Smart City Maturity Level Analysis Using ITIL Framework

Muhammad Nur
STISIP Universitas Indonesia Timur
Makasar, Indonesia

Johan Reimon Batmetan, Hizkia Kamang Manggopa
Information and Comunication Education Engineering Department
Universitas Negeri Manado
Manado, Indonesia
john.reimon@live.com

Abstract—The smart city has become the need for more modern and advanced urban communities with technological support. The development of a smart city is related to the increase of E-Government services applied to various government institutions. The purpose of this research is to analyze maturity level and smart city readiness using ITIL framework. The research method used is maturity level measurement method using ITIL framework. This study chose the location of Manado city as one of the cities that implement smart city. The results of this study indicate that the smart city used is still a command center stationed in the city of Manado that can monitor the activity of every vehicle and various problems that cause congestion. Analysis maturity level shows that human resources, especially on the user is still low on the use of the smart city, many users who do not know and feel the impact and benefits of smart city applications. The results of this study indicate the need to increase the level of maturity both in terms of smart city applications, management, and quality of human resources.

Keywords—smart city; e-governance; ITIL framework; marturity level; Manado

I. INTRODUCTION

Most human activities are in urban areas, as a consequence of various economic activities, trade and even education centered on the city [1]. This condition raises various problems, such as congestion, increasing population, increasing crime rates and many more problems that we can find in the city. This is certainly the responsibility of the government in finding a solution to the problems in the city.

Information and communication technology has experienced rapid development which has led to changes that have been synergized in urban communities. The smart city has become the need for more modern and advanced urban communities with technological support.

The development of a smart city is related to the increase of E-Government services applied to various government institutions.

In the field of government, there are now many who have developed public services through information and communication technology, both at the central government and in regional government [2]. Through information and communication technology is expected to be an answer to solving existing problems.

Currently, the concept of the smart city is developing which is expected to facilitate the government in managing the city. A city, even a country that is safe, conducive and comfortable, is estimated to be created through this smart city concept [1].

Data from APJII's 2017 survey on internet users by region, Sulawesi Island is on the 3rd national rank in the development of the smart city. This has become a great opportunity for the North Sulawesi government, especially the city of Manado in order to realize smart city. The government in a city should carry out preparatory stages for smart cities, one of which will be launched by the Smart Command Center (C3) system. This is very important in the context of developing a city government towards the smart city. To ensure a city can implement properly the smart city system is needed to measure the maturity level of a city e-government to ensure the readiness of a city to be able to implement a smart city system. This measurement can be done on the domain design service and transition service using the Information Technology Infrastructure Library (ITIL) framework.

The maturity level of a smart city in the development of a city governance will determine how the smart city system is in the city. This will greatly help a city government determine policies and directions in determining the types and models of technology that will be implemented towards smart cities that are getting better [3].

The results of the research indicate that smart cities must be smart in developing their cities in a forward-looking manner. The smart city must consider awareness, issues, self-assertiveness, contribution, issues, and independence, in seeing the development of an advanced and smart city development, comfortable to be occupied by many people. Awareness issues become potential because this potential can only be mobilized if the public, private sector, and government are aware of the position of the city, namely knowing the city not only from within but also aware of the surrounding environment. The development of advanced cities with 6 dimensions of the smart

city includes smart economy, smart mobility, smart governance, smart people, smart living, and smart environment. [4]. The smart city is a city that has the concept of developing, implementing, and implementing technology that is applied in an area as a complex interaction among the various systems that are based on information technology [5].

The purpose of this research is to analyze maturity level and smart city readiness using ITIL framework.

II. METHOD

This study chose the location of Manado the capital city of Norh Sulawesi, Indonesia as one of the cities that implement smart city.

The research method used is maturity level measurement method using Information Technology Infrastructure Library (ITIL) framework (show figure 1). ITIL framework have 5 main component [3], there is:

- Service Strategy, providing ITSM implementation guidelines on how to view the ITSM concept not only as an organizational capability (providing, managing and operating IT services) but also as a strategic asset of the company. This guide is presented in the form of basic principles of the ITSM concept, references and core processes that operate throughout the ITIL Service Lifecycle stages.

- Service Design, providing guidance to IT organizations systematically and best practices designing and building ITSM services and implementation itself. Service Design contains principles and design methods to convert the strategic objectives of IT and business organizations into IT service portfolios / collections as well as service assets, such as server, storage and so on. The scope of Service Design is not only to design new IT services, but also to process changes and improve service quality, service continuity and service performance.

- Service Transition, provides guidance to IT organizations to be able to develop the ability to change the design results of both new IT services and specification-modified IT services into the operational environment. This lifecycle stage provides an overview of how a need defined in Service Strategy is then formed in Service Design to be effectively realized in Service Operation.

- Service Operation, is a lifecycle stage that covers all the daily operational activities of managing IT services. There are various guidelines on how to manage IT services efficiently and effectively and guarantee the level of performance that has been promised with previous customers. These guidelines cover how to maintain the operational stability of IT services and manage changes in design, scale, scope and performance targets of IT services.

- Continual Service Improvement, contains important guidelines in preparing and maintaining service quality from the design, transition and operation processes. CSI

combines various principles and methods of quality management.

Fig. 1. ITIL framework.

III. RESULTS AND DISCUSSION

The results of this study show the level of measurement of Manado city e-government level security in domain design service and transition service using the Information Technology Infrastructure Library (ITIL) framework. This maturity level was obtained by measuring 150 respondents in Manado City. Data was obtained by distributing questionnaires to respondents both offline and online. The measurement scale used uses a scale of 1-9 where 1 shows weak while getting to the right is stronger with number 9 indicating very strong.

The results of this study indicate that respondents are helped by the Smart City Application so that it becomes more effective [6,7], seen in Figure 2.
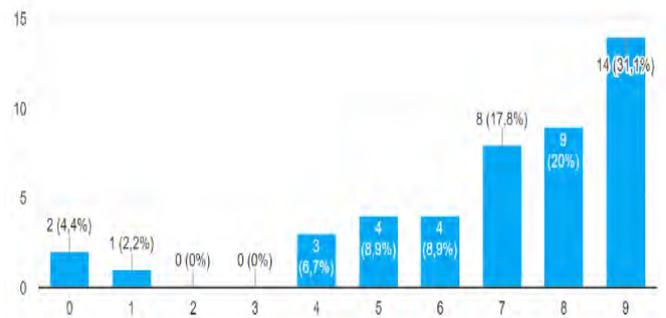

Fig. 2. Helped by the smart city application.

The results of this research also show respondents feel that the Smart City Application is useful in carrying out their basic needs such as providing traffic jams and directions [8-10], as shown in Figure 3.
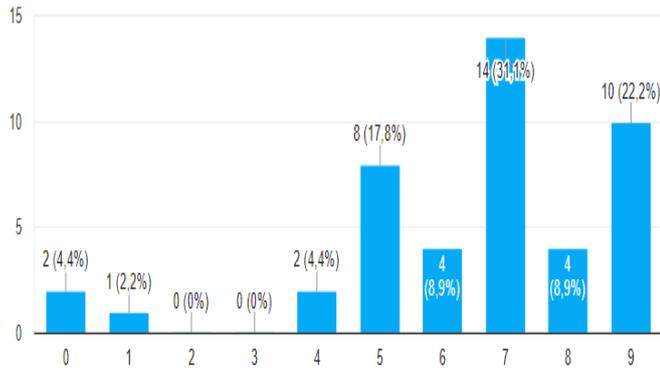
Fig. 3.   Smart city application is useful.

The results of this research also show that respondents feel that the Smart City Application can do everything I expect them to do such as providing information on ambulance information, cleaning services and transportation of home waste, floods, traffic jams and traffic directions [10,11], seen in Figure 4.
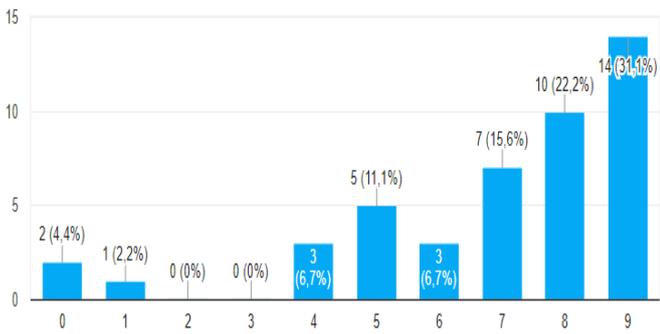

Fig. 4.   Smart city application can do everything.

The results of this study indicate that respondents feel this Smart City Application is very easy to use, generosity operates without experiencing many difficulties [12] seen in Figure 5.
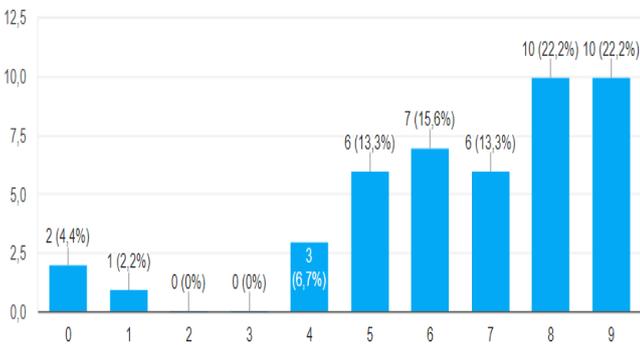

Fig. 5.   Smart city application is very easy to use.

The results of this study also show that respondents can use it without written instructions due to the easy interface display according to user needs [13], as seen in Figure 6.
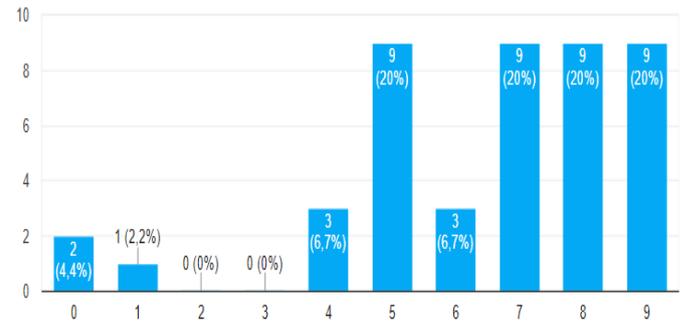

Fig. 6.   Respondents can use it without written instructions.

The result of this research shows that respondents can learn quickly in using this Smart City application [13], see figure 7.
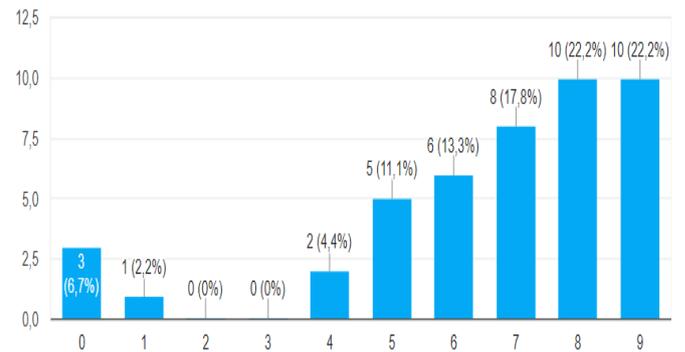

Fig. 7.   Respondents can learn quickly.

The survey results of respondents are easy to remember how to use it [14,15] see figure 8.
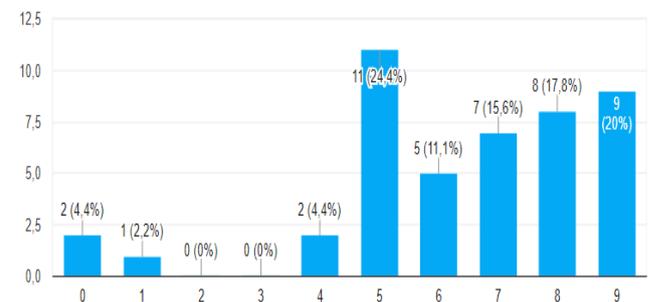

Fig. 8.   Easy to remember how to use it.

Survey results respondents Very easy to learn to use it [16], see figure 9.
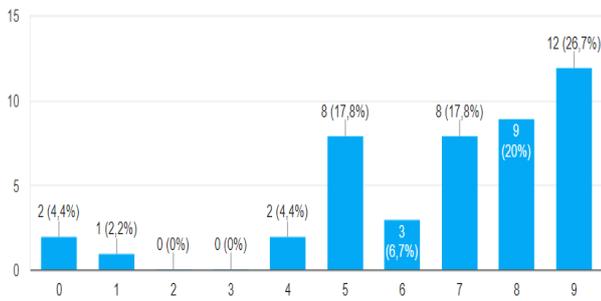
Fig. 9.   Very easy to learn to use it.

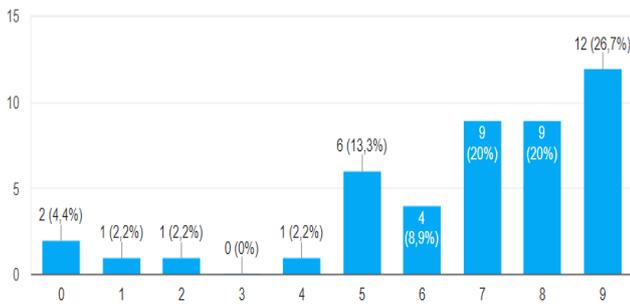Survey results Respondents are satisfied with this application [17], see figure 10.

Fig. 10. Respondents are satisfied.

The survey results of the Respondents will recommend to their friends [17], see figure 11.
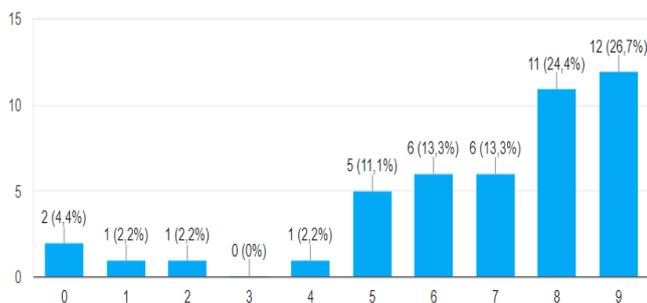

Fig. 11. Respondents will recommend to their friends.

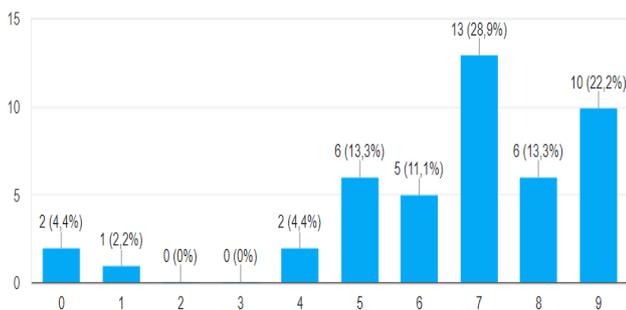The results of the application survey respondents work the way they want, see figure 12.

Fig. 12. Application survey respondents work the way they want.

In this section, it can be seen that the results of data collection with 150 respondents can be seen as the feasibility of the smart city application in Manado. In this result, it can be seen that this smart city application can be used at any time, especially in Manado command centers that can monitor the activity of each vehicle and various problems that cause congestion and can be seen from human resources for the use of this application, there are still many who do not know and feel the results, effects, and benefits of this smart application. Many residents or occupation of Manado are not using this smart city application technology.

The results of this study indicate that the smart city used is still a command center stationed in the city of Manado that can monitor the activity of every vehicle and various problems that cause congestion.

Analysis maturity level shows that human resources, especially on the user is still low on the use of the smart city, many users who do not know and feel the impact and benefits of smart city applications.

IV. CONCLUSION

To achieve a maturity level, a smart city requires good technology and human resources. This is very important to overcome many weaknesses in its implementation, but this situation does not mean not to be done, but to increase E-Government services in Manado smart city application to the smart city. There is still a lack of understanding and utilization of Smart City Application technology by occupation or society so that smart city has not seen a high level of maturity.

The results of this study indicate the need to increase the level of maturity both in terms of smart city applications, management, and quality of human resources.

REFERENCES

[1]   B.E. Bitjoli, Y.D.Y. Rindengan, and S. Karouw, "*Analisa Kesiapan Kota Cerdas (Studi Kasus : Pemerintah Kota Manado),*" Jurnal Teknik Informatika, vol.12, no.1, 2017.

[2]   E.A. Sosiawan, "*Tantangan dan Hambatan Dalam Implementasi E-Government Di Indonesia,*" Seminar Nasional Informatika, pp.99–108, 2008.

[3]   R. Kurniawati and A.D. Manuputty, "*Analisis Kualitas Layanan Teknologi Informasi dengan Menggunakan Framework Information Technology Infrastructure Library V.3 (ITIL V.3) Domain Service Transition (Studi Kasus pada Costumer Service Area Telkom Salatiga)*," vol.3, no.1, pp.31–45, 2013.

[4]   R. Giffinger, C. Fertner and H. Kramar, "City Ranking of European Medium Sized Cities", Vienna University of Technology & Delft University of Technology, 2007.

[5]   A.E. Pratama and I Putu, Smart City Beserta Cloud Computing dan Teknologi-Teknologi Pendukung Lainnya, Bandung: Informatika, 2014.

[6]   J.R.B. Suyoto and J.D.C.L. Suares, "An Empirical Investigation on Customer Behavior to Adopt Mobile Commerce among the Y Generation in Indonesia", Sriwijaya International Conference On Engineering, Science & Technology [SICEST 2016], 2016.

[7]   J.R. Batmetan and V.R. Palilingan, "Higher Education Students' Behaviour to Adopt Mobile Learning", IOP Conference Series: Materials Science and Engineering, 2018, vol. 306, Issue 1, pp. 012110, 2018.

[8] V.R. Palilingan and J.R. Batmetan, " Incident Management in Academic Information System using ITIL Framework", IOP Conference Series: Materials Science and Engineering, 2018, vol. 306, Issue 1, pp. 012110, 2018,

[9] I.M. Lopes and P. Oliveira, "Can a small city be considered a smart city?" Procedia Computer Science, vol.121, pp. 617-624, 2017.

[10] S. Escolar, F.J. Villanueva, M.J. ,Santo, D. Villa, J. Carlos, "Technological Forecasting & Social Change A Multiple-Attribute Decision Making-based approach for smart city rankings design," Technological Forecasting & Social Change, 2018, pp.1-14.

[11] P. Girardi, A. Temporelli, "Smartainability : a methodology for assessing the sustainability of the smart city," Energy Procedia, vol.111, pp. 810-816, 2017.

[12] L. Mora, M. Deakin, and A. Reid, "Technological Forecasting & Social Change Strategic principles for smart city development : A multiple case study analysis of European best practices," 2018.

[13] H. Yeh, The effects of successful ICT-based smart city services : From citizens ' perspectives, 2017.

[14] M.S. Hossain, G. Muhammad, S. Umar, "Improving consumer satisfaction in smart cities using edge computing and caching : A case study of date fruits classification," Future Generation Computer Systems, vol.88, pp.333-341, 2018.

[15] M. Zuccalà and E. Sergio, "Enabling energy smart cities through urban sharing ecosystems," Energy Procedia, vol.111, pp. 826-835, 2017.

[16] H.. Kumar, M.K. Singh, M.P. Gupta, J. Madaan, "Technological Forecasting & Social Change Moving towards smart cities : Solutions that lead to the Smart City Transformation Framework," Technological Forecasting & Social Change, pp. 1-16, 2018.

[17] B. Nathali, M. Khan, K. Han, "Towards sustainable smart cities : A review of trends, architectures, components , and open challenges in smart cities," Sustainable Cities and Society, vol.88, pp.697-713, 2018.