPER	- Registration and Licensing - Publication of information - Business and Investment
Land use And Public Works Agency	- GIS Roads and Bridges	- Facilities and transportation Infrastructure - Roads and Bridges - Public facilities

Table 2. Cont.

Agency	Existing Applications	Application Requirement
Community and Village Empowerment agency	- Information System of Village Finance Management	- Community and Village Empowerment
Environmental agency		- Environmental Impact Analysis System. .. - Environmental statistics
Division Chiefs of Justice	- Network Documentation And Legal Information	- Regent's Regulation, Decision of regent, Regional Regulations of Regency and Legislative Act
Regional Personal, Training and Civil Service Agency	- SAPK BKN - e-PUPNS	- Procurement of civil servants - Attendance and payroll - Employment Assessment of civil servants - Education and training
Management of Regional Revenue, Finance and Assets	- e-Reporting - Longlist - SPD - Simda	- Budget - Cash and Treasury - Regional Accounting - Regional Income
Sub-division Chiefs of general Affair		- Catalogue of Regional Goods - Management of Regional Goods
Procurement of Goods and Services Policy Board	- SPSE - SIRUP	- Electronic Procurement Service
Revised State Budget Agency	- SIM Potential of Local Taxes - SISMIOP - SI BPHTN	- Taxation and Retribution - Publication of information - Revenue Management Area
Public Order Enforcers		- Public Order Enforcers - Publication of information - Community Complaints
Archives and Library Agency		- Mail archive and related documents
(a) Indonesian National Board for Disaster Management		- Disaster Prone Areas
Regional General Hospital	SIMRS	- Disaster mitigation and mitigation

5.4. Implementation plan

Considering the characteristics ICT of district existing and which will be needed, and taking into account the various types of ICT initiatives that have been planned, the development of ICT of district will be divided into three stages:

- Stage of Preparation
- Stabilization Stages
- Implementation and Integration Stage

These three stages of development will be implemented sequentially starting from the Preparation stage, followed by the Stabilization phase, and closing with the Implementation and Integration stage.

Each stage will be carried out various ICT initiatives in such a way, in accordance with the characteristics and intent and purpose of each stage. The consolidation phase will begin in 2017 and 2018. The Stabilization Stage is expected to run from 2019 to 2020, and a phase of implementation and integration is expected to be implemented.

And completed in 2021 to 2022. Each stage of the development process will be the foundation and support for development in the next stage. The description of the strategy of the district e-government development phase can be seen in Figure 5. In the following sections, I will explain the objectives and characteristics of ICT initiatives at each stage. (Figure 5)

Figure 5. Strategies for the development of ICT in district.

6. Conclusion

The master plan of information and communication technology is a guide to construct ICT every agency in district government for 5 years in realizing good governance. The arrangement of ICT Master Plan begins with an evaluation of the e-governance system that existing on district. The PeGI model is used for the assessment model to determine the maturity level of e-governance. Based on the value of maturity obtained from PeGI, the district government can determine the expected future information and communication technology conditions. The information and communication technology master plan that is designed to accommodate all agency needs consists of human resources, network infrastructure and application.

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