

# Towards the Development of a Citizen-Centric Framework for Evaluating the Impact of E-government: A Case Study of Developing Countries

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## ABSTRACT

E-government has emerged as one of the innovative ways of providing information and delivering services to citizens. It is providing governments with new opportunities of bringing services closer to the citizen in cost-effective, efficient and transparent ways. In spite of the implementation of e-government, there is little research that has been conducted in the context of developing countries to benchmark and appraise the impact of e-government on the target groups. Assessment of impact is important to justify public fund expenditure and inform future projects. Most studies on assessment of e-government have been done in developed countries where the context is different from that of developing countries. Therefore, there is need to develop frameworks that are suitable in the context of developing countries. Studies on assessing impact have been done at macro, meso and micro levels. These studies are largely based on supply-side and a few on demand-sides with little focus on outcomes and impact. In this paper, we perform an analysis of various proposed e-government assessment frameworks with the aim of identifying and recommending the adoption of a framework that is suitable in the context of a developing country. We propose the adoption of a hybrid framework that amalgamates the frameworks proposed earlier due to their contextual suitability and citizen-centric approach. This is an exploratory study that lays foundation for further research in the development of an appropriate framework using the proposed approach.

**Keywords:** *E-government, impact, evaluation, developing countries, citizen-centric*

## 1. INTRODUCTION

The terms e-government and e-governance emerged with the rapid use of IT, the advent of the World Wide Web (WWW) technology and the Internet revolution in the late 1990s. The availability of open source software and emergence of cloud computing technology are having a significant impact on implementation of e-governance [29]. E-governance and e-government though interrelated and sometimes used interchangeably have different meanings. E-government is more than sending of emails and development of websites that facilitate citizen's access to information [23]. E-government is the use of ICT to promote innovative, efficient and cost effective government, facilitate access to government information and services whereas e-governance is a much wider term that covers a state's institutional arrangements, decision making processes and the interrelationships between government and the public [21], [7].

There are various models that have been proposed to explain the different maturity stages through which governments go through in the implementation of e-government, also called e-government maturity models [15],[9]. From the interaction perspective, e-government can be seen to happen in four key dimensions: government-to-citizen (G2C), government-to-employee (G2E), government-to-government (G2G), and government-to-business (G2B) [4], [23], [19], [14].

Bhatnagar and Singh [2] explain that using technology creates opportunities for offering services in new innovative ways that were not possible before. E-

government implementation has gained prominence in the developed countries and is slowly gaining ground in developing countries. The slow speed in uptake of e-government services in developing countries can largely be attributed to poor infrastructure, digital divide, political leadership and low literacy among the population [25], [3], and [6]. E-government projects have been intended to bring necessary reforms to the public sector.

These projects have been implemented in different countries with varying outcomes and impact depending on a myriad of factors that are unique and pertinent to implementation context. Studies on benchmarking and impact of e-governance projects have been conducted in the developed world, for example, eGEP, WiBe, Verdegem et al [26], Liu et al [17] and Wang and Liao [28]. The context and factors influencing implementation of e-government in developing countries is different from those in developing countries due to different technological, social and environmental factors.

For example, in developed countries, labour costs are high and equipment costs low and therefore it is easier to justify ICT projects in terms of cost saving. However in developing countries, labour costs are cheap and equipment cost high and therefore it is much difficult to justify cost savings [20].

Moreover, very few and some anecdotal studies have been conducted to measure impact as a result of adoption and application of e-governance and particularly in developing countries [18], [2] and [16]. Therefore, there is need to develop home-grown frameworks and strategies that take into account the context of developing countries and their unique characteristics different from

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those of the developed countries. Chen et al (2006) identify five key specific issues that can be used to differentiate developed and developing countries: maturity in government and culture, skills of IT staff, robustness of infrastructure, citizens' access to Internet (digital divide) and appreciation of e-government by government officers.

## 2. OBJECTIVES

There are several frameworks, concepts and theories that have been advanced in relation to assessment of e-government projects. The objective of this research paper is to perform an exploratory study and analysis of various e-government benchmarking and assessment frameworks with the aim of identifying a suitable citizen-centric framework that could be adopted in the context of a developing country. The main aim of this paper is to assist policy-makers, state and government agencies (for example, the Kenya ICT Board responsible for coordinating ICT strategies and operations in the country) in developing countries to enhance impact of their e-government initiatives and justify funding for on-going and future projects. The academia, civil society, donors and sponsors of e-government projects will also benefit from the new knowledge generated and giving justification for current or future funding of e-government services.

## 3. METHODOLOGY

In this paper, the researchers performs an exploratory study and analysis of the available benchmarking and e-government evaluation frameworks with the aim of contextualizing and making recommendations on how to adopt a framework that is suitable in the context of a developing country like Kenya. We will not be collecting and analyzing data at this stage.

## 4. FRAMEWORKS FOR BENCHMARKING AND EVALUATION OF E-GOVERNMENT

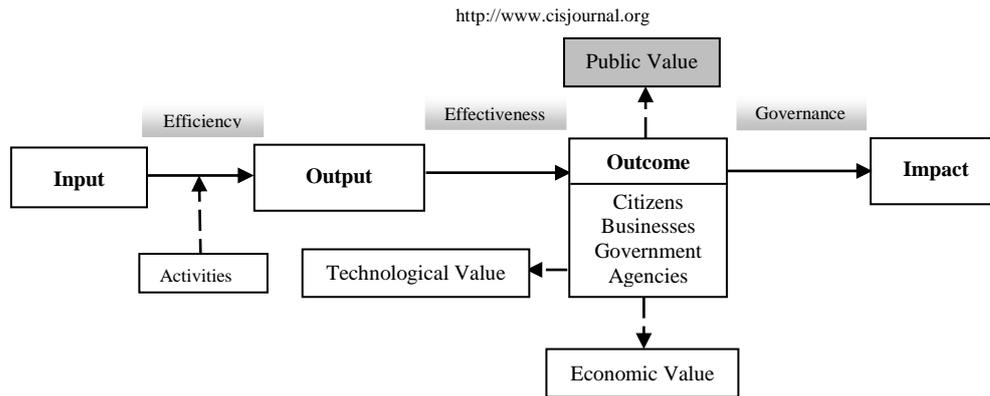
Roche [24] defines impact as sustained and lasting changes in people's lives brought about by a particular intervention, project or programme. Verdegem et al [26] in the context of their framework for measuring e-government impact perceives impact as the (direct or indirect) results of e-government uptake. Therefore, we define impact in our context as "the sustained and lasting changes (direct or indirect) in government, businesses and citizens' lives brought about by the implementation of e-government". Studies on benchmarking and assessment of the impact of e-government have been done at macro, meso and micro levels by developed nations. Macro level benchmarking and evaluation takes place at the global or international level for example eGEP (E-Government Economic Project) and European Index of Digital Inclusion (EIDI). Meso evaluation is done at the national level while micro level is at the organizational level [10].

E-government evaluation can also be done ex post or ex ante as suggested by some of the models [2], [27].

When evaluating the impact of e-government, it is worth noting that there are different stakeholders (citizens, government agencies, businesses and society at large). In the assessment of the impact of e-government, most researchers are tempted to apply methodologies that emphasize on technological or economic value as viewed from the agency or private sector perspective [17], [1].

Technological value is derived from how well technology makes information and services accessible, reliable and usable. It is imperative to note that while private enterprises are driven by the motivation to make profit (economic value); government agencies are driven by public (social) value, which is the need to serve the public. Public value is an approach of evaluating the societal-level impact of government agency services. E-government initiatives are mostly driven by government agencies with the aim of serving the public and therefore should be driven by public value. Public value is defined as "the value created by government through services, laws, regulation and other actions" [13], [5].

Codagnone and Undheim [8], Bhatnagar and Singh [2] and Verdegem et al [26] argue that though there are many e-government evaluation frameworks that have been developed and used before, most of them concentrate on e-readiness, maturity levels, web-metrics and front office supply-side (agency-side) but ignore demand side. The argument has been to change this orientation, bringing to fore the closely related paradigm shift of "from efficiency to effectiveness" [8], [26]. The implication is that there should be more concentration on a citizen-centred approach, which reflects the effectiveness of e-government services. It is also evident from literature review that very few studies have focused on outcomes and impacts of e-government initiatives [26], [2]. Figure 1 below summarizes some of the concepts advanced by these frameworks with emphasis on public value.



**Figure 1:** Basic framework for E-government impact evaluation

In spite of the implementation of e-government and from literature review, there is little research and studies that have been conducted in the context of developing countries to benchmark and evaluate the impact of e-government initiatives on the target groups and governance in general. It is imperative to assess the impact of e-government initiatives to justify expenditure of public funds by government and guarantee return on investment. Madon [18], Bhatnagar and Singh [2], Alshawi and Alalwany [1] and Miyata [20] lament that there are few documented studies on assessment of the impact of e-government projects and particularly in the developing and least developed countries (LDC). This is corroborated by reports by the United Nations and World Bank.

There are several frameworks that have been developed to evaluate e-government impact based on different perspectives and aspects as applicable in the context of their application. Bhatnagar and Singh [2] posit that eGEP as one of the e-government measurement frameworks is not restricted to quantitative but also incorporate some qualitative aspects of impact. The model is built around the three value drivers of efficiency, democracy, and effectiveness and elaborated in such a way as to produce a multidimensional assessment of the public value potentially generated by e-Government. eGEP was developed on the basis of review of MAREVA (Method of Analysis & Value Enhancement) framework.

MAREVA evaluation methodology provides a detailed method of computing costs and gains for an institution or agency to calculate the expected Return on Investment (ROI) before a project is taken up. It is based on supply-side and on four success criteria for projects: strategic alignment, economic justification, risk adjustment and follow-up of expected results. However, it suggests four other parameters on which a project should be assessed based on necessity of the project: level of risk, benefits to employees and society, and concrete benefits to clients [11]

WiBe (Economic Efficiency Assessment) methodology is a framework used to assess the economic value of ICT projects. It is based on three main factors:

profitability, investment & development costs and operating costs & benefits. It applies the economic concept of Net Present Value (NPV) and based on` impact and outcome assessment with detailed templates for calculating cost and revenue [2]. WiBe mostly uses quantitative (monetary) measures.

Demand and Value Assessment Methodology as the name suggests is a front office demand-side driven methodology that assesses project implication from the perspective of the user and partly the government agency. Value is traditionally associated with cost and benefits but in the context of e-government. This methodology also takes into account project risk assessment, social and governance implications.

Verdegem et al [26] came up with an evaluation framework with four components in the public service value chain: input, output, outcomes and impact. Inputs are monetary and non-monetary costs for production of outputs leading to outcomes and impact. The input-output-outcome relation is influenced by contextual variables mostly related to e-readiness and includes factors such as infrastructure, human skills, policy, politics and cultural issues. This model is guided by the paradigm shift "from efficiency to effectiveness" which is closely related to shift from government-agency to citizen-centric orientation.

Victor et al [27] emphasize the importance of post-implementation (ex post) audit and assessment of projects in e-government based on Key Performance Indicators (KPIs). The authors portend that such assessment can provide useful information for feedback, lessons learnt and improvement of future projects. This model is based on CMM (Capability Maturity Model) and COBIT (Control Objectives for Information & related Technology) process maturity frameworks [12]. It recommends that the balanced score card approach be applied and is largely based on supply-side approach. Evaluation is done ex post and based on IS approach as used to implement e-government.

Wang and Liao [28] adopted the evaluation model of DeLone and McLean (Information Systems success model) for assessing success in e-government

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projects and defined an evaluation framework for measuring the success of G2C Information Systems from the citizen's perspective. The model is user-centric and has six key dimensions: Information Quality, System Quality, Service Quality, Use, User Satisfaction, and Perceived Net Benefit (benefits from citizen's perspective) [12]. However, the model does not include other environmental factors and dimensions that affect system use like "ability to use the system". The model provides for specific parameters and indicators to be used to guide evaluation of each specific dimension.

Liu et al [17] proposed an e-government evaluation framework based on Key Performance Areas (KPA) and Key Performance Indicators (KPI) for the various e-government stakeholders [12]. This framework is broadly based on the concept of public (social) value and looks at the outcome and impact from the citizen perspective. The framework is based on three level analyses: 1) value category 2) key performance areas (KPA) and 3) key performance indicators (KPI). It consists of four value categories, which include: financial, social, operational (foundational) and strategic (political) values. KPAs are defined for each value category and ultimately KPIs for each KPA.

Rao et al [22] developed the E-governance Assessment Framework (EAF) for assessing e-government projects from various dimensions. The framework assesses services that the government offers to citizens (G2C), businesses (G2B) and government (G2G).

This framework further categorizes projects by size of investment (small, medium, large) and whether

they are initial or continuing projects. Since there are many parameters involved and the assessment may take a great deal of time and effort, evaluation can be done in two tiers: Summary Assessment (SA) and Detailed Assessment (DA). This framework gives a provision of five key attributes to be evaluated: service orientation, technology, sustainability, cost-effectiveness and replicability; each with sub-indicators and assigns weights to the attributes with service orientation given the highest weight meaning that it is outcome-based and user-centric.

Bhatnagar and Singh [2] proposed a framework that identifies an e-service delivery as impacting on three groups of stakeholders: clients receiving the service; the agency that delivers the service; and the wider community. This framework was based on eGEP, MAREVA, WiBe and EAF and applies both quantitative and qualitative indicators for measurement. Bhatnagar and Singh [2] define indicators on which impact would be evaluated and a methodology suitable for developing countries. The framework has the following aspects that are adopted and are relevant in the context of developing countries: costs of clients accessing service which utilizes common service centres and franchised outlets rather than 'self-use' and includes cost of bribes and trips made when seeking service; detailed methodology on how to "assess the impact" on manual and computerized systems; and method to capture the overall rating of a project based on qualitative assessment of certain factors. Table 1 below summarizes the approaches and key concepts advanced by the frameworks discussed:

**Table 1:** Analysis of e-government assessment frameworks

Author/Framework	Approach	Focus	Key concepts
eGEP	<ul style="list-style-type: none"> <li>- Key value drivers of efficiency, democracy and effectiveness</li> <li>- Applied in benchmarking</li> </ul>	Outcome / Impact (Citizen and Agency)	<ul style="list-style-type: none"> <li>- Applies quantitative as well as qualitative approaches</li> <li>- Multi-dimensional assessment of public value</li> <li>- Derived from MAREVA</li> </ul>
MAREVA	<ul style="list-style-type: none"> <li>- Four success criteria: strategic alignment; economic justification; risk adjustment and analysis of expected results</li> </ul>	Supply-side	<ul style="list-style-type: none"> <li>- Based on expected ROI</li> <li>- Based on level of risk, benefits to employees and society, and concrete benefits to clients</li> </ul>
WiBe (Economic Efficiency Assessment)	<ul style="list-style-type: none"> <li>- Computes profitability, investment &amp; development costs and operating costs and benefits</li> <li>- Computes cost and revenue using detailed templates</li> </ul>	Outcome / Impact (Agency)	<ul style="list-style-type: none"> <li>- Computes NPV</li> <li>- Mostly uses quantitative but has some qualitative aspects</li> </ul>
Demand Value Assessment Methodology	<ul style="list-style-type: none"> <li>- Project costs and benefits</li> <li>- Considers risks</li> </ul>	Demand-side	<ul style="list-style-type: none"> <li>- Social and governance implications</li> </ul>
Verdegem et al (2010)	<ul style="list-style-type: none"> <li>- Inputs are financial and non-financial cost producing output leading to outcomes and impact</li> </ul>	Outcome / Impact (Agency,	<ul style="list-style-type: none"> <li>- Public value chain with input, output, outcome and impact</li> <li>- The relation between these variables is</li> </ul>

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Author/Framework	Approach	Focus	Key concepts
	<ul style="list-style-type: none"> <li>- Provides specific measurement &amp; evaluation indicators including contextual variables</li> <li>- Includes key, sub and composite indicators</li> </ul>	Citizen, Business)	<ul style="list-style-type: none"> <li>- influenced by contextual variables</li> <li>- Paradigm shift “from efficiency to effectiveness”</li> </ul>
Victor et al (2007)	<ul style="list-style-type: none"> <li>- Post-implementation audit on IS project management</li> <li>- Provides feedback for future projects</li> <li>- Does not provide for specific indicators</li> </ul>	Supply-side	<ul style="list-style-type: none"> <li>- Uses KPIs and based on CMM and COBIT maturity frameworks</li> </ul>
Wang and Liao (2008)	<ul style="list-style-type: none"> <li>- Has six key dimensions: Information Quality, System Quality, Service Quality, Use, User Satisfaction, and Perceived Net Benefit</li> <li>- Uses data collected from surveys</li> </ul>	Demand-side	<ul style="list-style-type: none"> <li>- Adopted from DeLone &amp; McLean IS success model</li> <li>- Measures success of G2C Information Systems</li> </ul>
Liu et al (2008)	<ul style="list-style-type: none"> <li>- Based on three levels of analysis: value category, KPAs, and KPIs</li> <li>- Value categories include: financial, social, operational and strategic values</li> </ul>	Outcome / Impact (Citizen-Centred)	<ul style="list-style-type: none"> <li>- Uses KPAs and KPIs for various stakeholders</li> <li>- Based on the concept of public value</li> <li>- Evaluate returns from user perspective</li> </ul>
E-governance Assessment Framework (EAF)	<ul style="list-style-type: none"> <li>- Based on 5 key attributes (service orientation, technology, sustainability, cost-effectiveness and replicability) each with specific sub-indicators and weights</li> <li>- Gives detailed methodological approach</li> <li>- Context of a developing country</li> </ul>	Outcome / Impact (Citizen-Centred)	<ul style="list-style-type: none"> <li>- More weight on service orientation</li> <li>- Summary and detailed assessment</li> <li>- Assesses services offered to citizens (G2C), business (G2B) and government (G2G)</li> </ul>
Bhatnagar and Singh (2010)	<ul style="list-style-type: none"> <li>- Measures impact on three key stakeholders: clients, government agencies and citizens</li> <li>- A well-defined methodology for evaluation of manual and computerized systems</li> <li>- Considers overall rating of project</li> <li>- Has well-defined indicators</li> <li>- Context of a developing country</li> </ul>	Outcome / Impact (Citizen-Centred)	<ul style="list-style-type: none"> <li>- Utilizes assisted ‘service’ centres rather than ‘self-use’ centres</li> <li>- Adopted for developing countries</li> <li>- Has both qualitative and quantitative indicators</li> <li>- Focuses on impact from client and community perspective</li> <li>- Derived from eGEP, EAF, MAREVA and WiBe</li> </ul>

## 5. CONCLUSION AND RECOMMENDATIONS

E-government provides governments with an opportunity to provide information and offer better services to citizens; however, it requires public funding.

Citizens must get value for money and government must account for such expenditure by ensuring that the desired outcomes and impact are met [13]. Assessment of e-government requires that we take into account the implementation context since this has a significant impact on the outcome given the various contextual variables influencing e-government services.

Different authors have advanced different approaches to e-government assessment with most concentrating on value or outcome from government agency perspective. Codagnone and Undheim [8] argue that the relevance and validity of pure supply-side evaluations are questionable and some critics question their validity. E-government projects are driven by public value rather than technological and economic value [26], [17], and [13]. It is therefore imperative to adopt frameworks that emphasize citizen-centric or demand-side approach to ensure that citizens and businesses get value for money. Therefore, when assessing e-government impact it is important to consider the context of implementation and impact from the users’ perspective since they are key stakeholders.

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The analysis of e-government assessment frameworks discussed above provides a basis on which to adopt a framework that is suitable for developing countries. A combination of theories and concepts advanced by Verdegem et al (2010) and Bhatnagar and Singh [2] is proposed. They provide a suitable platform for adopting a suitable framework for developing countries since both apply a citizen-centric approach and have quantitative and qualitative indicators. Moreover, Bhatnagar and Singh's framework is based on concepts adopted from other frameworks including eGEP, MAREVA, WiBe and EAF. This framework also addresses some issues that are pertinent in the context of developing countries including costs of clients accessing service which utilizes common service centres and franchised outlets rather than 'self-use'; the cost of bribes (which is significant in developing countries); trips made when seeking service; paucity of data and weak monitoring and evaluation systems. The proposed framework in figure 1 above is based on the concepts advanced by the two frameworks.

Bhatnagar and Singh's framework has been used successfully to evaluate eight (8) mature e-government projects in India comparing client ratings in manual and computerized systems while Verdegem et al (2010) framework was based on statistical testing using Structural Equation Model (SEM) on large samples of data from the Belgian government and investigated the relationships between contextual variables and user satisfaction of e-government services.

From the literature review and findings of this study, the researchers intend to synthesize and consolidate the theories and concepts advanced by the two frameworks and adopt a robust framework that will be contextualized to a developing country and Kenya in particular. This will help in evaluation of e-government projects in the country from a user-centric perspective.

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