Developing Citizen Relationship Management (CiRM) Oriented E-Government Maturity Model

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***Abstract*—CIRM (Citizen Relationship Management) has an important role in the government because it puts citizen in the best interests. So far the implementation of e-government only focused on the technology assimilation process. Since existing e-government maturity assessment models only measure the ability of e-government technology, they lack in consideration towards citizen needs. Therefore an e-government maturity assessment model is developed by incorporating elements of CIRM. The model was developed through a grounded theory qualitative study approach. The object of this research is e-government application owned by the city of Surabaya. This research developed CiRM oriented e-government maturity model consisted of organization, interaction, service and citizen insight dimensions. This model then was used to assess the maturity of CiRM oriented e-government implementation of Surabaya Single Window (SSW) online service.**

***Keywords*—e-government, citizen relationship management, maturity model, grounded theory.**

I. Introduction

Ihanges in public services from traditional systems to e-government is seen to have many benefits, including the delivery of cost-effective services, service integration, the reduction of administrative costs, common point of view on society in all government services and ability to adapt more quickly on the needs of the citizen [1]. E-government capabilities can vary from simply providing information through networking sites, conducting financial transactions to participating in e-democracy, such as conducting electronic voting on government policies through internet [2].

Aside from government agencies, stakeholders in the digital government are the citizen and businesses [3]. Although citizen involvement in the e-government is an important governance norm [4], both practitioners and academic scientists found the government orientation to the public is still not widely expressed [5]. Most of the e-government projects only transformed originally traditional services and information into digital using information and communication technology without involving institutional and organizational changes [6]. The results of the study [7], [8] also showed that most of the models of e-government maturity measurement were technology assimilation models. These models assessed the maturity of e-government solely based on the technology or infrastructure factors adopted and used by institutions, such as websites, portals, applications and networks.

A concept involving the citizen in the implementation of government known as CIRM (Citizen Relationship Management). CIRM is essentially the implementation of CRM (Customer Relationship Management) in the public sector. Implementation of CRM in government can create opportunities for people to participate in government [9].

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Moreover, involving the citizen in governance is the key vision of the implementation of e-government [10] and the main standards of governance of e-government. Therefore effective CIRM will assist institutions/government agencies to develop and maintain strong relationships with people.

II. Method

This study used a qualitative grounded theory method referring to Cresswell [11]. Here are the steps in constructing the maturity model.

A. Conceptual Model Development

To find a complete set of CiRM oriented e-government maturity factors and construct a conseptual model, a wide range of literature on CRM, CiRM and e-government maturity factors and their measurement [12], [13], [14], [15], [16], [17] were reviewed. Those factors then were classified into four dimension (organization, service, interaction and citizen insight) according to.

During the development of the models here are the propositions:

P1: Citizen oriented culture is a factor measured in determining CiRM oriented e-government maturity.
P2: Top management support is a factor measured in determining CiRM oriented e-government maturity.
P3: Policy and strategy is a factor measured in determining CIRM oriented e-government maturity.
P4: Service offering is a factor measured in determining CiRM oriented e-government maturity.
P5: System features is a factor measured in determining CiRM oriented e-government maturity.
P6: System integration is a factor measured in determining CiRM oriented e-government maturity.
P7: Communication channel is a factor measured in determining CiRM oriented e-government maturity.
P8: Public officer participation is a factor measured in determining CiRM oriented e-government maturity.
P9: Citizen participation is a factor measured in

determining CiRM oriented e-government maturity.

P10: Citizen requirement analysis is a factor measured in determining CiRM oriented e-government maturity.

P11: Knowledge sharing is a factor measured in determining CIRM oriented e-government maturity.

P12: Segmentation and personalization is a factor measured in determining CiRM oriented e-government maturity.

P13: Performance measurement is a factor measured in determining CiRM oriented e-government maturity.

Organization representing the changes that need to be done and the internal support to implement CIRM. The factors included in this dimension showed in proposition 1 to 3. Service represents the range of online services and their features offered and provided by the government for their citizen. Proposition 4 to 6 showed factors included in this dimension. Interaction refers to citizen and public officer participation and tools that can be used by them to interact wth each other. The factors included in interaction dimension is presented in proposition 7 to 9. Citizen insights is the knowledge of the public demand for e-government services and the government performance measurement. Proposition 10 to 13 showed factors included in this dimension.

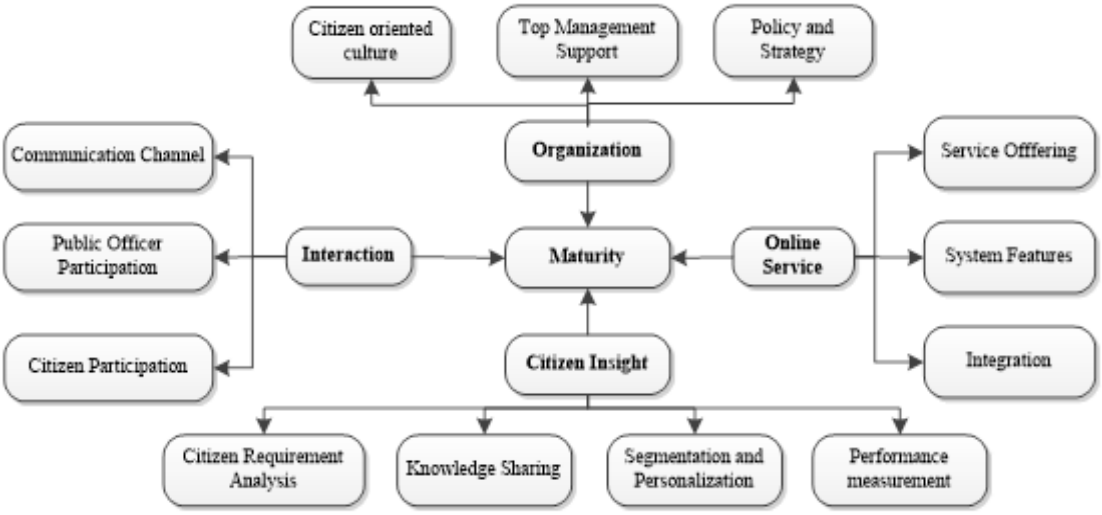

Figure 1. The Conseptual Model

B. Model Validation

Model validation conducted by interviewing citizen and business' who had experience in using e-government. The object in this research was the e-government application owned by Surabaya government, which are e-Delivery, SSW (Surabaya Single Window) and e-Lampid. Forty-one open questions were asked to the informants to conclude CiRM oriented e-government factors and its measurement process.

Then, the validity and reliability of the interviews data were checked using triangulation and member checking process. Triangulation is a method used by qualitative researchers to check and establish validity in their studies by analising a research question from multiple perspectives to arrive at consistency across data sources or approaches. There were two types of triangulation used in this research which are data source and time triangulation. Triangulation of data source conducted through interviews with different informants who had experience using the same application. While triangulation of time conducted by interviewing the each informants repeatedly. Member checking, also known as informant feedback or respondent validation, was done after the interview process. The informants were asked to determine the accuracy of the information collected in this research.

C. Data Analysis

The first stage of data analysis process, according to the spiral analysis data management, is data organizing. The process of data organizing was done by classifying information from the recorded interview into multiple parts. After organizing the data, the next stage was the data analysis to interpret the database as a whole which means trying to interpret the interview as a whole. To facilitate the process of describing, classifying and interpreting the data on the interview script, writing down the results of the interview into a document (memoing) was done.

The next step was the process of coding categories, namely open coding, axial coding and selective coding. At the open coding stage, there are two categories found as the focus of this research, CiRM oriented e-government maturity factors and measurement. Then, at axial coding stage, the interview database was exploited to confirm which factors are considered to measure CiRM oriented e-government maturity and how to measure it. Finally, at selective coding, a new factor was found which was online service reliability while segmentation and personalization factor was eliminated from the model. The final model of this research showed in Figure 2.

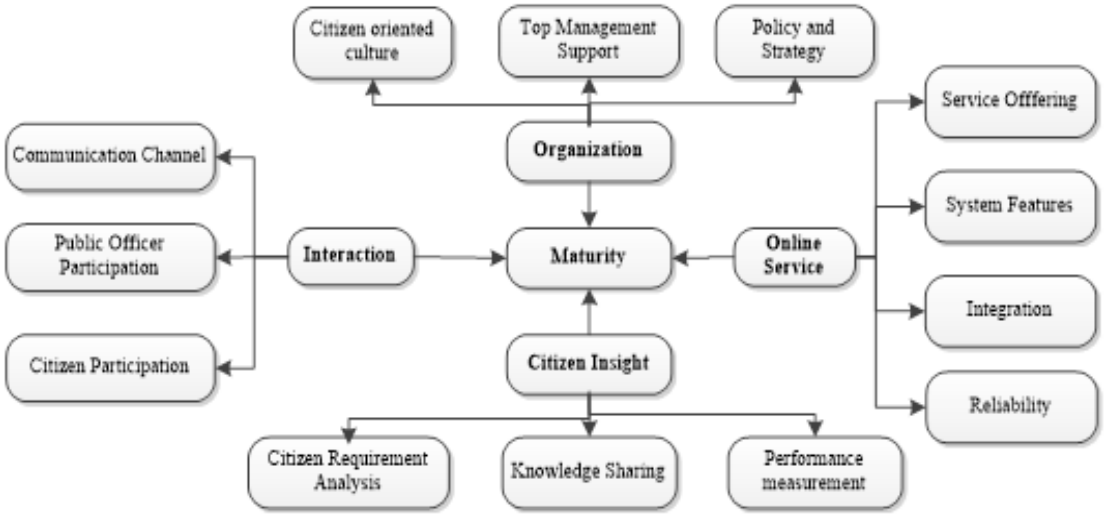

Figure 2. The Final Model

III. Results and Discussion

This chapter explained the model revision and the maturity assessment.

A. Maturity Factors

From the analysis,of interview data, all of propositions proven but segmentation and personalization. Most of the informant regarded the primary consideration for citizen is a reliable and easy to use online system. Therefore, reliability and easy to use factor were added into service domain. At last, CiRM oriented e-government maturity model consisted of 4 dimensions and 12 factors. Organization consisted of citizen oriented culture, top management support and policy factors. Interaction consisted of communication channels, public officer participation and citizen participation. Online service consisted of ease of use, system features, reliability and system integration. Citizen insight consisted of citizen requirement analysis, knowledge sharing and performance measurement.

1) Culture

Culture of service desired by the citizen is a faster and easier process without carrying around documents. In addition, citizen want a cooperative attitude of government employees when they give the service. This finding supports the claim by that the government should be aware of the importance of their relationship with the citizen. Government will only remain stable over long periods of time when the government has the ability to satisfy the citizen, particularly the ability to initiate a change in government.

2) Top Management Support

Successful implementation of citizen-oriented e-government is influenced by the support of the government agencies leaders. Regional leaders, in this case the mayor, who realized the strategic value of online services are the key to change from traditional to online services. Such leaders will be able to "force" public officer as well as citizen to switch to online services while at the same time improving the quality of online services. Institutional leaders can show their support for the implementation of citizen oriented e-government in various ways, such as making policy, whether written or oral, that may motivate, supervise and evaluate the course of the implementation of online services.

3) Strategy and Policy

Policies and strategies is one of the manifestations of leader supports for the implementation of citizen oriented online services by government agencies. The policy, both written and verbal, governing the implementation of citizen oriented e-government is important because only regulation that can bind and force all stakeholders in the public service to be actively involved in the successful implementation of citizen oriented e-government.

4) Ease of Use

Online services dimension consisted of ease of use, system features, reliability and system integration. Ease of use shows how easily the public to interact with a website. It is important to note that the government site is ease to navigate, contain clear, accurate and updated information, and also have search tools.

5) System Features

The online system features / services that citizen want can be grouped into three categories, namely information, interaction and transaction. Information means the availability of information about the online services that provided by the government and the user manual on how to use the application. While interaction category means features available in online services such as upload, download, form filling, printing and history, error notification when a user fills a form, notifications related to the data filled by user, and communication channels that enable the citizen to interact with government officials and provide feedback, suggestions and advice to the government. Transactions is the sistem ability to provide online payment service.

6) Integration

At most of maturity models, the highest level is integration of online services. In this case, the citizen wanted the same thing. The online services provided by an agency should integrate to those provided by other

government department or agencies and the central government..

7) Communication Channels

Interactive environment becomes one of the things to consider when developing an online service because it enables users to communicate and interact with government employees and enable them to obtain the necessary information. Of course, in order citizen and government employees can interact with one another, they need communication tools. Tthe government can use the communication tools to socialize their online services. While the citizen can use them to ask and look for solutions when they have difficulty in accessing or using the online services as well as express their aspirations. Communication tools provided to them could solve their problems without requiring them to come to the office. Communication channels provided may include phone, email, social network and online chat services.

8) Public Officer Participation

Government employees, especially those dealing directly with the citizen, are the parties directly involved in the implementation of public services. The quality of public services perform by the government can be identified from the services quality provided by government employees. Certainly, citizen expect good service from government employees. In serving the public, government officials are expected to be active in providing information and educating citizen about the availability of online services, guiding them to be able to use the online services, and of course as an online service users themselves.

9) Citizen Participation

Citizen are stakeholders in government thus public acceptance of online services is substantial. It would be futile when government provides online services, but the citizen is still choose to use the traditional/offline services. Therefore, not only should the participation of government officials be considered, but the government also needs to evaluate public participation in the implementation of online services. Active citizen are those who take the initiative to find out about the online services provided by the government then socialize them to other citzen, actively use and give feedback to improve services.

10) Citizen Requirement Analysis

Before an online application is developed, ideally, it is necessary to gather the citizen requirement thus the application can be a right solution for its users. However, since the public management are bound by formal rules, when developing an application, government should heavily relies on the regulation or law. Moreover, most citizen are tech-savvy thus they will not be able to understand and even not consider technical things of the online application. Therefore, the information gathered from requirement gathering process primarily related to a user profile, general problem solving related to online service process and or other requirements that are specific. An online application or service that can solve most, if not all, of citizen needs will attract them to shift from using traditional service into online.

11) Knowledge Sharing

It is necessary to have knowledge transfer/knowledge sharing among government officials thus there will be no gaps in information services provided to citizen. When knowledge gap exist, citizen may need to wait for certain government officer to obtain a service. Moreover, knowledge-sharing activity may bring in possible feedback useful to make improvements and innovations to the services provided.

The knowledge sharing process may be done in various ways, for example morning meeting (in the morning before starting work, all employees gather to share stories about their experiences on the previous day), briefing, training, socialization, and the provision of video tutorials.

12) Performance Measurement

To ensure the performance of something, it is necessary to conduct an evaluation. CIRM is no exception. The first thing that must be evaluated is the online application or service itself. An online service must be available at all time and situation, fast to access, easy to use, having no error, and contaim all the features needed by citizen (information, interaction and transaction). Simply, those are related to the user experience when using online application.

Next, another thing that needs to be evaluated is services. The services provided must be able to speed up, not complicate and resolve the problems faced by users. In the context of e-government, services are provided by government employees thus their extent of involvement in providing services also need to be evaluated. Next , policies, goals and objectives, and innovation made by government to improve the quality of online services provided also need to be assessed.

13) Segmentation and Personalization

The citizen of Surabaya is society and largely unfamiliar with the online service makes segmentation and personalization in online services is yet necessary. Segmentation can occure in different services to cater different segments of citizen, such as e-delivery for partner/vendor company of Surabaya government or SIUP/TDP for business. Similarly, the personalization is still regarded as additional features and less essential. The citizen of Surabaya, prefer online services that is easy to use, quickly accessible, meeting their needs without having to come to the office and be able to fasten the process of services.

B. Maturity Assessment

After all the factors of CIRM oriented e-government maturity obtained, the indicators for each of those factors were then determined. These indicators can be seen in Table 1.

TABLE 1.
CIRM ORIENTED E-GOVERNMENT MATURITY INDICATORS

A.	**Citizen Oriented Culture**
1.	People's satisfaction as the orientation of the organization when providing services
2.	Provision of added value to the community as the basis for policy, strategy and business process organization
B.	**Top Management Support**
1.	Government leaders place public services as a priority
2.	Top management able to encourage and motivate employees to provide services to the community as a top priority
3.	Top management involved in the implementation of the CIRM
C.	**Policy and Strategy**
1.	Regulations or instructions on the use of online services are established
2.	Government socialize government online services through various media (electronic media, printed media, etc.)
D.	**Ease of Use**
1.	Application is easy to use ease
2.	Online services is easy to learn
3.	Navigation of online services are easy to use
4.	Online services website address is easy to find
5.	Appearance or design of online services is suitable
6.	Layout tools on online services are suitable
E.	**System Features**
1.	The ease of finding information on online services
2.	The ability of the system to reuse user data stored for subsequent interactions
3.	The completeness of the information available on online services
4.	The availability of the necessary forms available on online services
5.	The availability of features for downloading or uploading documents in the online service
6.	The availability features to make online payments on online services
7.	The error notification feature availability on online services
8.	The system's ability to provide solutions to the mistakes made in online services
9.	The availability notification of the completion process of service of the online services
F.	**Reliability**
1.	The speed of the process of downloading the document / form on online services
2.	The speed of uploading process document / form on online services
3.	The availability of access to online services
4.	The online service's ability to successfully complete the process of service without having to be repeated
5.	The speed of the service process on the online service
6.	The compatibility of online services to other supporting devices (hardware / software)
G.	**Integration** [18]
1.	The integration of applications (application name) with other applications within the government agencies
2.	The integration of applications (application name) with other applications on other government agencies at the same level
3.	The integration of applications (application name) with other applications on other government agencies at the provincial level
4.	The application integration (application name) with other applications on other government agencies at the national level
H.	**Communication Channels** [19]
1.	The availability of communication by telephone
2.	The availability of communication via email
3.	The availability of communication through aid form
4.	The availability of communications via webchat
5.	The availability of communication through social media
I.	**Public Officer Participation**
1.	The public officers know about the online services
2.	The public officers understand the procedure of online services
3.	The public officers use online services
4.	The public officers socialize their online services
5.	The public officers provide guidance the citizen in using the online service
6.	The attitude of public officers when providing service
7.	The alertness of public officers to provide answers to questions from the community
8.	The accuracy / suitability of the answers given by public officer to questions of society
9.	The public officers commitment to increase community satisfaction
J.	**Citizen Participation**
1.	The citizen knows about online services
2.	The citizen understands the online service procedures
3.	The citizen uses online services
4.	The citizen socializes their online services
5.	The citizen gives feedback / complaints related to online services
K.	**Citizen Requirement and Profile Analysis**
1.	The process developed by the government to gain knowledge about the system and new services required by the community
2.	The process developed by the government to carry out profiling on society
L.	**Knowledge Sharing**
1.	The availability of open two-way communication between departments
2.	The availability of facilities that facilitate employee for making knowledge sharing for eg training, tutorial, etc.
3.	The ability of organizations to encourage employees to undertake knowledge sharing
M.	**Performance Measurement**
1.	The availability of process to measure citizen's satisfaction for online services
2.	The availability of government employee performance evaluation process based on their understanding of the

	citizen needs
3.	The avalability of process in assessing the successful implementation of online services

All the indicators that have been presented in Table 1 was used as a tool to assess the maturity of CIRM oriented e-government. Measuring tool that had been created was implemented to assess the implementation of online services maturity in Surabaya. The online service chosen to be assessed is Surabaya Single Window (SSW) application. There are eighteen respondents involved in the assessment. All of them are active user.

Each respondent was asked to give a score corresponding to the scale that is specified for each indicator. Adopting from [20], [21], the scale of each indicator was 0-100. Then the score of each indicator was obtained by calculating the average score of each indicator of all respondents. While the average score for each factor is obtained by calculating the average score of all indicators for related factors. After the score for each of these factors obtained, then the score was classified into two categories, namely mature (when a factor gained at least 80) and not mature (when the score of the factor was less than 80).

Adopting the level of maturity by, at the level 0 maturity, citizen oriented e-government implementation is still not well defined. While at the level 1 maturity, the organization began to realize the importance of changing its mindset towards meeting the necessity of its citizen and satisfy them, thus the cultural factors and strategies factors should be mature at this level. Researchers also adopted this statement and incorporate cultural factors and policies into level 1. At level 2 maturity, the leadership and management factors should be mature at this level. Both factors are similar to the management support factor thus management support was defined as the characteristic of level 2 maturity. At level 3 maturity, government employee must actively participate in the providing of e-government services. In this study, participation should go both ways, from the government employees as well the citizen side. Therefore, the of government employees and the citizen participation factor were put in level 3. At the level 4 maturity, organization must conduct routine evaluation of their services by implementing quantitative measurement, thus performance measurements factor was defined as the characteristic for this maturity level. At level 5 maturity, the technology and knowledge management should be mature. This study adopted this statement and included all factors in the domain of online services, citizen profiles and requirement analysis and knowledge sharing factor into level 5.

The results showed that the scores for all factors was below 80, which means there were no factors considered mature. Therefore, the SSW implementation was still not fully consider the citizen interest. Orgaization culture (citizen oriented culture) is the foundation of CIRM oriented e-government implementation. This factor imoact greatly onto the other factors, such as organizaton leaders support and the services quality provided by government employees. Most respondents gave low scores for cultural factors because they have yet feel satisfied with the services provided by government employees. The citizen was still having difficulty to communicate or interact with government employees via communication channels such as telephone or email. Sometimes though they had come to the government office, their problems was not necessarily resolved, because not all employees had knowledge to solve their problems thus they still had to wait or meet another employee or even go to another offices. Respondents felt the lack of active involvement of the organization leaders to encourage their employees to provide satisfactory services toward the citizen.

IV. Conclusion

Based on the results of research conducted, it can be concluded that there are four dimensions measured in the assessment of CIRM oriented e-government maturity, namely the organization, services, citizen interaction and citizen insight. Organization dimension was consisted of four factors, namely citizen oriented culture, top management support, policy and strategy. Four factors are evaluated in service dimension, namely ease of use, system functionality, system reliability and system integration. Interaction dimension was consisted of three factors, namely communication channel, government employees participation and citizen participation. While citizen insight dimension was consisted of three factors, namely citizen requirements and profile analysis, knowledge sharing among government employees and performance measurement.

We acknowledge that this study is no more than a first step toward a theoretically and practically sound CiRM oriented e-government maturity assessment tool. To accomplish our ultimate objective, we have to overcome several critical limitations, which should be addressed in future studies. First, this study only used three online application as its research objects. The future research need to add some other object to get a more comprehensive perspective. Second, the informants selected were those who have background and experience in the developing of online services. Moreover, the informants were only selected from citizen, thus the factors used to assess CiRM oriented e-government maturity was obtained from one point of view only. The future research shall add informants from different segments and also involve government and business, thus gaining more comprehensive maturity measurement factors. Third, based on the interview data results, the segmentation and personalization factor were removed from the model. Yet, many previous research put these factors as substantial in the context of citizen oriented services. Therefore, future study may include segmentation and personalization factor in the assessment of CiRM oriented e-government maturity. Fourth, in this study, a scale used to score the indicators was 0 to 100 for all indicators. This resulted in the assessment carried out solely based on perception. There were some indicators that the assessment should based on documented proof of CiRM oriented e-government implementation, such a policy. Future studies are recommended to use more rigid method of measurement for all indicators.

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