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Evaluation for Improving eGovernment in Least Developed Countries

Solange MUKAMURENZI
Örebro University, School of Business, Örebro, Sweden
University of Rwanda, College of Science and Technology, Huye, Rwanda
Solange.Mukamurenzi@oru.se

Abstract. E-government evaluation is challenging. However, it is important to design evaluations that support development towards the grand though often distant goal of better government. Although developing countries now have the same technology with developed ones, they still need to "leapfrog" in terms of administrative maturity. This is difficult as it requires changes not only in processes but also policies and organizational culture. The objective of this research is to contribute to finding ways of using evaluation effectively to support e-government development as a whole, including not just technology but also organizational maturity for least developed countries. Design science research methodology is used to investigate the problems involved, propose and develop an artifact to solve at least parts of the problems, and to test and evaluate the artifacts effectiveness. This research will also help to increase awareness among the e-government practitioners in Rwanda on how to achieve the ambitious e-government's goals.

Keywords. E-government evaluation, formative evaluation, organizational change, technological change, Rwanda

1. Introduction

Many countries have adopted e-government and both success and failures stories are being recorded. Particularly, Africa's e-government was reported to be slow and uneven, and causes are related to lack of human capital and on infrastructure gaps, lack of visionary strategies and of practical implementation plans [1]. The lack of both physical and human infrastructure was specifically found as impeding e-government in Sub-Saharan Africa [2]. Consequently, the digital divide is still observed between developed and developing countries.

This research will focus on Least Developed Countries (LDCs). These are poor countries in the world with low-income, human resource weakness, and economic vulnerability.

In the hope of closing that digital divide, Developing Countries (DCs) including LDCs have made plans to leapfrog new technologies from developed countries, to support many programs including the e-government. However, technology alone is not enough to close the digital divide and advance e-government. Organizational maturity is also needed and is even more difficult as it requires changes not only in processes but also in other organizational aspects: public agency structure, power distribution, strategic IT alignment strategy, prioritisation of services, future needs of the public agency, and organisational culture [3]. An example of difficulties in achieving the organizational

maturity is the case of the Document Tracking and Workflow Management System (e-Mboni) deployed in the public institutions in Rwanda in June 2011. The technological side was ready and training was provided, however, the use by intended users is still very low.

Evaluations would contribute to understanding what organizational elements to address in a given context, however, they -evaluations- tend to point to what is lacking but not on how to acquire what lacks or close the identified gap in developing e-government. An example is the UN e-government survey [1].It is pointed out that "Today's knowledge and evaluation research do not enable definitive prescriptions for the best e-government institutional model, especially given the diverse conditions facing both developing and developed countries" [4, pp.98]. Therefore, supplementary efforts are needed for evaluations to bring an understanding of what is needed for e-government to move from a stage of development to the next.

Evaluation generates benefits including evidence-based knowledge [5] and they would guide in leap-frogging technical and organizational aspects. The choice of timing of evaluations will also play different roles. Assessment done during the planning phase of an initiative establishes requirements for implementation, formative evaluations conducted during the development phase, are suggested to allow improvements of the ongoing initiatives [5]–[7], while post-implementation evaluation provides useful financial and statistical information [8] that would be used for future initiatives. Evaluation could as well be considered as an ongoing process in the life cycle of a project [9].

Hence the following research question: *How can evaluation contribute to improving e-government for least developed countries so as to reap e-government benefits*? This question has the following practical sub-questions:

- What is the status of research on e-government evaluation?
- What are the institutional strategic issues of e-government evaluation in Rwanda?
- How can evaluation contribute to improving e-government implementation in Rwanda?

This paper is structured as follows. After this introduction, related work is summarized. Then section 3 describes the research context and section 4 presents the research methodology. Finally, section 5 present the expected results.

2. Related Work

E-government in developed and developing countries is being evaluated. Success and failure stories have been reported. Failures are mostly reported in DCs [10]–[12].

Research on e-government in DCs investigates different aspects. They include designing e-government [13]; implementation in general [14], [15]; adoption [16], [17], diffusion [14], [16]; user experience [18]; and assessment of the digital divide [19].

Though still limited, research on e-government in the LDCs explores e-government and related aspects. In general, e-government is found to be in its early stages [20]–[22]. This status of e-government in LDCs is linked to lack of human skills, technological infrastructure, legal infrastructure, reengineering administrative and service processes [23], limited integration of public services [20] corruption and poor monitoring [24], gaps between initiatives and reality [11], [12], [25], these problems are found mainly at the national level. Access divide, social divide, perceived intensity of civil conflict, and

perceived behavioural conflict were found to have effects on intentions to use e-government services [26], these factors are also at national or group level although the intentions for use may be at individual or group level. Adoption was found to be influenced by culture, cost, and other social dimensions or beliefs [27], and relative advantage [28]. These factors are at the national or group level while other adoption factors are mainly individual, such as perceived usefulness, perceived ease of use, and trust [27], [28]. Identified barriers to e-government are at national level and are related to issues of investment climate, market structure, infrastructural capacity, social contexts, political and cultural resistance [29], and the dominance of donor funded ICT initiatives [24]. In [21] challenges were identified to be technical, organizational and adoption challenges.

Positive elements of e-government and its implementation in LDCs were also recorded and are mainly at the national level. They include the development of policies and technological readiness [22], [24] like putting in place information and service centres to increase access [30]. Some work on evaluation is also done like in [22].

The need of more efforts in e-government evaluation are pointed out [31], and attention was drawn to the need of supervision of e-government implementation [25]. However, e-government evaluation literature is dominated by the work on developed countries, and in contrary to research on LDCs, the research on developed countries goes in depth to look into different aspects. My review of contemporary literature on e-government evaluation found five main factors for evaluation, including maturity levels [32]–[34]; evaluation object [7], [35], evaluation indicators [36], [33], evaluation timing [9], [37], and stakeholder involvement [7], [6]. It also discusses different types of models: ladder models and level models trying to measure output while preconditions models, or reason models, try to explain what makes e-government happen.

3. Research Context

This section provides some facts about Rwanda, the country where the case studies for the research were taken from.

Rwanda is an East African country, one of the 48 LDCs. It borders the Democratic Republic of Congo, Uganda, Tanzania and Burundi. Rwanda has three official languages Kinyarwanda, French and English. It has an area of about 26000 km^2, slightly smaller than Belgium. The population is more than 12 million [38] and in 2013 life expectancy at birth was 63 years and the gross national income per capita USD 700 [39]. According to the ITU report in 2015the literacy rate was 70.5%, the ICT Development Index was 2.04, there were 64 mobile phone subscriptions per 100 inhabitants, and the international internet bandwidth per internet user was 8.5 Bit/s [40]. In 2014, the Rwanda's e-government Development Index was 0.3589, the 140th of the 193 countries surveyed [1].

Rwanda's Vision 2020 aims at transforming the country into a middle-income nation by the year 2020 [42]. As means to attain its vision, Rwanda has identified a number of focus areas including Science, Technology, and ICT. "*The Government of Rwanda (GoR) strongly believes that Information and Communication Technology (ICT) can enable Rwanda to leap-frog the key stages of industrialization*" [43].

This vision has formed a basis for the development of, among others, the National ICT Strategic and Action Plan (NICI) to guide the implementation of ICT-related initiatives. The NICI has series of five-year plans since the year 2000. Efforts of NICI I were mainly on legal and regulatory aspects. For NICI II, the focus was on infrastructure

roll out while NICI III was about services with a focus on skills development, cyber security, community development, e-government, and private sector development. At the end of 2015, the 4th generation of the NICI plan was adopted to build on the previous plans; it is known as the Smart Rwanda 2020 Master Plan (SRMP) [44]. One of the ten objectives of SRMP is to transform Rwanda's government into a digital one. During NICI III (2011-2015), e-government was one of the key areas, and related projects were started including, for example, the Rwanda Online Project. It started in 2014 aiming at creating an integrated access point, "Irembo", to 100 selected government services [45].

The SRMP is spearheaded by the Ministry of Youth and ICT, which is in charge of development and coordination of ICT-related policies. The implementing arm of the Ministry is the ICT Department in the Rwanda Development Board (RDB) whose mission is "Fast tracking economic development in Rwanda by enabling private sector growth". ICT-related initiatives in Rwanda benefit from the top leadership support. The President's support is one of the important elements leading to a conducive environment.

4. Methodology

4.1. Research Design

The overall objective of this study is to contribute to finding effective ways to use evaluation to support the transition from low to higher levels of both technical and organizational maturity so as for LDCs to reap the benefits of good e-government.

This research will follow the design science research (DSR) methodology in its phases: awareness of problem, suggestion, development, evaluation and conclusion. "In the design science paradigm, knowledge and understanding of a problem domain and its solution are achieved in the building and application of the designed artefact" [45, pp.75]. The design science research methodology will be used as follows.

Awareness of problem. Initially, the research has conducted a literature review on e-government evaluation and a case study on Rwanda investigating e-government evaluation in Rwanda. These two will lead to establishing the status of research on e-government evaluation in the literature and in Rwanda, and identifying institutional strategic issues of e-government evaluation in Rwanda. The identified problems will be used in the next phase.

Suggestion. Having identified the issues around e-government evaluation in Rwanda, the research will proceed to propose evaluation model to address institutional strategic issues for e-government. The output of this phase will lay the ground for the next step of development.

Development and evaluation. The proposed evaluation model in the suggestion phase will guide the development of an artefact that will address strategic issues for institutions, as discovered in the first phase (awareness of problem). This step will consider existing models and analyze them, if there is an existing model that can be customized it will be used, otherwise a new one will be developed. Then that model will be tested and evaluated in Rwanda to ensure that it meets the suggested proposal and that it will contribute to solving the problem as it was aimed at in the suggestion phase.

Conclusion. The results of the research will be communicated and lessons learnt shared.

Figure 1 gives an overview of the research process following the DSR steps and links them with the planned studies.

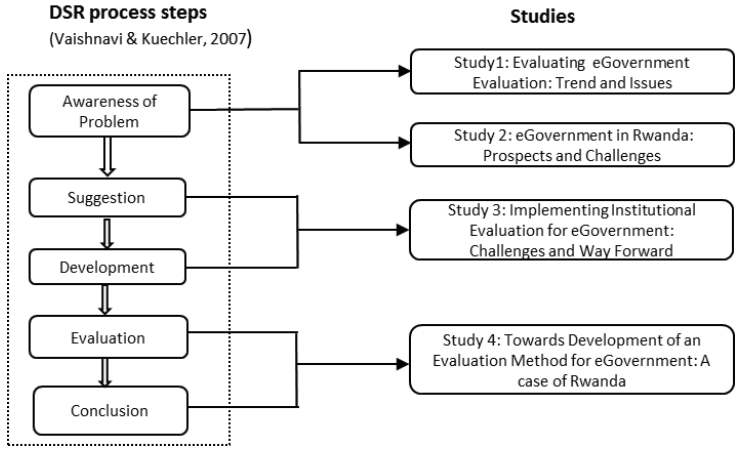

Figure 1. Overview of the research process using Design Science Research adapted from [46]

4.2. Methods for Empirical Studies

Studies 2, 3 and 4, are empirical using interviews as the main data collection technique. Interviews suit best the aim of the studies of gaining information about the status of e-government and its evaluations in Rwanda.

The chosen cases are the Kigali Online Construction Permit System of the City of Kigali and the Business Registration System of the Office of the Registrar General in RDB. The choice of the two cases was motivated by the fact that their services are in use for more than two years and this would allow the availability of data on the systems and their services as well as on their evaluation. The services provided so far are found to be at the initial stages of e-government development. For example, users of the systems can apply for and get services online. However, the back-end processes are mainly manual. Because of this status, the integration is a challenge for and beyond organizations providing services. ICT literacy is still an issue as well, which means that intermediaries are often required to help citizens apply for and get services they need.

Besides the service cases, RDB-ICT is the organizational case chosen for addressing the issues of evaluation practice. RDB-ICT was chosen because it is in charge of e-government and ICT initiatives in general at the national level. It is also responsible for evaluating those initiatives. RDB-ICT is involved in acquiring technologies and in recruiting technical staff for public institutions mainly the ministries while those institutions are responsible for their organizational processes themselves.

For the above-mentioned cases, so far, interviews have conducted for study 2 and 3. Informants were in different positions: policy makers, RDB-ICT-managers, e-government project managers, managers in the Office of the Registrar General, in the City of Kigali City and in Rwanda Online. Both front- and back-end users were among the interviewees. All the interviews were semi-structured and they were in two categories. The first category was on the status of the initiatives, systems, and services and related benefits, challenges and recommendations for improvement. The second category was on evaluation and questions were on who conducts evaluation; when, why and how it conducted; what is evaluated; how are the results used; faced challenges and suggestion

to improve the situation. The interviews were conducted in two phases. The first phase was from October 2014 to January 2015 with 23 interviewees and the second was from November 2015 to January 2016 with 20 interviewees. Each interview lasted 45 to 60 minutes.

All the studies in line with this research and related method are provided in Table1.

Table 1. Studies and related methods

Study	Strategies	Methods
1: Evaluating eGovernment Evaluation: Trend and Issues	Literature review	Webster and Watson [47]
2: E-government in Rwanda: Prospects and Challenges	Case study	Interviews with questionnaires
3: Implementing Institutional Evaluation for E-government: Challenges and Way Forward	Case study	Interviews with questionnaires
4: Towards Development of an Evaluation Model for E-government: A Case of Rwanda	Case study	Design and test

5. Results and Contribution

The overall results from this work is a combination of results from the four studies. The studies will, respectively, lead to:

1. Understanding the state of the art in the field: A review of contemporary literature investigated the status of research on e-government evaluation
2. Understanding the status of e-government in Rwanda, current status, challenges, and prospects
3. Understanding of implementing institutional e-government evaluation in Rwanda
4. Development and evaluation of an e-government evaluation model for Rwanda

The first study "Evaluating eGovernment Evaluation: Trend and Issues" has found the issues involved in e-government evaluation to be described by five critical factors: maturity levels, evaluation object, type of indicators, evaluation timing, and stakeholder involvement. The study acknowledges that there is no best model, but that e-government evaluation has to be contextualized and take a formative approach to guide the following step. It also points to the need for a clear perspective on where e-government development is going and provides a model to conceptualize that development.

The objective of the second study is to gain an understanding of the status of e-government in Rwanda. The researcher met different e-government stakeholders in Rwanda to get insights on e-government status, the faced challenges, and future plans. Two cases were investigated to clarify the situation.

Moving on, in the third study, evaluation of e-government is being investigated to explore practices at the institutional level. The issues from this study will lead the research in finding practical solutions that will guide the next steps of e-government initiatives.

Based on the findings and understanding gained from the previous studies, the fourth study will suggest and develop an evaluation model that will take into consideration both the technological and organizational aspects. The developed artefact will be tested to

ensure that it meets the suggested requirements. The feedback from practitioners and decision makers will also be sought to increase the relevancy of the suggested model.

It is expected that this research will help to increase awareness of the need of complementarity of technical and organizational aspects among the e-government practitioners in order to achieve e-government goals in Rwanda. Those practitioners are mainly the RDB staff as well as the staff of the other institutions involved in the research.

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