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Political Institutions, ICT Infrastructure, and Social Networks Impact on Citizens' Policy Formulation E-participation Engagement Behaviour in Uganda

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Abstract
This paper assessed the impact of political institutions, ICT infrastructure, and social networks on citizens' self-motivation and engagement in policy formulation. The study was motivated by limited citizen engagement in policy formulation in Uganda which has made Uganda as a country to score poorly both in the e-government and e-participation index and contradict Article 38 of the Constitution of Uganda which advocates for citizen engagement in policy formulation. Thus, this study aimed to increase citizen engagement through the adaption of the Motivation, Opportunity, and Ability (MOA) model. A survey collected Primary data from 361 village health teams and local council Chairpersons. The collected data was analysed using SPSS and SEM. Results found that; political institutions, ICT infrastructure, and social networks influence self-motivation, political institutions, and self-motivation influence engagement while self-motivation fully mediates the relationship between ICT infrastructure, social networks, and citizen engagement, it partially mediates the relationship between political institutions and engagement. The practical implication is that political institutions are essential in stimulating citizens' self-motivation and engagement.

Keywords: Political Institutions, ICT Infrastructure, Social Networks, Citizen Engagement, E-participation, Policy formulation.
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Introduction

Citizen engagement is the redistribution of power to enable citizens, presently excluded from the political and economic processes, to be deliberately included (Lin & Kant, 2021). It has become a

global necessity in the current 21st century as a result of weaknesses of representative democracy where most elected leaders choose to ignore citizens' needs and represent their wants. The advancement in technology has made citizen engagement through e-participation more viable with most governments investing heavily in different e-participation initiatives following anticipation of many benefits (Democracy International, 2018).

The government of Uganda equally invested huge funds in the Ministry of ICT to create several e-participation implementation platforms to support e-government and e-participation following the fact that participation is one of the 232 specific indicators of good governance in the achievement of seventeen Sustainable Development Goals (United Nations, 2020; Gilwald *et al.,* 2019). This has created an opportunity for citizens to engage in policy formulation either traditionally or electronically (Gilwald *et al.,* 2019). However, amidst the existence of e-participation opportunities and its advantages of being convenient, cost, and time-saving, few Ugandan citizens are currently engaging in policy formulation through e-participation, (Gilwald *et al.,* 2019). The limited engagement is partly attributed to; limited motivation, ICT infrastructure, and internet penetration with an average of 39.6% compared to the 62.7% global average, limited technical and complementary digital skills, weak legal regulatory and institutional frameworks, poor governance, and corruption (United Nations, 2020; Kabanozi, 2021). This is evidenced by limited sponsored programs on discussion forums of social networking sites on the existing government websites (Kabanozi, 2021).

Limited engagement caused Uganda to score 22% in an independent global measure in the UN survey report, with only 28% citizen engagement in the policy formulation far higher than the global average score of 12%, scoring poorly both in the e-government and e-participation index and contradict Article 38 of the Constitution of Uganda which advocates for citizen engagement in policy formulation (Gilwald *et al.,* 2019; Open Budget Survey, 2017). This study, therefore, aimed at understanding factors that could motivate citizens to massively engage in policy formulation through e-participation. The study was guided by the following research questions; RQ1. What influence do support of political institutions, ICT Infrastructure, and online social networks have on citizens' self-motivation? RQ2. What mediating role does self-motivation play in the relationship between support of political institutions, ICT Infrastructure, online social networks, and citizens' engagement? RQ3. What influence do support of political institutions, ICT Infrastructure, online social networks, and self-motivation have on citizens' engagement?

Literature Review

E-participation and Citizen Engagement

E-participation has recently attracted a lot of attention because of its importance in improving the delivery of government services, the inclusion of citizens in the formulation of policies, and supporting demand for accountability from the government (Pflughoeft & Schneider, 2020). According to Nabafu *et al.,* (2021), e-participation is citizens' use of ICT tools to engage in policy formulation and decision-making while Nilsson and Barbutiu, (2019) define e-participation as formal and informal inputs on policy formulation and decision-making within the political and government sphere. Three modes of e-participation are e-information, e-consultation, and e-decision-making. Most governments in developing countries have successfully achieved e-information but are still struggling to achieve e-consultation and e-decision making which are

essential to ensuring citizens' inclusion in policy formulation (Nabafu *et al.*, 2021). Citizen Engagement on the other hand is the top-down consultation between government agencies and citizens over specific topics (Nilsson & Barbutiu, 2019). Most countries have invested heavily in e-participation with anticipation of rebuilding lost trust between citizens, governments, and public institutions, improving service delivery, and reducing costs of service delivery, (United Nations, 2020). Thus, e-participation is anticipated to increase citizen engagement by enabling busy citizens to participate during their convenient time from any place using electronic devices of their choice. This however is not what is on the ground in Uganda due to limited IT skills, motivation, and failure to effectively re-structure democratic processes to pave way for citizens' use of ICTs and equal participation in the formulation of policies (Waheduzzaman & Khandaker, 2022). As a result, most citizens do not participate, are disappointed with formulated policies and policy formulators, and hardly comply with the formulated policies.

Policy and Policy Formulation in Uganda

Policies are important in providing the ability and guiding the planning and execution of interventions by laying out the guiding principles for their application, proposing the necessary legal and regulatory frameworks, and defining the roles of various actors (Kuttig, 2020). The effective functioning of different sectors and ministries depends on the quality of policies formulated. Thus, failure to formulate representative policies may fail respective ministries to address the needs of their people. Extensive and inclusive discussion of the various aspects of a policy problem should therefore be done to avoid policy inefficiency. Policy formulation on the other hand is a proposed course of action by the government to realize a specific purpose or solve a given problem (Bhuiyan & Farazmand, 2020). It involves the development of policy alternatives to deal with problems on the public agenda (Reed *et al.*, 2020). Policy formulation takes place in four levels. The levels range from national-level policies developed for the national good; sectoral policies developed for specific ministries like labour; operational policies developed for specific sectors like government departments, and, local-level policies, developed for the local community (Schmidt, 2020). It comes about when the government perceives the existence of a problem that requires actions. Policy formulation creates knowledge and supports scientific analysis which is an appropriate tool for approaching policy questions and facilitates explanation of the causes and consequences of problems affecting a broader society.

In Uganda, policy-making institutions include; government ministries, civil society organisations, research institutions, the Centre for Basic Research, and International organizations. According to Article 111 of the Constitution of Uganda, Cabinet is the highest policy-making organ empowered by (Article 111(2)) of the Constitution of Uganda to determine, formulate and implement policies of the Government. Thus, before embarking on any policy program, ministers and members of parliament give adequate consideration to how it will be managed and resourced (A guide to policy development and management in Uganda, 2013). The development of policy is done by the relevant line Ministry after identifying the need for a policy and goes ahead to prepare a draft Cabinet Memorandum based on Guidelines provided by the Cabinet Secretariat. The draft policy Memorandum is discussed by the Ministry's Senior and Top Management teams to obtain ownership of the proposed policy in the Ministry. During policy development, Ministries identify the financial, legal, and other administrative implications of proposed policies and how they will

affect other Ministries. Whenever there is a need for a new law or amendment to existing law, the Minister responsible prepares and submits to Cabinet the principles for the proposed legislation. The draft bill is subsequently presented to Cabinet for approval and authorization is given to the Minister to have the bill gazetted and tabled in Parliament for debate and enactment (A Guide to Policy Development & Management in Uganda, 2013).

ICT Policy Institutions in Uganda and Challenges Faced

The ICT sector in Uganda is organized into three functional levels; the top level is managed by the Ministry of ICT and National Guidance (MoICTNG), and the middle level is managed by regulatory agencies like Uganda Communications Commission (UCC), National Information Technology Authority Uganda (NITA-U) while the bottom level is managed by public sector players like Local Governments (LGs) and Ministries, Departments, and Agencies (MDAs) with the parliament of Uganda facilitating the policy process. These ICT Institutions play a great role to ensure that ICT infrastructure is fully developed, humanitarian and digital skills are fully developed and legal policies and frameworks are put in place to ensure proper usage of ICTs for personal and economic development (Gilwald *et al.*, 2019). The ICT institutions in Uganda are facing structural challenges of separation in regulatory functions related to IT and Telecommunications which has caused continuous conflict between the two agencies responsible for regulating a converged technology and services environment and maintained confusion among operators and practitioners in the ICT sector. Different regulators have been given different implementation responsibilities. For instance, RCDF falls directly under the regulatory arm while NITA-U also has its regulatory and operational functions under the same operational authority. Thus, there is a lack of coordination among MDAs, with most taking disparate ICT paths and projects. This lack of coordination by the state and between the various MDAs has partly caused Uganda's poor performance on global indices. Coordination is therefore needed to ensure the cross-cutting role of ICT in a digital economy, digital innovation, and human development (Gilwald *et al.*, 2019).

Policies Formulated to Support ICT Initiatives in Uganda

Uganda has formulated several policies for different purposes in different sectors. The National ICT Policy 2014 was formulated with the aim of supporting the realization of the national vision and achieving broad policy objectives like building a knowledge-based human capital, promoting innovation in economic and social systems, expanding ICT infrastructure and its integration throughout the country, deepening utilization of ICT services by government, private sector, Non-Government Organizations, and Citizenry, enhancing research and innovation in ICT products, applications, and services; and improving ICT governance and environment in Uganda. Other related policies formulated include; the Data Protection and privacy regulation, 2020, electronic transaction regulation, 2013, National Postcode and addressing system policy, the National broadband policy, national information technology authority – Uganda (e-government) Regulations 2014, the electronic waste management policy, 2012, national spectrum policy for Uganda among others (Ampaire *et al.*, 2017; GoU, 2015).

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E-participation at the Global and African Level

The E-participation Index is essential in benchmarking e-participation progress among the 193 member countries based on three dimensions; e-information, e-consultation, and e-decision making using assessment features like availability of online tools, evidence of citizen engagements in consultation, and evidence of government partnership with civil society and the private sector to provide services, and government efforts to promote citizens' engagement in policymaking (Kabanozi, 2021). E-government surveys and E-Participation Index has shown a rapid development of the "supply side" of e-participation globally with most governments now "checking all boxes" of the e-participation ladders ranging from the provision of e-information, e-consultation, and e-decision making. This rapid development was experienced between the year 2012 and 2018. However, this is in exception of Africa and Oceania (United Nations, 2018). In terms of positioning, according to the United Nations survey 2022 on e-government, Japan ranked first with an e-participation index score of 1 followed by Australia and Estonia with 0.99 and 0.97, respectively. Thus, in comparison to 2020, Japan improved its position from fourth to first, Estonia decreased by two places while Africa still lagged (United Nations, 2022).

Internet Penetration and Support of E-participation in Sub-Saharan Africa

Sub-saharan Africa's internet penetration has increased in the past two decades with a tenfold increase compared to a threefold increase in the world (Mutung'u, 2022). This success came as a result of the support given by international development organizations to implement strategies that have supported e-government and e-participation (Mutung'u, 2022). For instance, the UN Economic Commission for Africa in 1996 after realizing the ICT impact on digital transformation and service delivery adopted a resolution calling for increased adoption of ICT by the Sub-Saharan African governments through collaboration with the private sector. This effort saw the region's e-government development index (EGDI) increase from 0.2 in 2003 to 0.3914 in 2020 (Mutung'u, 2022). As a result, by the year 2020, 43/46 Sub-Saharan African countries had established their own ICT ministries responsible for the digitalization of their governments. Thus, most of these countries had their national digital transformation strategies in place. However, though these strategies are in place, they are facing implementation challenges due to a lack of legislation and regulatory frameworks to govern their execution.

Further to that, only 25 Sub-Saharan African countries have acquired personal data protection legislation with 37 countries only adopting laws on cybercrime (Mutung'u, 2022). Besides that, although fixed broadband penetration in Sub-Saharan Africa has increased in recent years in urban areas following a drop in subscription fees, mobile broadband which is commonly used across Africa to access the internet, has the lowest penetration of 25% with high subscription charges (Broadband Commission, 2019). In addition, African countries still lack enabling infrastructure of digital-ID systems with most countries failing to give citizens legal identification apart from eleven countries of; Angola, Ghana, South Africa, Seychelles, Kenya, Lesotho, Mauritius, Senegal, Tanzania, Uganda, and Nigeria.

Theoretical Perspectives of the Study

In an attempt to increase citizen engagement in policy formulation through e-participation, a critical literature review and adoption model of motivation, opportunity, and ability by MacInnis *et al.,* (1991) was used to identify factors that could increase citizen engagement in policy formulation through e-participation. According to the MOA model, the three factors that influence user behaviour like engagement include; motivation, opportunity, and ability (MacInnis *et al.,* 1991). This study while adapting the MOA model tested the influence of self-motivation type of motivation, ICT infrastructure, and support of political institutions type of opportunity, and online social networks type of ability on engagement.

Political institutions are institutional arrangements for political governance (Razak *et al.,* 2020), ICT infrastructures are all the information and communications technology infrastructure and systems including hardware, software, networks, and other facilities that are required to develop, test, deliver, monitor, control, and support engagement services (Gilwald *et al.,* 2019), the online social network is a group of individuals who voluntarily interact based on the area of interest like participating in the formulation of inclusive policies for the good of all community members. It is measured by network centrality and network density (Sykes *et al.,* 2009), while self-motivation is all those brain processes that energize and direct behaviour. It is measured by enjoyment, knowledge acquisition, social status, and self-esteem (Sha, 2021; Razak *et al.,* 2020; Jatau *et al.,* 2019; Gilwald *et al.,* 2019). *Citizen engagement* is the frequency, duration, and intensity of the use of information technology tools to engage in policy formulation through e-participation (Naranjo-Zolotov, 2018). It is measured by political participation and voluntarism. Thus, support from political institutions, accessibility and affordability of e-participation tools and internet bundles, prior possession of ICT skills, and belonging to an online social network encourage citizen engagement in policy formulation since online social networks can be a source where citizens could easily get engagement skills through social network friends. Lastly, citizen engagement enables citizens to search for, access, and share information which support participation in the formulation of policies (Magotra *et al.,* 2016).

Conceptual Background and Hypotheses

The adapted Motivation, Opportunity, and Ability model by MacInnis *et al.,* (1991), helped in assessing the impact of three independent variables on citizens' self-motivation and engagement behaviour as discussed in the hypothesis formulation below;

ICT Infrastructure Influence on Citizens' Self-motivation and Engagement

ICT infrastructures are all the information and communications technology infrastructure and systems that enable innovation, efficiency, mobilization, and inclusion of citizens in policy formulation, (Gilwald *et al.,* 2019; World Bank Group, 2016). ICTs can create self-motivation among citizens towards engagement, and create more opportunities for those not yet engaged to engage (Gilwald *et al.,* 2019). Research findings of Griva *et al.,* (2020) found that ICTs have a significant influence on learners' motivation while those of Jho and Song, (2015) reported that the development of ICT infrastructure leads to increased levels of engagement. This study also investigated the influence of ICT infrastructure on citizens' self-motivation and engagement behaviour by hypothesizing that:

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H1b: ICT Infrastructure significantly influences citizens' self-motivation
H3b: ICT Infrastructure significantly Influences citizens' engagement behaviour.

Support of Political Institutions Influence on Citizens' Self-Motivation and Engagement Behaviour

Political institutions are institutional arrangements for political governance or organizations in the government that create, enforce, apply laws, mediate conflict, make policy on the economy, and provide representation for the population (Razak *et al.,* 2020). They consist of the legislature, executives, and the judiciary like courts of law, political party organizations, and trade unions. These systems operate following the rules and principles set up by political parties, (Jho & Song, 2015). Public policies are developed by politicians and government institutions like the judiciary though they are supposed to be based on views and opinions given by citizens most of these citizens need to be individually motivated to participate (Antonini *et al.,* 2015). Thus, results from the study findings of Antonini *et al.,* (2015) reported that citizens can be self-motivated to give their views if they receive support from these political Institutions. According to the study findings of Mallick, (2021), and Razak *et al.,* (2020), the Support of Political Institutions determines citizens' motivation and engagement behaviour. While, Jho & Song, (2015) findings reveal that support of political institutions influences citizens' engagement. This study, therefore, investigated the influence of support of political institutions on citizens' motivation and engagement behaviour by hypothesizing that:

H1a: Support of political institutions significantly influence citizens' self-motivation.
H3a: Support of political institutions significantly influence citizens' engagement behaviour.

Online Social Networks Influence on Citizens' Self-motivation and Engagement in Policy Formulation

Online Social networks are stable social relationships formed by interaction and communication between individual members of society in a certain area, (Sha, 2021). It is also defined as a virtual Internet community platform consisting of technology, information, and human interfaces upon which people create, share, and exchange opinions, views, and experiences, (Saud *et al.,* 2020). Some social networking sites include Facebook, Instagram, Twitter, and LinkedIn, with Facebook being the most commonly used and its increased usage has led to the creation of virtual communities and social interaction among those communities by making it easy for them to share information and ideas. (Brailovskaia *et al.,* 2020; López-Ornelasa *et al.,* 2017). These platforms enable users to join and share information moreover with the capability of allowing users to choose whom they want to receive communications from (Brailovskaia *et al.,* 2020). The two types of social ties are network density which relates to obtaining help from people within your group, and network centrality, which is the ability to give help to other members within your setting to enable better understanding and engagement in policy formulation (Sykes *et al.,* 2009).

Social networks are associated with benefits like; high interaction, resource sharing, and convenience in accessing information anytime and from anywhere which results in ease in the expression of citizens' views (Kim & Hoewe, 2020). Online social networks have been reported to have a significant positive influence on the self-motivation of citizens through social interaction

and reduction of the risk of information asymmetry (Oh *et al.*, 2020). According to Lin and Benneker, (2021), social networks contribute to citizen engagement by increasing access to information. On the contrary, Ostic *et al.*, (2021) study findings reported that social networks increase both citizens' self-motivation and engagement levels. This study, therefore, investigated the influence of online social networks on both citizens' self-motivation and engagement behaviour by hypothesizing that:

H1c: Online social networks significantly influence citizens' self-motivation.
H3c: Online social networks significantly influence citizens' engagement behaviour.

Self-motivation mediates the relationship between support of political institutions, ICT infrastructure, online social networks, and engagement behaviour.

Different scholars have reported different mediators in engagement behaviour and little is known about the mediation effect of self-motivation in the relationship between support of political institutions, ICT infrastructure, online social networks, and engagement behaviour. According to Copriady, (2014), motivation is a great mediator of readiness in the use of ICT infrastructure to engage in a behaviour. While Alassiri *et al.*, (2014) report that Technology mediates social networking and engagement while Khan *et al,* (2023) reported that social networks have a mediation effect on the relationship between information quality, and consumer online purchase intentions. On the contrary, Shao, (2022) results show that there are significant associations between ICT factors and national health outcomes. This study sought to understand the mediation effect of self-motivation in the relationship between support of political institutions, ICT infrastructure, online social networks, and engagement behaviour by hypothesizing that:

H2a. Self-motivation mediates support of political institutions and engagement behaviour.
H2b. Self-motivation mediates ICT infrastructure and engagement behaviour.
H2c. Self-motivation mediates online social networks and engagement behaviour.

Self-motivation has a Significant Influence on Citizen Engagement

Self-motivation according to Karna and Ko, (2022) is the willingness to acquire and share knowledge and information out of interest without needing any pressure from others. This kind of self-motivation positively influences an individual's actual behaviour which in this case is engagement in policy formulation. Li *et al.*, (2013) categorize motivation into three that's; Intrinsic motivation toward accomplishment where pleasure and satisfaction are experienced through solving problems and overcoming difficulties, ii) intrinsic motivation to know how pleasure and satisfaction are experienced after learning new things like using information system and iii) intrinsic motivation to experience stimulation where pleasure and satisfaction are experienced after successfully interacting with Information Systems. Thus, self-enhancement, personal self-esteem, collective self-esteem, and anticipation for positive outcomes categorized into self-related motivations influence engagement in policy formulation, (Karna & Ko, 2022; Macaulay *et al.*, 2022). This study, therefore, hypothesized that:

H3d: Self-motivation significantly influence citizens' engagement behaviour.

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Citizen Engagement

In the current 21st century, participation has shifted from offline to online participation due to offline weaknesses causing inconveniences to citizens like inaccessibility to a venue, the inability to find the time to participate, and lack of public speaking abilities which lead to engagement in small numbers and exclusion of disadvantaged groups (Lin & Kant, 2021). Citizen engagement through online platforms currently being used is promoting transparency, the inclusion of the disadvantaged in decision-making, and improvement in democratic, legitimacy, and problem-solving capacity (Zhang *et al.*, 2019). This study investigated the influence of self-motivation, online social networks, ICT Infrastructure, and support of political institutions on citizens' engagement behaviour through e-participation as hypothesizing above.

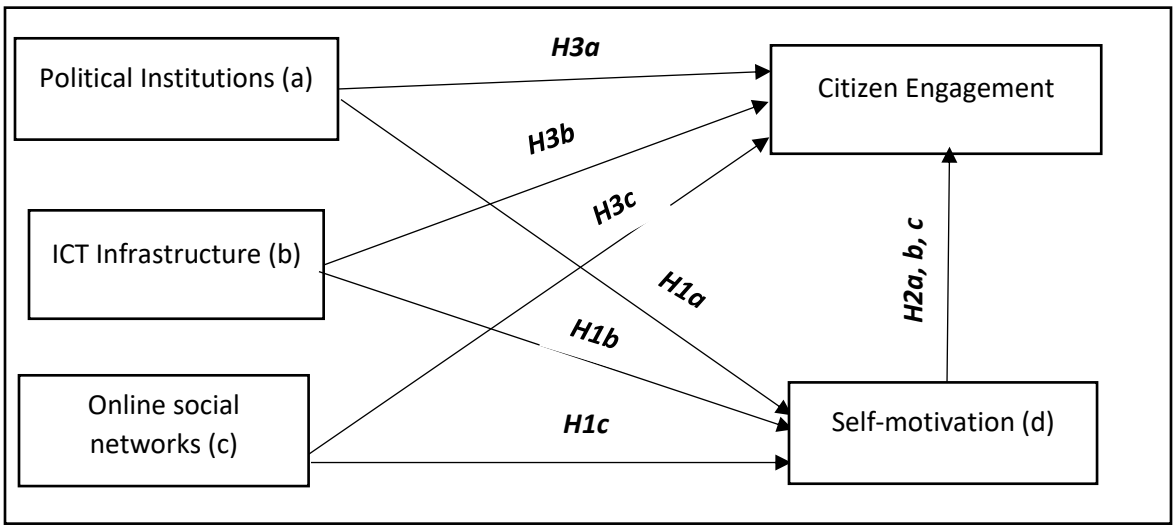

Figure 1*:* Conceptual framework of study variables

While testing the hypotheses, this study used the conceptual framework in Fig. 1 above where hypothesized direct and mediated relationships are depicted. The study variable measures were adapted from different theories and literature and adjusted to the context of the study. Items from Karna and Ko, (2022) measured self-motivation, Items of Park, (2016); measured social network, Ellison *et al.*, (2007) measured ICT infrastructure, Naranjo-Zolotov *et al.*, (2018) measured support of political institutions and citizen engagement. The population for this study was village health teams and local council chairpersons. These respondents were from four cities; Mbarara in Western Uganda, Mbale in Eastern Uganda, Lira in Northern Uganda, and Kampala in Central Uganda, and four rural districts; Buhweju in Western Uganda, Kween in Eastern Uganda, Abim in Northern Uganda, and Buvuma in Central Uganda. The selection of all four regions one rural district and one city was to ensure equal representation of all citizens in rural-urban areas in the entire country. The justification for choice of village health teams and local council chairpersons was there being knowledgeable of community problems given the fact that they work within and with people of those communities we presumed that they knew what was best in terms of views and policies for them.

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Multistage and stratified sampling methods were used to select the study population and category of respondents. The stratification of this survey was first conducted based on the division of four regions (Eastern, Central, Northern, and Western) regions in Uganda and then the sample was drawn from two districts of each region according to the level of economic development that urban city and rural district. Based on economic development, the first layer comprised four more developed cities of Kampala, Mbale, Gulu, and Mbarara, and the second layer comprised four rural underdeveloped districts of Kween, Buhweju, Abim, and Buvuma. Data was collected using the survey questionnaire method anchored on a 5-point Likert-type scale from 1 (strongly disagree) to 5 (strongly agree) and was conducted offline with 380 questionnaires distributed to respondents and 361 were successfully filled and were within the minimum sample size needed for quantitative analysis as per the rule of thumb by Crouch (1984). Collected data was statistically analysed using SPSS and SEM. Cronbach Alpha, compositee reliability, and construct validity in terms of convergent and divergent validity were tested to ensure that they measured what they were intended to measure (Johnson & Shoulders, 2019). Besides that, Condition Index and Variance Inflation Factor (VIF) were used to test for multicollinearity (Hair *et al.*, (2017).

Findings of the Study

This study's findings are presented below:

Background Information

The respondents' background information is presented in Table 1:

Table 1: Respondents' background information

Education			**Income**			**Age**			**District**		
Education	F	%	Income	F	%	Age	F	%	District	F	%
Primary	5	1	<=235000	45	11	18-30	86	22	Mbarara	46	12
O level	78	20	<=335000	88	22	31-42	114	29	Buhweju	41	10
A level	80	20	<=410000	53	13	43-55	113	29	Lira	61	15
Certificate	69	18	<=10000000	201	51	>56	82	21	Abim	44	11
Diploma	79	20	>10000000	8	2	Gender			Kampala	68	17
Degree	59	15				Gender	Fre	%	Buvuma	50	13
Masters	25	6				Male	222	56	Mbale	45	11
						Female	173	44	Kween	40	10

Source: Primary data

Respondents' demographic results in Table 1 show that males were 56% while females were 44%. Most of the respondents had income levels 410001-10000000 (51%) followed by 235001-335000 (22%). Most respondents were between the age of 31-55 with a percentage of 58% altogether and most of the respondents came from Kampala City (17%) followed by Lira (15%) and Buvuma (13%) following the fact that respondents sample sizes per district/city were proportional to their population.

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Reliability and Validity of Study Instruments

Table 2: Reliability and validity of study variables

No	Variable	Cronbach's Alpha	Composite Reliability	Convergent Validity	Divergent Validity
1	Political Institutions	0.849	0.754	0.5976	0.7730
2	ICT Infrastructure	0.745	0.8247	0.5395	0.7345
3	Social Networks	0.848	0.6690	0.5102	0.7143
4	Self-motivation	0.703	0.8381	0.5741	0.7577
5	Citizen Engagement	0.777	0.8259	0.8758	0.9358

Source: Primary data

Results in Table 2 show that all the study variables were valid and reliable all being above the required 0.7. Support of political institutions had 0.849 Cronbach's Alpha, 0.754 composite reliability, 0.5976 AVE, and 0.7730 DV. ICT infrastructure had 0.745 Cronbach's Alpha, 0.8247 composite reliability, 0.5395 AVE, and 0.7345 DV. Social networks had. 0.848 Cronbach's Alpha, 0.6690 composite reliability, 0.5102 AVE, and 0.7143 DV. Self-motivation had 0.703 Cronbach's Alpha, 0.8381 composite reliability, 0.5741 AVE, and 0.7577 DV while citizen engagement had 0.777 Cronbach's Alpha, 0.8259 composite reliability, 0.8758 AVE, and 0.9358 DV.

Multiple Hierarchical Regression

Multiple Hierarchical Regression was used to determine the influence of independent variables on mediating and dependent variables. The results are presented in Table 3:

Table 3: Multiple hierarchical regression results for the independent, mediating, and dependent variable

Variable	Model1		Model2		Model3	
	B	Beta	B	Beta	B	Beta
Constant	13.093	-	8.994	-	6.901	-
Support of Political Institutions	.369	.338**	.285	.261**	.207	.189**
ICT Infrastructure			.245	.281**	.191	.219**
Online social networks					.423	.281**
R	.338		.432		.505	
R^2	.114		.187		.255	
Adj R^2	.112		.183		.249	
R^2 Change	.114		.073		.068	
F Change	50.577		35.193		35.571	
Sig. F	.000		.000		.000	
F	50.577		45.085		44.564	
Sig	.000		.000		.000	

Source: Primary data

Multiple hierarchical regression coefficients and model summary results in Table 3 reported that political institutions had a significant influence on self-motivation with a Beta = .189**, P<.001, and accounted for 11.4% of the variation in self-motivation. ICT infrastructure had a significant influence on self-motivation with a Beta = .219**, P<.001 explained 18.7% of the variation in self-motivation. Social networks equally had a significant influence on self-motivation with a Beta = .281**, P<.001, and accounted for 25.5% of the variation in self-motivation. When all independent variables were included in the regression model, they contributed 24.9% to self-motivation

Table 4: Multiple hierarchical regression results for independent, and dependent variable
Source: Primary data

Variable	Model1		Model2		Model3		Model4	
	B	Beta	B	Beta	B	Beta	B	Beta
Constant	11.216		7.998		6.303		5.772	
Political Institutions	.228	.309**	.163	.221**	.099	.134*	.083	.113*
ICT Infrastructure			.193	.326**	.149	.253**	.134	.228*
Social networks					.343	.337**	.310	.305**
Self-motivation							.077	.114*
R	.309		.441		.540		.549	
R^2	.096		.194		.292		.301	
Adj R^2	.093		.190		.286		.294	
R^2 Change	.096		.099		.097		.010	
F Change	41.622		47.946		53.817		5.383	
Sig. F	.000		.000		.000		.021	
F	41.622		47.270		53.698		42.071	
Sig	.000		.000		.000		.000	

Multiple hierarchical regression coefficients and model summary results in Table 4 reported that political institutions had a significant influence on citizen engagement with a Beta = .113*, P<.05, and accounted for 09.6% of the variation in citizen engagement. ICT infrastructure explained 19.4% of the variation in citizen engagement and had a Beta = .228*, significant at P<.005. Online social networks equally had a significant influence on citizen engagement with a Beta = .305**, P<.001 and accounted for 29.2%% of the variation in citizen engagement and was significant while self-motivation had a significant influence on citizen engagement with a Beta = .114*, P<.005 and accounted for 30.1% of the variation in citizen engagement. When all independent variables were included in the regression model, they contributed 29.4% to citizen engagement.

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Mediation Results of Independent Variables on the Dependent Variable

The assumption made in this study was that self-motivation mediates the relationship between support of political institutions, ICT infrastructure, online social networks, and citizen engagement as presented in Table 5:

Table 5: Mediation effects of self-motivation

Results	Political Institutions	ICT Infrastructure	Social networks
Sobel Z-value	4.485162	4.227106	3.800254
Sig	.000007	.000024	.000145
95% Symmetrical Confidence Internal			
Lower Bound	.03968	.02783	.04093
Higher Bound	.10128	.07594	.1281
Unstandardized Indirect Effect			
a*b	.07048	.05188	.08451
se	.01571	.01227	.02224
Standardized Coefficients			
Total effects	.574 R^2 = .147	.574 R^2=.201	.574 R^2=.243
Direct effects	.214 R^2=.040	.298 R^2=.077	.369 R^2=.114
Indirect effects	.17 R^2=.107	.15 R^2=.123	.124 R^2=.129
Indirect to total Ratio	.297 R^2=.726	.262 R^2=.613	.216 R^2=.530

Source: Primary data

Results in Table 5 show that self-motivation mediates the relationship between support of political institutions, ICT infrastructure, online social networks, and citizen engagement with a Sobel z-value of 4.485162, 4.227106, 3.8002254 at significant levels of P=<.000007, .000024 and .000145 respectively with a direct effect of Beta=.214, R2=.040, Beta .298; R2=.077 and Beta= .369; R2=.114 respectively and indirect effect of Beta=.17; R2=.107, Beta.15; R2=.123 and Beta=.124; R2=.129 respectively. Thus, self-motivation indirectly contributes 10.7% to strengthening the relationship between support of political institutions and citizen engagement, 12.3% to strengthening the relationship between ICT Infrastructure and citizen engagement, and 12.9% to strengthening the relationship between online social networks and citizen engagement. This implies that self-motivation has a stronger mediation effect in the relationship between online social networks and citizen engagement at 12.9%, followed by ICT infrastructure with 12.3%, then lastly with support of political institutions at 10.7%. Thus, self-motivation fully mediates the relationship between ICT infrastructure, online social networks, and citizen engagement but partially mediates the relationship between political institutions, and engagement.

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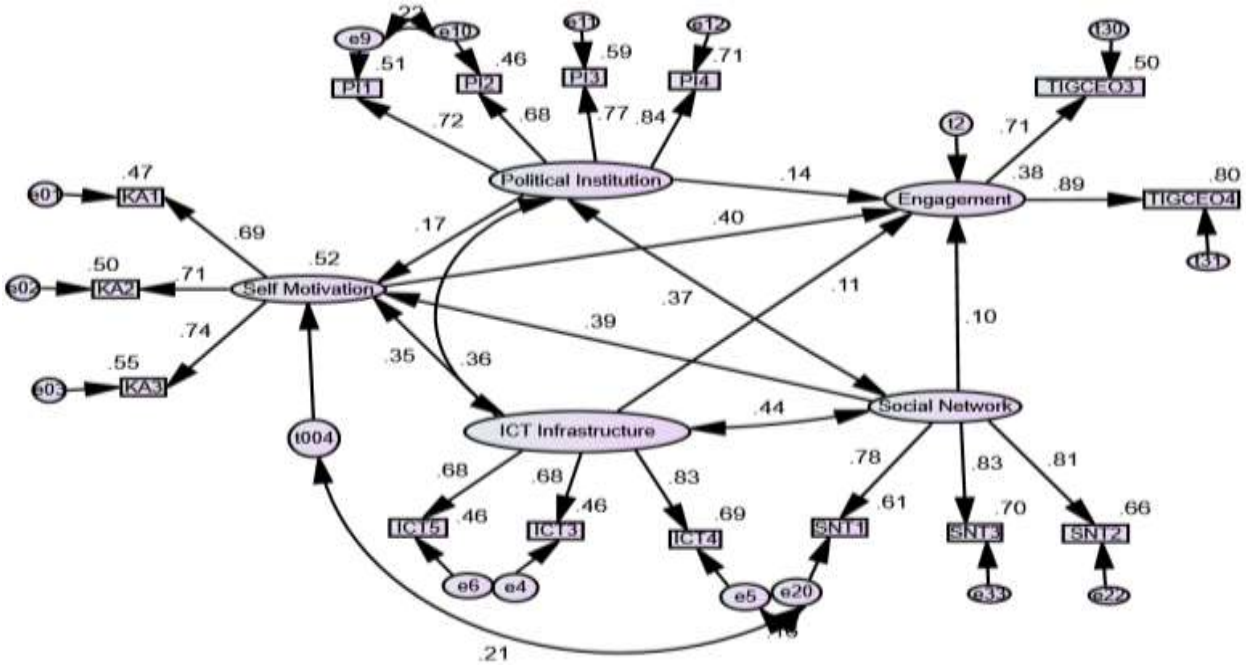

Figure 2: SEM model results for study variables

Table 6: Regression weights for the independent variable and dependent variable

Parameters			Estimate	S.E.	C.R.	P
Self-motivation	<--	Political Institution	.169	.059	2.860	.004
Self-motivation	<--	ICTINFRU	.388	.075	5.143	***
Self-motivation	<--	Social Network	.374	.062	5.997	***
Engagement	<--	Social Network	.099	.075	1.316	.188
Engagement	<--	Political Institution	.146	.066	2.208	.027
Engagement	<--	ICT Infrastructure	.124	.086	1.449	.147
Engagement	<--	Self-Motivation	.420	.102	4.119	***

CMIN/DF	P	Df	CMIN	GFI	AGFI	NFI	RFI	IFI	TLI	CFI	RMSEA
1.193	.118	77	91.884	.971	.955	.963	.950	.994	.992	.994	.022

The SEM estimates presented in Table 6 were acceptable with the goodness of fit in all model indices GFI = .971, AGFI=.955, RFI =.950, IFI=.994, TLI=.992, CFI= .994, RMSEA =.022 all being above the required level of .90, and a P value of >.05 (.118) and also, CMIN of 1.193 above recommended 0.3 and RMSEA = .022. According to regression weights results in Table 7, support of political institutions, ICT infrastructure, and Social networks have a significant influence on self-motivation with the Beta and P values of (Beta=.169*, P<.005; Beta=.388**, P<.001, and Beta= .374, P<.001) respectively. Besides that, political institutions and self-motivation have a significant influence on engagement with Beta and P values of; (Beta=.146*, P<.05 and Beta=.420**, P<.001) respectively while ICT infrastructure and social networks have no significant influence on engagement with Beta and P values of (Beta=.124, P>.05 and Beta=.099, P>.05) respectively.

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Table 7: Squared multiple correlations for study variables

Parameter	Estimate
Self-motivation	.519
Engagement	.378

The Squared Multiple Correlations also found that the three independent variables being mediated by self-motivation contribute 51.9% of the variance in self-motivation while all the four independent variables contribute 37.8% of the variance in citizens' engagement.

Discussion of key findings

This section discusses and interprets the results presented in the previous section.

Support of political institutions, ICT infrastructure, and online social network influence on self-motivation (H1a, H1b, and H1c)

According to study findings in Table 6 political institutions, ICT infrastructure, and social networks significantly influence self-motivation with P values of 0.027, 0.000, and 0.000 respectively. Thus, hypotheses *H1a, H1b, and H1c* stating that support of political institutions, ICT infrastructure, and social network have a significant influence on citizens' self-motivation were supported. The finding that political institutions influence self-motivation is in line with the study findings of Mallick, (2021) which reported that support from political Institutions self-motivates citizens to give their views. The finding that ICT infrastructure influence self-motivation is in line with the study findings of Griva *et al.*, (2020) which state that ICTs create self-motivation for engagement, while the finding that online social networks influence self-motivation is in line with the study findings of Oh *et al.*, (2020) which reported that social networks significantly influence self-motivation of citizens through social interaction and reduction of anticipated risk.

Self-motivation mediates the relationship between political institutions, ICT infrastructure, online social networks, and engagement behaviour (H2a, H2b, and H2c)

Results in Table 5 reveal that self-motivation mediates the relationship between political institutions, ICT infrastructure, social networks, and engagement with a Sobel z-value of 4.485162, 4.227106, 3.8002254 respectively at significant levels of P=<.000007, .000024 and .000145 respectively. The finding that self-motivation partially mediates the relationship between political institutions and engagement contradicts the findings of Jho and Song, (2015) finding which reveals that political institutions only have a direct influence on engagement. The finding that self-motivation mediates the relationship between ICT infrastructure and engagement is in line with study findings of Copriady (2014) which reveal that motivation is a great mediator of the use of ICT infrastructure to engage in behaviour while the finding that self-motivation mediates social network and engagement contradicts with Alassiri *et al.*, (2014) findings which reported that Technology mediates social networking and engagement, not motivation.

Support of political institutions, ICT infrastructure, online social network, and self-motivation influence engagement behaviour (H3a, H3b, H3c, and H3d)

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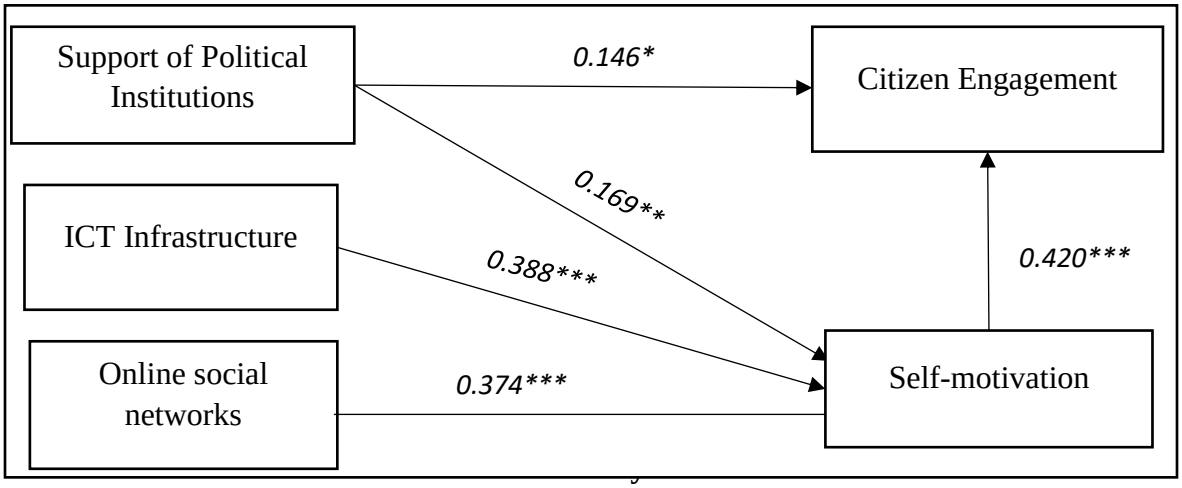
According to study's findings in Table 6 support of political institutions, and self-motivation have a significant influence on engagement with P values of 0.027, and 0.000 respectively while ICT infrastructure and social network have no significant influence on engagement as their P > 0.05. Thus, the study hypotheses *H3a, and H3d* stating that support of political institutions, and self-motivation have a significant influence on engagement were supported. The finding that support of political institutions influences engagement is in line with the study findings of Razak *et al.,* (2020), and the World Bank, (2016) which reports that political institutions determine citizens' engagement behaviour while the study finding that self-motivation influence engagement is in line with study findings of Karna and Ko (2022) which reveal that self-motivations influence engagement. On the contrary, the finding that ICT infrastructure has no significant influence on engagement contradicts with study findings of Jho and Song (2015) which reported that ICT infrastructure leads to increased engagement due to ease exhibited in acquiring the tools and accessing information. This contradiction could be due to a lack of self-drive among Ugandan citizens. While the finding that online social network has no significant influence on engagement contradict with study findings of Ostic *et al.,* (2021) which reported that social networks increase citizens' engagement levels. This contradiction could be a result Ugandan government fighting citizens' freedom of social interactions through Cyber laws and other unfriendly laws which have suffocated its effective operations. The final model was designed based on the study findings.



The research was exploratory, thus, a descriptive research design was used in data collection while analysis was done based on the set hypotheses using SPP to run multiple hierarchical regression, Medgraph by Jose to run the mediations, and SEM model to confirm hierarchical regression results. Results reported that ICT infrastructure, support of political institutions, and online social networks have a significant positive influence on self-motivation, self-motivation partially mediates political institutions and engagement but fully mediates social network, ICT infrastructure with engagement while political institutions and self-motivation have a significant positive influence on engagement. According to the study findings, support of political institutions and self-motivation are essential factors that directly influence citizen engagement in policy formulation compared to social networks and ICT infrastructure which only have indirect influence through self-motivation.

It's therefore necessary for the government of Uganda to increase support of political institutions to citizens by increasing internet accessibility and affordability, supporting and granting freedom of expression to citizens, sensitizing and training them using government internet centres, putting in place ICT standards and increasing network reliability. Besides that, it should also improve citizens' self-motivation which is generated internally by giving them the required digital skills and also convincing them to make an effort to learn on their own through social networks, incorporating their views in the policies formulated to build trust and support future engagements, and also by continuously improving ICT infrastructure, especially in rural communities.

Empirical, Theoretical and Methodological Implications of the Study

Empirically, this study contributed to the literature by measuring the ability variable using online social networks rather than self-efficacy which has been predominantly tested and confirmed the mediation role of self-motivation in the relationship between political institutions, ICT infrastructure, online social networks, and engagement which was not yet clear in citizen engagement in policy formulation in the Ugandan context. Thus, this study contributed to the empirical findings of the influence of political institutions, ICT infrastructure, online social networks on self-motivation and engagement behaviour of Ugandan citizens. This discovery would help the government address the self-motivation and political institutions essential factors and improve citizen engagement.

Theoretically, the final model designed based on MOA model adaption would guide the government on how best to improve engagement and add on the existing models developed for engagement in policy formulation in the Ugandan context. Methodologically, this study designed the SEM model which confirmed the applicability of the Motivation, Opportunity, and Ability model of MacInnis *et al.*, (1991) in policy formulation in Uganda and enabled policy recommendations concerning engagement through e-participation based on study findings which would increase citizen engagement levels, and e-government and e-participation index, and also lead to the formulation of representative policies and realize compliance to formulated policies. Lastly it would create a balance between investment in ICT and citizen engagement in policy formulation through e-participation platforms and ensure the achievement of good governance and sustainable development goals.

Ethical Considerations

Under ethical consideration, the gender balance was observed by ensuring that both genders participated in giving responses, respondents were informed of the purpose of data collection, and confidentiality was ensured by not capturing respondents' details as recommended by Resnik (2015).

Study Limitations and Areas for Further Research

Due to limited time, this study was cross-sectional and purely quantitative. Besides that, the use of only eight districts to represent 134 districts in the entire country could have caused generalization challenges in the results. Future research should be carried out on the influence of

citizen engagement in building citizens' trust in government and increasing usage of Information technology.

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