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# Towards design of citizen centric e-government projects in developing country context: the design-reality gap in Uganda

### Stephen Kyakulumbye

University of the Western Cape, Robert Sobukwe Rd, Bellville, Cape Town, 7535, South Africa  
3759606@myuwc.ac.za

### Shaun Pather

University of the Western Cape, Robert Sobukwe Rd, Bellville, Cape Town, 7535, South Africa  
spather@uwc.ac.za

### Mmaki Jantjies

University of the Western Cape, Robert Sobukwe Rd, Bellville, Cape Town, 7535, South Africa  
mjantjies@uwc.ac.za

### Abstract:

E-government projects should be at the heart of service delivery in developing countries if the lives of citizens, especially the socially and economically marginalized, are to be improved. However, quite often in developing country contexts, citizens have been treated as recipients of technology projects through a top-down approach from central governments. Such a paradigm of implementation usually results in the non-use of the deployed technologies and their associated e-services. A consequence of non-use of e-services results in a wastage of the public fiscus. The extant literature points to a number of underlying causes of the problem. One such problem which has been highlighted is called the "Design-Reality gap". This paper investigates the nature of the gap. It presents findings from policy analysis and in-depth face-to-face interviews with e-government policy makers and implementers. In addition, it reports on findings from focus group discussions with potential e-government users in a health sector setting. The results which are based on a participatory action research methodology reveal that there exists a glaring design-reality gap between e-government policy planners and citizens' aspirations. We argue that co-creation could be a feasible approach for the design of e-government application services towards efforts to bridge the design-reality gap.

### Keywords:

project participatory design; e-government; design-reality gap; co-creation; marginalized citizens.

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## 1. Introduction

Governments worldwide have devised and encouraged the application of Information and Communication Technology (ICT) in governance. As a consequence of such a commitment, a number of electronic government (e-government) applications have been deployed in both developed and developing countries. For instance, in the Ugandan context, which serves as the selected case of this paper, these systems include: Integrated Financial Management System (IFMS) for budgeting and control of expenditures, Integrated Personnel and Payroll System, Education Management Information System, Health Management Information Systems and the land information system among others. Such application deployments in Uganda are consistent with Gonzalez-Zapata and Heeks [1] who estimated that US\$3 trillion was spent on information technology by governments between 2000-2010, with an overall failure rate of 60%. However, despite the increasing penetration of the Internet in developing countries, the available literature including a United Nations Reports reveals that the African region overall lags in electronic government (e-government) development compared to the rest of the world [1].

The Chaos Reports [2-4], which categorize projects globally by how they are concluded, highlights the following resolutions:

- Resolution Type 1 (project success): The project is completed on-time and on-budget, with all features and functions as initially specified;
- Resolution Type 2 (project challenged): The project is completed and operational but over-budget, over the time estimate, and offers fewer features and functions than originally specified;
- Resolution Type 3 (project impaired): The project is cancelled at some point during the development cycle.

The 2018 CHAOS Report [4], which measures projects against the CHAOS database using six metrics of being on time, on budget, on target, on goal, valuable, and customer satisfaction, revealed that 52% of projects are challenged, 30% successful, and that 19% failed. User involvement features in the top 20% of the metrics for projects that are successful. The CHAOS research clearly shows that projects that lack user involvement perform poorly. This therefore indicates that user involvement and hence usability related issues are a key success metric. Instances of user involvement during the project cycle include participation in the information gathering process, application requirements review, basic research, prototyping and other consensus building tools.

One of the underlying causes of the failure of ICT projects has been termed as “*a design-reality gap*” [5]. A contributing factor to project failure is an assumption that existing system design frameworks inherent in e-government frameworks, can act as, for example, “*a one size fits all*” solution [6]. Such a design-reality gap is exacerbated by the design of e-government projects in a top-down approach from central governments. This situation has not yielded positive results especially considering marginalized citizens who have competing needs. Additionally, some e-government projects have been deployed using linear models and imminent failure is evident. For instance, Table 1 provides a comparison of agile and waterfall methods, where the former has some form of iterative design (or participatory design).

Table 1: A comparison of project failure rate between Agile and Waterfall project approaches

Project Size	Agile	Waterfall
Small	4%	11%
Medium	11%	25%
Large	23%	42%
All sizes	9%	29%

Source: Standish Group [3]

The data from table 1 reveals that agile projects which have an inherent iterative or participatory design component have a lower failure rate. Taking failure into account, this paper reports on a study that was undertaken in a selected district in the Ugandan context, within a health setting to serve as the unit of analysis. The research study investigated an alternative approach to incept, design and deploy e-Government applications and projects together with the intended users of such systems. This paper draws from participatory action research methods while harnessing the design science research paradigm and design thinking principles.

The primary question that this paper addresses is, “*How do e-government policy designers and implementers undergo early requirements gathering to align their project design intentions to citizens’ aspirations and needs in a marginalized context?*” In pursuance of the latter, the specific sub-questions which underpinned the research were:

- What are the citizen-focused e-government interventions under the strategic direction of the Ugandan Ministry of ICT that are aimed at service delivery improvement?
- What are the citizens’ needs and to what extent are their aspirations aligned to the National e-government strategy roadmap?
- Are there conceptual divergences between citizens’ requirements and governments’ requirements which impact on e-government strategy and its associated project design and programming?
- How can such divergences be mitigated in order to bridge the design-reality gap and thereby develop citizen centric e-government projects?

The remainder of the paper is structured as follows. Firstly a literature review is presented, which underscores the socio-technical underpinning of ICT development and the lack of citizen-centricity in respect of e-government applications. This is followed by the presentation of the research design in which an Iterative Co-Design Research Model is presented, as well as the details of the case study design and the qualitative data analysis process that were applied in the study. Finally the results of the study are discussed after which the conclusions are presented in which the key findings are synthesised into a Government to Citizen (G2C) Design-Reality Gap Theory of Change.

## 2. Literature Review

### 2.1 The notion of marginality

Marginality has been conceptualized as an adverse state or condition of existence of individuals or groups in a relation of subordination or inferiority to individuals or groups that are at the ‘centre’ or ‘mainstream’ [7]. In the event that there is no marginality, there can be centrality. Marginalization has been conceptualized as the process by which the condition of marginalized is reached [7]. Whereas marginality has been rooted in cultural and structural contexts, new forms have been linked to social exclusion and also, in relation to this study, to digital exclusion or digital divide especially in developing nations [8-9]. From the United Nations Development Programme (UNDP) human development report entitled, ‘*human development for everyone*’ [10], one in three people in developing nations continue to live in low levels of human development. The report shows that in most developing countries several groups face disadvantages that often overlap and reinforce each other which include, increasing vulnerability, widening the progress gap across generations, and making it harder for such nations and their citizens to catch up as the world moves on [10].

In developing nations, quite a number of populations have been stratified under marginality and they include: women, people with disabilities, youth and minority groups among others [11-12]. However, in terms of development, the most affected are those who are marginalized yet they are dynamic promoters of social and economic transformations in society and active agents [13]. They may include youth, rural community leaders and self-help groups, women, small and medium enterprises in rural and urban peripherals [14]. ICT and the Internet have the capability to improve the state of marginality in the form of information access from the pursuit of efficiency to effectiveness of public service delivery [15]. The cooperation between a government and its citizens is not only an issue of electronic interfaces (e-government), but most importantly a question of high quality and reliable services in a bid to improve the human

development capabilities [16-17]. There are various conceptualizations of e-government for improving citizen services [18].

## 2.2 ICTs projects for marginalized citizens

Information and Communications technologies (ICTs) have the ability to empower the poor marginalized communities [11]. Lofstedt [18] examines e-government from a more diverse perspective. They are management and organization, Electronic Democracy (e-democracy), interactions, Electronic Security (e-security) and Electronic Services (e-services) (Figure 1).

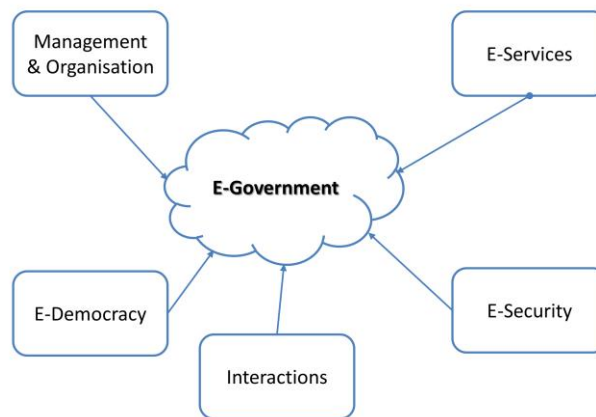


Figure 1: E-government perspectives for developing nations (Source: With modification from Lofstedt [18])

From figure 1, whereas e-government is conceptualized in various terms like e-democracy, interactions, e-security, management and organization, the point of departure for this paper is that citizen e-services comprise a key e-government service dimension for marginalized citizens. These are pre-requirements if the rest of the dimensions are to be utilized by citizens [19-20]. This is in support of Lofstedt [18] who reveals that current interest is however increasingly focusing on the demand-side (the individual citizen). Research concerning user-related issues is thus becoming more frequent [21-22]. Interest in the field has begun to shift from government at the national level where studies are more abundant to more citizen-related issues such as usability and user willingness [23]. This study posits, like other similar authors who observe that Information Technology (IT) and Information Systems (IS) related projects have lower utilization levels than other projects [24], that the challenge of citizens not willing to use e-government solutions still prevails. We therefore postulate that approaching the problem using a co-design approach for developing e-services applications may offer a solution [25-26].

From the reviewed cases, ICT when appropriated as e-government for citizens, has the ability to reduce poverty by improving poor people's access to education, health, financial services and public safety enhancement [27-30]. For instance, in India small scale farmers, artisans and Small and Medium Enterprises (SMEs) living in rural areas through their project '*computerized milk collection centers*' have enabled citizens to obtain access to information about prices, data on crops, weather conditions, credit facilities and market opportunities [31]. However, the design of such ICT projects in most developing nations, including Uganda, is characterized by a design-reality gap. This design-reality gap can be linked to the lens used to assess IS designs [5], [32]. Whereas there are a number of design science theoretical frameworks for the context of developing nations, a socio-technical approach is a viable theoretical perspective.

### 2.3 Socio-technical approach for IS project design

In a socio-technical approach, the focus is on the analysis of the problem and the formulation of the design in joint consideration of the technical system requirements and the social system requirements [24], [33]. It is further observed that this type of design process should not only consider procedural aspects of design but also people and change processes [34]. Design science research is an essential part of IS research as it has been argued that the IS field should not only try to understand how the world is, but also devise solutions of how to change it [34]. The authors reveal that the rationale for the use of a socio-technical design lens is that knowledge and theory generated from such an approach can support practitioners in understanding which mechanisms lead to desired outcomes.

The cornerstone of the socio-technical approach is that the fit is achieved by a design process aiming at the joint optimization of the subsystems i.e. any organizational system maximizes performance only if the interdependency of the subsystems is explicitly recognized [35]. Hence, any design or redesign must seek out the impact each subsystem has on the other, and planning must aim at the achievement of superior results by ensuring that all the subsystems are working in harmony but guided by socio-technical design theories. From a project management perspective this is critical to IS project success.

From a socio-technical perspective, the social aspect during design in the IS discipline is key. Henningsson et al. [36] observe that IS designers, with the ambition to provide socio-technical solutions to real world problems, require the contribution of external stakeholders to the development, testing, and implementation of the design contribution. These authors [36] analyze socio-technical IS design research from a resource dependency perspective. The resource dependency theory holds a notion that resources flow from the periphery of poor and underdeveloped states to a core of wealth states, enriching the latter at the expense of the former [37]. This makes the rich nations and rich individuals more enriched by way of integrating the poor into the developed world system [36, 37]. The need to achieve a balance between development and that of technological projects (e-government projects) whilst aligning developing nations with their citizenry's needs, is the precursor to mitigate the design-reality gaps.

### 2.4 The design-reality gap in e-government related projects

Heeks [5] observes that central to e-government success and failure is the amount of change between where citizens are now and where the government project wants to take them. The author argues further that the success or failure of e-government depends on the size of the gap that exists between the current realities and the design of the e-government project [5]. Heeks points out that Information, Technology, Process, Objectives and values, Staffing and skills, Management systems and structures, their resources such as time and money (ITPOSMO), are general dimensions not particular to a specific cohort in the e-government categorizations and that that bring variations in the design-reality gap.

Drury [38] has referred to them as a 5C Model of Context, Content, Connectivity, Capacity and Community. Sigwejo and Pather [6] in their E-government User Centric Satisfaction Framework (ECSF) have summarized them as functionality of service, motivation to use service, enabling infrastructure and government preparedness. The first two, functionality of service and motivation to use can be directly linked to users and government preparedness linked to policy.

Similarly, Peffers et al. [39], [40] have articulated a design gap as the lack of a conceptual model for how researchers and designers can carry out design work of IS (e-government) and mental models of citizens' evaluation of such services. By focusing on interrelationships between various contexts, citizen-centric design is a promising innovative design towards service usability [41-45]. Notwithstanding, e-government application design which is well thought out from inception has the potential to improve the lives of the undeveloped nations and their poor citizens.

### 2.5 E-government projects and citizen livelihood improvement

Heeks [4] warns that e-government is not merely computerization of government systems, but a belief in the ability of technology to achieve high levels of improvement in various areas of citizen service delivery. Whereas a number of studies perceive e-government as a subset of e-governance, this study conceptualises e-government as a pre-requisite for e-governance [46]. This is because e-governance consists of three components that are all very critical to citizens [4]:

- E-administration-improving government processes,
- E-citizens and e-services-connecting citizens, and
- E-society- building interactions with and within the civil society.

However, the issues related to livelihood improvement that yield effective adoption and usability of e-government are not well articulated. Similarly, Bhatnagar [47] notes that e-government has two complementary aspects: a political aspect, which focuses on enabling democratic participatory processes by engaging citizens. The second aspect is the technical aspect which focuses on government operations and processes. This conceptualization of e-government cannot elicit effective use of e-government from marginalised communities.

There is a need to address livelihood improvement issues as a key return to investment on side of government and socio-economic relevancy to citizens so that such applications are designed from a participatory approach that address citizens' needs to ensure usability. Soriano [48] conducted an Information Communications and Technology for Development (ICT4D) study in China and found that making tele-centers available in rural communities, does not guarantee that poor people will and can use them to create and share knowledge that could help lift them out of poverty. Whereas Vaismoradi et al. [66] found that to be the case, more developing countries like Uganda are deploying tele-centers, digital centers or Public Access Center programmes to provide information access to poorer rural areas in the hope that citizens would use them. Unfortunately, this has not been the case, and yet quite a number of authors reveal the link between effective e-government solutions use and community wellbeing [49-52].

### 2.6 Lack of citizen-centricity at the application and e-government service level in a G2C context

Evans and Yen [53] highlight challenges as obstacles in terms of e-government cooperation as dissimilarity in conditions, different objectives, inconsistent technology and differing levels of adaptability. Related to Evans and Yen [53] findings, Heeks [5] points out that e-government services are implemented as technocratic projects and with implicit assumptions that citizens will use them. To further the argument, Assimwe and Lim [54] reveal that from a government-citizen centric perspective, many government websites are seldom used, especially by people with disabilities. This is because visual and communication features, for example, are critical from a user perspective if usability is to be attained. These include, though are not limited to design consistency in web pages, visual design (font and color formatting), feedback/enquiry forms and interactive tools, page content sharing tools, zoom options and audio content [54]. Similarly, Kaisara and Pather [55] use a citizen evaluation continuum to highlight six service quality dimensions applicable in e-Government evaluation viz. website design, navigation, communication, site aesthetics, information quality and security.

From the aforementioned evaluations, the factors highlighted are user-centered features that may call for co-design especially for web application services as e-government applications. Cross cutting features from the literature are related to cooperation, dissimilarity in conditions, demographic characteristics, technicalities of projects, and lack of interactive forms, among others. These are challenges related to a lack of user centeredness at application and e-government service level in an e-government context [56]. These call for a focus on participatory design as a remedy to address the design-reality gaps.

### 3. Methodology

The study design was based on a Participatory Action Research (PAR) approach which harnesses the participatory design science research qualitative paradigm. There are two core elements of the research approach adopted in this study. Firstly, an underlying design science approach as suggested by Peffers et al. [39] and Hevner et al. [57], secondly the incorporation of co-design within an overarching case-study Yin [58] with embedded units [59]. It is embedded in the form that Uganda has a district governance structure and Mukono district is the focus area of this case study. There are also e-government policy makers and implementers as one unit of analysis and citizens in a health sector setting as another unit of analysis. This assessment at the supply side (government side) and the demand side (citizen side) provided an impetus for analysing the design-reality gap. The whole study process upon which this paper draws was iterative in nature and details of the two case studies are provided in the subsequent sections.

#### 3.1 Iterative Co-Design Research Model

This paper is guided by the **Iterative Co-Design Research** model abbreviated as **IcoDeRe** (Figure 2) featuring Design Research 1 (DR1), Design Research 2 (DR2), Design Research 3 (DR3) and Design Research 4 (DR4).

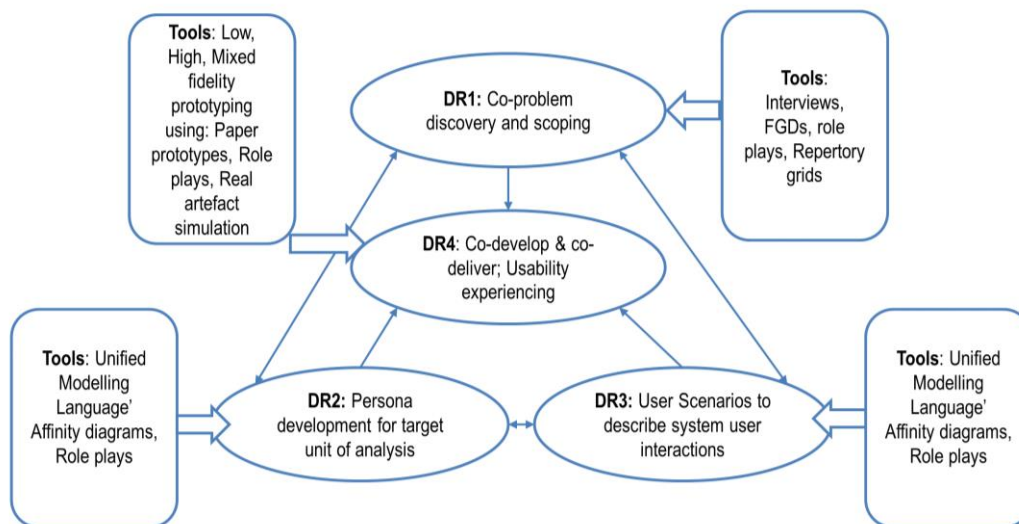


Figure 2: Iterative Co-Design Research (ICoDeRe) Model

The guiding model was constructed from design thinking principles with the purpose of revealing points of convergences and divergences in relation to the design process. In the divergent mode at DR1, the co-design team openly identifies all views, problems and potential impacts of the intervention being planned. In the convergent mode, the team hones in on viable scenarios for users with a view to create buy-in amongst stakeholders for the change process being sought.

#### 3.2 Establishing the parameters for problem discovery and scoping

This paper reports on Design Science Research 1 (represented as DR1 in Figure 2) at the policy level and which mainly comprises of co-problem discovery and scoping. The researchers and a design team ascertained a class of problems that affect marginalized communities in Mukono District of Uganda. These were scoped through both interactive and iterative processes. At the problem discovery phase, problems from a user perspective were perceived in practice based on their lived experiences in the communities. This was followed by an assessment of the current state of affairs in respect of how e-government policy makers arrive at the e-government projects and interventions they design for

citizens. This in turn provided the impetus for formulating the research effort and articulating the design-reality gap. It is noted that the input for this formulation can come from practitioners, end user communities, the researchers, existing technologies, policy makers and/or review of prior research [57]. Some scientists have argued that the problem formulation stage identifies and conceptualizes a research opportunity based on existing theories and technologies as well for a given case study context [58].

### 3.3 Case study approach

Yin [58] notes that a case study method is appropriate when a researcher wants to address either a descriptive question like (what happened?) or an explanatory question (how and why did something happen?). Yin [58] further comments that compared to other methods, the strength of the case study method is its ability to examine in-depth a case within its real-life context. Second, case studies are revealed to be appropriate when a researcher wants to illuminate a particular situation, to get a close in-depth and first hand understanding of it. Gerring et al. [59] re-affirms that the case study approach is a method of evidence gathering that is natural, that the researcher investigates the properties of a single phenomenon, instance or example.

In the software engineering context, the case may be a software development project, which is the most straightforward choice or it may alternatively be an individual, a group of people, a process, a product, a policy, a role in the organization, an event, a technology, etc. [60]. Benbasat et al. [61] argue that even though a study appears to be a single-case, embedded unit of analysis, it could be considered a multiple-case design, due to the decentralized nature of the study sites.

In the broader study from which this paper draws, we followed Benbasat et al. [61] and Yin's [58] notion of embedded case studies where multiple units of analysis are studied within a case [61], [63-65]. Two of those cases are the e-government policy planners and implementers and citizens in the health sector pilot case unit as a co-problem discovery and scoping case within Mukono District, Uganda.

#### *Case unit one: e-government policy officials and e-government policy documents*

As a way of understanding e-government policy related issues, the researcher undertook purposive sampling of key informants (Table 2), where eight key government officers were sampled. The collection of evidence involved a focus group discussion among five e-government application designers (software developer, database administrator, business process officer, manager business process and ICT officer) as well as one-on-one semi-structured interviews. Additionally, sixteen (16) e-government policy related documents and websites were reviewed in order to establish the status quo regarding available e-government projects and related citizen interventions [31], [66-80]. The objective of the review was to examine whether there were successful citizen e-government projects, if any, as well as notable failures, crises, extreme cases of wither problematic and good e-government scenarios. The same criterion was used to sample government websites for review and for data triangulation and verification.

#### *Case unit two: Rural Health Hospital*

Table 2 highlights this unit of analysis that formed a pilot phase of the project. The rationale for this selection is that most of the e-government interventions are geared at deploying ICTs to improve health service delivery. In other words in Uganda, the health sector is one of the sectors where a number of e-government projects and efforts are focused. We aimed to examine the extent to which the planned e-government health related projects are aligned with citizen's needs and aspirations. The method used to collate data was a focus group discussion that comprised 40 diverse citizens. These citizens were purposefully selected because of their position and influence in the communities they hailed from. They included representatives from the religious sector, motor cyclists leaders, village health teams, community elders and community group representatives. Table 2 depicts a summary of the respondents of the study.



Table 2: Respondents category for interviews and focus group data

Respondent category	Number (N)	Gender	Sampling rationale
<b>Government officers (Interviews)</b>			
Rural Communications Development Fund (RCDF) Manager	1	Male	Key informant in charge of rural technology
Ministry of ICT (Permanent Secretary and Personal Assistant to the Minister of ICT)	2	Male	Key informants in charge national ICT policy
Business Process Specialist MoICT	1	Female	Key informant FGD for district ICT development
Software Developer MoICT	1	Male	Key informant FGD for district ICT development
Database Administrator MoICT	1	Male	Key informant FGD for district ICT development
ICT specialist MoICT	1	Male	Key informant FGD for district ICT development
Programmer MoICT	1	Male	Key informant FGD for district ICT development
<b>Health setting stakeholders Focus Group Discussion (FGD)</b>			
Hospital Board Members	5	2 Males 3 Females	Key informants
Hospital staff (Nurses and doctors)	5	3 Males 2 Females	Key informants
Village Health Teams members	20	10 Male 10 Females	Key informants
Clergy and religious people	5	2 Male 3 Female	Key informants
Motor cyclists stage managers	5	Male	Key informants

From table 2, the selected government officer stakeholder group is at the core of design and implementing citizen applications. They included rural communications development fund project officers and Ministry of ICT officers. This helped in the analysis of the gap between the supply and demand side of e-government for citizen applications.

### 3.4 Qualitative data analysis process

From both case studies, the data was analysed using Thematic Content Analysis (TCA) whilst combining content and thematic analysis. Thematic content analysis is conceptualized as a descriptive presentation of qualitative data [64]. Bloor and Wood [63] note that the purpose of content analysis is to describe the characteristics of the document's content by examining who says what, to whom and with what effect. Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data [65]. This study combined the two analysis methods given that Vaismoradi et al. [65] observed that the two share the same aim of analytically examining narrative materials from life stories by breaking text into relatively small units. The researcher grouped and distilled from the texts a list of common themes in order to give expression to the communality of voices across participants. Every attempt was made to employ names for themes from the actual words of participants (in-vivo descriptors) and to group themes in a manner that directly reflects the texts as a whole.

## 4. Results and discussion

From the Ministry point of view, project interventions under the Ministry of ICT strategy direction that are aimed at citizen's engagement with government are related to e-procurement processes, e-health, e-tax, and e-education [68]. Whereas e-procurement is a key intervention, it is not an e-service required directly by the underserved (marginalized citizens). This was ascertained from the focus group interview results in which the stakeholders within the health setting, never identified e-procurement as an application of concern based on the rural health sector needs. Another intervention of concern to the side of government is public health reporting. However, the e-government strategy based on the interviews with the officers was not precise as to what such public health requirements should be and called upon universities and private sector innovators to take it on as a point of concern. This was revealed during interviews with the Rural Communications Development Fund (RCDF) manager and an officer from Ministry of ICT, Uganda. When these respondents were interviewed as regards to government support to universities to innovate in support of citizen-

centric application development, the officers noted that government does not solicit projects and only delivers based on their strategic plans and national priority areas.

As regards to the extent to which citizens' aspirations and needs are incorporated into the G2C e-government strategy, this is a glaring design-reality gap as government showed no commitment to funding whatever comes from citizens. Such a design scenario concretizes the view that e-government design for citizens takes a top to bottom approach. For instance one of the officers commented,

*“Government has meagre resources that cannot be directed to fund any proposals that are generated from citizens. We follow our Master designed roadmap bearing what we think works for the general community and funds will only be directed towards that.”*

Moreover, when it comes to private sector to reach ICT related services to rural communities, the officer commented that it is not viable to extend services to such areas by telecommunication companies since such ventures are not profitable. He commented,

*“Business you understand, a company will not try and put 3G or 4G internet in the village since it is not viable at all. Many telecom companies have opted to serve the urban areas but we as government are trying to get the best requirements for the locals but we are still failing.”*

With regards to explanatory issues of the conceptual divergences of citizens' requirements and government's requirements for e-government strategy design, it was revealed that resource allocation against set strategy was a key issue on the side of government. For citizens, their aspirations and mental models are in line with effective engagement with government as regards to issues of community well being, safety and security featuring reduced crime, fire outbreaks, sanitation, kidnaps and hard to reach effective transport booking systems. In the health sector where public health seemed to be a compatible problem between government and citizens' aspirations, citizens (client's interest) requirements were linked to online booking and complaints reporting systems for better service delivery improvement.

As e-government interventions, the point of convergence between the designers and government within the e-government national strategy was the nurturing of innovation and development. The officer commented,

*“It is good that you are working with youth in the Universities to think aloud and develop IS interventions that speak to the citizens' needs. However, as Ministry, we shall be able to point and support those that are in line with our strategy due to resource constraints. However, the desire would be to fully implement whatever comes from the citizens but we cannot. However, we appreciate the need to work with private partners to serve citizens better.”*

Whereas policy documents highlight some issues related to government being citizen-centric, there are no deliberate operational strategies to effect such a policy envisioned and a lot of designed projects meant for citizens have turned into 'white elephants' [66-68]. Furthermore, from the health sector, the Uganda National e-healthy policy [69] observes that the Ugandan health sector is characterized by a fragmented landscape of ICT pilot projects and numerous data and health information system silos with significant barriers to the effective sharing of information between healthcare participants. The policy further reveals that although the government, partners, and private institutions are continuing to invest in various ICT initiatives, without some form of a national plan and coordination, there is a real risk of continued duplication, ineffective expenditure, and the creation of new solutions that cannot be integrated or scaled across the continuum of care.

A focus group interview with the five application development team members also noted that there is a lack of well documented citizen centric commitment towards design of most e-government application. The group noted,

*“Whereas we want to design solutions for the locals, we actually have not known what such locals’ need. The Business Processing teams try to generate those needs but still, most times, our e-government interventions and projects have fallen short of such citizen groups.”*

Such results from e-government policy makers and implementers render support to the Chaos report [4] that points out that user involvement features in the top 20% of the metrics for projects that are successful, yet such a metric is neglected at the government design side. The results from the policy makers viewpoint contravenes the socio-technical approach whose focus is on the analysis of the problem and the formulation of the design in joint consideration of the technical system requirements and the social system requirements [24], [33]. This paper observes that such a design loophole is a design-reality gap.

To examine such a design loop hole from the citizen demand side, focus group discussions with the rural health facility hospital, too, revealed divergent views as to how ICT could be applicable in their contexts of a resource constrained environments. The leading question for the problem discovery phase with staff, selected clients and stakeholders was: *“How can a hospital in a resource constrained environment maintain health service delivery at a low cost and yet enhance service accessibility and affordability to the poor population served?”*

The purpose of this question was to enable stakeholders to document and reveal innovative ways of ensuring that health service are viable and affordable access among the citizens.

The focus group discussions comprised eight groups with at least n=5 participants each totalling to n=40 participants.

Table 3 shows the results of the thematic content analysis and categorization. The themes represent ways for improving service delivery while making health care affordable to the indigent.

Table 3: Themes from the eight focus group discussions of the health setting stakeholders

Themes	Frequency counts (n=8 groups)
Design strategies for insurance and medical benefits	4
Hospital should undertake school health visits	3
University students medical services should be covered by hospital	2
Fliers need to be printed and distributed	2
TVs, radio and newspaper advertisements need to be placed	4
Project proposals to funding agencies	5
Hospital website featuring a Doctor booking form and a client complaint form should be designed	6

Source: Focus group discussion transcripts

Most of the group themes evidenced the need for an online web based system and they include:

*“Private wing needs to be furnished with online booking services to improve accessibility and timeliness of care giving so that more private patients are attracted all over the country to enhance **revenue** for offering sustainable services to the other non-paying patients.”* (Group presenter emphasis)

Similarly another focus group comments was,

*“The hospital has done enough to put in place medical equipment, we now need effective use. Let’s put our services online to a wider community, be transparent and accountable to our donors and other partners, this will yield us more resource support.”*

A retired civil servant accessing services from the hospital revealed that,

*“As a private patient, I want to come to hospital and find my medical record sorted than being asked over and over again, so let’s put services online than making us stand in line here.”*

The results of the Focus Group Discussions (FGDs) are contrary to the modernization theory and render support for the resource dependency theory by arguing that the *haves* should be at the fore front of spurring development to create a spill over effect to the *have-nots*. Such spill over effects leads to improvement in health care giving to the poor citizens and communities [70-73]. From the literature, similar submissions have been made that include: Patient complaints help to identify problems in patient safety and quality of clinical care [72]; effective complaint handling systems aid in the generation of recovery strategies on a hospital’s revenue and profitability, dramatically and efficiently [73]; Implementation of patient care information systems is a potential means to achieving medical error reduction [70] and a reciprocation between theory and practice [74], among other benefits.

During the plenary discussion of how such an online web based system would be of benefit to the marginalized, the following themes came forth: Web based applications aid patient centeredness; Patients are given more freedom in decision making about their preferences for the appointments and to have improved access; Improve online offerings to patients who can pay so that the over 70% of poor non-paying citizens will have better services delivered to them as well. For instance, one private patient paying Ugshs 300,000 (equivalent to 80 US dollars) can in effect subsidise 30 patients who are charged user fees of Ugshs 10,000 each (equivalent to 2.68 US dollars). Therefore, one paying patient whose service satisfaction is improved through ICTs can offer a contribution to over 30 non-paying patients. This creates a positive spill over resource effect (externality) i.e. intangible benefits of ICTs as opposed to well known tangible ones to the economically marginalized citizens.

Finally, our findings turn to the *Design-reality gap*. Whereas government and e-government policy design teams have their conceptualized designs like online birth registration system and clinical information (health informatics), provision of health services at a distance (tele-health), sharing information and knowledge with health care providers (e-learning) among others as per the Uganda National e-healthy policy [69], the citizens had a different perspective in terms of problem priority. This therefore points to the need for the design teams and e-government policy designers to undertake participatory problem discoveries and scoping during project designs. Kristensson et al. [73] offer support for the results of the co-discovery phase where they note that participants need to be exposed to problem discovery methods that give them the freedom to put their views across based on their own pressing needs, rather than going with pre-configured problems for design for them to rubber stamp. Sanders and Stappers [41] too offer similar guidance and argues that co-design in a broader sense should ensure that designers and people not trained in design, collaboratively work together in the design development process from problem definition phase to determine design outcomes. Van de Ven and Johnson [74] emphasize that such cooperative working is the most critical way in which the gap between theory and practice can be bridged.

## 5. Conclusions and recommendations

This paper concludes by offering recommendations as per the final research objective of proposing a framework that can underpin such divergences in order to bridge the design-reality gap and develop citizen centric projects especially for citizens. The recommendations emanate from the conclusion that there is a design reality-gap where citizen’s conceptual models are not aligned with government citizen e-government strategy due to absence a deliberate targeted strategy. The concept of “*give them, they will come*”, has not resulted into usability and government leaders have ended up disappointed. For instance, at The Hague Organization for Economic Cooperation and Development (OECD) conference [77], the leaders agreed that countries are struggling to better meet user expectations, but few have the necessary and sufficient knowledge of these expectations.

This paper recommends that co-creation of e-government applications services and projects with citizens in a bottom-up approach, will lead to proper integration of citizens’ needs and assumptions into the design. Hence, this results in

effective use of such applications and programmes. However, citizen centric design needs to be preceded with well designed co-problem discovery and scoping phases with citizen stakeholder groups following a theory of change. We therefore propose that governments in developing contexts should adopt a Government to Citizen and/or Citizen to Government (G2C/C2G) design-reality gap theory of change (Figure 3).

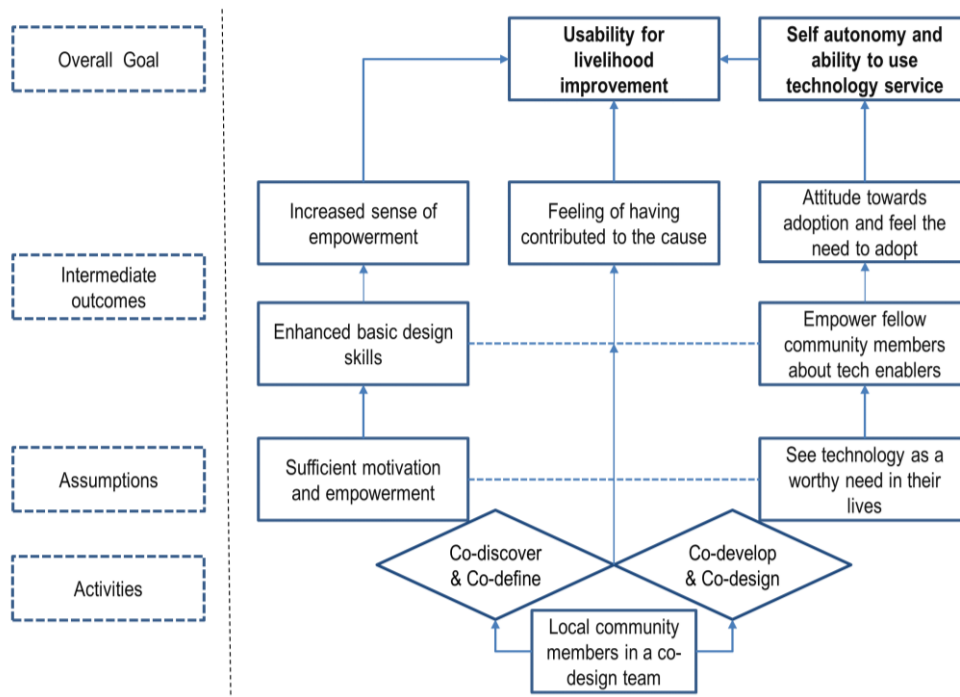




Figure 3: G2C Design-Reality Gap proposed Theory of Change

Legend: Co-Design processes   
 Project activities, assumptions and goals 

From the above framework, when a group of citizens from a local community form a co-design team, their current realities are most likely to be incorporated and embedded in the artefact and project design. The activities elicited from the co-discovery phase in turn shape the scoping at co-definition phase. The diamonds are used to reveal points of divergences and convergences between the designers’ conceptual models and citizens’ mental models as has also been used by the British Design Council and applicable during design thinking initiatives. When in divergent mode, quite a number of beliefs, attitudes, assumptions, are revealed from the participatory approach. Furthermore, co-scoping leads to mental convergences between citizens and designers. This is followed by co-development with low fidelity prototypes and presentation of actual artefact to yield further insights into the design based on the citizens’ own application evaluation criteria. However, the participating citizens need to have sufficient motivation, empowerment and self-realisation that the project under development is a worthwhile need in their lives.

At the activity level, there are measurable immediate results (outputs) coupled with intermediate results (outcomes). These may include but are not limited to: enhanced basic computer skills, technologically empowered citizens (technology savvy citizens), feeling of the need to use and adopt technology which ultimately contributes to the overall goal of ICT4D in terms of usability and continuance to use technology for livelihood improvement. The realisation of

the highlighted results chain may make a contribution to the National strategy set by the Uganda Ministry of Information and Communications Technology, to ensure the alignment of the e-government strategy [78], [79], [80] to the real pressing needs of the citizens. In other words, this may ensure that what is well documented in national policy documents but not implemented, is actually realised.

Such national alignments will contribute to the Global ICT mandate as documented in the World Summit on Information Systems [79] that calls on nations to re-think their ICT design mentality of “*build-it and they-will-come*”. This is under the World Summit on Information Systems (WSIS+10) [79] action line C2 and C3 which challenges governments to provide rural people access to ICT infrastructure and Internet in order to move them into the digital society. However, the summit reveals that this has not worked at all and governments have been disappointed. This therefore underscores the recommendation of this paper to embed participatory design approaches and methods to develop e-government systems that will have inherent citizen value. Finally, to attain a more robust and successful e-government project implementation, we argue that there is a need to collaboratively align information systems development with best practice standards for Project and Program Management (PPM). Similarly, Teubner, [81] has re-affirmed that academic research on IT related Project and program management is still at its infancy and needs to be enhanced to improve practice. Through the participatory design approach that is proposed, we render support to authors who recommend measuring project success in the eyes of the customer [6, 41-45, 54, 81], or rather the citizen user, as is the case in e-government projects.

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**Biographical notes****Stephen Kyakulumbye**

Stephen is a Certified Senior Project Manager, International Association of Project Manager (IAPM) Germany and a Professional Member of PMSA. He has been in the project management and Information Systems environment for over ten years as a PM/IS consultant. Prior to embarking on his PhD studies at University of the Western Cape South Africa, he has been working as a Program and Project Management Information Systems Consultant at Uganda Management Institute and a Lecturer at Uganda Christian University. He has consulted as a project monitoring and evaluation expert for several local and international organizations. Special projects of interest for design are those that lead to social change transformation, through design for social good. For his Doctoral studies, Stephen has been a National Research Foundation, South Africa in e-government and DAAD Germany scholar in Big Data Predictive Analytics for project design and implementation.

**Shaun Pather**

Shaun Pather, is Professor of Information Systems in the Faculty of Economic and Management Sciences at the University of the Western Cape. He is a Fulbright scholar, and has over twenty-seven years of work experience, in the broad education and ICT sectors, and is actively involved from both research and policy perspectives with government, industry and non-profit organizations. Shaun's research focuses on advancing the Information Society in developing countries. He is passionate about the use of ICTs for societal upliftment, and the nexus thereof on public policy. His research outputs span the thematic areas of ICT for Development (ICT4D), ICT adoption, ICT Evaluation, E-Government, and E-Commerce. Shaun serves on several international conference committees, and journal editorial boards.

**Mmaki Jantjies**

Mmaki Jantjies is an Associate professor in Information Systems. Her research is on ICT for Development with a focus on education technology in developing countries. She is further passionate about the uptake STEM subjects in disadvantaged communities and runs technology education programs in South Africa local schools. Mmaki is a member of the International Mobile Learning Association, an Executive peer-reviewer for the International Journal of Education Technology and Society and a South African member of the W20 in the G20 focusing on policies related to digitization in various countries.