

Information and Communication Technology in Rural Healthcare and Social Welfare Service Provision in Ghana - Prospects in the Face of Social Inequalities

Paul Kwaku Larbi Anderson, Johannes Schädler, Lars Wissenbach

Center for Planning and Development of Social Services (ZPE) University of Siegen, Germany

Abstract: In recent times, Information and Communication Technologies (ICTs) are being adopted more widely and variously by local governments across the globe to enhance citizens' participation in the socio-political decision-making process. Potentially, ICTs, if properly designed and implemented, can improve civic participation in the context of information dissemination, request and feedback, and direct engagement in local policy debates in various areas of public service delivery. This paper presents the findings of a study that examined the prospects of enhancing citizens' participation in local governance and development through ICTs in rural Ghanaian communities. The main objective was to explore the potential of ICTs to facilitate communication relating to social welfare and health-related services between rural dispersed communities and local government structures. The study was conducted in two purposefully selected municipalities, one being Nsawam-Adoagyiri, and the other Suhum, both situated in the Eastern Region of Ghana. Through community engagements and participatory design, digital competence, and the use of ICT tools for communication and participation in local governance were explored with the primary focus on public service delivery relating to health and social care.

Keywords: participation, inequalities, ICT, local governance.

I. INTRODUCTION

The global outbreak of the Covid-19 pandemic and ensuing restrictions on physical interactions have shown the relevance of Information and Communication Technologies (ICTs) in the provision of health and social services in local communities and municipalities in general. The situation emphasizes the need to heighten digital transformation in local governance and development toward equal access to public goods and services. Across the globe, the use of mobile phones as a communication tool, in particular, is increasingly bringing service delivery such as market information, financial, and health services to the remotest [1]. Evidence suggests that the increased use of ICTs is not progressing at the same pace across local government sectors. While some sectors, such as business development, appear to be more ICT-affine, digitalization is progressing comparatively slowly in other sectors, such as social welfare [1], [2].

In sub-Saharan Africa, ICTs are developing significantly in diverse fields of endeavor over the past few decades [1]. The phenomena have brought to the fore, the important role that ICTs can play in facilitating political and socio-economic development in countries of the Global South. It is undeniable

that in the past decades, ICTs have become central to everyone's day-to-day activities, even in rural and remote areas. Accordingly, a nation's capacity to accelerate and transform its socioeconomic development also depends on the extent of the exploitation of ICT opportunities in local governance and development. Digital innovations have already shaped and improved the communication routines and everyday processes of people in Ghana like in most African societies in many areas (e.g., mobile money, messenger services). The diffusion of digital innovations, especially the use of mobile and smartphones, is proceeding at high speed. However, research on ICT use and the impact of digitalization on local governance and public service delivery in the sub-Saharan and especially the Ghanaian context is still scarce [20].

Indeed, ICTs can unfold great potential by facilitating innovative approaches for local governance in enhancing effective participation in decision-making and policy implementation to address development challenges [1]–[3]. The discourse on ICT in development was accelerated by the diffusion of new digital technologies around the millennium which greatly increased the possibilities for global information sharing and accelerated development [4]. As a result, Information and Communication Technologies for Development, 'ICT4D', emerged as a major field for science, policy, and practice within and beyond the already broad and contested field of communication, development, and social change, also in Ghana (ibid.). This evolution had direct implications for Ghanaian development approaches, including for local development planning right from the start. The government was proposing the use of ICTs to enhance participation in local development planning and implementation and promoting ICTs in public service delivery in areas such as health, social welfare, education, agriculture, and the agro-business industry [7,9]. Like many countries, Ghana had high hopes for this 'new field' as reflected by corresponding policies at all government levels. Those, however, were criticized "for repeating the same mistakes of earlier decades, i.e. by presuming, simplistically that inserting technologies will enable developing societies and individuals therein to 'leapfrog' to modernity" and to catch up to advancements in the North [4]. Despite various policy initiatives since the early 2000s, access to digital infrastructure distribution as well as digital literacy remains inadequate and unevenly distributed in Ghana with several gaps [3,6,11].

While mobile and internet access and use are constantly increasing strongly around the globe, those lacking access and/or user skills are often disproportionately poorer, less educated, rural, or are female, elderly people, or people with disabilities [4], [6]–[10].

From a local governance perspective, ICTs might serve as an innovative approach to public service delivery to marginalized populations or people in remote villages. Especially internet-based communication can provide greater access to health and social care-related information and offer wider communication channels to participate in the decision-making and implementation processes on local public goods and services in the fields of healthcare and social welfare. At the same time, ICT gaps affect both individuals and entire communities that may be denied access to opportunities or services and thus impact people's ability to participate in society on an equal basis with others. Therefore, the study sought to explore the potential of ICTs in the context of local social welfare and health-related service communication between dispersed rural communities and local government structures. Based on the premise that digital solutions alone will not unfold the potential to eradicate other pre-existing divides, inequalities, and exclusions, a deeper insight into inequalities in access and use was of particular interest.

II. METHODOLOGY

This research adopted a case study design with a mixed methodological approach in a community-based participatory framework. Purposive sampling was used to select a total of 1109 respondents from 27 communities within the municipalities of Nsawam-Adoagyiri and Suhum in the Eastern Region of Ghana. The respondents were selected from local government officials (47), community-based Civil Society Organizations (6), heads of household (220), and community members (836). Data was collected through questionnaires with both quantitative and qualitative elements. Findings were backed and validated through stakeholder consultation meetings and validation workshops that were recorded and transcribed. The data were analyzed using descriptive statistics and qualitative content analysis. Data were disaggregated by gender, age, location, level of formal education, and disability. The Washington Group Short Set on Functioning (WG-SS) was used to identify respondents with so-called disabilities.

III. ICT, E-GOVERNANCE, AND CIVIC PARTICIPATION - THE GHANAIAN POLICY FRAMEWORK

This paper refers to ICT as all possibilities of analog and digital technology-based information and communication support such as computers, tablets, phones, television, radio, etc. While digital technologies are increasingly being assumed, it is frequently underestimated that analog forms of information and communication are still relevant, and in many parts of the world even more relevant. In Ghana, for example, community radios are still very important, especially in rural dispersed settlements. Global policy frameworks such as the Agenda 2030 for Sustainable Development [11] and UN-HABITAT III New Urban Agenda (NUA) [12] call for attention to the use of

ICTs for civic empowerment and emphasize the role of local governments in enhancing civic participation, social inclusion, and public well-being through “citizen-centered digital governance tools” to make information and communications technologies accessible to the public. Correspondingly, prospects of the African Union's Digital Transformation Strategy [13] are explicit on “digital transformation for all” that is affordable, accessible, creates equal access to opportunities, and mitigates risks of exclusion. The strategy addresses “every African, every African business, and every African government” to be digitally enabled by 2030. Accordingly, it focuses on the digital, social, and financial inclusion of the citizenry, especially, marginalized populations, and corresponding transformation processes at the local level.

Several African countries have declared enhancement in ICT in all sectors of the economy and governance as a development priority. In Ghana, corresponding objectives can be found in current development strategies such as the Ghana Digital Road Map [14]–[16], the Ghana Beyond Aid Strategy [17], the Long-term National Development Plan of Ghana (2018-2057) [18], and the Ghana Coordinated Program of Economic and Social Development Policies (2017-2024) [19]. The framework of these policies is built on the premise of developing the country through the deployment and exploitation of ICT within the economy and society. The policies aim among other things to expand digital services to facilitate communication, participation, service delivery, and information sharing, and primarily, to assist in bridging development gaps between rural and urban communities. [20]. To demonstrate Ghana's commitment to the digitalization process, the government has set core elements of strategic objectives for the development of digital infrastructure and expansion of digitalized platforms, such as communication between citizens and local administrations, as well as a systematic opening out of digital literacy and skills of the entire population. For instance, within the framework of the current “Ghana Beyond Aid Policy”, the government is pursuing the goal of developing Ghana into a leading country for ICT innovations in sub-Saharan Africa by 2023. In this context, the Ghana Digital Roadmap [14], [21] also outlines measures to expand the digitalization of public services and, accordingly, an expansion of the “digital skills” of public servants.

ICT in governance is conceptualized within three spheres of technologically mediated interactions. These are government-to-government interactions that are concerned with the use of technologies to enhance the internal efficiency of public bureaucracies, such as the automation of routine tasks and the rapid sharing of information between departments and agencies. There is also the Government-to-business enterprise and Government-to-citizen interactions to provide public service delivery. Ghana has one of the highest E-Government Development Index (EGDI) in Africa according to the United Nations E-Government Survey of 2020 [22]. The World Bank has supported the government through the E-Transform project to harness ICT for the effective use of public funds, and electronic identification systems as well as the development of

applications that improve service delivery in education, health, judicial, and parliamentary services [23], [24]. This is now manifested in transformations such as the Integrated e-immigration system, Paperless Port System, e-procurement, e-Parliament, e-cabinet, e-justice, e-policing, integration of government databases, and Ghana Post GPS. The focus of Ghana's e-government strategy is the use of ICT to facilitate service delivery and to enhance the participation of the people in the decision-making process. This pillar in the Ghana ICT policies focuses on the effective delivery of services to the public through increased productivity, empowering the public by building an e-Government platform that facilitates their relationship and interactions with the Government. It is also to enhance accurate and timely information to better shape policies, strategic plans, and tactical decisions for developing and enhancing the delivery of affordable public services. Local governments, which take on a major part of public goods and services and are in direct contact with the people daily, are therefore of enormous importance in this context. Essentially, ICTs are considered of tremendous potential for rural development in Ghana in the areas of agriculture, health, Micro and Small Enterprises, and education [1], [2]

Also, from the user point of view, a great potential for the use of ICT in public services and citizen participation in local development processes can be assumed. In 2020, majorities of Ghanaian households had radios (83%) and televisions (76%), even in rural areas [1]. The vast majority of Ghanaians (93%) either own or live in a household where someone else owns a mobile phone [1], with a significant urban-rural gap in individual ownership [11]. Recent statistics on Ghana's internet penetration rate stood at 53 % with a doubling of users in the past 5 years [9], [25] Access to mobile phones and mobile internet is likely to increase at a rapid pace in the next years and therewith the potential for e-governance and digital civic participation. A pertinent question will be how local governments manage to create the conditions to tap into this potential. This includes the question of how this can be done in a way that no one is left behind. So far, it turns out that the participation and interaction of the local people in decision-making for developmental processes remain low [1,11]. It appears most unlikely that technology alone will change pre-existing information, communication, and participation inequalities and exclusions. Against this background, the study introduced here asked about the opportunities and boundaries of ICT use in the context of local social welfare and health services.

IV. KEY FINDINGS OF THE STUDY

Knowledge of the Functioning of the Municipal Assembly in Local Governance

Findings from the study indicated that more than half of the people surveyed (56.5%) rate their knowledge of the functioning of the Municipal Assembly as not good. Participants who reported good knowledge (43.5%) were slightly higher among heads of households compared to other community members. The data did not show any correlation

between the distance of communities to the district capital and knowledge of the functioning of the Municipal Assembly. However, there was a clear indication of good knowledge of the Municipal Assembly's mandate among people with higher education. Also, overall, the knowledge of community members about the mandate of the Municipal Assembly increased with age. Furthermore, most of the people surveyed said they were not reached by any form of awareness-raising or advocacy campaigns by the Municipal Assembly. Those who expressed knowledge reported issues relating to health and community development.

Access to Social Welfare and Health-Related Services in the Municipalities

About half of the people surveyed claimed to have only little difficulty accessing social welfare and health-related services in the municipality. Nevertheless, those who expressed some form of difficulty accessing services in the municipality were higher among people 55 years and above as compared to younger individuals. Respective challenges were also higher among respondents with disabilities. Inadequate health facilities followed by unavailability of effective communication channels were reported as the main challenges in accessing social welfare and health-related services in the municipalities Community Health Planning and Services (CHPS) compounds, the primary public health service level in Ghana, was by far reported as the most relevant health facility of first contact in the local communities and can be regarded as a hub for information and communication on health-related services in the municipalities.

Most interestingly, challenges in accessing social welfare and health-related services reported were to a significant extent related to aspects of information and/or communication between the local government structure in charge and the people living in the communities surveyed. Challenges included inadequate information on existing programs and application procedures, lack of contact person details, and long waiting hours. A direct walk-in into the health center or the social welfare department was reported to be by far the most frequent way to assess social welfare or health-related information.

Existing Communication Structures, Digital Competence, and ICT Usage

Community information centers (a unidirectional loudspeaker system operated by the local government across local communities), followed by community gatherings were reported as the primary means of awareness raising in the communities by the Municipal Assembly. Almost all respondents were not aware of the existence of the Municipal Assemblies' web portals (96.4%) or the helplines (93.2%). The findings further suggest that existing ICT-based systems are currently of very little importance in the work of government officials in health and social welfare as there was a clear indication that little importance is attached to ICT-based means such as the use of radio and television, phone call, SMS, social

media, or websites in the context of local health and social welfare-related services.

Most of the people surveyed across all age groups claimed they have not attained any form of formal ICT-related training. Those who reported ICT-related knowledge acquired it from friends or school. Almost all respondents with disabilities had no formal ICT-related training. However, study results suggest sound digital competencies and expressed knowledge of ICT device usage with all local government officials and the majority of overall respondents reporting good basic digital competence. Again, there was a disparity in digital competencies among the various age groups, levels of education, gender, and persons living with disabilities. Moreover, the findings showed that higher education correlates with better digital competence. Young adults in the age cohorts 18-25 and 26-35 reported better digital competencies than adults of middle age 36-45 and older people above 55 years. The main challenges reported in using the specified ICT devices were poor network connectivity, lack of training on device usage, and high cost of devices and airtime charges.

Mobile Phone Ownership, Internet Access, and Usage

Almost all the respondents (96.1%) in the municipalities either owned a cell phone or had access to one. Disaggregation by gender and age shows that more males (94.7%) than females (89.7%) owned a cell phone whereas that of individuals in the age cohort 26-35 (97.0%) surpasses those between 46-55 (90.4%) and above 55 years (78.1%). Also, mobile phone ownership was much lower (68.3%) among persons with disabilities. About half of the people surveyed (47.9%) owned a smartphone and could be reached via internet-based means of communication. More generally, the findings indicated that about 92.1% of community members can be reached via mobile phone (calls / SMS), and only 7.9% of the surveyed population cannot be directly reached through mobile phones.

The most common ICT device reported in the surveyed communities was the basic phone (locally referred to as “yam phone”) or feature phone, followed by the smartphone. Meanwhile, some respondents reported using both smart and feature phones. Only very few respondents reported owning other devices such as laptops, tablets, and desktop computers. WhatsApp followed by Facebook and Mobile money-related services were reported as the most used mobile applications in the surveyed communities followed by social media platforms such as Instagram, YouTube, Twitter, Telegram, and TikTok.

Younger adults had greater access to the internet than older people above 55 years. The data collected further suggests a gender gap as well as a significant disability gap when it comes to internet access. Again, all people with access reported using the internet daily, almost exclusively accessing mobile internet via their phones. The main challenge reported concerning internet access was poor network coverage and costs of devices and airtime.

V. DISCUSSION

Opportunities for expanding ICT usage

Access to local government services 24/7 is the main objective of Ghana’s e-governance policy. ICT plays a profound role in facilitating interaction between local government functionaries and members of the community in all aspects of society. The assumed benefits of ICT in local governance include convenience, cost-effectiveness, easy access to data/information, participation in local democracy, and improvement in information flow for growth and development. Initially, this promised great potential for the use of ICTs to enhance participation in the local government decision-making process. At the same time, respective approaches always run the risk of leaving people behind, reproducing old exclusions, and establishing new ones. It must be kept in mind that technology and the digitalization of information and communication spaces do not automatically eliminate a lack of participation. This is because access barriers are most often not technically, but rather socially and culturally determined. Like many other African countries, Ghana has a comprehensive ICT policy which indicates the government’s commitment to supporting e-governance programs in the country. What is required now is to ensure the effectiveness of the policy implementation and at the same time allow for ongoing critical reflection to achieve the desired results.

The comparatively low knowledge about the functioning of the Municipal Assembly found in this study can be attributed to a low level of participation in the decentralization and local governance processes in Ghana. Notwithstanding, a review of the Medium-Term Development Plans (MTDP) of the Municipal Assemblies surveyed shows avenues for communal fora such as town-hall meetings, durbars, and community needs assessment forums. Primarily, all these forms of engagement with the community members require their physical presence. The local governments have not yet created avenues for digital participation in the decision-making process.

Recent statistics on Ghana’s internet penetration rate stood at 53 % of the population at the start of 2022 with a doubling of users in the past 5 years [25], [28] and a high probability of continued rapid growth. This study’s internet penetration rate of 45 % among the local population might reflect the rather peri-urban and rural settings of the communities surveyed. Indeed, mobile communication has become an integral part of our daily activities by facilitating access to information and helping people to stay connected to friends, family, and co-workers as well as encouraging social interactions. This is supported by data presented from this study showing a vast majority of the respondents own or have access to mobile phones and more than half of mobile phone users surveyed use smartphones already, mostly daily. Statistical evidence from across Ghana shows that the mobile phone (92.7%) is by far the device mostly used to access the internet, both in urban and rural areas[2], [3], [29]. This is in line with the findings of this study with 89.9 % of internet users accessing the internet through mobile phones. Against this backdrop and with the

prospect of mobile phone penetration and internet use continuing at an extremely fast pace, it seems imperative to also focus initiatives to support internet-based communication in the context of health- and social welfare-related communication between local governments and the people.

Risks of deepening social inequalities

Access rates of both mobile phones and the internet, however, pointed to considerable gaps along the dimensions of age, gender, disability, and education. Especially in remote communities, with increasing internet connectivity, older people might potentially have increased opportunities to integrate digital technology into their daily lives to stay connected, participate in civic dialogue, and access services out of reach, particularly in the area of health and social welfare. At the same time, using such digital technologies requires a certain level of digital literacy to be accessed which especially older people frequently have not acquired so far. As populations around the globe are aging, such age-related digital gap and its effects on elderly people with regard to social participation, access to services, and quality of life, in general, is discussed as a global phenomenon [6], [30], [31]. In line with existing evidence from Ghana [11], findings from this study point to age-related gaps in mobile phone ownership and internet access. The former shows a decline from 90% to 78% for the 55+ age group. The latter shows a decline of 10% for the 46-55 age group and 18% for the +55-age group. Further, people 55+ surveyed reported significantly lower digital competencies. Hence, the lack of access and skills of older people to use digital technologies increases the danger of social exclusion of older people in the study region with the increasing digitalization of many sectors and areas of life.

Women across the globe face challenges relating to acquiring digital skills and affording access to ICTs [32]. Women in low- and middle-income countries are 15% less likely to use mobile internet than men, with a situation for Sub-Saharan Africa, where the gender gap remains largely unchanged [7]. According to the 2020 Mobile Gender Gap Report [8], women are still less likely to have access to mobile phones and use mobile services, are more likely to have basic mobile phones that do not support internet use, and are 20% less likely than men to own a smartphone. This is particularly the case for women who are mostly underserved such as those with low literacy levels, incomes, disabilities, or living in a rural area [8], [33]. The findings of this study on a gender gap in access to mobile phones and the internet are in line with other study results from across the globe and Ghana showing that on average, ownership of mobile phones and smartphones in particular, as well as internet access is higher among males relative to females [10], [34], [35]. For the study region, internet access was reported significantly higher with males (52.3%) compared to females (38.3%). Further, women reported significantly lower digital competencies than men, as demonstrated by 71.8% of males and 58.6% of females reporting good digital competence. Discussing barriers to ICT of women in Global South countries, Hafkin & Huyer [36] concluded that “for many women, ICTs remain inaccessible

due to affordability issues associated with poverty, lack of basic technological skills, low levels of literacy and numeracy, geographic isolation, and poor technology infrastructure [...].as well as the cultural expectations, norms and mores that influence the ability of women to own and/or access ICTs in public places”. Antonio & Tuffley [33] argue that when such variables are controlled, women are generally more active users of digital technologies than men. They suggest that access and user skills will allow women to use the potential of ICTs with regard to online social relationships, identity expression, education and training, and economic opportunities. Corresponding examples could be observed during the data collection for the present study, such as women using internet access for learning platforms or young seamstresses in remote villages marketing their products via their WhatsApp statuses.

Even more pertinent were the differences in access and use of ICTs between people with and without disabilities. The UN Convention on the Rights of Persons with Disabilities (CRPD) obliges States Parties to “take appropriate measures [...] to promote access for persons with disabilities to new information and communications technologies and systems, including the Internet; [and] to promote the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost [...]” [37]. In fact, digitalization and the use of ICT is frequently assumed to allow the removal barriers faced by people with disabilities, to be “a positive force of transformation and a crucial element of any personal development/empowerment and institutional framework for inclusive development”, and to allow for “unprecedented levels of access to education, skills training and employment, as well as the opportunity to participate in the economic, cultural and social life of their communities” [38]. A 2013 assessment by the International Telecommunication Union (ITU) estimates a huge potential of mobile devices and services for improving the independent living of people with disabilities and a moderate to the large potential of the internet and mobile devices and services for improvements in the areas of healthcare, education, employment, government services, and participation in public and political life [38]. This positive perspective is contrasted by evidence of a serious gap between people with and without disabilities when it comes to ICT access and digital competence. Around the globe, people with disabilities tend to have much lower levels of mobile phone and smartphone ownership and are less aware of mobile internet or perceive it as less beneficial compared with non-disabled persons [7], [39]. Existing evidence reports literacy and digital skills to be primary barriers to ownership of mobile phones by people with disabilities followed by affordability and the perceived relevance of mobile phones which, again, are also barriers to mobile internet use [7]. Against this background, the question arises as to the actual potential in the context of the living realities of people with disabilities.

The findings of the present study support a rather critical assessment, as access and usage remain relatively low

compared to the overall study population. While 92.1% of all respondents reported owning a mobile phone, the proportion among respondents with disabilities was only 65.9%. 34.1 % of respondents with disabilities did not own a mobile phone whereas 25.6 % of respondents with disabilities compared to 3.2 % of the overall study population had no access to mobile phones at all. And while 45% of all respondents said they had access to the internet, the figure for respondents with disabilities was only 8.5 %. Thus, the findings of this study point to a significant disability digital gap for the two study regions which would have to be examined more closely. This is in line with recent findings from a study on the 'Mobile Disability Gap in Ghana' conducted by GSMA in the Ashanti, Eastern, Greater Accra, and Northern Region [9], according to which people with disabilities are 34% less likely to own a mobile phone than people without disabilities and 72 % less likely to own a smartphone. Further, people with disabilities were 42% less likely to know about the internet compared to people without disabilities and 74% less likely to use mobile internet [9]. As the main barriers to using mobile internet more often, mobile internet users with disabilities reported the cost of data and internet-enabled devices. The same study, however, also found that once people with disabilities start using mobile internet, usage of mobile apps and services is like that of people without disabilities which points to the need of removing access and skills-related barriers. Satari [9] discusses mobile internet use as a journey from accessing a mobile to learning how to use, awareness of the Internet to adopting digital services and using the mobile internet regularly. This is not always a linear process as many people with disabilities face barriers to regular mobile internet use at different stages of this journey. She concludes that disability gaps frequently widen as users progress through these stages, both in Ghana and other middle- and low-income countries.

Data collected within the framework of this study further suggests digital gaps with regard to educational background and occupation which interact in myriad ways with other dimensions of inequality. The discussion of findings on digital inequalities points to the complexity of intersections between access and skills to use ICTs and other social categorizations such as age, gender, disability, or education, which in turn form only some of many dimensions that interact and are relevant for life chances in increasingly digitalized societies. Digital gaps can be assumed to be caused by and reinforcing traditional systems of inequality such as socioeconomic status, gender, ethnicity, or disability causing disadvantages in accessing social interaction, governmental information, general educational opportunities, and access to some services such as healthcare and financial services, to name just a few [40]. The discussion of digital gaps addresses the concern that social inequalities will intensify in the course of the different uses of new media. From a power relations perspective, it can be stated that "due to its role as a means of information gathering and sharing, use of ICT corresponds to having increased power and control within society. The digital divide draws attention to how disempowered groups with limited economic resources have reduced access to ICTs" [41] which reinforces

disempowerment even further. It can be assumed that the global COVID-19 pandemic has exacerbated pre-existing inequalities and deepened intersecting vulnerabilities.

VI. CONCLUSION

The paper presents and discusses the findings of a study on local governance and ICT usage in the fields of health and social welfare in rural areas in Ghana. Based on a case study approach, the study sought to find out about the potential of ICTs to disseminate information and facilitate communication relating to social welfare and health-related services more broadly between dispersed rural communities and local government structures. In conclusion, the findings of this study indicate opportunities for using ICTs by the local governments to promote social welfare and health-related communication in the study districts. This conclusion is drawn based on (1) a relatively high usage of and competence on ICTs (especially mobile phones) among citizens (daily use), with a tendency to further increase rapidly; (2) very high usage and competence among government officials surveyed; and (3) the finding that several social-welfare and health administration challenges reported by respondents had an information and communication dimension. Against this background, the authors assume a high potential for using ICTs for local social welfare and health administration in rural communities in Ghana which, however, would have to be tapped systematically. This includes sound responsiveness to existing digital inequalities as outlined above concerning existing gaps in access and usage of ICT related to location (community), gender, age, disability, education, and others. These have to be considered carefully when developing approaches and policies toward the digitalization of health and social welfare-related communication between local public bodies and the people living in remote rural communities. The results of this study confirm existing assumptions and evidence on digital inequalities for the study regions and thus provide a basis for being responsive to them in the conceptualization of ICT-based applications in health and social welfare-related communication between local government entities and the people. However, the data does not yet allow a deeper insight into the question, of how existing inequalities in access and use reinforce other inequalities such as opportunities for economic mobility and social participation which would require further, and also qualitative research based on a more thorough understanding of digital inequalities considering how ICT's impact on existing social inequalities and how these unfold in the practical realities of people in daily community life. More generally, it can also be concluded that the use of ICT in the field of local health and social welfare-related communication may only be successful if it directly links to the communication routines of the people and reflects and respects the diversity of such routines.

REFERENCES

- [1] T. M. Waema and O. E. Adera, *Local Governance, and ICTs in Africa: Case Studies and Guidelines for Implementation and Evaluation*. Cape Town, South Africa: Pambazuka Press. Cape Town, 2011. [Online]. Available:

- <https://www.idrc.ca/sites/default/files/openebooks/518-2/index.html>
- [2] G. Frempong, "Evidence for ICT Policy Action Understanding what is happening in ICT in Ghana Evidence for ICT Policy Action," 2012. [Online]. Available: <http://a4ai.org/wp-content/uploads/2014/03/Policy-Paper-4-Understanding-what-is-happening-in-ICT-in-Ghana.pdf>
- [3] R. of Ghana, "The Ghana ICT for Accelerated Development Policy (ICT4AD)." 2003. [Online]. Available: <https://moc.gov.gh/sites/default/files/downloads/Ghana-ICTAD-Policy-Master-final-2.pdf>
- [4] H. Steeves and J. Kwami, "ICT4D, Gender Divides, and Development: The Case of Ghana. In S. Melkote (Ed.) Development Communication in Directed Social Change: A Reappraisal of Theory & Practice. Singapore: AMIC.," 2012, pp. 199–217.
- [5] Ghana Statistical Service., "2021 PHC General Report Vol 3D_Literacy and Education.pdf." 2021. [Online]. Available: https://statsghana.gov.gh/gssmain/fileUpload/pressrelease/2021%20PHC%20General%20Report%20Vol%203D_Literacy%20and%20Education.pdf
- [6] A. Antonio and D. Tuffley, "Bridging the Age-based Digital Divide," International Journal of Digital Literacy and Digital Competence (IJDLDC), vol. 6, no. 3, pp. 1–15, 2015, doi: 10.4018/IJDLDC.2015070101.
- [7] C. Aranda-Jan, "GSMA – The Mobile Disability Gap Report 2020," p. 33, 2020.
- [8] GSMA, "GSMA-The-Mobile-Gender-Gap-Report-2020.pdf," 2020. <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/05/GSMA-The-Mobile-Gender-Gap-Report-2020.pdf> (accessed Nov. 10, 2022).
- [9] A. Satari, "Closing-the-mobile-disability-gap-in-Ghana. Insights and Recommendations," 2022. Accessed: Sep. 02, 2022. [Online]. Available: <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2022/04/Closing-the-mobile-disability-gap-in-Ghana.pdf>
- [10] H. L. Steeves and J. D. Kwami, "Social Context in Development Communication: Reflecting on Gender and Information and Communication Technologies for Development in Ghana," SAGE Publications India, Dec. 2019. Accessed: Sep. 02, 2022. [Online]. Available: https://journals.sagepub.com/doi/pdf/10.1177/1326365X19856139?casa_token=hJ4sCMakgN8AAAAA:ur_iEb6GRcgKxxB37bMEu_i5WUrbBTVLNFegrrPgxWsd-ZBKE-Cx3YevSfk1a_XGQnBthm4PiXKqcQ
<https://doi.org/10.1177/1326365X19856139>
- [11] United Nations, "Transforming our world: the 2030 Agenda for Sustainable Development Transforming our world: the 2030 Agenda for Sustainable Development Preamble," 2015, [Online]. Available: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf
- [12] United Nations, "New Urban Agenda Quito Declaration on Sustainable Cities and Human Settlements for All," 2016, [Online]. Available: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_71_256.pdf
- [13] AU/EU, The Digital Transformation Strategy for Africa 2020-2030 | Futurium. 2020. Accessed: Jan. 02, 2021. [Online]. Available: <https://futurium.ec.europa.eu/en/Digital4Development/library/digital-transformation-strategy-africa-2020-2030>
- [14] GPSD, "Ghana National Data Roadmap Process," 2017. [Online]. Available: <http://www.statsghana.gov.gh/docfiles/SDGs/Data%20Roadmap%20Forum-Concept%20Note.pdf>
- [15] "Data Roadmap Forum- Concept Note.pdf." 2017. Accessed: Nov. 11, 2022. [Online]. Available: <https://webdeploy.statsghana.gov.gh/docfiles/SDGs/Data%20Roadmap%20Forum-%20Concept%20Note.pdf>
- [16] "CS2-Ghana National Data Roadmap Process_Final2.pdf." https://www.data4sdgs.org/sites/default/files/services_files/CS2-Ghana%20National%20Data%20Roadmap%20Process_Final2.pdf (accessed Nov. 11, 2022).
- [17] GhanaWeb, "Akufo-Addo outlines policies for 'Ghana beyond aid.'" 2018. Accessed: Jun. 04, 2022. [Online]. Available: <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Akuf-o-Addo-outlines-policies-for-Ghana-beyond-aid-632060>
- [18] National Development Planning Commission (NDPC), "Long-term_National_Development_Plan_2018-2057.pdf." 2017. Accessed: Nov. 11, 2022. [Online]. Available: https://ndpc.gov.gh/media/Long-term_National_Development_Plan_2018-2057.pdf
- [19] G. National Development Planning Commission (NDPC), "The coordinated program of economic and social development policies (2017-2024)," p. 151, 2017, [Online]. Available: [https://s3-us-west-2.amazonaws.com/new-ndpc-static1/CACHES/PUBLICATIONS/2018/04/11/Coordinate+Programme-Final+\(November+11,+2017\)+cover.pdf](https://s3-us-west-2.amazonaws.com/new-ndpc-static1/CACHES/PUBLICATIONS/2018/04/11/Coordinate+Programme-Final+(November+11,+2017)+cover.pdf)
- [20] G. LGS, Annual Progress Report, Republic of Ghana, 2019. 2019. Accessed: Feb. 07, 2021. [Online]. Available: <http://lgs.gov.gh/index.php/annual-report/>
- [21] World Bank Group, "Digital Economy for Ghana," World Bank, Washington, DC, 2019. [Online]. Available: <http://pubdocs.worldbank.org/en/412821598381054828/Ghana-DE4A-LOW-Res.pdf>
- [22] United Nations, E-Government Survey 2020 - Digital Government in the Decade of Action for Sustainable Development: With addendum on COVID-19 Response, vol. 1, no. 1. 2020.
- [23] The World Bank, "Ghana - e-Transform Ghana Project: Additional Financing," 2020.
- [24] Ministry of Communications, "E-Transform Project," 2021. <https://www.moc.gov.gh/e-transform-project>
- [25] K. Simon, "Kemp, S. (2022). Digital 2022. Ghana,," 2022, [Online]. Available: <https://datareportal.com/reports/digital-2022-ghana>
- [26] Afrobarometer, "Ghana' s e-learning program during pandemic presents access challenges for many students," 2020.
- [27] PIWA and UNDP, "E-governance and Citizen Participation in West Africa : Challenges and Opportunities. Case studies: Burkina Faso, Cape Verde, Côte d'Ivoire, Ghana, Nigeria, Senegal," The Panos Institute West Africa & The United Nations Development Programme, New York, 2011. [Online]. Available: www.undp.org/governance
https://www.undp.org/content/undp/en/home/librarypage/democratic-governance/access_to_informationand-e-governance/e-govinWA.html
- [28] D. D. Sosu, "Ghana: number of internet users 2017-2022," Statista. <https://www.statista.com/statistics/1171416/number-of-internet-users-ghana/> (accessed Oct. 22, 2022).
- [29] National Communications Authority and Ghana Statistical Service, "Household survey on ICT in Ghana (abridged). A nationwide survey on ICT access, usage, skills and digital divide in Ghana," 2020.
- [30] S. Doerr, J. Frost, L. Gambacorta, and H. Qiu, "Population aging and the digital divide," no. 270, p. 8, 2022, [Online]. Available: https://www.suerf.org/docx/f_4125b4e94852e1a68b609205afc1f5f7_40251_suerf.pdf
- [31] B. Niehaves and R. Plattfaut, "Internet adoption by the elderly: Employing IS technology acceptance theories for understanding the age-related digital divide," European Journal of Information Systems, vol. 23, pp. 708–726, Aug. 2013, doi: 10.1057/ejis.2013.19.
- [32] A. Tyers-Chowdhury and G. Binder, "What we know about the gender digital divide for girls:" [Online]. Available: <https://www.unicef.org/eap/media/8311/file/What%20we%20know%20about%20the%20gender%20digital%20divide%20for%20girls:%20A%20literature%20review.pdf>
- [33] A. Antonio and D. Tuffley, "The Gender Digital Divide in Developing Countries," Future Internet, vol. 6, no. 4, pp. 673–687, Oct. 2014, doi: 10.3390/fi6040673.
- [34] C. Chair, I. Brudivg, and C. Cameron, "Women's-Rights-Online-Report-1.pdf," World Wide Web Foundation, 2020. Accessed: Sep. 02, 2022. [Online]. Available: <https://webfoundation.org/docs/2020/10/Womens-Rights-Online-Report-1.pdf>

- [35] NCA and GSS, "Household survey on ICT in Ghana (abridged). A Nationwide survey on ICT access, usage, skills, and digital divide in Ghana - National Communications Authority and Ghana Statistical Service (GSS)," 2020. [Online]. Available: [https://statsghana.gov.gh/gssmain/fileUpload/pressrelease/Household Survey on ICT in Ghana \(Abridged\) new \(1\).pdf](https://statsghana.gov.gh/gssmain/fileUpload/pressrelease/Household Survey on ICT in Ghana (Abridged) new (1).pdf)
- [36] N. Hafkin and S. Huyer, *Cinderella or Cyberella? Empowering Women in the Knowledge Society*. Kumarian Press, Incorporated, 2006.
- [37] United Nations, "UN Department of Economic and Social Affairs Division for Public Administration and Development Management UN Global E-government Readiness Report 2005 From E-government to E-inclusion," 2006, [Online]. Available: <https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2005-Survey/Complete-survey.pdf>
- [38] ITU, "The ICT Opportunity for a Disability_Inclusive Development Framework.pdf," 2013. https://www.itu.int/en/action/accessibility/Documents/The%20ICT%20Opportunity%20for%20a%20Disability_Inclusive%20Development%20Framework.pdf (accessed Nov. 10, 2022).
- [39] M. Pinet, "Advancing youth-centered digital ecosystems in Africa in a post-Covid-19 world," ODI: Think change, Feb. 25, 2021. <https://odi.org/en/publications/advancing-youth-centred-digital-ecosystems-in-africa-in-a-post-covid-19-world/> (accessed Nov. 10, 2022).
- [40] C. M. Kularski, "The Digital Divide as a Continuation of Traditional Systems of Inequality," p. 23, 2012.
- [41] D. Chadwick, C. Wesson, and C. Fullwood, "Internet Access by People with Intellectual Disabilities: Inequalities and Opportunities," *Future Internet*, vol. 5, pp. 376–397, Jul. 2013, doi: 10.3390/fi5030376.