e-Government Challenges in Developing Countries: A Literature Review

Ruci Meiyanti[a1], Bagus Utomo[a2], Dana Indra Sensuse[a3], Rinda Wahyuni[a4]
[a]e-Government and e-Business Research Lab, Faculty of Computer Science, Universitas Indonesia, Indonesia
[1]ruci.meiyanti@ui.ac.id, [2]bagus.utomo@ui.ac.id, [3]dana@cs.ui.ac.id, [4]rinda.wahyuni@ui.ac.id

***Abstract*—Implementation of e-government can improve government's services to their stakeholders. However, there are many challenges that impede its implementation. The high failure of e-government encourages the research about challenges of e-government implementation in developing countries. This study aims to identify and propose a generic framework of e-government implementation challenges in developing countries. This research used Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) method and data source such as: IEEE Xplore, Science Direct, and SpringerLink. From 18 sources in review, there are six challenges categories of e-government implementation in developing countries. They are IT infrastructure, managerial issue, digital culture, budgeting, laws and legislation, and human resources. Government must pay attention and focus on these challenges to ensure the successful implementation of e-government.**

Keywords—e-government, implementation challenges, developing countries

I. INTRODUCTION

The main goal of e-government is to develop a digital state in order to deliver public services and information to citizens electronically [1]. As the most fundamental infrastructure for transformation from traditional government to e-government services, Information Technology (IT) play important part in facilitating organizational change programs where e-government has been implemented in many countries [2]. Implementation of e-government can improve government's services to their stakeholders, especially for developing countries. The top three benefit of e-government for stakeholder group/roles are: easy to use, accessibility and inclusivity, and confidentiality and privacy [3].

However, challenges in e-government implementation can make the project fail. The failure either fail or can not meet the expected outcomes of e-government initiatives is more than 60 percent [4]. The analyst estimates that from more than 40 e-government implementation projects in developing or transitional countries, 35% were total failures, 50% partially failed, and only 15% were successes [4]. The failure rate is higher in developing countries because of many challenges faced by the government.

In developing countries, many different models have been developed to make sure these ideas succeed. Unfortunately, the strategies and experiences from developed countries may not be directly applicable to developing countries because of the differences in technological and social condition [2]. The difference maturity of technical and non-technical infrastructures need different strategies. Focus in e-government implementation is the main difference between developed and developing countries, where e-government in developing countries focus on transparency and fighting corruption [4].

The high failure of e-government implementation in developing countries is motivation to do this research. This study aims to identify and propose a generic framework of e-government implementation challenges in developing countries. Therefore, a systematic literature review is conducted based on previous study about e-government implementation in developing countries, mostly in Asia and Africa. The findings of this paper hopefully can be used to guide and give understanding about challenges that government must pay attention and focus to ensure the successful implementation of e-government. This paper was organized using PRISMA method and divide into five sections. The first section explained about the introduction. The second section review the theories which used in this study. The third section defines the methodology. The result of analysis is explained in section fourth. Finally, conclusion of this study declared in the fifth section.

II. BACKGROUND THEORY

A developing country, also known as a less-developed country (LDC), defined as a nation which have three conditions: low living standard, undeveloped industrial base, and low Human Development Index (HDI) compare to other countries [5]. There are many definitions of e-government. E-government can be defined as the ability of government to provide government information and services electronically, quickly, and accurately to their citizens, with minimum costs and less effort through a single site on the Internet [5]. The World Bank has defined E-government as the use of information technologies (such as Wide Area Networks, the Internet, and mobile computing) by government agencies that have the ability to transform relations with citizens, businesses, and other arms of government (Worldbank.org).

E-government also defined as the use of ICTs to increase the process of government, also called as citizen's services, re-design with technology or procurement through the Internet [6]. E-government [7] transform traditional government into electronic government as shown in table I.

TABLE I
DIFFERENCES BETWEEN TRADITIONAL AND ELECTRONIC GOVERNMENT

Traditional Government	E-government
Controlled bureaucratically, authority of hierarchy clearly defined	Client service and community empowerment, unclearly/blurred hierarchy
Process centricity	Customer centricity
Isolated administrative functions and gathering data	Integrated resource service and focus on knowledge
Functional specialization of units or geographic bias	Eliminate unit barrier, integrated government
Decision based on organizational rules and reporting approvals	Negotiable decision and implicit controls and approvals
Administrative functions separately	Integrated resource services
Silo information technologies	Integrated network solutions
Slowly process, time-consuming	Fast streamlined responses

E-government can be classified into 8 categories as follows [6]:

(1) Government-to-Citizen (G2C)
Provide public services online, use the electronic service for delivering information and communications;

(2) Citizen-to-Government (C2G)
Provide public services online, use the electronic service for exchange of information and communication;

(3) Government-to-Business (G2B)
Encourage E-transactions initiatives such as e-procurement and create an electronic marketplace for government purchases; and implement Government procurement tenders electronically;

(4) Business -to-Government (B2G)
Encourage E-transactions initiatives such as e-procurement and create an electronic marketplace for government purchases; and implement government procurement tenders electronically;

(5) Government-to-Employee (G2E)
Begin initiatives that will accommodate the management of the civil service and internal communication with governmental employees in order to make e-career applications and paperless system in E-office.

(6) Government-to-Government (G2G)
Provide the Government's departments cooperation and communication online to increase efficiency and effectiveness, including internal exchange of information and commodities.

(7) Government-to-Nonprofit (G2N)
Government deliver information and communication to nonprofit organizations, such as political parties, social organizations, Legislature, etc.

(8) Nonprofit-to-Government (N2G)
Transfer of information and communication between government and nonprofit organizations such as political parties, social organizations, Legislature, etc.

The evolutionary of e-government development can be divided into four steps, from (1) web-presence through (2) interaction and (3) transaction levels, to the (4) transformation or horizontal integration level, where all government information systems are integrated across departments [4].

III. REVIEW METHODS

A. PRISMA Method

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) is a methodology that is used in this systematic review to identify the research. PRISMA are divided into four steps as follow: identification, screening, eligibility, and included [8], [9].

Step one, identification consists of identification through database searching and other resources. Identification through database is conducted by searching through online databases, which are: IEEE Xplore, Science Direct, SpringerLink, Emerald Insight, ACM, Researchgate, CiteseerX, and ICDST. Using keywords such as: “e-government” AND “challenges” AND “developing countries” OR “opportunities” OR “obstacles” OR “barriers” OR “success factor”. Step two, screening is restricting articles that are only published from 2008 until 2017 and eliminating the articles that are duplicate. Step three, eligibility is selecting articles based on the inclusion criteria and eliminates articles based on exclusion criteria. Step four, the articles that passed eligibility are included in the synthesis.

B. Research Question

The systematic review is used to answer the following question: What are challenges of e-government implementation in developing countries?

C. Inclusion and Exclusion Criteria

The purpose of inclusion and exclusion criteria is to ensure that only relevant researches are included in our literature review. We collect research articles published from 2008 to 2107 in digital databases which related to e-government implementation especially in developing countries. We eliminate researches that located in developed countries such as United Kingdom and Sweden. Inclusion and Exclusion of this paper can be seen on table II.

TABLE II
INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria: ▪ Articles about e-government implementation ▪ Articles about challenges, opportunities, obstacles, barrier, success, failure e-government implementation in developing countries ▪ Articles related to the research question
Exclusion Criteria: ▪ Duplicate articles ▪ E-government implementation in developed countries ▪ Unpublished articles

D. Article Selection Process

The process of articles selection consist of four main stages refers to PRISMA as shown in figure 1.

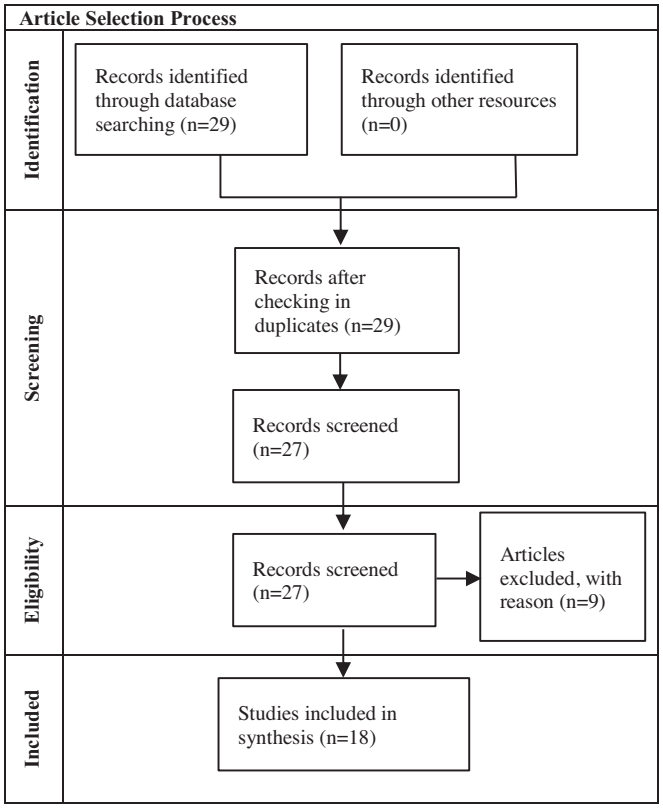

Fig.1. Articles Selection Process (PRISMA)

Figure 1 shows that identification resulting 29 articles. There are no duplicate articles because already eliminated when searching on identification stage. Records were excluded in eligibility stage because not relevant with research question. Finally, 18 articles remain and included in the synthesis.

E. Data Extraction and Synthesis

The process of extraction and synthesis data was performed by reading each article carefully and write down the relevance item into Microsoft Excel spreadsheets. The following items were extracted are: study ID, bibliographic references, challenges, location, and others context. The detail data extraction for the 18 articles was driven in table III.

TABLE III
DATA EXTRACTION

Extracted Data	Description
Study ID	Unique identity for the paper
Bibliographic references	Authors, tittle, publication years and publication source
Challenges	List of e-government implementation challenges
Other contexts	Definition e-government, developing countries, some recommendation and conclusion

IV. RESULT

This section focuses on the result obtained after analysis each article. The analysis focus on answering the research question which has mentioned in section 3. We use challenges and opportunities framework [5] and potential challenges and opportunities [6] as a tool to mapping others challenges in e-government Implementation. According to research question, this paper only focuses on e-government implementation challenges. Odat [5] categorized these challenges into five key as shown on figure 2.

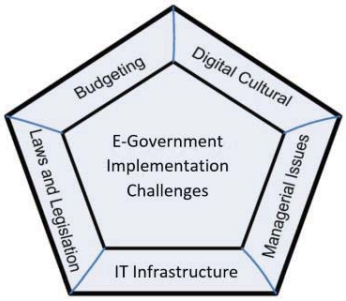

Fig. 2. Challenges Framework in E-government Implementation

From each category, Odat [5] breakdown into a group of detailed point as follows in table IV:

TABLE IV
IMPORTANT POINT OF EACH CHALENGES

IT Infrastructure
1. Lack of technological skills among leaders
2. Lack of technological skills among employees
3. Lack of technological skills among citizens
4. Lack of technological skills among disabled people
5. Lack of qualifications required of government IT staff/developers
6. Lack of Hardware and / or maintenance and / or updated
7. Lack of Software and / or maintenance and / or updated
8. Lack of communication systems
9. Poor/Lack of Digitized Information
10. Lack of Integration Systems
11. Lack of Interoperability
12. Lack of Record Mobility
13. Availability and Preservation of Data

Managerial Issues
1. Well care from the top of the pyramid in the administrative state
2. Workforce and Resistance of Change
3. Lack of Transparency
4. Turnover of workforce
5. Collaboration and Coordination

Digital Culture
1. Digital Divide
2. Lack of Awareness
3. Lack of Trust

Laws And Legislation
1. Updated to recognize electronic documents and transactions
2. Policies support rather than impede e-government

Budgeting
1. Lack of budget in general
2. Lack of funding sources
3. Lack of management of the availability resources
4. Corruption and misuse public money

As comparation, Yanqing [6] identify challenges of e-government implementation as follow: computer security, privacy, disparities in computer access, government information technology management, and funding. All these challenges are already listed in the challenges framework [5]. From now, challenges framework [5] will be used as benchmark to mapping other challenges from other developing countries. Challenges from others developing countries is shown in Appendix A.

V. Discussion

According to table V, there are many different challenges from different countries. These challenges influenced by different conditions included social, economic, political, cultural, education etc. Most challenges are mentioned in challenges framework [5]. Although the challenges framework is complete enough, but there are some challenges not mentioned such as training, education, and motivation to e-government user and developer. These challenges can group into human resources category, consist of training [10], [12], [13], [15], motivating [10], educating [7], [10], [15], skill shortage [11], [15], and unspecified other human resources [14], [16], [18], [19]. According to infodev.org, "successful e-government is at most 20% technology and at least 80% about people, processes, and organizations"[20]. Based on these result, we proposed to customize the challenges framework by adding "human resources" key. Human resource key included training, education, motivation, skill shortage, and others factor that support user or developer implementing e-government. The new challenges framework is shown on figure 3.

Fig.3. The New Challenges Framework of E-government Implementation

VI. Conclusions

This systematic literature review uses PRISMA method to identify e-government implementation challenges in developing countries. We started from 29 initial studies that was collected from online scientific database. During articles selection process, only 18 papers were included in analysis. Based on these 18 studies, e-government implementation challenges can be classified into 5 keys, there are: IT infrastructure, managerial issue, digital culture, budgeting, laws and legislation, and human resources. Each key has some detailed important points.

IT infrastructure represent lack of hardware, software, maintenance and updated system, communication systems, integration systems, etc. Managerial issues consist of well care from the top of the pyramid, workforce and resistance of change, lack of transparency, turnover of workforce, and collaboration and coordination. While digital culture separated into three aspects: digital divide, lack of awareness, and lack of trust. Budgeting challenges divide into lack of budget in general, lack of funding sources, lack of management of the availability resources, and corruption and misuse public money. There is no detailed point from laws and legislation key. Finally, human resources consist of training, education, motivation, skill shortage, and others factor that support user or developer implementing e-government.

Although these challenges can impede the implementation of e-government, the challenges can be opportunities as well. Government must pay attention and focus on these challenges to ensure the successful implementation of e-government.

VII. Limitations And Future Works

The new challenges framework must be validated to confirm the validity. It needs to re-categorized important point of each challenge key to avoid redundancy. The next research may be can use this new challenge framework to identify e-government implementation challenges in other developing countries.

Limitation of this research is the new framework has not been validated by expert. In order to avoid redundancy, it necessary to re-categorized important point of each challenge key. The next research may use this new challenge framework to identify e-government implementation challenges in other developing countries.

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Appendix A. E-Government Challenges in Developing Countries

Sources	Countries	Challenges
(Sarrayrih & Sriram, 2015)[10]	Oman	- planning and management - training for public, ICT and staff members for using the ICT resources - motivating and educating to the importance of using e-government techniques - high data security - internet services
(Furuholt & Wahid, 2008) [4]	Indonesia	- management - infrastructure - human factors
(Ahmed, Moreton, Mehdi, & Elmaghraby, 2013)[2]	Libya	- technical - infrastructure - cultural - social
(Asogwa, 2013)[11]	Nigeria	- lack of consultation - incessant power outage - security and privacy protection - technological barriers - low internet penetration - the issue of the “digital divide” - shortage of skilled manpower - bribery and corruption
(Al-Tourki, El-Sofany, Al-Sadoon, & Al-Howimel, 2012) [12]	Saudi Arabia	- resistance to change to electronic ways - lack of policy and regulation for e-usage: - lack of partnership and collaboration - lack of strategic planning - financial barriers - lack of qualified personnel and training - lack of programs to promote e-government - benefits and advantages - culture - leaders and management support - ICT infrastructure - privacy, security and trust in e-services
(Nkwe, 2012) [13]	Botswana	- digital divide - privacy and security concern - limited IT skills and training - culture - lack of citizen awareness and participation
(Almarabeh, 2011) [7]	Jordan	- online services - telecommunication infrastructure - education
(Khan, Khan, & Zhang, 2010) [14]	Pakistan	- lack of proper institutional, regulatory, monitory, and financial policy - lack of Government Information Infrastructure (GII) - low Telecommunication Infrastructure - low Human Capital Index in both Adults Literacy Rate and combined Primary, Secondary and Tertiary enrolment ratios - lack of online availability of any basic citizen or business services
(Mutula & Mostert, 2010) [15]	South Africa	- poverty - inequality - corruption - insecurity - illiteracy - skills shortage - legacy systems - the need to implement transversal systems - shortage of ICT skills - limited capacity to deliver the necessary task force. - education and training
(Bhuiyan, 2010) [16]	Kazakhstan	- political support and relationship between political institutions, bureaucracy and citizens - corruption

Sources	Countries	Challenges
		- digital divide - Infrastructural development - human resources - poverty - harnessing privacy
(Sang, Lee, & Lee, 2009) [17]	Cambodia	- infrastructure development - law and ICT policy - management - equity issues - the digital divide - privacy and security
(Nkohkwo & Islam, 2013) [18]	SubSaharan Africa	- financial aspects - organizational aspect - political aspect - socio-economic aspects - human aspects - infrastructural aspects
(Mohammed et al., 2016) [19]	Iraqi	- politics - organizational - human capability - technical - security

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