Analysis of a City Readiness in Indonesia in Implementing Integrated Information Systems toward Smart City Actualization

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Abstract—The purpose of this study is to analyze the readiness of a Municipality in implementing an integrated information system to make a smart city becomes a reality in Indonesia. In order to achieve the smart city, the Municipality needs to conduct bureaucracy reformation and good government governance. This objective can be achieved through integrated information systems. There were four variables tested in this research: management commitment, infrastructure, human resources, and organizational culture. Data were collected by using questionnaire as well as interview from civil servants at Pariaman City, West Sumatera, Indonesia. There were 149 respondents participate in this study. It is found out that in general, Pariaman City is ready to implement integrated information systems, especially related to management commitment and infra structure readiness. However, the Municipality still needs to improve human resources readiness and organizational culture itself. The results of this study can enrich knowledge related to Management Information Systems as well as Accounting Information System in government organization. The result will also give benefits to improve information system management at Municipality in Indonesia, especially at Pariaman City.

Keywords—integrated information systems; smart city; bureaucracy reformation; good government governance; organizational culture readiness

I. INTRODUCTION

World globalization will change the way individuals and organizations communicate, collaborate, and compete. Cross-border business and available information and communication technologies flatten the world and form new, complex systems to interact. As a results, knowledge revolution, which is mainly created through interconnected markets and databases as well as a large number of participants that are virtually linked together via information and communication technologies, forces the public sector to revise strategies, management, and operations to respond to increased citizen demands in a more dynamic economic environment [1].

Almost all governments in Indonesia are conducting large-scale reforms due to poor bureaucracy towards good governance. E-Government is a part of that movement.

Indonesian government has actually started the improvement of bureaucracy based on technology since the days of President Suharto with establishment of Coordination Board Automation State Administration (BAKOTAN) in 1969. It was continued by issuing Presidential Decree No. 20 of 2006 concerning the formation of the Information Technology and National Communications by Mr. President, Susilo Bambang Yudhoyono. The Provincial Government of West Sumatra, the development of e-Government is set as a priority program in its development plan, specifically to achieve the mission of achieving good, clean and professional governance as stated in Regional Regulation number 4 of 2014 concerning Amendment to Law Number 5 of 2011 concerning Regional Medium-Term Development Plan 2010-2015. The use of e-Government is one of the integrated movements of bureaucratic reform carried out by the Provincial Government of West Sumatra with the aim of increasing the management of the administration of regional government.

Correspondingly, Pariaman City Government has also made the bureaucratic reform-based technologies for achieving good governance as a priority in the Medium-Term Development Plan 2013-2018. Integrated systems is one appropriate solution in reforming the bureaucracy to realize good governance at Pariaman. As much as 72.43% of the system implementation project between 1994 and 2008 had problematic [2]. As one of the cities in West Sumatra, the City Government of Pariaman has planned e-Government in Regional Regulation No. 10 of 2014 concerning the Regional Medium Term Development Plan of 2013 to 2018, which is stated in the effort to achieve the development vision of Pariaman City to become a tourist and economic destination creative based on environment, culture and religion. The effort was formulated into the Kota Pariaman mission consisting of 4 (four) targets, one of which was to improve good and clean governance that is able to encourage the business world and the community to be more independent. It can be achieved through strengthening bureaucratic reform. The objectives are to increase the quality of Regional Financial Reports and implementing government-based and online accountability and bureaucracy or e-Government. The objectives can be achieved through reliable integrated information systems. The purpose of this research is to find out whether cities in Indonesia,

especially Pariaman City, are ready to implement integrated information system.

II. RESEARCH METHODOLOGY

This research is a type of descriptive research. Descriptive research is research that seeks to obtain a complete description of the research subject. In this study the author attempts to obtain a complete and accurate description of the readiness of the local government to implement an integrated information system in Indonesia. The object of this research is Kota Pariaman, West Sumatra, Indonesia. Pariaman City has 3,268 employees in their daily work in 40 divisions or units. Data were collected through a questionnaire using a Likert scale of 1 to 4. There were 149 questionnaires returned. Data is processed by using SPSS. There are four variables measured in this research. They are Management Commitment Readiness [3]; ICT and Infrastructure Readiness [4]; Human Resources Readiness [3-5], and Organizational Culture Readiness [7,8]. Figure 1 shows the research framework and indicators used for this research.
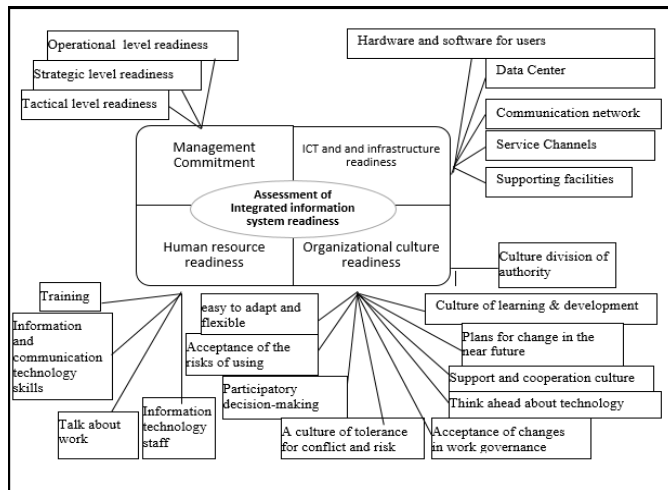

Fig. 1. Research framework.

III. RESEARCH RESULTS AND DISCUSSION

As stated in the methodology section, this study took a sample of the Pariaman city government, West Sumatra by taking civil servants who use computers in their work as the respondents for the research. There are 18 applications implemented nowadays in Pariaman city, where 12 of them from central government and 6 applications developed its own. The results of the validity of the items for the research variables indicate that all the questions in all variables are valid because the value of Corrected Item-Total Correlation is greater than r table at df 146: 0.1614. The reliability test of this research instrument was calculated by cronbach's alpha coefficient. This research instrument is said to be reliable if the value of cronbach's alpha variable is greater than 0.7. After testing, all variables show the cronbach's alpha coefficient is above 0.9. it means that all variables are reliable. Figure 2 shows the research results for all variable tested. It shows that score for management commitment is 3.52; for infra structure readiness is 3.33; for organizational culture is 3.12; and the

lowest is for human resource readiness. The following sections will explain the results for each of variables.
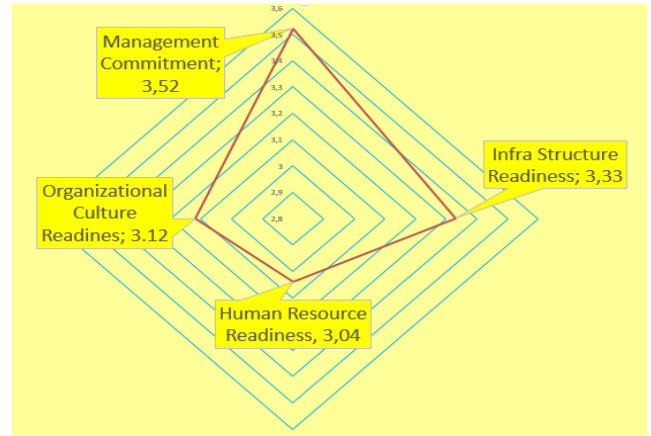

Fig. 2. E-Government readiness.

A. Information Technology and Infrastructure Readiness

Organizations in competition today always need information and communication technology (ICT) [9]. Hardware, software, data and storage, networking and security are all part of organizational technology as a whole. Almost all units in the organization utilize several aspects of Information Communication Technology (ICT), so the technology infrastructure is considered the backbone of the organization. In terms of ICT infrastructure readiness, Pariaman City Government obtained a pretty good score with an average of 3.33 (three point thirty-three) based on the general guidelines of the PeGI assessment. As seen in Figure 3, the research results found that in term of ICT and Infra Structure Readiness, Pariaman City is ready especially in Infra Structure and Communication Network, with full score of 4. However, it still need to improve hardware and software (with score of 3.5), and Network Services (with score of 3). At the data center, the city has score of 2.5. The score is very low to support E-government. The city should make a plan to implement Integrated information system to make data center reliable.
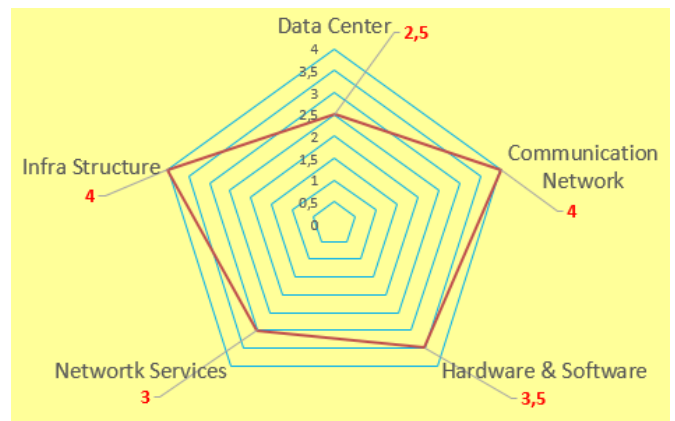

Fig. 3. ICT and infrastructure readines.

B. Management Commitment Readiness

There are several considerations inherent in an ERP implementation which is a prerequisite for effective organizational transformation required by system implementation [10]. These considerations are strategic levels, tactics and operational considerations. At the strategic level, leaders should understand the need for large resources allocation in the implementation of integrated information systems. Tchokogué further argued that the quality of human and financial resources is vital and irreplaceable in project implementation. Without strong commitment and support from top management, the system integration project will not be successful. This condition is a key strategic factor that determines the successful implementation of an integrated information system. While at the tactical level, the Manager should be able to utilize the project as an opportunity for the organization to rearrange its business concept [3]. Figure 4 shows average score for each indicator fo management commitment at Pariaman City.
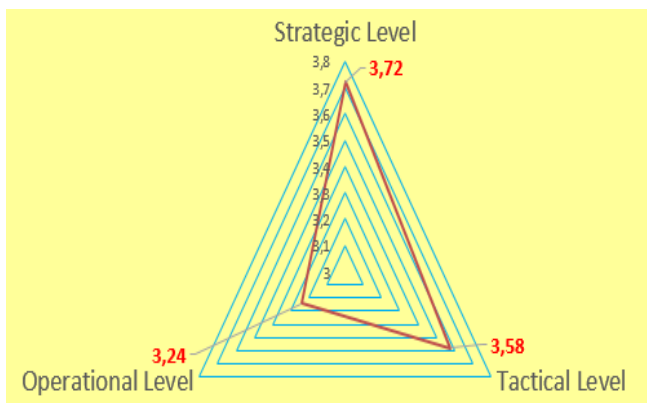

Fig. 4.   Management commitment readiness.

As seen in Figure 4, the readiness of the management, Pariaman City Government obtained the average score of 3.52. The score is the highest among four variables tested. It means in general, all managerial levels are ready to implement integrated information systems. The city has the highest score at strategic level (3.72 and follows by a score of 3.58 by tactical level. However, among the three indicators, operational readiness obtains the lowest score of 3.24. The strategic and tactical level readiness is considered better because the Pariaman City Government has been able to describe the ICT development planning in the existing budget planning and implementation documents, so that this readiness appears to have a real impact and its existence. While for operational readiness, there are some problems which are quite disturbing, data processing that has been planned to be integrated is still not able to be implemented due to various technical factors.

C. Human Resources Readiness

Guided by the theory of human capital, where in addition to technological factors, social factors also play an important role in the development of e-Government. There is an influence of human resources on the performance of e-Government implementation [11]. The higher the level of information technology literacy in human resources in the government, the more ready they are to implement the concept of e-Government. Human resources readiness has three indicators to be measured: Work Competence, Training Adequacy, and ICT Competence. Figure 5 shows the reaserch results for all indicators for human resource readiness.
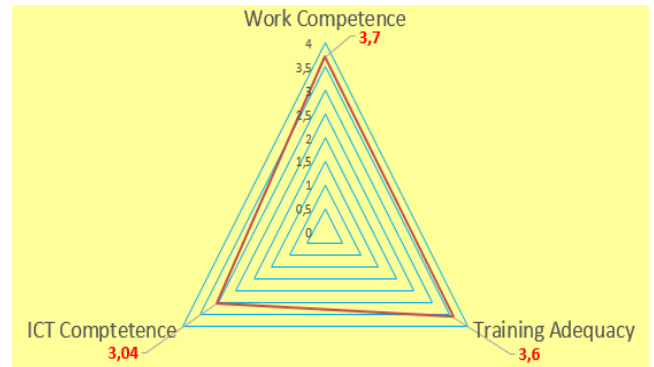

Fig. 5.   Human resource readiness.

As seen in Figure 5, the employees have a good score in work competence and training adequacy with the score of 3.7 and 3,6 respectively. It means that the employees have enough training and competence in conducting their job. However, they still have low score in ICT competency with the score of 3.04. Eventhough it is statistically good, but the results of interviews and document analysis found several problems that must be immediately followed up in order to achieve optimal readiness. Managers should be able to utilize the project as an opportunity for the organization to rearrange its business concept. The most prominent problem is the indicator of ICT skills which although statistically quite good and the fulfillment of the needs of employees, but apparently the placement of employees with a computer background is still not optimal yet.

D. Organizational Culture Readiness

Organizational culture is important in the implementation of an integrated information system [12]. Organizational culture can be a support or obstacle in the implementation process because an integrated information system will change the way employee works. Therefore, the success of the overall acceptance of integrated information system implementation depends on the organizational culture. In order to be successful in the implementation of the system, an organizational culture that emphasizes the value of sharing is needed where the common goal is prioritized and the value of trust between partners, employees, leaders and organizations. Figure 6 shows indicators used in measuring organizational culture readiness. There are ten indicators usage in measuring organizational readdiness. Figure 6 shows indicators for organizational culture readiness and its mean scores generated from this study.

Fig. 6. Organizational culture readiness.

Based on Figure 6, it is clear enough that Padang city has very good conflict management and change planning with the score of 3.46 and 3.22. The rest shows that learning culture (2.63), work delegation (2.89), team work (2.88), change resistance (2.86), flexible and adaptation (2.99), ICT risk Acceptance (2.49), ICT palnning (2.91), and participative decision (2.5).

IV. CONCLUSION

Empirical evidence obtained from the results of the study can be concluded that the City Government of Pariaman is ready in the implementation of an integrated system with several strengths and constraints. The Pariaman City Government has the potential to be successful in the readiness of information and communication technology infrastructure. However, there were problems with the lack of optimal service channels, the absence of DRC and the absence of some ICT infrastructure maintenance in implementing regulations in the City Government of Pariaman. Pariaman has a successful potential in the readiness of the adoption level in the implementation of an integrated system because it is supported by the existence of ICT development documents with legal strength, both in the long, medium and short term. Basically, there are problems with planning procedures that have not been consistently applied. The Pariaman City Government has the potential for success in the readiness of human resources in the implementation of the ERP system because there are leaders who are trusted by staffs and the DPRD able to carry out IT projects well. But there is a problem of lack of personnel with ICT skills and also cannot be utilized by staffs with a computer background in its place. The Pariaman City Government has the potential for organizational culture success in the implementation of the ERP system because of awareness of technological needs that cannot be avoided and a culture of good leadership and has a real form of bureaucratic reform. However, there are problems in this organizational culture, namely the reluctance to change in the near future because it is in a comfortable zone or staffs is difficult to eliminate the use of paper documents that are processed manually. A culture of tolerance for conflict and risk is considered inappropriate to measure the readiness of regional governments, because the lack of rules in the implementation of governance that cannot be equated with profit organizations so that despite the bad value this cannot be said to be a weakness in organizational culture.

From the findings of this study it is suggested to the Pariaman City Government to: (1) build disaster recovery documents to minimize financial and non-financial losses in the face of chaos or natural disasters; (2) building web-based service channels needs to be optimized in public services so that the services provided are better; (3) revise the Standard Costs of Kota Pariaman's Regional Revenue and Expenditure Budget to cover the budget for maintaining ICT infrastructure and ICT support. For the readiness of the system adoption level, it is necessary to formulate strict planning rules and have sanctions against violators. For the readiness of human resources, a review of human resources with a computer education background is needed to be used optimally in the implementation of an integrated information system later. As for organizational culture it is advisable to make regulations that have sanctions or are forced to force staffs to run governance with ICTs, so that the use of the system in governance becomes a must.

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