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E-Government Implementation in Developing Countries: Enterprise Content Management in Rwanda

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Abstract. E-Government is now on the rise in developing countries. While developing countries can "leapfrog" technology generations, the necessary organizational change is another matter. In industrialized countries technical systems have been developed over long time in parallel with institutional development; developing countries hope to make that journey faster. Most of the e-Government implementation research focuses on developed countries. It is important to explore the relation between the literature and the findings in the context of developing countries as to come up with a gap to reduce. An interview study with 56 people in 10 government organizations involved in implementing a government-wide enterprise content management system was conducted to find out how critical success factors found in literature on implementation of information management systems relate to the situation in the Rwanda public sector to discover the step forward in Rwanda. We find a large gap between expectations and results due to a strong focus on the technical tool and little concerns about issues related to organizational change.

Keywords: e-Government, Implementation, ECM, Developing countries, Rwanda

1. Introduction

Using IT for managing information in an organization is an issue that has attracted a lot of research over a number of years. Research has concerned technical as well as organizational and user-oriented issues. There are several reviews of the literature in the area. Some recent ones (2012) on Enterprise Content Management (ECM), management of diverse and unstructured information include those by Grahlmann [1] and Alalawan and Weistroffer [2]. Another three reviews of the related concept of Enterprise Resource Planning systems (ERP), from 2013, 2015 and 2016 respectively include those by Shaul and Tauber [3], Norton [4] and Saade and Nijher [5]. These studies provide a number of critical success factors for implementation of information management systems that aim

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at supporting organizations in implementing those systems to manage their information content. Managing information on a large scale is of course a key issue in e-government and systems labelled ECM, ERP and similar IT systems are frequently used in governments across the world. However, implementation of such systems goes with challenges in any type of country [6]. A major challenge involved is that managing information in large and diverse organizations, of which governments are very good examples, involves tying together different information from many sources which may work under different regulations and be differently organized.

In developing countries today we find an increased interest in e-government including implementation of ECM and other organization information management systems. An expectation, or hope, is that e-government will emerge more rapidly in developing countries as the technology is already there. It has been developed over many years in the industrialized world and is today relatively cheap and standardized. By example from the rapid spread of the mobile phones across the developing world, so would e-government.

However, major challenges in ERP or ECM implementation pertain to organizational issues [6]. Effective and efficient use of technology requires effective organization. In the industrialized world government organization has changed considerably over the e-government decades as technology has permeated the organizations. In developing countries much administration is still manual. Now modern technology is being installed, the same technology as in governments in developed countries but in very different organizations. Of course it would be good if the developing countries could leapfrog not just some technology generations but also some implementation mistakes done in other countries. But is that possible?

As there is yet little research on e-government in general from developing countries, particularly concerning organizational issues, this paper reports a case study of e-government in Rwanda. The paper studies the partly completed implementation of one of these systems, an ECM system labelled DTWMS, document tracking and workflow management system. As of today it is implemented in 120 government organizations (project coordinator, 2015, personal communication, August 12) but use of DTWMS varies a lot among those organizations. Many organizations do not use it at all. This study aims to find success factors in implementation of the DTWMS and to relate them with those found in literature on implementation of information management systems in order to formulate the step forward for Rwanda case.

2. Related work and the case of Rwanda

Klein and Sorra [7] find two key determinants of innovation implementation effectiveness: (1) implementation climate, defined as "targeted employees' shared summary perceptions of the extent to which their use of a specific innovation is rewarded, supported, and expected within an organization" [7, p. 1060]; and (2) innovation-values fit, defined as "the extent to which targeted users perceive that use of the innovation will foster (or, conversely, inhibit) the fulfilment of their values" [7, p.1063]. Implementation climate affects implementation effectiveness through skills, incentives, and absence of obstacles, while innovation-values fit impacts implementation effectiveness through user commitment [7, 8]. Steenkamp [9] found that the key reasons indicated for not adopting eXtensible Business Reporting Language (XBRL), a language for electronic

communication of business and financial data, are that it is not yet an obligation in South Africa to adopt it and according to respondents they do not see any benefit in adopting XBRL [9].

The above three research works tackle, in general, on issues of innovation, technology in relation to implementation climate in this case meaning 'organizations' or 'governments' and users.

Looking at specific technologies for information management, Enterprise Content Management (ECM) and Enterprise Resource Planning (ERP) are the two main technologies to manage mainly unstructured and structured information respectively in an organization setting [10]. Implementation critical success factors of ERP systems cited include organization fit, skills, management structure and strategy, software systems design, user involvement and training, technology planning, and project management, user friendliness, alignment with user needs, change management [11, 12]. Literature works such as Norton [4] identified 27 critical ERP implementation factors among which balanced team, business process re-engineering, change management, clear vision and communication plan are the top five. Likewise, Horne and Hawamdeh suggest five categories of factors that impact ECM implementation: managerial factors, user factors, task-related factors, technological factors and content factors [13].

As concerns developing countries, Nkohkwo and Islam [14] as well as Weerakkody *et al.* [15] suggest that the most salient challenges include ICT infrastructure, human resources, legal framework, Internet access, the digital divide, and inability to access e-government services using local languages. While such studies consistently mention major general challenges in e-government implementation, there is yet little knowledge on issues in information systems implementation, especially ECM implementation issues in public sector organizations in developing countries. A study by Katuu [16] on a developing country on ECM implementation highlights the penetration of ECM among organisations and their vendors but it does not tackle any issues on its implementation in the public sector.

In order to find critical success factors in implementation of ECM in a developing country and to relate them to literature, this study considers a case in the Rwanda public sector where an ECM labelled 'DTWMS' (Document tracking and workflow management system) was implemented. As described in a Country Report [17], e-government in Rwanda is part of an ambitious modernization plan where IT plays a major role. It includes a long-term – 20 years – economic development plan ("Vision 2020") as well as medium-term strategy ("Economic Development Poverty Reduction Strategy") and the National Information Communication Infrastructure (NICI) plan. Together these plans aim to transform the country from an agrarian economy to an information-rich and knowledge-based middle-income country by 2020 [17]. As indicated in [18], key actors in the NICI plan are the Ministry of Youth and ICT at egovernment policy and strategy level, Rwanda Development Board/IT (RDB/IT) department at the level of project co-ordination and implementation, and Rwanda Utilities Regulatory Agency (RURA) as the national ICT Regulating Agency [18].

The project of implementing the DTWMS started in 2010 and was expected to be completed by 2015[17]. An ECM system was procured by RDB which also customized it and trained staff [19, 20]. The goal was to improve information sharing and management and to improve how administrative processes are carried out in public sector. Main outcomes are cited as reduction of petty corruption, increased accountability

and transparency, increased efficiency, and increased productivity of employees [17]. The project was funded by World Bank [21] and out of the total funding of 10 million USD, 1.7 million was allocated to the DTWMS project (project coordinator, 2015, personal communication, August 12, 2015). The DTWMS was built to help public organizations to manage and exchange documents, emails and other unstructured information electronically, not only internally but also across the entire public sector as necessary to improve administrative processes. It was originally intended to be used by the Office of the President, all ministries and organizations under those ministries. Later all province headquarters and local government were included. The system was first introduced by end of 2012 in ministries and by beginning of 2013 in local government organizations.

3. Method

The study is based on semi-structured interviews with 56 people – managers, users, and IT staff – in ten public organizations in Rwanda, eight in local government and two in central government. Ten organizations were selected based on system usage data, which is regularly retrieved by the RDB/IT department. We inspected usage data from 50 organizations (30 districts, 15 ministries and 5 provinces) from February to May 2014. We selected the three ones (one ministry and two districts) who had the highest use (700-1000 document transactions per month), and seven (one ministry and six districts) with low use (0-40 transactions per month. In fact, out of the 30 districts in Rwanda the two "high use" ones we selected were the only with anything resembling regular use; all the others had only a few transactions per month. The districts are all (except one which is 10 % larger) of similar size with population ranging from about 320 000 to 360 000 and a staff of 87 (93 for the larger one). All provide similar services to citizens, other government units, firms, and non-governmental organizations.

The interview questionnaire (available upon request) was designed based on ECM and document management literature [2], [22]. The interviews were conducted in Kinyarwanda language from July to December 2015. Fifty-six of them were retained after discarding nine with insufficient information. Interviewees were selected in three categories, unit managers (n=26), system users (n=17) and IT professionals (n=13). The selection of individuals was based on their involvement in the DTWMS project in their respective organizations and their availability to participate in interviews. In nine of the organizations 4-8 people were interviewed, in one it was only one person.

3.1 Research Design and Data Analysis frameworks

As the purpose of this article is find issues related to implementation of the DTWMS in developing country and to relate the corresponding critical success factors with those in literature on the implementation of information management systems, we analysed the interviews in view of just that literature. The framework by Horne and Hawamdeh [13] suggests various types of factors that have been found to influence ECM implementation. Norton [4] provides another type of framework ranking the relative importance of known success factors and shows that this has changed over the years. The frameworks hence take two different perspectives on organization development with use of organizational

information management systems. A comprehensive map is useful to understand what factors should be considered. A relative importance framework suggests that different factors are more or less important at different stages of development. Together they provide reasonable tools to understand the current situation in Rwanda; to what extent does it resemble the state of the art as provided by the literature at different points in time along the development process?

The Horne and Hawamdeh framework [13] draws on an earlier IS success model by Roger [23], the IS implementation model of Kwon and Zmud [24] and ECM factors by Tyrvainen *et al.* [25]. The Horne and Hawamdeh framework includes five sets of success factors: managerial, user, task-related, content and technological [13, p.4].

4. Results

Out of the 40 success factors in the Horne and Hawamdeh [13] framework our respondents mentioned 14. Table 1 shows that user factors followed by task related factors were most mentioned by the respondents. It also shows that in general all three respondent categories were in agreement on factors such as user involvement in IT system improvement, change management and technical infrastructure. Some factors, like project management plan, was mainly mentioned by those directly involved with the project, i.e. managers and IT professionals. Each and every category of success factors found in the case of Rwanda is discussed in the following paragraphs.

	Managers (n=26)	Users (n=17)	IT professionals (n=13)	All respondents (n=56)
User factors				
User Involvement in IT system improvement	23 (88%)	14 (82%)	5 (39%)	42 (75%)
User Perception of System advantage	6 (23%)	14 (82%)	4 (31%)	24 (43%)
Training	4 (15%)	6 (35%)	3 (23%)	13 (23%)
User Perception of System complexity	0 (0%)	1 (6%)	0 (0%)	1 (2%)
Task related Factors				
Project Management Plan	17 (65%)	3 (18%)	8 (62%)	28 (50%)
Change Management Plan	9 (35%)	7 (42%)	7 (54%)	23 (41%)
Project Cost Planning	2 (8%)	4 (24%)	0 (0%)	6 (11%)
Post- implementation evaluation Plan	4 (15%)	0 (0%)	1 (8%)	5 (9%)
Building a Business Case	2 (8%)	0 (0%)	0 (0%)	2 (4%)

Table 1. Factors by respondent categories

	Managers (n=26)	Users (n=17)	IT professionals (n=13)	All respondents (n=56)
Technological Factors				
Technical infrastructure	6 (23%)	5 (29%)	1 (8%)	12 (21%)
Business Process Re- engineering	1 (4%)	4 (24%)	0 (0%)	5 (9%)
System Quality	1 (4%)	1 (6%)	0 (0%)	2 (4%)
Content Factors				
Digital Signature	7 (27%)	5 (29%)	1 (8%)	13 (23%)
Managerial Factors				
Top management support	5 (19%)	2 (12%)	3 (23%)	10 (18%)

User factors. The respondents strongly point out a lack of user involvement in the IT system improvement. A second major factor was the perceived lack of advantages for the users, even though managers were considerably more positive on this point than the actual users themselves. Although far less important, users and IT professionals also much more than managers pointed to a need for more training. The numbers suggest that the training need was more related to aligning technology with work processes and achieving benefits than system complexity. Users mentioned issues like incomplete system requiring much double work, such as first scanning documents to process them and then printing them for signing.

Task-related factors. There seemed to be a lack of strategy regarding how to make efficient and effective use of the system. Respondents mentioned users being resistant to use, lack of buy-in among managers, and, limited 'follow up' about use of the system. Others mentioned lack of plans for change; the system is not 'mandatory', there is no policy about the system of document tracking in their organizations, neither internal in the organizations or as part of the performance contracts. Says one manager: "Up to now there is no strategy in place but as we do a district management meeting every year we may take resolutions..."

Technological factors. Technical infrastructure is the most mentioned factor, exemplified by internet disconnection, power cuts or other technical issues of the system and network. In particular system users called for analysis and redesign of processes and workflow so as to improve efficiency of work processes and to retain staff; some respondents mentioned issues related to a lot of work, imbalance in work distribution, staff leaving their duties when requested to go help their colleagues with too much work, Data Security and Confidentiality was an issue which was raised by staff in finance as a reason not to adopt DTWMS.

Managerial factors. While not the highest ranked factor, a lack of top management commitment and support was identified among all respondent groups. Organizations managers and unit managers in those organizations were criticized for not 'encouraging' or 'stimulating' or 'supporting' use of the system. Some system user: voices: "there are leaders who don't like to use a computer machine..."

"the management in general does not give attention to the system...".

Some managers also admitted to have no policy regarding system implementation.

Content factors. The lack of an electronic signature system was mentioned as managers and users alike found this to be the main reason behind the double work caused by the failure to reduce printing. As concerns differences between the different kinds of organizations (high-low use), unsurprisingly, the "low" users were much more concerned in general about the project. There were not major differences in terms of what was mentioned. The same four factors were mentioned most frequently. However, the low users mentioned User involvement in IT system improvement as number the number one factor while this came as number four by the high users. Conversely the high users had Change management most frequently and this appeared as the fourth most frequent factor by the low users.

Table 2 ranks success factors in order of importance and compares the top four factors of Norton's 2007 ranking of factors [4] with our findings. It is interesting to see that the rankings give very different pictures of the situation. Norton provides rankings from 2001 and 2007. Top management support is the number one factor both 2001 and 2007, but it does not appear until on place 8 in our study. Change management is high ranked in 2007 and in our study but not in 2001. Change management is an issue that has received increasing attention over a number of years, but in 2001 it was still behind other important issues, predominantly those to do with project management and technology. User involvement appears on top of the list as defined by our respondents followed by Project management, User perception of system advantage and Change management.

Ranking	Factors by Norton	Ranking in Rwanda
1	Top management commitment and support	8
2	Change management	4
3	Business Process and Re-engineering and Software Configuration	12
4	Training and job redesign	5

 Table 2. Factor ranking from Norton [4] on ERP literature 2007 compared to the ranking in our study

5. Discussion and Conclusion

Comparing the responses from this study with success factors of previous research we find that the picture changes over time. While generally the same factors appear in our ranking as in Norton's rankings from 2001 and 2007, the order differs considerably among the three. Clearly – as Norton [4] also concludes – the order of success factors change considerably depending on changes in the context, including increased technical sophistication and maturity as well as increased managerial awareness of the opportunities for redesign of operations and willingness to redesign. One lesson from this comparison is that it is important to understand both where you want to go and the

nature of your current situation in order to understand the gaps you need to overcome. It does not seem a great idea to just take a list of success factors as the blueprint for success.

So what about the Rwanda situation? User issues appear on top of the list as defined by our respondents. Only two districts out of the total 30 exhibit anything like regular use of the system (700-1000 transactions per month), all the others show no or sporadic transactions. It appears users do not see advantages of the system and the project management plan is at least unclear. This does not seem strange given a start situation where most operations are still manual. The move from papers to digitalization and at the same time from organizational isolation to inter-organizational electronic cooperation is indeed a big one. It is implemented top-down: the technical system, the DTWMS is procured and implemented by a central government IT organization on central government order. Hence there is little management commitment and support in the government organizations where the system is to be used. Neither is there any known (to users and management alike) plan for reorganization as the project is so far only about implementing a technical system. There is no project on the user organizations' side concerning organizational change, improved performance, or the like.

All in all, our ranking paints a picture of organizations at a very early stage of egovernment development. In this situation the choice has been to first implement the technical system and then assume people will use it. In retrospect – from the viewpoint of countries where e-government is much more implemented – this seems to be a situation where organizational change issues should be brought in. The change plan should be defined: What are staff and citizens supposed to do and achieve by using the new system? In terms of Norton's two rankings, our findings match better with the one from 2001 than the later one. Issues of clear goals, project management, project champions, management of expectations, and top management support seem to be most urgently lacking in general at user organizations. More generally expressed, while both Norton's [4] rankings picture implementation of organization information management system as a project of change, the picture of the Rwanda project is rather one of implementing a technical system.

We set out to investigate how critical success factors found in literature on implementation of information management systems relate to findings in the Rwanda public sector. The findings indicate that they do but it is not enough to take the latest findings as the blueprint for success. It would not be fair to say that the early strong focus on technology was wrong. It may have been a necessary first step to take to make the ball roll. At this point, however, it is clearly due time for concerns about users, processes, and incentives for government organizations to change.

One limitation of this study is the relatively small number of respondents. To some extent this is compensated for by the agreement across categories of respondents and organizations.

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