

Assessing the relationship between digital divide and citizens' political participation in Africa

Gowokani Chijere Chirwa, Laston Petro Manja, Michael Chasukwa, Anthony Gunde, Boniface Dulani, Happy Kayuni & Blessings Chinsinga

To cite this article: Gowokani Chijere Chirwa, Laston Petro Manja, Michael Chasukwa, Anthony Gunde, Boniface Dulani, Happy Kayuni & Blessings Chinsinga (2023) Assessing the relationship between digital divide and citizens' political participation in Africa, Development Southern Africa, 40:6, 1258-1276, DOI: [10.1080/0376835X.2023.2224363](https://doi.org/10.1080/0376835X.2023.2224363)

To link to this article: <https://doi.org/10.1080/0376835X.2023.2224363>



Published online: 04 Jul 2023.



Submit your article to this journal [↗](#)



Article views: 324




View related articles [↗](#)



View Crossmark data [↗](#)



Assessing the relationship between digital divide and citizens' political participation in Africa

Gowokani Chijere Chirwa ^a, Laston Petro Manja^a, Michael Chasukwa^b, Anthony Gunde^{c,d}, Boniface Dulani^b, Happy Kayuni^b and Blessings Chinsinga^b

^aDepartment of Economics, School of Law, Economics and Governance, University of Malawi, Zomba, Malawi; ^bDepartment of Politics and Government, School of Law, Economics and Governance, University of Malawi, Zomba, Malawi; ^cMedia and Communication Studies Department, School of Arts, Communication and Design, University of Malawi, Zomba, Malawi; ^dJournalism Department, Stellenbosch University, Stellenbosch, South Africa

ABSTRACT

The proliferation of access to digital technology has raised remarkable interest regarding its various effects on everyday life, with recent studies largely focusing on financial inclusion. This study examined the influence of digital inequalities on political participation in Africa's nascent democracies using the sixth wave of Afrobarometer data covering 36 countries and involving 49 896 respondents. The descriptive analysis shows that nearly 70 per cent of the respondents voted, were interested in public affairs, and took part in political discussions. Furthermore, digital inequalities were found to be geographically correlated, with the highest prevalence in Southern Africa. Using the OLS regression technique, we observe that access to the internet and mobile phones and usage thereof have strong positive relationships with various aspects of political participation, among others. Our results suggest the need to promote policies directed towards reducing digital inequalities, including internet usage subsidies, to engage citizens in political participation.

KEYWORDS


Digital inequality; voting; internet; cell phone; sub-Saharan; Afrobarometer

JEL CLASSIFICATIONS

C31; O30

1. Introduction

The dawn of the twenty-first century witnessed unprecedented growth in both global digitisation and democracy. Statistics show that 90 per cent of the global population had access to mobile/cellular networks by 2010 (International Telecommunication Union [ITU], 2010), at a time when almost all countries had adopted some form of democratic government or other aspect of citizen participation that subscribes to the rule of the people. While global access to mobile technologies has been increasing, including access to personal computers, television, the internet, and smart mobile phones, Africa still lags behind other regions. While up to 65 per cent of European citizens had access to the internet by 2010, Africa had the lowest internet penetration of all regions, with only about 9.6 per cent of all residents using the internet on a regular basis

CONTACT Gowokani Chijere Chirwa  gowokani@gmail.com; gchirwa@unima.ac.mw  Department of Economics, University of Malawi, Zomba, Malawi

© 2023 Government Technical Advisory Centre (GTAC)

(ITU, 2010). Although the region still lags behind on connectivity, by 2019 up to 29 per cent of the total population on the continent was estimated to have access to the internet, with youth at the forefront of internet usage (40 per cent) (ITU, 2020). This shows that access to digital technologies is growing quickly and slowly catching up with the rest of the world.

Improved access to digital technologies has been credited with a number of developments. While directly contributing to economic activity (2.5 and 4.7 per cent of global GDP by 2015 and 2019, respectively; Groupe Speciale Mobile Association [GSMA], 2018, 2020), access to digital technologies is also found to improve outcomes in the health sector (staff training and patient services; Kenny et al., 2012), the financial sector (banking; *The Economist*, 2007), and the education sector (libraries; Bomah, 2014). However, this positive trend in technology adoption is accompanied by a digital divide. According to Wilson (2004), a digital divide refers to inequality in terms of access, distribution, and use of information, communication and technology (ICT) between two or more populations. In this case, access to these technologies is dependent on individuals' socio-economic status and technological skills. Measures of the divide include availability of communication infrastructure, computers, alternative access via television or mobile phone, and internet access (Organisation of Economic Cooperation and Development [OECD], 2001). This inadequate and unequal distribution of digital technologies has a number of negative effects, not only on human capital development but also general welfare, as it hinders people from participating in, and benefiting from, the information age.

With regard to the existing literature, knowledge about the link between the digital divide and political participation remains scanty and geographically sparse. Political participation basically includes all activities that citizens undertake to influence the selection of and decisions made by government personnel (Verba et al., 1978). At its core, political participation centres on stakeholders making a deliberate effort to engage authorities with matters that will improve the welfare of citizens and oppose policies that limit opportunities for citizens to access public services (Feeney, 1998). The World Bank defines participation as 'a process through which stakeholders influence and share control over priority setting, policy-making, resource allocation and access to public goods and services'. The various definitions of political participation hark back to Verba's (1967) conceptualisation of the concept, that is:

the intention to influence decision-makers ... does not include what can be called 'ceremonial' or 'support' participation, where citizens 'take part' by expressing support for the government, marching in parades, working hard in community projects, or voting in ceremonial elections. Participation is not confined to the electoral process nor is it limited to any particular type of political act such as voting, letter-writing, picketing, or political-party activities. [It] is not limited to any particular government level. Participatory acts refer to interactions between citizens and decision-makers, and political participation is not necessarily successful participation. (58)

Political participation can be both direct and indirect, and can take place at different levels of society: international, continental, national, community and individual (Buer, 2012). Studies linking the two concepts of political participation and the digital divide have produced interesting results, with most suggesting that there is a positive relationship between some aspects of the digital divide, such as online social networking and

online political participation, especially if this is coupled with higher socio-economic status (Bode, 2012; Gainous et al., 2013; Chen et al., 2020; Kim & Joshanloo, 2020). Other studies, meanwhile, find that internet access and use significantly influence direct democratic participation (Budge, 1996). However, Schlozman et al. (2010) find no evidence supporting the role of the internet as a bridge between participation and the digital divide. Most of the available studies on the topic of the digital divide, however, draw from Western experience together with that of some other parts of the world. As such, despite the cornucopia of studies on the digital divide, there still exists a huge gap, especially in Africa.

To begin with, the aforementioned studies focus mainly on online social networking and not the various definitions of political participation. In addition, the earlier studies fail to properly define the digital divide in terms of the various elements. Most previous studies also take a solely economic approach, finding digital access to be positively related to, among other things, economic growth (Andrianaiivo & Kpodar, 2012; Majeed, 2020), financial inclusion (Fanta et al., 2016), rural techno-economic development (Hübler & Hartje, 2016), and corruption reduction (Kanyam et al., 2017). This study is motivated by the need to understand this under-researched phenomenon, with particular reference to the African context.

To fill in the gaps identified in this study, the main objective of this article is to assess the effect of digital inequalities on political participation, especially in Africa's nascent democracies. We add to the existing literature by answering the following questions: (1) What proportion of the respondents voted, were interested in public affairs, and took part in political discussions? (2) What demographic characteristics result in digital inequalities among those surveyed? (3) Is there a positive or negative relationship between the digital divide and various aspects of political participation in Africa? To answer these questions, the study adopts a two-stage plan of analysis: first, a descriptive analysis is conducted using non-parametric methods; second, a multi-variate econometric analysis is conducted employing regression methods using ordinary least squares (OLS).

Our study is important for several reasons. First, we find that improvements in ICT are associated with improvements in democratic participation. Additionally, events that occurred during the Afro-Arab Spring ushered in several changes in the democratic process that are highly associated with digital access (Wolfsfeld et al., 2013). Similar effects of digital access and political participation have been identified in other countries (Perloff, 2013). A clear understanding of these issues is important for achievement of Sustainable Development Goal (SDG) 9.c of the 2030 development agenda, and also the 2063 African agenda. Hence, the African context provides a unique setting as political transitions and digital inequality are occurring simultaneously. Thus, our study provides the first case evaluation concerning this phenomenon on the African continent.

The rest of the article is organised as follows: Section 2 presents the theoretical framework for the study; Section 3 presents the methodology, and Section 4 offers an interpretation of the empirical results. The implications of the results are then discussed in Section 5, which also includes the summary and limitations.

2. Theoretical underpinnings

The debate on cyber citizen participation in public affairs is anchored on digital citizenship theory. Digital citizenship has multiple conceptualisations and narratives but all focus on the interaction between elected and appointed officials and citizens in cyberspace. A common feature of discussions on digital citizenship is that technology has transformed how citizens interact with the state (Mossberger, 2008). Concepts closely related to digital citizenship include empowerment, governance, and training. According to Mossberger, digital citizenship is about ‘those who use the Internet every day ... and the educational competencies to perform tasks such as finding and using information on the web and communicating with others on the Internet [and the fact that] digital citizenship is an enabling factor for political citizenship’ (173–4). This conceptualisation of digital citizenship takes a conditional approach because inclusion and exclusion in the information society are dependent on access to some resources and the availability of some conditions.

Choi (2016, 584) provides an alternative understanding of digital citizenship; defining it as ‘abilities, thinking and action regarding Internet use, which allows people to understand, navigate, engage in and transform self, community, society and the world’. This conceptualisation is normative because, according to Jørring et al. (2019), it is ‘the ideal way to act online and can be used to discuss ethical and moral considerations in relation to online participation’. Choi (2016) concurs with Mossberger (2008) that effective digital citizenship requires the existence of some conditions, of which four are critical: ‘Media and Information Literacy, Participation/Engagement, Critical Resistance, and Ethics’. In practical terms, both conditional and normative approaches to digital citizenship are contextual because meaning is shaped by the historical, political, social, and economic realities of the macro- and micro-environments of citizens and states. Jørring et al. (2019, 21) echoes this view in postulating that digital citizenship ‘encompasses very diverse experiences of what it is like to live as a citizen in the digital age’. The contextual narrative recognises that digital citizenship is fluid because the meaning and terms of citizenship are negotiated based on circumstantial factors.

Digital citizenship is also referred to as ‘internet citizenry’ (Carrizales, 2009) and ‘e-government’ (Lee, 2010). However, each of these terms depicts a single element of digital citizenship and, hence, is limited in its understanding of citizen–state relations transformed by technology. Internet citizenry acknowledges the interaction between the state and citizens but assumes that the internet is the only platform available to them via which to engage with one another. E-government narrows the interaction between citizens and the state when the concept of digital citizenship transcends government circles to include citizen engagement in political realms such as online voting and petitioning. According to Min (2010, 25), digital citizenship is ‘multimodal, interactive, horizontal, low-cost and nonterritorial’. In this regard, digital citizenship scholars argue that the relevance of states as geographical entities is increasingly diluted because citizens can take part in decision making at both the domestic and global levels (Pors, 2015; Dencik & Cable, 2017).

Central to understanding digital citizenship are three dimensions: access, use, and consequences (Min, 2010). Whereas ‘access’ focuses on quality, speed, ease and who has and who does not have access to ICT, the dimension of ‘use’ discusses ‘how

people make use of ICT and what factors influence the different uses' (25). 'Consequences' as a dimension of digital citizenship examines the 'impact of the use of ICTs on the various dimensions of citizens' participation in society' (ibid). Digital citizenship has challenged traditional governance in public machinery whereby public officers interact with citizens physically. According to Mossberger et al. (2007, cited in Carrizales, 2009), digital citizenship focuses on 'the public and its relationship with the Internet, but most importantly, it challenges government entities in fostering the digital age'.

For his part, Smith (1997) identifies three types of digital citizenship: liberalism, civic republicanism, and ascriptive hierarchy. Whilst liberal digital citizenship promotes access to government facilities through online mechanisms on competitive terms, civic republicanism digital citizenship is interested in civic participation and empowerment. Ascriptive hierarchy digital citizenship links the structure of a society to citizen participation based on class, gender, race, and professional and educational attainment. All three types of digital citizenship enhance participation in public matters dependent on internet connectivity and financial capacity. Digital citizenship may be a double-edged sword because, depending on some parameters such as finances, citizen participation can be enhanced or frustrated. In this regard, digital citizenship excludes some citizens or limits their active participation in public affairs. Digital inequalities affect digital citizenship, and this situation is very pronounced in African countries because of the wide economic inequality that exists between the rich and the poor. This view is summed up by Carrizales (2009, 351) when he contends that 'social deficiencies such as poverty, illiteracy, and unequal educational opportunities further divide people from full online participation and digital citizenship'. The central argument is that digital citizenship goes beyond merely 'having technological access to the Internet but also having online educational competencies' (Choi, 2016; Manzuoli et al., 2019).

Digital citizenship theory also argues for technology and information training and policies that empower citizens to effectively use the digital spaces that are key elements of active citizenship. Digital citizens are limited in terms of participating in public affairs if government policies are not conducive and when they do not have adequate knowledge and skills regarding online platforms. Shulman et al. (2004, 4) established 'a direct linkage between a desire for computer proficiency and digital citizenship'. The present discussion promoting digital citizenship involves both state and non-state actors and citizens adopting an innovative approach to technology and computer literacy to reduce the digital inequalities that emerge as a result of economic and social divisions. Norris (2001, 3) makes the same observation: if digital citizenship is about ICT, then digital citizenship is 'a Pandora's box unleashing new inequalities of power and wealth, reinforcing deeper divisions between information rich and poor, the tuned-in and the tuned-out, the activists and disengaged'.

Van Dijk's theory on access to digital technology and its societal impact sheds further light on the drivers of the digital divide. Van Dijk (2005) argues that digital inequalities are concerned not merely with problems to do with physical access to the internet but also skills and usage access. Based on this understanding, it cannot be expected that the problem of digital inequality will be solved when citizens gain physical access; rather, it can be further reflected in actual usage of digital media in everyday life. Thus, in addressing the digital divide, first-level (physical access) and second-level (skills and usage access) inequalities must be focused on (Bonfadelli, 2002; Hargittai,

2002). For African countries, van Dijk's theory is relevant and applicable because both first- and second-level digital inequalities are evident. Table 1 summarises the conceptual framework used to operationalise the study.

3. Methods

3.1. Data

We use data from the sixth wave of Afrobarometer data collected between 2014 and 2015 covering 36 countries and 53 935 respondents. However, in our analysis we do not use data for North Africa because the region had missing data on the questions of interest in the study. Adopting a continental approach enables us to locate the whole of the African continent squarely within debates concerning the linkage between access to digital technology and political participation without being unduly influenced by region-specific factors. Although our scope is continental, we nonetheless provide regional comparisons. This enables us to disaggregate the results, where possible, to the different geographical regions of Africa (North, West, Central, East, and Southern).

Regarding what constitutes the digital divide, various measures have been suggested (Cullen, 2001; Keegan Eamon, 2004). In this article, the digital divide is defined as use of the internet, as well as ownership and use of a mobile phone (Rashid, 2016; Hong et al., 2017; Ruiz-Rodríguez et al., 2018). We note that people may use their phones for purposes other than accessing the internet or social media. Nonetheless, the definition of the digital divide also includes phone usage because the election bodies of some

Table 1. Summary of conceptual framework.

Concept	Core Elements
Digital citizenship (Mossberger, 2008), internet citizenry (Carrizales, 2009), e-government (Lee, 2010).	<ul style="list-style-type: none"> • argues technology determines and shapes state–citizen interaction (Mossberger, 2008) • associated with empowerment, governance, and training (Mossberger, 2008) • conditions for effective digital governance: media and information literacy, participation/engagement, critical resistance, and ethics (Choi, 2016) • three types of digital citizenship: liberalism, civic republicanism, and ascriptive hierarchy (Smith, 1997) • three dimensions, namely: access, use, and consequences (Min, 2010).
Access to digital technology and societal impacts (van Dijk, 2005)	<ul style="list-style-type: none"> • centres on resources and appropriation theory • digital inequality is beyond physical access and includes skills and usage access (Hargittai, 2002; Bonfadelli, 2002) first- and second-level digital inequalities (van Dijk, 2005) • 'material access as a cause for differences in skills, uses, and outcomes' (van Deursen & van Dijk, 2019) • 'Internet attitudes as a cause for inequalities in material access' (van Deursen & van Dijk, 2019) • core arguments: 'Categorical inequalities in society produce an unequal distribution of resources, an unequal distribution of resources causes unequal access to digital technologies, unequal access to digital technologies also depends on the characteristics of these technologies, unequal access to digital technologies brings about unequal participation in society and unequal participation in society reinforces categorical inequalities and unequal distributions of resources.' (Van Dijk, 2005)

countries (such as Malawi) send informational text messages to registered voters, and hence this may affect political participation in the form of voting, among others. Our dependent variables of interest are based on previous literature and are thus defined as voting, taking part in political discussions (Festenstein, 1997), having political interest (Min, 2010), and raising an issue with political leaders (Zaheer, 2016). Various control variables, based on these dependent variables, are also motivated by previous studies (Winkler et al., 1981; Vecchione & Caprara, 2009; Goldberg, 2014).

Afrobarometer data is available for public use and is freely downloadable.¹ All variables used in the study are described in Table 2.

3.2. Research design

The study adopts a positivist research paradigm, rooted in the natural sciences and defined as a systematic, scientific approach to research associated with scientific discoveries and application of scientific methodology. Positivism is traced back to the seventeenth and eighteenth centuries and is ascribed to the philosophers Descartes and Locke. The idea is to apply methods from the natural sciences to social sciences so as to understand the world. The scientific method involves collecting data, developing theory, testing hypotheses, conducting research, and reviewing theory. We use the quantitative methodological design – a structured approach in which all aspects of the research process are decided upon before data collection (Kumar, 2014).

3.3. Statistical analysis

In this article, we use graphs, descriptive statistics, and regression analysis. However, it is worth noting that given the observational data used in this study, there is a possibility of potential bias due to reverse causality, whereby the decision to use digital media could also be affected by political participation. As such, instead of focusing on establishing causality between the two variables, we limit our focus in this study to exploring the relationship between the two. All data are analysed using Stata 17.0 (Statacorp, 2020).

4. Results

4.1. Descriptive analysis

Given the different ways of defining the dependent variable, in terms of voting, taking part in political discussions, having political interest, and raising an issue with political leaders, we obtained different sets of results. First, we conducted a bivariate analysis, investigating the relationship between the digital divide and political participation without regard for any other possible regressors. The results show that North Africa scores higher than the rest of the regions in terms of people having interest in public affairs (84 per cent), but it is lower in the Central Africa region (68 per cent). On voting, the lowest was North Africa (60 per cent) and the highest was East Africa (84 per cent). Regarding discussions about politics, it was almost 70 per cent across all

¹<http://afrobarometer.org/data/merged-round-6-data-36-countries-2016>.

Table 2. Variable definitions.

Variable	Description
Response variables	
Discuss politics	Binary variable = 1 if respondent discusses politics, either occasionally or frequently; 0 = respondent never discusses politics
Vote	Binary variable = 1 if respondent voted in the most recent national elections; 0 = respondent did not vote
Interested in public affairs	Binary variable = 1 if respondent was interested in public affairs; 0 = respondent was not at all interested
Engage in all	Binary variable = 1 if respondent was engaged in all three activities; 0 = respondent was involved in fewer than three activities
Independent variables	
Education	Categorical variable = 0 if no formal education; 1 = primary education; 2 = secondary education; 3 = post-secondary education
Age	Categorical variable = 1 for 18–25 years; 2 = 26–35 years; 3 = 36–45 years; 4 = 46–55 years; 5 = 56–65 years; 6 = over 65 years
Place of residence	Binary variable = 1 if respondent resides in an urban area; 0 = respondent resides in rural area
Religion	Categorical variable = 1 if respondent is Christian; 2 = Muslim; 3 = other religion
Employment	Binary variable = 1 if respondent is employed, either part-time or full-time; 0 = respondent is not employed
Uses phone	Binary variable = 1 if respondent uses phones, at any frequency; 0 = respondent does not use phone at all
Own mobile phone	Binary variable = 1 if respondent owns phones; 0 = respondent does not own mobile phone
Uses internet	Binary variable = 1 if respondent uses internet, at any frequency; 0 = respondent does not use internet
Availability of cell-phone service	Binary variable = 1 if respondent's primary sampling unit or enumeration area has available phone service; 0 = area has no service
Sex of respondent	Binary variable = 1 if respondent is male; 0 = respondent is female
Wealth	A series of values generated by principal component analysis (PCA)
Country by region	A series of binary variables indicating respondent's region of residence in Africa (West, East, Southern, North, or Central Africa)
Lived poverty index	Continuous variable indicating respondent's poverty categories; < 0.50 for very low or no lived poverty; 0.5–2.5 for moderate lived poverty; > 2.5 for extreme lived poverty

regions. Taking part in demonstrations is low across all regions of the continent, at approximately 16 per cent. The findings are reported in [Table 3](#).

In terms of sex, there was 50:50 representation in the Afrobarometer data. In all regions, employment ranged from 32 to 45 per cent. The majority of the respondents were either Christian or Muslim. Cell phone coverage, which was recorded by the field supervisors, ranged from 92 to 98 per cent in all study areas. Access to digital technologies is observed to be highest in Central Africa, and lowest in the East Africa. For Central Africa, about 93 per cent of respondents reported having used a cell phone, 90 per cent owned a phone, and about 48 per cent used the internet. These statistics are closely followed by those for North Africa: 92, 87, and 46 per cent of respondents used or owned a cell phone and used the internet, respectively. For all regions, it can be observed that usage of a mobile phone is not solely contingent on owning one, as some respondents reported using a phone but not owning one. While mobile phone usage was relatively high, internet usage was consistently below 50 per cent, with all regions recording figures for internet use that are approximately half those of cell phone ownership. This is in line with the finding that mobile internet penetration was only about 23 per cent in 2015, with smart phone adoption pegged at 20 per cent. For East Africa, the digital divide was more pronounced: smart phones accounted for only

Table 3. Descriptive statistics.

Variable	West Africa		East Africa		Southern Africa		North Africa		Central Africa	
	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>
Political participation										
<i>Interest in public affairs</i>	76	28129	81	13588	79	28537	84	10012	68	2419
<i>Voting</i>	81	26334	84	12854	78	25367	60	6728	65	2004
<i>Discuss politics</i>	67	25023	66	11108	67	24060	69	8279	73	2609
<i>Community meetings</i>	83	20422	93	11492	83	21616	42	3307	79	1564
<i>Demonstration</i>	14	3720	11	1402	11	2617	16	1346	24	506
<i>Raise an issue</i>	70	14492	83	8252	69	14322	38	2854	61	833
Education level										
<i>No formal education</i>	34	12511	14	2367	9	3298	19	2296	3	107
<i>Primary</i>	21	7915	48	8030	34	12324	26	3105	19	668
<i>Secondary</i>	32	11904	28	4673	44	15851	26	3079	57	2044
<i>Post-secondary</i>	13	4747	10	1700	12	4442	29	3431	21	749
Age category										
<i>Age 18–25</i>	40	14923	39	6577	39	13810	37	4441	32	1141
<i>Age 26–35</i>	29	10707	30	5005	27	9782	28	3338	32	1126
<i>Age 36–45</i>	19	7052	19	3118	21	7443	21	2450	18	622
<i>Age 46–55</i>	13	2253	12	1038	12	2204	17	1005	11	386
<i>Age 56–65</i>	8	1349	7	621	8	1498	8	465	5	192
<i>Age 65+</i>	5	812	5	384	6	1098	5	279	3	95
Urban	43	15929	27	4579	38	13808	55	6592	66	2375
Employment status										
<i>Not employed</i>	68	25323	55	9210	66	23449	58	6905	61	2163
<i>Employed</i>	32	11725	45	7550	35	12370	42	4977	39	1397
Religion										
<i>Christian</i>	45	8107	79	6641	79	14156	0	9	83	2960
<i>Muslim</i>	45	8138	17	1451	6	1061	99	4771	6	202
<i>Other religion</i>	9	1686	3	288	15	2723	0	20	11	405
Cell service in the area	92	34211	92	15486	92	33103	98	11747	98	3513
Male	50	18565	50	8394	50	17835	50	5991	50	1786
Lived Poverty	1.324	49220	1.252	21015	1.145	41165	0.724	8671	1.397	4986
Observations	37185		16782		35992		11987		3576	

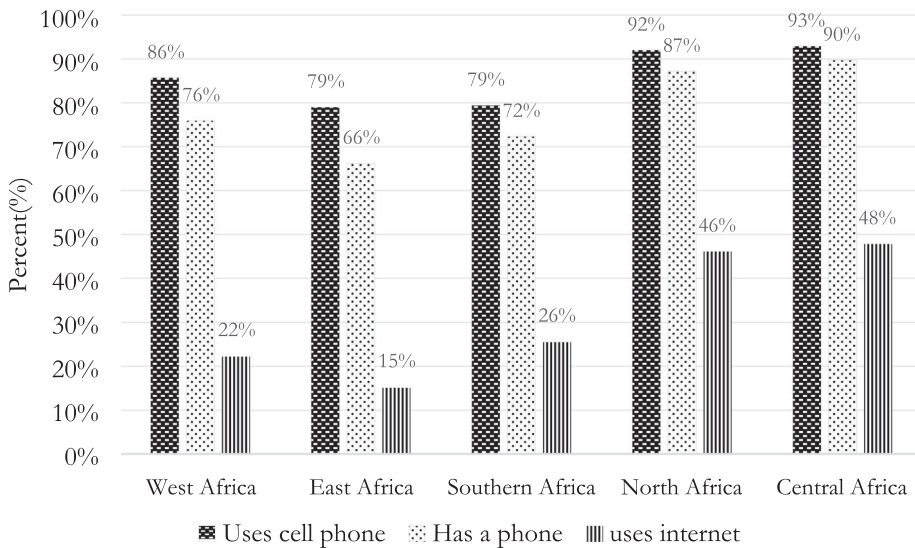


Figure 1. Digital Access across African Regions.

11 per cent of connections in 2014, the lowest within the sub-Saharan (SSA) region (GSMA Intelligence, 2015). Figure 1 captures this distribution.

Moving away from the univariate analysis, we now focus on the econometric results. In this stage, we first present results for all countries in the sample, and then reduce the sample to focus on the SSA region alone.

4.2. Econometric analysis

The first set of results in Table 3 does not include control variables in order to evaluate relationships with digital access only. From Table 4, we found that political participation was indeed correlated with many elements of the digital divide. Interestingly, we observed that ownership of a mobile phone and use of the internet and a phone had positive relationships with political participation in terms of individuals' ability to discuss politics and to show interest in public affairs. More specifically, ownership of a mobile phone increased one's chances of discussing politics and showing interest in public affairs by 6.7 and 4.8 percentage points, respectively. Ownership of a mobile phone and use of internet are basic tools for acts of political participation, to the annoyance of autocracies, whereby the internet plays a big role in mobilising people to participate in public affairs thereby allowing citizens to circumvent laws that prevent people from physically gathering to express their political opinions (Zaheer, 2016). The phone and the internet enable citizens to meet en masse in cyber space without breaking the law.

We then proceeded to investigate the relationship between the digital divide and political participation in the presence of control variables. These results are shown in Table 5 and are very similar to those in the absence of control variables because digital access was also found to be positively related to political participation. Overall, mobile phone ownership and internet use were positively related to political engagement (2.4 and 2.7 per cent, respectively). Specifically, internet use increased the chances of discussing politics

Table 4. Marginal effects on political engagement.

Dependent variable	Discuss politics	Vote	Interest in public affairs	Engage in all
Own mobile phone	0.067*** (0.008)	−0.002 (0.009)	0.048*** (0.007)	0.030*** (0.005)
Uses phone	0.066*** (0.009)	−0.000 (0.010)	0.012 (0.008)	0.003 (0.006)
Uses internet	0.111*** (0.005)	−0.098*** (0.005)	0.064*** (0.005)	0.009*** (0.003)
N	53734	47264	53375	53861

Standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

and being interested in public affairs by 5.9 and 3.8 per cent, respectively. Rather surprisingly, however, this indicator was found to reduce chances of voting by about 1.7 per cent, which contrasts with the findings of Hargittai and Shaw (2013) and Min (2010). Among others, the negative relationship between internet use and voting could be due to the fact that people who use the internet are more exposed to the latest political information, which could sometimes demotivate them from participating in the electoral process. For Africa, the increased prevalence of fake news could also be putting internet users at more risk of disengaging from politics compared to non-users; however, it is more to be expected that people learn about elections via social media, resulting in increased political knowledge. Furthermore, internet use may lead to decreased levels of political distrust and apathy and thus greater political interest and participation (Gil de Zúñiga et al., 2014; Beam et al., 2016; Yamamoto et al., 2017).

Table 5. Effects of digital divide on political participation.

Variables	Discuss politics	Vote	Interest in public affairs	Engage in all
Education				
Primary	0.032*** (0.007)	−0.000 (0.007)	0.025*** (0.006)	0.015*** (0.005)
Secondary	0.083*** (0.008)	−0.007 (0.008)	0.045*** (0.007)	0.015*** (0.005)
Post-secondary	0.177*** (0.010)	−0.009 (0.010)	0.122*** (0.009)	0.043*** (0.007)
Age				
Age 26–35	0.044*** (0.006)	0.110*** (0.006)	0.036*** (0.006)	0.070*** (0.004)
Age 36–45	0.071*** (0.007)	0.168*** (0.007)	0.054*** (0.006)	0.093*** (0.005)
Age 46–55	0.070*** (0.008)	0.217*** (0.008)	0.070*** (0.008)	0.112*** (0.006)
Age 56–65	0.042*** (0.010)	0.232*** (0.010)	0.051*** (0.009)	0.109*** (0.007)
Age 65+	0.034*** (0.011)	0.218*** (0.012)	0.052*** (0.010)	0.102*** (0.007)
Place of residence	−0.017*** (0.005)	−0.039*** (0.005)	−0.041*** (0.005)	−0.019*** (0.003)
Employment Status	0.035*** (0.005)	0.024*** (0.005)	0.022*** (0.005)	0.016*** (0.003)
Religion				
Christian	0.023*** (0.008)	0.002 (0.008)	0.004 (0.007)	0.010** (0.005)
Muslim	0.094*** (0.009)	0.016* (0.009)	0.063*** (0.008)	0.018*** (0.006)
Digital access				
Uses phone	0.056*** (0.009)	0.007 (0.010)	0.010 (0.008)	0.005 (0.006)
Uses Internet	0.059*** (0.007)	−0.017*** (0.006)	0.038*** (0.006)	0.027*** (0.004)
Own mobile phone	0.033*** (0.009)	0.012 (0.009)	0.036*** (0.008)	0.024*** (0.005)
Phone service available	0.029*** (0.010)	−0.000 (0.010)	0.006 (0.009)	0.009 (0.006)
Sex of respondent	0.110*** (0.005)	0.024*** (0.005)	0.071*** (0.004)	0.028*** (0.003)
Lived poverty	0.009*** (0.003)	−0.018*** (0.003)	−0.005** (0.002)	−0.000 (0.002)
Region of country				
East Africa	−0.025*** (0.007)	0.028*** (0.008)	0.034*** (0.007)	0.010** (0.005)
Southern Africa	0.004 (0.006)	−0.019*** (0.006)	0.053*** (0.006)	−0.001 (0.004)
North Africa	−0.104*** (0.009)	−0.251*** (0.008)	−0.013 (0.009)	−0.067*** (0.006)
Central Africa	0.033*** (0.010)	−0.098*** (0.009)	−0.065*** (0.009)	−0.017*** (0.006)
N	51 732	45 406	51 450	51 844

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Despite evidence suggesting low election turnout and partisanship among Africa's youth (cf. Resnick & Casale, 2011), our findings show that internet usage in most African countries is highest among the youth. We may thus be capturing the age effect in the technology dividend created by internet usage. We argue that, whilst technology increased demand for political participation, this did not apply to all acts of political participation. This was because there was a decrease in demand for political participation, especially in relation to those technologies associated with putting citizens at risk and being less credible and more costly; that is, technologies that can be hacked and hence divulge personal information, non-official sites, non-peer-reviewed information, and not easily affordable due to high data tariffs.

In terms of the control variables, the findings show that chances of participating in politics increased at higher levels of education and older ages. For age, however, we observed diminishing returns after 46–55 years of age.

In addition, people in urban areas had a lower chance of participating in political activities (a 4.1 per cent lower chance of being interested in public affairs), whereas Muslims (compared to other religious affiliations), males (compared to females) and people from East Africa (compared to those in West Africa) all have higher chances of political participation. We subscribe to the view that people in urban areas and elites in Africa are disincentivised to participate in mainstream political activities because they are still able to access political and public institutions through other means, including informal and social spaces (Kalebe-Nyamongo & Marquette, 2014). Political participation in urban areas may also be suppressed by dictatorial governments thereby making it less attractive for urban residents to engage despite wishing to do so. However, we consider cities to be 'melting points' for intense and aggressive political participation when technology has been used to harness and narrow down several competing interests of urban dwellers to common and specific interests with actionable demands. The results show that people from North, Central and Southern Africa have lower chances of voting compared to their West African counterparts, possibly because of a lack of confidence in the political process and voter apathy, both of which affect people's belief in whether they can really have an impact on voting outcomes. Excluding the control for geography, the results remain the same, with all indicators of digital access having positive effects on political participation except for voting. A significant difference in this case is that use of mobile phones positively affected voting, likely because electoral commissions usually update registered voters using text messages. These results are summarised in Table 6.

4.3. Political participation in the sub-Saharan Africa region

Having looked at the results at the continent level, we now narrow down to the sub-Saharan Africa (SSA) region. This meant estimation of different regression models with the exclusion of Algeria, Egypt, Morocco, and Tunisia from the sample. The results are similar to those in Table 5, with mobile phone ownership and usage and access to the internet having positive relationships with interest in discussing politics, yet a negative relationship with voting. In addition, all measures of digital access increased chances to demonstrate but mobile phone ownership reducing that chance. With the inclusion of various control factors, coefficients for the sub-Saharan Africa sample are similar to those of the full continental sample, implying that the relationship

Table 6. Effects of digital divide on political participation, excluding geography.

Variables	Discuss politics	Vote	Interest in public affairs	Engage in all
Education				
Primary	0.017** (0.007)	−0.043*** (0.007)	0.033*** (0.006)	0.005 (0.004)
Secondary	0.076*** (0.008)	−0.050*** (0.008)	0.047*** (0.007)	0.005 (0.005)
Post-secondary	0.160*** (0.010)	−0.067*** (0.010)	0.124*** (0.009)	0.028*** (0.007)
Age				
Age 26–35	0.042*** (0.006)	0.110*** (0.006)	0.038*** (0.006)	0.069*** (0.004)
Age 36–45	0.067*** (0.007)	0.162*** (0.007)	0.056*** (0.006)	0.089*** (0.005)
Age 46–55	0.065*** (0.008)	0.203*** (0.008)	0.072*** (0.008)	0.107*** (0.006)
Age 56–65	0.037*** (0.010)	0.217*** (0.010)	0.055*** (0.009)	0.103*** (0.007)
Age 65+	0.027** (0.011)	0.193*** (0.012)	0.058*** (0.010)	0.094*** (0.007)
Place of residence	−0.016*** (0.005)	−0.051*** (0.005)	−0.052*** (0.005)	−0.022*** (0.003)
Employment status	0.034*** (0.005)	0.028*** (0.005)	0.022*** (0.005)	0.018*** (0.003)
Religion				
Christian	0.022*** (0.008)	0.011 (0.008)	0.004 (0.007)	0.013** (0.005)
Muslim	0.053*** (0.008)	−0.075*** (0.008)	0.044*** (0.008)	−0.005 (0.005)
Digital access				
Uses phone	0.059*** (0.009)	0.018* (0.010)	0.002 (0.008)	0.008 (0.006)
Uses internet	0.053*** (0.007)	−0.043*** (0.006)	0.034*** (0.006)	0.021*** (0.004)
Own mobile phone	0.034*** (0.009)	0.001 (0.009)	0.035*** (0.009)	0.021*** (0.005)
Phone service Available	0.022** (0.010)	−0.019* (0.010)	0.002 (0.009)	0.005 (0.006)
Sex of respondent	0.112*** (0.005)	0.031*** (0.005)	0.071*** (0.004)	0.029*** (0.003)
Lived poverty	0.013*** (0.003)	−0.016*** (0.003)	−0.010*** (0.002)	0.001 (0.002)
N	51 732	45 406	51 450	51 844

Standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

between digital access and political participation does not vary significantly between SSA and non-SSA countries. See [Table 7](#).

To extend our analysis further, we assessed how use of technology is affected by education. At a minimum, this involved the interaction of the education variable with each of the digital technology variables. These results are presented in [Table 8](#).

The results show that, while education was positively related to involvement in demonstrations within the SSA, the variable had a negative relationship with voting, a result that contrasted with that for the whole of Africa, with the inclusion of regions as control variables in the models. However, in [Table 3](#) the significant negative coefficient was also observed for the whole of Africa, with the exclusion of geographical regions as control variables in the models. The relationship between digital access and political participation was seen to take a fascinating twist as a result of the interaction with education. For example, with higher levels of education, phone ownership is found to have a positive effect on voting behaviour and a negative effect on involvement in demonstrations. This is because demonstrations tend to impose higher opportunity costs on more educated people, with the result that they largely opt to buy into more peaceful ways of resolving conflict as a self-serving strategy than less-educated citizens. The effect of internet use, in the presence of higher education, contrasts with the case when education is not considered; that is, internet use increases voting behaviour and reduces engagement.

5. Discussion

This study presents – to the best of our knowledge – the first empirical evidence on the effect of digital inequality on citizens' political participation, drawing on rich cross-

Table 7. Marginal effects on political engagement in sub-Saharan Africa.

Variables	Discuss politics	Vote	Demonstration	Raise an issue
Education				
Primary	0.039*** (0.006)	0.009 (0.006)	0.020*** (0.007)	0.019* (0.011)
Secondary	0.084*** (0.007)	−0.006 (0.007)	0.040*** (0.007)	0.025** (0.011)
Post-secondary	0.174*** (0.009)	−0.010 (0.009)	0.060*** (0.009)	0.059*** (0.014)
Age				
Age 26–35	0.042*** (0.006)	0.105*** (0.005)	−0.005 (0.005)	0.066*** (0.009)
Age 36–45	0.058*** (0.006)	0.166*** (0.006)	−0.003 (0.006)	0.098*** (0.010)
Age 46–55	0.051*** (0.007)	0.201*** (0.007)	−0.020*** (0.007)	0.063*** (0.012)
Age 56–65	0.033*** (0.009)	0.215*** (0.009)	−0.047*** (0.009)	0.076*** (0.014)
Age 65+	0.019* (0.010)	0.210*** (0.011)	−0.061*** (0.011)	0.027* (0.016)
Place of residence	−0.026*** (0.005)	−0.045*** (0.004)	0.006 (0.004)	−0.136*** (0.007)
Employment status	0.032*** (0.005)	0.027*** (0.004)	0.005 (0.004)	0.023*** (0.007)
Religion				
Christian	0.030*** (0.007)	0.013** (0.006)	0.021*** (0.007)	0.105*** (0.011)
Muslim	0.080*** (0.008)	0.018** (0.008)	−0.012 (0.008)	0.130*** (0.013)
Digital access				
Uses phone	0.059*** (0.008)	0.003 (0.008)	0.046*** (0.008)	0.102*** (0.014)
Uses internet	0.071*** (0.006)	−0.023*** (0.006)	0.068*** (0.005)	0.019** (0.009)
Own mobile phone	0.029*** (0.008)	0.021*** (0.007)	−0.015** (0.007)	0.012 (0.013)
Availability of cell phone service	0.027*** (0.008)	0.011 (0.008)	−0.030*** (0.008)	−0.049*** (0.013)
Sex of respondent	0.111*** (0.004)	0.023*** (0.004)	0.038*** (0.004)	0.124*** (0.007)
Lived poverty	0.014*** (0.002)	−0.010*** (0.002)	0.023*** (0.002)	0.061*** (0.004)
Region of country				
East Africa	−0.031*** (0.006)	0.017*** (0.006)	−0.094*** (0.006)	0.170*** (0.011)
Southern Africa	−0.004 (0.006)	−0.011** (0.005)	−0.061*** (0.005)	0.020** (0.009)
North Africa	−0.162*** (0.014)	−0.240*** (0.012)	0.011 (0.012)	−0.139*** (0.020)
Central Africa	0.018* (0.009)	−0.091*** (0.008)	0.002 (0.008)	0.067*** (0.015)
N	48 168	42 143	30 530	20 685

Standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

sectional data from 36 African countries. We also provide, for the first time, evidence at continental level. Our results identify several issues that should be considered within the context of African countries, linked to the existing contexts and used to guide policy.

We found that people with digital access are interested in public affairs, and this is consistent across all forms of digital access that have a positive relationship with political participation. This supports the finding in a comparative study focusing on Nigeria, Kenya, and the USA (Adegbola & Gearhart, 2019). In terms of voting, we mainly observed a negative relationship between using the internet and political participation. However, digital access was positively related to having an interest in both political discussion and public affairs. This result reveals both positive and negative

Table 8. Marginal effects on citizen participation (no controls).

Variables	Vote	Demonstration
Own mobile phone	0.004 (0.008)	0.024*** (0.008)
Education	−0.024*** (0.005)	0.038*** (0.005)
Phone x education	0.010* (0.006)	−0.015*** (0.005)
Uses phone	0.002 (0.009)	0.029*** (0.009)
Uses internet	−0.114*** (0.010)	0.113*** (0.009)
Phone use x education	−0.003 (0.007)	−0.001 (0.007)
Internet x education	0.021*** (0.004)	−0.017*** (0.004)
N	83 136	65 321

Standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

relationships. This may be due to the fact that elections happen after a long period of time and thus apathy may develop in the process. In addition, it may also capture age effects that are identified in internet usage. Previous research has shown that younger citizens are less likely to vote but more likely to use the internet than older people (UNDP, 2012; Zaheer, 2016; Hoffmann & Lutz, 2019). Our findings confirm these trends and show that political participation in formal, institutional processes such as voting is relatively low among Africa's youth when compared to older citizens (UNDP, 2012; UNDP & UNDESA, n.d.); hence, the result may be a manifestation of the age divide. Youths, known as the cheetah generation, find technology convenient and stylish; not only is a virtual presence important among peers but it can also facilitate political participation as well. Older citizens' lack of political participation may be explained by the fact that internet usage is limited and reserved for the social elite or wealthy (Bruce & MacInnis, n.d.).

Generally, we observed that digital access had a positive relationship with political participation. These results raise confidence that reducing the digital divide can have positive effects in terms of improving political participation on the African continent. Although the digital divide is already declining as a result of technological advancements throughout the world, there is a need for extra effort given that the rates at which the divide is declining are not evenly balanced across countries on the continent. This is especially the case for Southern Africa, which is more digitally divided on measures such as use of cell phones. We argue that technology can be a key component in strengthening democratic institutions on the African continent. The policy side of governance must be designed in such a way that it does not constrain use of technology for political participation (Alonso & Lippez-De-Castro, 2016). All of our results are consistent after controlling for geographical differences and gender and we also note gender and age effects on the various aspects of political participation overall.

Our study has several limitations. We used self-reported data and acknowledge that there might be potential bias due to reverse causality. As such, future studies should employ methods such as propensity score matching and instrumental variables to ensure that potential endogeneity is resolved. Furthermore, there is a need to use other measures of political participation, such as the World Development Indicators, which are at the macro-level as opposed to individual-level measures. Nevertheless, valuable lessons have been learned from the analysis and our work makes an important initial contribution to answering important questions. In view of the foregoing, the key question that comes to mind is: what does this study mean?

This study suggests that digital inequality has both positive and negative effects on the political participation of citizens, depending on the type of technology used and access to such. However, a large majority of the effects are positive. Voting patterns in African economies, in particular, may be age-cohort specific; that is, younger people are less likely to vote but more likely use internet facilities and digital devices. As a policy recommendation, we may argue that, if governments are to stimulate political discussions and boost people's interest in political issues, then they must improve access to digital technology.

The findings have some implications for Africa as the quest for digital inclusion continues. Given that access to phones and usage thereof affect the digital divide, bridging policies such as income transfers may be handy. Individual countries may consider

government subsidisation of tariffs, such as internet bundles, which may boost use of various digital devices. In addition, new approaches should be taken to the use of devices so that they can be used for understanding the political landscape, during both campaign and non-campaign periods. Introduction of chatrooms via the digital landscape, for example, may help in bridging the information gap via digital access. Lastly, individual countries should invest more in digital device infrastructure. By doing so, the secondary goal of political inclusion may be realised if all individuals have the necessary access.

Acknowledgments

We are grateful to Afrobarometer for making its data publicly available for analysis. The round six Afrobarometer surveys were funded by a consortium of donors that included the UK's Department for International Development (DFID), the Mo Ibrahim Foundation, the Swedish International Development Agency (SIDA), the United States Agency for International Development (USAID), and the World Bank. The authors are also grateful to participants in various workshops at the University of Malawi, whose comments helped to improve the article.

Disclosure statement

No potential conflict of interest was reported by the authors.

Declaration of interest statement

The authors declare no conflicts of interest.

ORCID

Gowokani Chijere Chirwa  <http://orcid.org/0000-0003-0199-779X>

References

- Adegbola, O & Gearhart, S, 2019. Examining the relationship between media Use and political engagement: A comparative study among the United States, Kenya, and Nigeria. *International Journal of Communication* 13, 1231–51.
- Alonso, GR & Lippez-De Castro, S, 2016. Technology helps, people make: A Smart City Governance Framework Grounded In Deliberative Democracy, in R Gil-Garcia, TA Pardo & T Nam (Eds.) *Smarter as the New Urban Agenda: A Comprehensive View of the 21st Century City*. Springer, Stockholm.
- Andrianaivo, M & Kpodar, K, 2012. Mobile phones, financial inclusion, and growth. *Review of Economics and Institutions* 3(2), 1–30. doi:10.5202/rei.v3i2.75
- Beam, M, Hutchens, M & Hmielowski, J, 2016. Clicking vs. sharing: The relationship between online news behaviors and political knowledge. *Computers in Human Behavior* 59, 215–20. doi:10.1016/j.chb.2016.02.013
- Bode, L, 2012. Facebooking it to the polls: A study in online social networking and political behavior. *Journal of Information Technology and Politics* 9(4), 352–69.
- Bomah, KB, 2014. Digital divide: effects on education development in Africa. Conference: LYIT Dept. of Computing: Technical Writing Presentation At: Letterkenny Institute of Technology, Ireland, Dec 16, pp. 1–21.

- Bonfadelli, H, 2002. The internet and knowledge gaps: A theoretical and empirical investigation. *European Journal of Communication* 17(1), 65–84.
- Bruce, D & MacInnis, M, n.d. Wealth, age, and education play key role in internet use. The New Rural Economy Project. https://www.concordia.ca/content/dam/artsci/sociology-anthropology/nre/docs/insites-flyers/InSites_09_-_David_Bruce_3_-_VERSION_3.pdf.
- Budge, I, 1996. *The New challenge of direct democracy*. Polity Press, Cambridge, MA.
- Buer, TF, 2012. Achieving the millennium development goal 3: the role of the church in empowerment of women: a case study of the Anglican Diocese of Kumasi. Unpublished masters thesis, Kwame Nkrumah University of Science and Technology.
- Carrizales, T, 2009. The internet citizenry: access and participation. *Public Administration Review* 69(2), 350–3.
- Chen, C, Liu, C, Hui, BPH & Chung, M, 2020. Does education background affect digital equal opportunity and the political participation of sustainable digital citizens? A Taiwan case. *Sustainability* 12, 1359–1376.
- Choi, M, 2016. A concept analysis of digital citizenship for democratic citizenship education in the internet Age. *Theory & Research in Social Education* 44(4), 565–607.
- Cullen, R, 2001. Addressing the digital divide. *Online Information Review* 25(5), 311–20. doi:10.1108/14684520110410517
- Dencik, L & Cable, J, 2017. The advent of surveillance realism: public opinion and activist responses to the snowden leaks. *International Journal of Communication* 11, 763–81.
- Economist, 2007. Mobile banking: a bank in every pocket. Retrieved from Economist: www.economist.com/opinion/displaystory.cfm?story_id=10133998.
- Fanta, AB, Mutsonziwa, K, Goosen, R, Emanuel, M & Kettles, N, 2016. The role of mobile money in financial inclusion in the SADC region. FinMark trust policy research paper No. 03/2016.
- Feeney, P, 1998. *Accountable Aid: local participation in major projects*. Oxfam, Oxford.
- Festenstein, M, 1997. The ties of communication: Dewey on ideal and political democracy. *History of Political Thought* 18(1), 104–124.
- Gainous, J, Marlowe, AD & Wagner, KM, 2013. Traditional cleavages or a New world: does online social networking bridge the political participation divide? *International Journal of Politics, Culture, and Society* 26, 145–58. doi:10.1007/s10767-013-9130-2
- Gil de Zúñiga, H, Molyneaux, L & Zheng, P, 2014. Social media, political expression, and political participation: panel analysis of lagged and concurrent relationships. *Journal of Communication* 64, 612–34. doi:10.1111/jcom.12103
- Goldberg, AC, 2014. The impact of religion on voting behaviour – A multilevel approach for Switzerland. *Swiss Political Science Review* 20(2), 305–29. doi:10.1111/spsr.12068
- GSMA, 2018. *The mobile economy: Sub-saharan Africa*. GSM Association, London. <https://www.gsma.com/mobileeconomy/sub-saharan-africa/> Accessed 9 October 2018
- GSMA, 2020. *The mobile economy 2020*. GSM Association, London. https://www.gsma.com/mobileeconomy/wp-content/uploads/2020/03/GSMA_MobileEconomy2020_Global.pdf Accessed 13 February 2021
- GSMA Intelligence, 2015. *The mobile economy: Sub-saharan Africa 2015*. GSM Association, London.
- Hargittai, E, 2002. The second-level divide: differences in people's online skills. *First Monday* 7(4), 1–14. <http://firstmonday.org/article/view/942/864>. Accessed 17 May 2016.
- Hargittai, E & Shaw, A, 2013. Digitally savvy citizenship: The role of internet skills and engagement in young adults' political participation around the 2008 presidential election. *Journal of Broadcast & Electronic Media* 57, 115–34. doi:10.1080/08838151.2013.787079
- Hoffmann, CP & Lutz, C, 2019. Digital divides in political participation: The mediating role of social media self-efficacy and privacy concerns. *Policy & Internet* 13(1), 6–29. doi:10.1002/poi3.225
- Hong, YA, Zhou, Z, Fang, Y & Shi, L, 2017. The digital divide and health disparities in China: evidence from a national survey and policy implications. *Journal of Medical Internet Research* 19(9), 1–13. doi:10.2196/jmir.7786

- Hübler, M & Hartje, R, 2016. Are smart phones smart for economic development? *Economics Letters* 141, 130–3.
- ITU, 2010. ICT facts and figures: The world in 2010. International Telecommunication Union, Geneva.
- ITU, 2020. Measuring digital development: facts and figures 2020. International Telecommunication Union, Geneva.
- Jørring, L, António, V & Pablo, P-C, 2019. Mapping a changing field. A literature review on digital citizenship. *Digital Culture and Society* 4(2), 11–37.
- Kalebe-Nyamongo, C & Marquette, H, 2014. Elites and coalitions elite attitudes towards cash transfers and the poor in Malawi, Development leadership programme research paper 30, Birmingham: University of Birmingham.
- Kanyam, DA, Kostandini, G & Ferreira, S, 2017. The mobile phone revolution: have mobile phones and the internet reduced corruption in Sub-saharan Africa? *World Development* 99, 271–84. doi:10.1016/j.worlddev.2017.05.022
- Keegan Eamon, M, 2004. Digital divide in computer access and use between poor and non-poor youth. *J. Soc. & Soc. Welfare* 31, 1–23.
- Kenny, R, Park, C, Van Neste- Kenny, J, Burton, P, Park, C & Qayyum, A, 2012. Using self- efficacy to assess the readiness of nursing educators and students for mobile learning. *International Review of Research in Open and Distance Learning* 13(3), 277–96.
- Kim, H & Joshanloo, M, 2020. Internet access and voicing opinions: The moderating roles of Age and the national economy. *Social Indicators Research* 150, 121–41.
- Kumar, R, 2014. *Research methodology: A step-by-step guide for beginners*. 4th edn. SAGE, London.
- Lee, J, 2010. 10 year retrospect on stage models of e-government: A qualitative meta synthesis. *Government Information Quarterly* 27, 220–30.
- Majeed, MT, 2020. Do digital governments foster economic growth in the developing world? An empirical analysis. *NETNOMICS: Economic Research and Electronic Networking* 21, 1–16. doi:10.1007/s11066-020-09138-4
- Manzuoli, CH, Sánchez, AV & Bedoya, ED, 2019. Digital citizenship: A theoretical review of the concept and trends. *The Turkish Online Journal of Educational Technology* 18(2), 10–8.
- Min, S-J, 2010. From the digital divide to the democratic divide: internet skills, political interest, and the second-level digital divide in political internet use. *Journal of Information, Technology, and Politics* 7, 22–35. doi:10.1080/19331680903109402
- Mossberger, K, 2008. Toward digital citizenship. addressing inequality in the information age. In A Chadwick & PN Howard (Eds.), *Routledge handbook of internet politics* (pp. 173–85). Routledge, Hoboken.
- Mossberger, K & Mcneal, RS, 2007. *Digital citizenship: The internet, society, and participation*. MIT Press.
- Norris, P, 2001. *The digital divide: civic engagement, information poverty, and the internet world-wide*. Cambridge University Press, Cambridge, UK.
- OECD, 2001. *Understanding the digital divide*. OECD, Paris. <https://www.oecd.org/sti/1888451.pdf>
- Perloff, RM, 2013. *The dynamics of political communication: media and politics in a digital age*. Routledge, London.
- Pors, AS, 2015. Becoming digital - passages to service in the digitized bureaucracy. *Journal of Organizational Ethnography* 4(2), 177–92.
- Rashid, AT, 2016. Digital inclusion and social inequality: gender differences in ICT access and Use in five developing countries. *Gender, Technology and Development* 20(3), 306–32. doi:10.1177/0971852416660651
- Resnick, D & Casale, D, 2011. The political participation of Africa's youth: Turnout, partisanship, and protest. UNU-WIDER working paper No. 2011/56.
- Ruiz-Rodriguez, F, Lucendo-Monedero, AL & González-Relaño, R, 2018. Measurement and characterisation of the digital divide of spanish regions at enterprise level. A comparative analysis with the European context. *Telecommunications Policy* 42(3), 187–211. doi:10.1016/j.telpol.2017.11.007

- Schlozman, K, Verba, S & Brady, H, **2010**. Weapon of the strong? participatory inequality and the internet. *Perspectives on Politics* 8(2), 487–509.
- Shulman, SW, Shelley, MC & Thrane, L, **2004**. Digital citizenship: parameters of the digital divide. *Social Science Computer Review* 22(2), 256–69.
- Smith, RM, **1997**. *Civic ideals: conflicting visions of citizenship in U.S history*. Yale University, New Haven.
- Statacorp, **2020**. *Stata*. <https://www.stata.com/>.
- UNDP, **2012**. *Enhancing youth political participation throughout the electoral cycle*. UNDP, New York.
- UNDP & UNDESA, **n.d**. *Youth, political participation and decision making*. UNDP & UNDESA, New York. <https://www.un.org/esa/socdev/documents/youth/fact-sheets/youth-political-participation.pdf>
- van Deursen, AJAM & van Dijk, JAGM, **2019**. The first-level digital divide shifts from inequalities in physical access to inequalities in material access. *New Media and Society* 21(2)v 354–75.
- van Dijk, JAGM, **2005**. *The deepening divide*. SAGE, Thousand Oaks, CA.
- Vecchione, M & Caprara, GV, **2009**. Personality determinants of political participation: The contribution of traits and self-efficacy beliefs. *Personality and Individual Differences* 46(4), 487–92. doi:10.1016/j.paid.2008.11.021
- Verba, S, **1967**. The annals of the American academy of political and social science. *Social Goals and Indicators for American Society* 373(1), 53–78.
- Verba, S, Nie, N & Kim, J-O, **1978**. *Participation and political equality: A seven-national comparison*. Cambridge University Press, Cambridge.
- Wilson, EJ, **2004**. *The information revolution and developing countries*. MIT Press, Cambridge, MA.
- Winkler, JD, Judd, CM & Kelman, HC, **1981**. Determinants of political participation in a Canadian and a United States city. *Political Psychology* 3(3/4), 140–61. doi:10.2307/3791144
- Wolfsfeld, G, Segev, E & Sheaffer, T, **2013**. Social media and the arab spring: politics comes first. *The International Journal of Press/Politics* 18(2), 115–37.
- Yamamoto, M, Kushin, M & Dalisay, F, **2017**. Social media and political disengagement among young adults: A moderated mediation model of cynicism, efficacy, and social media Use on apathy. *Mass Communication & Society* 20, 149–68. doi:10.1080/15205436.2016.1224352
- Zaheer, L, **2016**. Use of social media and political participation among university students. *Pakistan Vision* 17(1), 278–299.