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# A Multi-dimensional E-participation Model to Boost Public Confidence in Democracy in Rural Uganda: Participatory Approach

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*Abstract*— *Electronic participation (e-participation) is an essential e-government instrument used by government across the world to support democratic decision-making processes. Despite its usefulness, e-participation initiatives face challenges, emerging predominantly from the limited involvement of the actual users in design and deployment of e-participation models and systems. Limited users' involvement restricts guidance on which model requirements and dimension would be suitable for promoting democracy in specific settings through use of e-participation initiatives. Consequently, the users' needs suitable for specific context is inadequately addressed in most existing models and e-participation initiatives. This leads to the public losing interest in using e-participation initiatives to achieve democracy. This paper proposes a new multidimensional model derived from users' perspectives on model requirements that boost the public's confidence in using e-participation to achieve democracy. Two participatory workshops involving 23 participants from local government leaders and ordinary rural citizens from two parishes in Isingiro district Uganda were deployed to generate insights and gather model requirements used to develop the model. The study provides a model consisting of seven dimensions including 1) socio-technical contextual discovery, 2) actors, 3) technology, 4) levels of digital device usage, 5) strategies, 6) e-participation system requirements and 7) expected outcomes. The model provides guidance on how e-participation initiatives can be designed so that they capture public's priority needs tailored to their context to boost the public's confidence in e-participation.*

*Keywords—e-participation, e-participation models, multidimensional models, e-democracy, Africa, Uganda*

## I. Introduction

Citizen participation is one of the most significant topics in government administration, especially as the demand to use Information Communication Technologies (ICTs) to enhance citizen participation in democratic processes increases globally [1, 2]. ICTs refer to the use of digital technologies like radio, television, computers, internet, mobile devices, and personal computer kiosks to produce, capture, process, store, send, receive, access and manipulate information [3]. In Uganda, 43.3% of the population owns a mobile phone, showing higher penetration than other devices [4]. At the rural level, 71% of households have mobile access, but only 5% have internet access [5]. The use of ICTs to facilitate interactions between government and citizens to achieve inclusive deliberative decision-making processes is referred to as electronic participation (e-participation) [6]. When citizens are engaged in these deliberative discussions, it increases government accountability, quality of policies, citizens' trust in public institutions and ensures that public services are tailored towards citizen's needs [7] and consequently enables building of strong institutions. However, despite the benefits associated with e-participation, there is limited research in the field [8], especially in Africa [9, 10].

The rise of e-participation in the late 1990s, led to research focusing on e-participation models and frameworks in the 2000s, to provide guidance in successful designs and implementations [8]. However, most of the e-participation models developed were based on developed countries, with very few emerging from developing countries [2]. Research shows that when models from developed countries are applied to developing countries whose contexts like social, cultural, technological, and political differ they usually fail due to a mismatch between design and context reality [11, 12, 13]. Study [9], asserts that design reality gap occurs when the design consideration in terms of information, technologies, processes, objectives and values, staff's skills capabilities and finances is not suitable for the context of the end users of the information system. This limitation partly stems from not involving end-users in model design to ensure value. [14]. As a result, solutions often miss user context, leading to low trust and adoption [15].

Customising e-participation models for developing countries is essential to reflect local realities and reduce the design-reality gap. This would result in e-participation adaptability and user's confidence and contribute to democratic processes. For instance, research shows that when a high-degree design-fit is achieved, there is increased acceptance and usage of e-participation initiative [16]. One way to achieve high degree design fitness is to allow ender users define their context and provide context-tailored solutions for e-participation models and initiatives [17, 18]. This can lead to better e-participation outcomes and boost user confidence in its role in democracy, as people are more likely to engage when they believe their actions will have a positive impact [19,20]. Therefore, it is important to consult users for strategies that ensure their e-participation leads to meaningful democratic change.

Unfortunately, most of the existing e-participation models are developed with limited involvement of users [21] especially in rural areas to provide insights into needs suitable for their context [2]. This paper contributes to addressing this gap in literature. It reports on a study that engages with rural users in Uganda as active agents in the development of an e-participation model critical for the developing country context. The aim of the paper is to identify multi-dimensional e-participation model requirements and design the model based on the rural users' insights and perspectives. The remaining part of the paper is divided into six sections.

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Section II focuses related work. Section III outlines the research methodology. Section IV presents the findings while section V discusses the implication of the findings. The final Section VI presents the conclusion and future work.

## II. BACKGROUND: E-PARTICIPATION MODELS

Existing models guiding how e-participation initiatives should be designed, implemented, and evaluated are classified into five categories. These include e-participation level, e-participation evaluation, e-participation processes, dimensional e-participation models and context-based models. These models are briefly discussed in these sections.

### A. *E-participation Levels Models*

E-participation models provide schema or systematic steps through which citizens' role changes as they transition through each level of the models. Reference [22] and International Association for Public Participation (IAP2) models present typical examples where citizens' participation to influence public decisions are informed by the levels. The author [22] presents a model with eight steps grouped into three categories: 1) non-participation (manipulation and therapy), 2) tokenism (informing, consultation and placation) and 3) citizen power (partnership, delegated power and citizen control) [22, p.217]. The third category is considered as the highest level where citizens gain control, and influence political decision-making compared to the first category [2]. The IAP2 model shares similar schema with five levels of e-participation: e-inform, e-consult, e-involve, e-decision, e-collaborate and e-empowerment [23, 24, 25, 26].

The model in [26] is another well-known e-participation schema, which consists of three levels: e-enabling, e-engaging and e-empowering. The lowest level, e-enabling, involves a two-way communication between government and citizens where they are considered consumers. The middle level, e-engaging, involves a two-way communication between government and citizens where citizens are consulted to choose from the government's pre-defined options while the e-empowering level offers highest citizens' influence in initiating policy development and follow-up to ensure that the policies are implemented.

Additional models involving three to four levels are also put forward in [24, 25]. These models as in [24, 25] are based on IAP2 and include: e-informing, e-consulting, e-collaborating and e-empowering. The models only differ from the model in [26] by dividing the e-engaging level into e-consulting and e-collaborating to cater for citizens' passive (e-consult) and active (e-collaborate) engagement. This breakdown provides a specific way to set goals for initiatives and a manageable way to evaluate them.

Reference [27], further breaks down the e-participation levels into six sub-levels. These include 1) non-participation, 2) informing, 3) consulting, 4) co-production, 5) co-creation and 6) citizen empowerment. The model acknowledges that participation may be absent at times. It divides e-collaboration into two forms: co-production and co-creation.

### B. *Evaluation Models*

Another classification of models is the e-participation evaluation models which provide guidance on how to assess e-participation initiatives [28]. For instance, [29] presents an evaluation framework that includes six e-participation dimensions adopted from reference [26]. The dimensions include, actors, e-participation levels, rules of engagement, technologies, stage in decision-making and duration and sustainability. By using multiple dimensions, the model offers a holistic guidance for planning, implementing, and evaluating e-participation [30]. However, it lacks guidance on how to combine technologies to achieve inclusiveness in e-participation for a specific context [29]. Like the model in [29], a model in [23] is based on literature and is not designed for a specific context. The model's main argument is that assessment should include whether e-participation levels are supported by appropriate tools and technology that competently enable activities at the e-participation levels.

### C. *E-participation Process Models*

The e-participation process models involve sequential processes of participation. It is one of the highly cited models. It is based on developed countries and provides 5 steps: defining 1) democratic processes, 2) participation areas, 3) participation techniques, 4) categories of tools and 5) technologies [31]. The steps are conducted through a combination of top-down and bottom-up approaches. The model is suitable for developed countries where citizens may have political efficacy with enriched capabilities and resources to participate. Reference [32] critiqued this model arguing for its limited suitability for contexts with different social, technological and economic environments where capacity building is a prerequisite for citizens' engagements. The author [32] addresses the limitation by proposing a model that consists of seven processes: 1) policy and capacity building, 2) planning and goal setting, 3) programs and content development, 4) processes and tools, 5) promotion, 6) participation and 7) post-implementation analysis. However, the model in [32] lacks an approach for initiating participation. To address this limitation, [33] presents a model that adapts models in [31, 32] but with a focus on the developing country context.

However, the models in [31-33] guide on actors' identification and application design alignment to the processes. Reference [34] provides a processual model that begins at identification of actors, then proceeds to designing application that supports actors and levels of participation. Next, it identifies strategies and support mechanisms to enable participation. The model concludes by showing that these steps should lead to positive e-participation outcomes.

In general, the process models are usually generic and lack details to enable customisation [35]. They inadequately address the social, technical and democratic aspects of e-participation [36]. For instance, the models do not show how to achieve e-participation levels activities and strategies to achieve participation outcomes for specific contexts.

### D. *E-participation Dimensional Models*

Some e-participation models are classified as dimensional models, with the main dimensions including democratic processes, e-participation as a platform and e-participation as a project [37]. Research into these models has further classified the main dimensions into sub dimension including technology, e-participation levels, participation objectives, stakeholders, key performance indicators, participation outcomes, contextual factors and e-participation strategies [30, 34, 38-41]. The sub classification reduces complexities associated with understanding, planning, implementing, and evaluating e-participation initiatives. For instance, the model in [39] comprises of three dimensions such as technology and e-participation levels and outcomes.

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Researchers [40] present a four-dimension model consisting of stakeholders, e-participation levels, technology and participation outcomes dimensions. The model directs that stakeholder roles should be aligned to e-participation levels and appropriate technology to achieve meaningful participation. However, consideration of only one contextual factor limits it from being holistic. Other researchers [30, 41] have proposed more holistic dimensional models. Reference [41] present a four-dimension model involving contextual factors, stakeholders, e-participation levels and technology dimensions. Similarly, a model in [30] consists of six dimensions including e-participation objectives, e-participation levels, e-participation strategies, e-participation technology and tools, participation demand groups and contextual factors (accountability, transparency, technology and stakeholders). Collectively, the dimensional models are developed predominantly based on literature and developed countries' context. The common dimensions are technology, e-participation levels, and stakeholders while participation key indicators/outcomes, contextual factors and strategies are the least common.

### E. *Context Based Models*

Contexts are considered as critical factors that may affect the success of e-participation [15]. This paper draws on reference [15]'s context description to identify context-based e-participation models. E-participation is shaped by contextual factors such as social, economic, cultural, technology, political and legal as reflected in models in [41, 42], stakeholders; ethical and quality of living and individual capabilities as seen in models in [30, 43, 44]. Other contextual factors reflected in models include perceived usefulness like accountability, transparency, attitude, perceived ease of use, social influence, facilitating conditions, subjective norms, trust, trust in government [2, 16, 30].

Reference [45] categorises factors into a three-dimensional model that consists of technology, organisational and environmental contextual factors. The technology factors include ICT infrastructure aligned to participation levels and context. The organisational factors include top leaders support and experts in e-participation. Finally, the environment context includes public pressure and citizens' readiness regarding availability of required skills and capabilities.

Consideration of contexts is very crucial and ought to be considered in e-participation models' development. Through understanding contexts, strategies suitable for a specific setting can be identified for increasing the chances of e-participation success [43, 46]. For instance, [47] notes that when contextual demand is inadequately addressed during system development, the users' context is usually not addressed. This results in the system being shunned by the users. This is evident in research in Estonia where e-participation system failed due to the contextual factors not being understood and aligned to the system development and implementation [15].

In sum, evidence from the review shows that most of the models are derived through literature review based on developed countries whose context is different. This hinders identification of e-participation that may work in developing countries. The limitation can be addressed by including people from specific settings to inform the design of e-participation. Moreover, most existing models lack dimensions like contextual factors and outcome-driven strategies. This paper seeks to address these gaps.

## III. METHODS

The study adopted a participatory approach to co-design the model with rural citizens and local government leaders from two parishes in Isingiro district in Uganda. The approach is essential for enabling context discovery and increasing chances of adoption [17]. The research involved 23 respondents who participated in an initial study in February-March 2023 to identify the rural contexts that support or hinder e-participation. The research approach was framed following guidance as in [18], with a focus on creating an enabling environment for deliberation and gathering insights on end-user needs for the model.

Two separate deliberative workshops of three hours were conveyed on the 13th of July 2023 at Isingiro District Local government premises, Uganda. One workshop involved the ordinary rural citizens and the other for local government leaders. The researchers purposively ensured the citizens' workshop included at least one participant with each of the following attributes from the initial study: illiterate, literate, female, male, age group (18–27, 28-37, 38-47, 48-57, 58-67), married, and unmarried. In each workshop, smaller groups comprising between 3-6 members were formed to enable free interaction and the researchers played a facilitator role [17, 18]. By playing a facilitator role, the researchers triggered the participants to remain on track by asking what-if questions while at the same time providing minimal guidance with some suggestions when participants were stuck. During the workshops, the participants were provided with pens, pencils, markers, stick notes, manila paper charts and personas based on the results from the earlier study to enable them to visualize their ideas [18]. The personas guided participants to identity model requirements and other considerations deemed relevant for their context. Participants were encouraged to write or draw their solutions using the material provided. In addition, audio recorders were used that captured the audio discussions. Participants mainly used their native language as majority did not understand English. The audio recordings were transcribed and analysed following the thematic analysis process in Nvivo 12. The findings were presented as categories and themes as seen in section IV.

## IV. RESULTS

The study results are presented in two parts: model requirements, and the model with its description.

### A. *Model Requirements*

*Actors* emerged as one of the categories. Analysis of the data shows that some participants perceived local government as critical actors in delivering information to citizens and lobbying government to provide resources that enable citizens and leaders interact. The information is reported to be communicated through ICTs such as mobile phones, as one local leader explains: "*We use ICT by calling them on phone to provide the information and use phone texts to inform citizens.*" P01Leader. However, while the use of mobile phones can facilitate and speed up the transfer of information, some citizens felt that it limits or exclude information access to those who are without the devices or living outside the mobile telephony coverage areas. To address this limitation, the participants echo the need for

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additional resources and improved collaboration between the rural citizens and leaders.

"*The government should extend the electricity grid to our rural areas so we can power ICT devices. Sometimes we even have money to pay for charging, there's simply nowhere to charge them"*P08RuralCitizen

"*For collaboration, citizens and leaders can be grouped according to their interests and then be tasked to develop something together and submit it for further vetting by the higher authority*." P05Leader

Rural citizens also emerged in the data as actors whose role are to receive information and submit their opinions, collaborate with their leaders, and initiate ideas through ICTs. The last two actors are husbands and religious leaders. Participants highlighted that husbands control their wives to own mobile phones or access to phones or to attend decision-making meetings. This may reinforce the gender divide and consequently limit the inclusive participation of women in decision-making processes that after them. To encourage the husbands to allow their wives to own mobile phones and attend meetings, participants advised that religious leaders who are held in high regard should counsel husbands to allow their wives to own mobile phones.

"*… the leaders can collaborate with religious leaders to encourage the men to allow their wives to have phones and explain to the husbands that when wives have phones, they are able to know what is going on regarding national decision-making processes.*" P02Leader

Overall, the analysis highlights the vital roles of these actors, their interrelationships, and mutual dependence in supporting inclusive and deliberative political decision-making through ICTs in rural Uganda.

*Technology* is another category that emerged from the data. Results show that the participants including citizens and leaders use a variety of technology devices to interact and facilitate information dissemination. This includes basic mobile phones, smartphones, telecommunication masts, mobile trumpets, radios, television and computers as shown in Figure 1. Mobile trumpet refers to conned shaped device that plays a pre-recorded audio message while attached to a moving vehicle (car or a motorcycle). The choice of the devices used is generally influenced by their affordability and accessibility by majority of the population. It is also influenced by citizens' ability to read, and availability of electricity and internet. The most mentioned devices were radios, mobile trumpets and basic mobile phones as seen in Figure 1. The other form of technology featured various data formats—audio, text and images—along with multi-language support, translation, offline and online access, privacy features, social media, internet and virtual interactions. The results offer valuable socio-technical insights on which technologies or devices to design or use to support inclusive, deliberative democratic processes in rural areas.

The *levels of digital device usage* category highlights the different ways digital devices are used at distinct levels of citizen and leaders' interactions. At the first level, participants mentioned leaders use diverse devices like basic mobile phones, mobile trumpets, smartphone with social media,

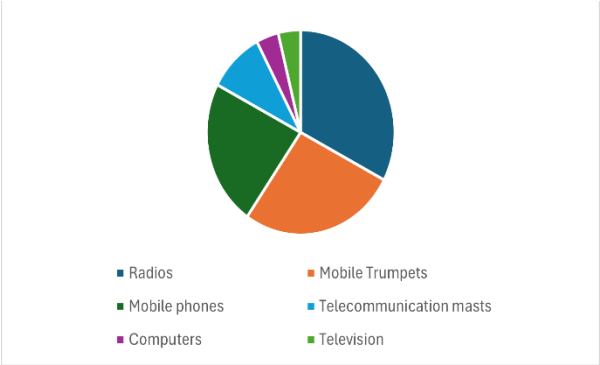


Figure 1. Showing devices mentioned

and television to inform citizens.

"*Leaders use mobile phone to send SMS to citizens and make phone calls to some citizens to disseminate information*" P11RuralCitizen.

Report from this and many other participants suggests that this level of usage is top-down, as information flow from leaders to citizens with limited or no input from them.

At the second level, the leaders use basic mobile phones to consult citizens on key policy and resource distribution agenda. While this approach provides some degree of inclusive participation, it has its limitations. Most citizens expressed concerns about the protection of their identity and the possibility of the leaders ignoring their input. Therefore, the participants acknowledged that ICTs, such as computers and smartphones, could enhance anonymity, facilitate the collaboration between leaders and citizens and enable citizens initiate their own ideas.

The *strategy* category focuses on activities that can foster more inclusive and participatory democratic practices facilitated through ICTs. The analysis of the data reveals six themes under the strategy category: 1) levels of digital device usage, 2) ensuring inclusiveness, 3) capacity building, 4) reducing gender discrimination, 5) security, and 6) attainment of e-participation outcomes.

Participants provide some strategies that relates to the *level of digital device usage*, ensuring leaders effectively inform citizens and facilitate inclusive communication. To achieve this, the participants suggested the use of audio (phone calls and pre-recorded audio) and images for the illiterates. They emphasised that images would especially serve the illiterates and usage of diverse devices to inform the wider citizens.

"*…With the inform stage, the first step is sharing information by inviting people to meetings. As leaders, we start by calling them, and the next day, we can use public mobile trumpet devices with recorded messages to reach more people*". P05Leader

Participants also highlighted that leaders should create consistent schedules for releasing information to citizens, improving better awareness.

*"…They should create a time and place where people can go to get information. For example, the system should have a schedule for releasing information and give announcement for this and this*." P06Leader.

For the leaders to have a successful consultation, participants highlighted that the leaders should first invite the citizens to share the agenda prior to the consultation

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activities. The data further reveal the need for secret voting for options preferred by citizens, consensus and final decision taken through the majority vote. It also includes allowing citizens to follow-up on the implementation of the final decision resulting from the majority vote.

> *"During consultation, citizens should be provided with the meeting agenda in advance so they understand the purpose and can contribute meaningfully. Leaders must first explain the available options, then allow citizens to freely choose the option they prefer…without imposing their own views. The final decision should reflect the majority vote, and the outcome must be documented and made accessible to both citizens and leaders". P05Leader*

Regarding usage of ICT to enable leaders and citizens to collaborate, the data shows that citizens and leaders of similar interest ought to be grouped together so that they develop something together. It is noted that the idea should be submitted to high-level leaders for vetting as highlighted in an earlier quote.

*Inclusiveness* is another theme that emerged under the strategies category. This involves two folds: (i) ensuring inclusiveness through the selection of communication and technology tools that cater for different categories of citizens and, (ii) developing strategies that support multi-languages usage. As mentioned earlier, the participants mentioned the use of diverse communication devices to cater for citizens' needs. The choice of these tools should be guided by their affordability and accessibility to most of the population. "*Yes, I think this is better (more affordable) than putting an announcement on the radio* ..." P03Leader.

To this end, the participants suggested that devices like radios and mobile phones could be used or shared to enable those with limited access to the devices to receive information from their leaders.

> "*They should share phones and radios. If a time is known that the announcement will be put on at a particular time, people can gather and go to a neighbour who has a phone and receive the communication from there*." P05Leader.

Furthermore, to ensure that language barriers do not exclude some citizens from participating, the use of multi-languages systems that integrate the native language like Runyankole was recommended by the participants.

Regarding the *capacity building strategy* theme, 4-sub-themes emerged from the data. These include, 1) infrastructure building, 2) lobbying government, 3) cultivating inclusive political culture, and 4) providing an enabling financial environment for citizens. Under the infrastructure sub-theme, participants highlighted the need to build more schools, training citizens to acquire literacy, ICT skills and deliberative skills, increase telecommunication masts, and extend electricity to include solar energy. The result suggests that building appropriate infrastructure could facilitate effective use of digital devices and provision of service. The *lobbying* sub-theme relates to the need for local leaders to lobby government to provide the appropriate infrastructure. As some participants put it: "*The government should provide solar panels*". P22RuralCitizen. *"…the government should increase the network services in areas by putting more masts*". P18RuralCitizen.

"*... The leaders should lobby for government to build more schools … they can learn to read and write and also use phones and computers." P08RuralCitizen. The results suggest that the effort to develop inclusive participatory system should extend beyond digital devices by focusing on building the necessary infrastructure and digital literacy skills*."

For the next sub-theme – *providing an enabling financial environment for citizen* – the participants explained that government should provide financial support and incentives to promote inclusive digital technology usage. This should include reducing charges of airtime and electricity units for rural people, reducing taxes on airtime and providing money to citizens to enable them make calls to their leaders.

"*They should try and reduce airtime charges or the tax on airtime*" P18RuralCitizen. *"…Reduce the electricity unit charges (money) for rural places*". P09RuralCitizen. "*I would suggest that the government should give us money to enable us call and communicate with our leaders*". P17RuralCitizen

Regarding the theme on *reducing gender discrimination*, participants highlighted that local government leaders should collaborate with religious leaders to sensitise and encourage the husbands to allow their wives to own mobile phones and attend decision-making meeting as earlier evidenced under the actor category. The participants further advised that for husbands who do so, their wives should be given incentives that also benefit the husbands to encourage the husbands.

> *"...there should be incentives given to woman that the husband can benefit from as well. This will encourage the men to allow their wives to attend the meetings*." P09RuralCitizen

Under the *security strategies* theme, participants alluded the need for measures to protect the identity of citizens who submit their opinions to their leaders, ensure that the resolution from meetings remain unaltered by leaders, and to limit leaders from denying citizen access to information. As this participant states:

> "*We should put means in place where citizens can submit their opinions to the leaders without revealing their identity*". P08RuralCitizen

Under the e-*participation outcomes strategies* theme, participants emphasised that enabling citizen voting, transparently showing real-time consensus building, and ensuring voting results are accessible to both citizens and leaders would promote inclusiveness, accountability, transparency, and foster a sense of empowerment and respect among citizens.

> *".. a record of the majority vote should be made known to the leader and the citizens immediately if possible. In that way, the citizens feel respected by their leaders and that the citizens are valuable and a good resource. This way transparency and accountability and inclusiveness and a sense of citizens feeling empowered will be achieved*". P05Leader

The *e-participation system requirements* category characterises the roles of actors, technology, levels of digital device usage to support e-participation, strategies and expected outcome discussed in the earlier sections. The final category is the *expected outcome*. According to the data, key outcomes of participation include citizen inclusiveness,

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empowerment, and a sense of respect, along with transparent decision-making processes and greater accountability from leaders, as previously highlighted in the outcomes strategy section.

B. Model Description

The input data shown in Figure 2 is derived from the model requirements discussed in the categories above, which are grouped into six dimensions. Since these dimensions were shaped by findings from a previous study, the discovery of the socio-technical context forms the first dimension of the model. The model shows that context discovery by end-users helps identify key dimensions—such as expected outcomes—that address specific contextual challenges. This approach is expected to enhance citizens' confidence in using e-participation. The model comprises seven dimensions: socio-technical context discovery, actors, technology, levels of digital devices, strategies, e-participation system requirements, and expected outcomes, as illustrated in Figure 2.

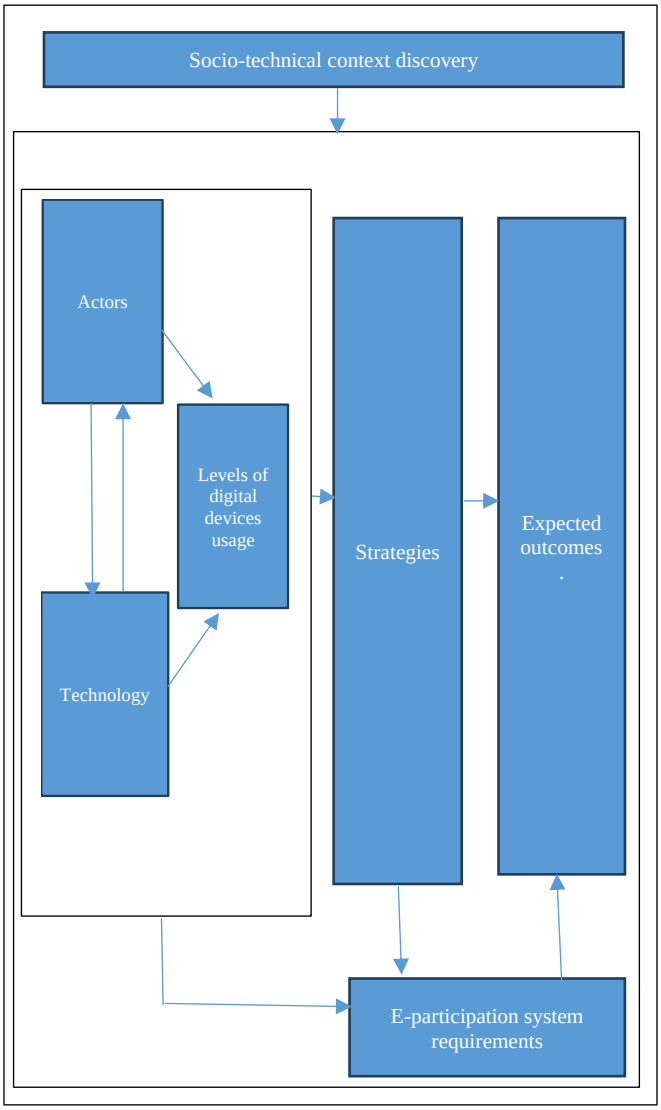


Figure 2. Multi-dimensional E-participation

The model begins at the *social-technical context discovery dimension*. It involves identifying the social and technical factors that either hinder or facilitate the participation of rural population in electronic-enabled decision-making processes. This step provides guidance on accurately identifying actors, selecting appropriate technology, evaluating levels of digital device usage, and developing strategies and e-participation systems requirements to achieve the expected outcomes.

The *actors dimension* defines the people or institutions who influence usage of digital device to enable citizens and leaders to interact. This influence occurs either through their own use of the devices or by determining who can or cannot use them. The *actors dimension* accounts for identifying the key actors in the e-participation ecosystem, such as the national government, local government leaders, citizens, husbands, and religious leaders. At this stage of the model, the unique characteristics of the actors that influence their positive and negative roles are identified. Identifying the actors and understanding how they enhance or hinder interactions between citizens and leaders is critical in designing an e-participation system geared towards solving challenges within a particular setting. The characteristics and roles of actors influence the levels of digital device, choice of technology, strategies, e-participation system requirements, as illustrated in Figure 2, and ultimately shaping the expected outcomes.

The *technology dimension* facilitates the identification of the most appropriate technology. The process involves determining the most suitable technology based on the actors' characteristics and roles, as well as existing or necessary interactions between the citizens and the leaders, as shown in Figure 2. Technology that caters for diverse needs of groups within the rural population should be identified.

The next dimension of the model is *levels of digital device usage which* measures the extent of digital devices adoption and usage in interactions between leaders and citizens, based on the participation levels that consist of inform, consult, collaborate, and empowerment. The discovery at this dimension is influenced by the social-technical context. At this stage, it is important to identify the levels of citizen engagement and the nature of interactions that exist between the leaders and citizens along with their associated strengths and weaknesses. Furthermore, the discovery at this dimension provides essential background knowledge for formulating e-participation features, strategies and intended outcomes. At each participation level, suitable e-participation features, strategies and intended outcomes should be formulated within their respective dimensions.

The *strategies dimension* provides a plan for enabling active citizens' participation in decision-making processes. The dimension is shaped by the unique social-technical context and the discovery at the *levels of digital devices usage* dimension. For each level and the social-technical context, a strategy is developed to address the gaps within the associated dimensions while taking advantage of the opportunities available. This approach allows for future scalability and enables designers to determine which levels of digital device usage to focus on when developing e-participation systems tailored to a unique context.

The *e-participation system requirements identification dimension* is very critical in the model, as it provides a blueprint of the final e-participation systems to be designed and implemented to realise the expected outcomes. Ideally,

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the e-participation system requirements should be derived from all the other dimensions and should contribute to achieving positive outcomes in the expected outcome dimension.

The final dimension is *expected outcome which* provides the expected impact of the e-participation in rural areas. The expected outcome should be realised when the strategies and the e-participation systems requirements highlighted in the model are effectively implemented. The expected outcomes include but not limited to availability of an enabling environment for citizens to participate, accountability, transparency, citizens' empowerment, and increased inclusion. In addition, this dimension provides the basis for evaluating e-participation initiatives in the rural settings of similar settings.

## V. DISCUSSION

The introduction and background sections of this paper highlight that most of the existing e-participation models are predominantly designed based on the developed countries urban context [2, 32], with limited end-user involvement [16]. In addition, the majority of the models are generic with limited details, which provides inadequate guidance to the design of e-participation systems [28] and limits their applicability or transferability to other differing contexts [32]. This paper has provided a multidimensional e-participation model informed by insights from the rural population in Western Uganda to promote usage and adoption of e-participation.

### A. *Actors*

The findings on actors align with the work of many researchers who emphasise the critical roles of various stakeholders, such as citizens, government, government institutions and leaders, and companies, in the design and deployment of e-participation systems and activities [14, 30, 34, 37]. In addition to these actors, the findings highlight uncommonly mentioned actors such as husbands and religious leaders. These actors are shown to be crucial in the design and uptake of e-participation systems in the Uganda context. It corroborates with findings in [48] who also consider actors from local institutions like family and religious welfare. The results highlight the significant influence of non-traditional actors, such as religious leaders and husbands, on the adoption and use of e-participation in societies with a high belief in patriarchal family. The model demonstrates that the formal and informal government structures, cultural norms and family structures are very critical in the successful design, implementation and adoption of e-participation. This is in line with results in [49] that stated that these institutions should therefore be carefully accessed during the design of e-participation systems. Furthermore, the involvement of end-users to identify the institutions that influence e-participation adoption, supports admonition in [50]. The author advocates for the use of co-creative methods to understand if citizens are able to influence decision-making processes when under the influence of the formal or informal institutions [50]. In essence, the assessment of formal or informal institutions enables effective strategizing to utilise the opportunities, like resource provision, that arise from their influence while also mitigating any associated negative impacts.

### B. *Technology*

This work extends research in [29] by illustrating a mixture of devices and technology that are appropriate for rural context to enhance inclusiveness. The research also extends the work of [23] by identifying suitable tools and technologies to support e-participation within the rural population, which are often characterised by limited access to devices, electricity, literacy, ICT skills, income, telecommunication, and internet network connectivity, as well as being located in hard-to-reach areas. Overall, although offline technologies were cited more than the online technologies, online technologies are very crucial in supporting collaborations between citizens and leaders and idea initiations by citizens. Consequently, a hybrid of offline and online is required to support interactions of citizens and leaders at all levels of participation.

### C. *Levels of Digital Devices Usage*

The careful selection of a variety of devices to support different categories of citizens to use digital devices to interact with their leaders in different forms provides guidance on achieving inclusiveness in specific settings, as recommended in previous research in [29]. In the Ugandan context, e-participation is still at the lowest level in rural areas, as the majority of the activities are at the e-inform (information delivery) level with limited activities occurring at the e-consult (consultative) level. While the results show that the rural population has not yet experienced e-collaboration and e-empowerment, they also highlight that these aspects are valued and considered important to the citizens. Therefore, the model emphasises achieving citizens' empowerment to reach the highest level of participation, where citizens exert the greatest level of influence in decision-making processes, as suggested by previous researchers [2, 26]. The research shows that devices supporting higher levels of participation are scarce in rural areas, which highlights a lack of readiness for higher levels e-participation in these settings. Result suggests that one way to achieve higher levels participation – where citizens are seen as partners rather than mere consumers in decision-making processes – is through capacity building activities and the use of appropriate devices in rural areas. This can involve the providing the necessary devices and offering training on their use by the rural population.

### D. Strategies

The model contributes by providing strategies to promote inclusiveness and increase adoption of e-participation, which are limited in e-participation research. This research extends the study in [51], which highlights the need of research that provide strategies to promote participation. To ensure that the strategies achieve the expected outcomes, the findings suggest that the model should demonstrate how participation activities lead to tangible benefits of e-participation. Doing this can provide a way to encourage the citizens to take part in e-participation again, as shown in the previous models [30, 39]. The authors show that demonstrating transparency, accountability and other tangible benefits of e-participation can encourage citizens' engagement in e-participation initiatives.

The specific strategies suggested to enable the attainment of the expected outcomes in this study extends a model in [34]. The authors advocate for the establishment of strategies to support e-participation but does not align the strategies to the expected outcomes as demonstrated in this paper. The

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proposed model in our study outlines strategies on how to design e-participations to achieve the expected outcomes for a specific setting. Results show that the strategies, such as the capacity building and safety strategies identified, confirm that technology alone does not guarantee e-participation usage and adoption [52]. Thus, the strategies dimension provides an opportunity to boost the confidence of end-users to use e-participation systems and achieve the expected outcomes. In addition, the findings highlight that strategies geared towards enabling citizens to acquire literacy, ICT skills, access to devices, electricity and deliberative skills are crucial for promoting meaningful interactions between citizens and leaders through ICTs. This finding supports previous research [2], which highlights that facilitating conditions are very critical in the adoption of e-participation. The research extends the previous research by providing concrete examples of facilitating conditions for rural populations. As already seen in other research that facilitating conditions needs vary among settings due differences in context like cultural, socio-economic, political and technology.

### E. *E-participation System Requirements*

The model contributes to the body of knowledge by highlighting e-participation system features dimension relationship to the context discovery, strategies and e-participation levels and outcome dimensions. This provides a meta-process which defines what e-participation system features to consider and as a result offers guidance on the design of e-participation tools, which is very limited among other models (only 13% models demonstrate it) [53].

### F. *Expected Outcomes*

The proposed model advances e-participation research by establishing expected outcomes as a basis for developing testing mechanisms for e-participation systems. This is an important contribution given that most e-participation initiatives fail to account for the expected outcomes dimension [54]. Research shows that only 33% of the models provide an evaluation of the participation [53]. For example, the model in [30] provides the expected outcomes dimension, but with limited coverage of security. The resulting model includes a safe participation space where citizen's privacy is protected as an important required outcome. This is in line with work that suggests that citizens from limited democracies prefer to participate in safe spaces where they are assured of identify protection [55].

### G. Comparative Analysis with Existing Models

While most of the reviewed models are based on literature review and developed countries context [2, 23-26, 29, 31-32] our model is based on end-user perspectives from a developing country context like Uganda. The model considers the socio-technical context of rural Uganda, allowing for more specific and relevant details. Considering that the majority of the existing models [30, 34, 40] are generic and lack details [28] which limits their customisation to other settings [32], the proposed model provides details which can be used as a blueprint for similar contexts. The proposed model can be adopted for developing e-participation systems in settings with limited internet access, literacy, device access and income and with patriarchy beliefs, multi-lingual and similar political context. Also, the model relies on several socio-technical contextual factors as compared to most of the existing models like [22-28, 34, 40] that inadequately address the contextual factors that influence e-participation. Compared to models in [30, 34, 40], this model offers more comprehensive dimensions—including socio-technical context discovery for a specific setting, actors, technology, participation levels, strategies, system requirements, and expected outcomes—resulting in a more holistic approach. Overall, the proposed model offers a framework to guide researchers, developers, and policymakers in creating e-participation systems that users trust and are willing to adopt.

### *H. Practical implememtation steps of the model*

The model has the following practical implementation steps. Firstly, identify factors (political, technological, societal, cultural, economic, etc.) that could hinder or support citizens from taking part in e-participation. Secondly, based on the factors, identify key actors and their characteristics, and what roles they might play to enhance or hinder e-participation. Thirdly, determine the existing or desired e-participation levels. Next, identify appropriate technologies that support these levels, align with the roles and characteristics of the actors, and fit the identified context. Fourthly, formulate strategies that align with the identified actors, participation levels, technology, context, and expected outcomes. Fifthly, define the e-participation system application requirements, ensuring they align with all previous steps and the expected outcomes. Finally, translate the prior steps into the expected outcomes.

## VI. CONCLUSIONS, LIMITATIONS AND FUTUREWORK

Existing e-participation models are predominantly designed based on the urban context in developed nations. Therefore, the applicability of these models in developing countries remains a significant challenge due to differences in social and technical contexts. This study proposes a multidimensional model that is developed with end-users in rural Uganda. The proposed model can guide the development of context-based e-participation initiatives and systems by involving end-users to ensure the specific context and needs are accurately captured. This can increase the confidence of the population in e-participation, and as a result, increase usage and adoption of e-participation systems. The paper shows that boosting the confidence of the population in e-participation should start at an early stage where the public are involved in developing e-participation models, as a blue-print for the design, implementation, and evaluation of the e-participation systems. However, implementing the model may face challenges such as political resistance and limited resources. Therefore, securing support from high-level political leaders and mobilising adequate funding are essential for successful implementation.

While this research offers valuable insights, it also has certain limitations. The proposed model was not implemented, so its effectiveness in real-world contexts remains untested. In addition, the study is purely qualitative and is based on 23 participants from two rural parishes in one district in Uganda. This may limit the generalizability of the findings. Thus, future work will include, designing an e-participation prototypes based on the model and then evaluating the model based on the how the prototypes achieve the expected outcomes of the model.

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