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Exploring the Adoption of Multipurpose Community Telecentre in Sub-Saharan Africa

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Abstract. In several countries of Sub-Saharan Africa, the hope rests heavily on Information and Communication Technologies for the economic, social, political and cultural development of marginalized people and communities. Therefore, Telecentres have been carefully presented to disadvantaged communities as a hub to facilitate the economic and social empowerment of rural communities. To fill the research gap observed in the literature, this study aims to explore the key determinants associated to the adoption of Telecentres in several rural municipalities in Cameroon. It intends to contextualize the UTAUT model, branching out constructs which are specific to the study environment. This qualitative study, adopting a mixed research methodology, presents the findings of an analysis of the need for digital services in several rural areas. In addition, the study fills the identified gaps observed in the emerging literature on the digital divide in rural Africa.

Keywords: Telecentre, Rural Empowerment, Africa, Digital Divide

1 Introduction

The Multipurpose Community telecentres project has been adopted by several countries in search of development to break the digital divide and thus dematerialize access to public services for citizens and communities living in landlocked areas [1]. The deployment of ICT infrastructures and services is aligned with the aim of promoting the multi-sectoral development of localities that have been slow to reach the digital world. Although having dedicated enormous financial resources to the deployment, acceptance and use of ICT tools, their effective use remains a big challenge in most of the countries in Sub-Saharan Africa where a large mass of people and communities reside in rural areas with limited access to technology, and a low level of digital literacy [2].

In Africa, the information society has for several years been encountering fundamental ethical problems which are undergoing rapid and exponential changes in the light of the globalization of different activities and fields [3,4]. The use of the internet and digital tools have become substantial when we look at the place that digital occupies in modern life and society, which happens to be an important vector for the development of several sectors [5]. In addition, the exponential growth of digital tools and the

digital mutations generated in daily life of humans have given rise to another level of difficulties which integrate digital inequality and social exclusion [6].

Although digital inequalities persist in sub-Saharan Africa, the gap in the appropriation of digital technologies remains large between cities and villages to date the prospects are promising for the digital economy [7]. According to United Nations, the number of people in Africa is expected to double by 2050, from more than a billion to over 2.5 billion [8]. The following **Figure 1** shows the disparities existing in the use of mobile internet in low-and-middle-income countries.

Rural gap in mobile internet use in low- and middle-income countries
Base: Total population

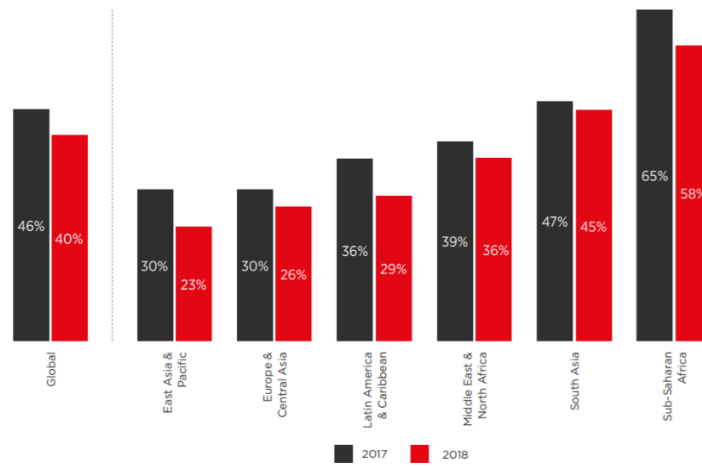


Figure 1. Rural gap in mobile internet use in low- and middle-income countries [9]

This study aims to increase the existing literature on MCTs in Africa by proposing a model that extends the Unified Theory of Acceptance and Use of Technology, contextualized to the acceptance and Use of Telecentres in a specific environment characterized by poverty, lack of technological infrastructure and the internet. The use of the UTAUT model in this context is justified because it incorporates demographic factors and experience in the generic model. Coupled with the emerging literature on Telecentres around the world and on socioeconomic and cultural specificities in Africa, we will examine the following research question: *what are the key determinants of the use and adoption of Multipurpose Community Telecentres for value creation and socio-economic development in rural areas?*

2 Conceptual Framework

This section is dedicated to the theoretical description of models and theories used to address our research objectives and thus formulate our hypotheses. We propose an extension of the Unified Theory of Acceptance and Use of Technology by branching out constructs which are specific to the context and the study environment (**Figure 2**). [10] set out key constructs which constitute and contribute to the formation of UTAUT:

Performance Expectancy, effort Expectancy, Social Influence and Facilitating Conditions. The Unified Theory of Acceptance and Use of Technologies as modeled by Venkatesh, is one of the key theories when it comes to investigating the adoption of a Technology in different contexts of study [11]. To arrive at this theory, the UTAUT model went through a rigorous review and underwent significant experimental validation of eight important adoption theories [11]. The Unified Theory of Acceptance and Use of Technology (UTAUT) is used in this study because it already incorporates the demographic variables (gender, age, experience), which is not the case with the original Technology Acceptance model (TAM). In fact, most of Technology adoption model like the TAM lack a variety of constructs that can influence the study context, hence the restructuring of the study in order to be able to fit into several study contexts and thus correspond to the objectives sought [12].

2.1 Core constructs

Performance Expectancy: “the degree an individual user believes that using the telecentre will assist in enhancing his/her performance” [11].

H1: Performance Expectancy has a positive influence on Behavioral Intention to Use Telecentre (BIU).

Effort Expectancy: refers to the level of facility in using telecentre services [11].

H2: Effort Expectancy has a positive influence on Behavioral Intention to Use Telecentre BIU.

Social Influence: refers to the measurement perceived by a user of the importance in the use of the telecentre by another user [11].

H3: Social Influence has a positive influence on BIU.

Management Effectiveness: It includes the specifications related to resolution of organizational problems and actions concerning staff management within the Telecentre [13].

H4: Management Effectiveness has positive influence on BIU.

Programme Effectiveness: refers to specific programs and activities that the telecentre will provide as it is set up with the aim of providing a certain number of digital services to rural communities [14].

H5: Program Effectiveness has positive influence on BIU.

Facilitating Conditions: is defined as the firm conviction that any user has over the existence of a technical supervision in charge of supporting the operation of the telecentre [11].

H6: Facilitating Conditions influence positively BIU.

2.2 Factors Used to Customized UTAUT Model

These factors are related to the specificity of the study environment as well as various development indicators of the study area. Therefore, they come as an extension of various models and theories drawn from the literature to explain and highlight the experience studied.

Awareness: It is defined as the ability to be aware of the use of a new service / product, a concept that could be beneficial in carrying out the daily tasks of a community.

H7: Awareness impact positively BIU.

Culture: Cameroon has hundreds of traditional kingdoms and more than 250 dialects in all 10 regions in the country. The official languages of are French and English. However, young people have created a complex form of slang called “camfranglais” (mixture of French, English, vernacular Cameroonian phrases and even verlan) that varies between cities [15]. Some also use the “pijin”, which is a mixture of English and slang [16]. As for the traders, they negotiate very often in “pidjin” english (form of English Creole) for more than 50 years [17].

H8: Culture impact positively BIU.

Power Supply: The supply of electrical energy remains a real problem in sub-Saharan Africa, both for large cities and for rural areas. Although governments and international organizations have mobilized to be able to respond to electrical energy problems, there is still a huge gap between supply and demand [18].

H9: Power Supply has positive impact on BIU.

Government Regulatory: The Cameroonian government has set up several regulations on the management and use of telecentres through the Ministry of Posts and Telecommunications.

H10: Legal/ Government regulatory has positive impact on BIU.

Accessibility: “the availability of necessary IT tools for the operation of telecentres for particular users” [19].

H11: Accessibility has a positive influence on BIU

Trust: refers “to the intention to be voluntarily vulnerable to the actions of other users” [20].

H12: trust has positive impact on BIU.

Reliability: It refers to “the feeling possessed by individuals regarding the ability of the telecentre to perform all the missions assigned to it, without fail” [21].

H13: reliability influence positively BIU.

2.3 Control variables

H14: control variables (**age, gender, experience, income, Education**) have positive impact to moderate core constructs (performance expectancy, effort expectancy, social influence, management effectiveness, program effectiveness, facilitating conditions) on BIU

H15: control variables (**age, gender, experience, income, Education**) have positive impact to moderate core constructs (performance expectancy, effort expectancy, social influence, management effectiveness, program effectiveness, facilitating conditions) on Cameroon Factors (awareness, culture, power supply, government regulatory, accessibility, trust, Reliability)

Behavioral Intention to Use Telecentre: it refers to the level of the intention to manifest a specific attitude regarding the intention to use telecentre services [22].

H16: Behavioral Intention to Use Telecentre has a positive effect on Telecentre User Acceptance.

Telecentre User Acceptance: It focuses on the acceptance of the individual use of the Telecentre by users.

H17: Telecentre User Acceptance positively impact on telecentre value creation

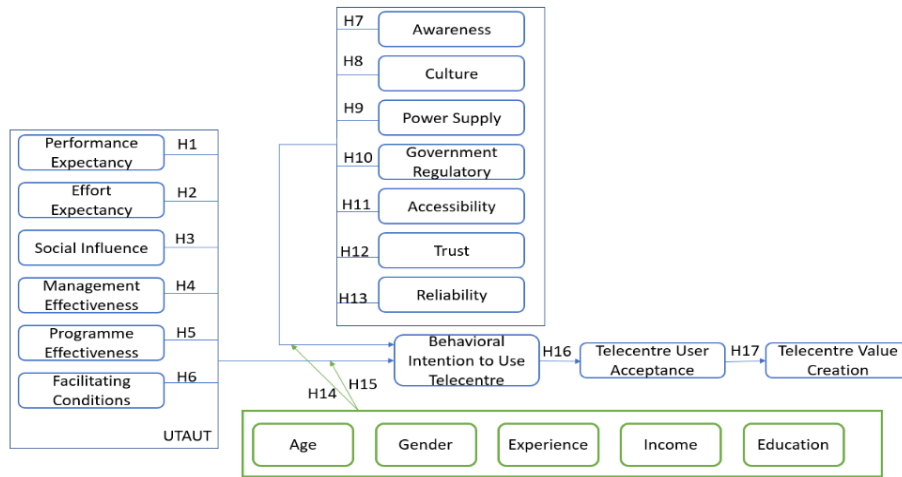


Figure 2. Research Model

3 Methodology

This paper intend to use a mixed research method for testing and analyzing the proposed research [23]. It's a method based on both quantitative and qualitative approach in the same research study to provide a response to the observed deficiencies in both methods [23]. The quantitative methodology is used in this work to assess opinions, behaviors, and to induce from a much larger sample [23]. Furthermore, research on technology acceptance and Digital Divide are commonly conducted using survey questionnaires [24]. We will therefore make use of measurable data in order to be able to address the observed experience and to exhibit research trends. To obtain respondents for our study, we are planning to investigate with local actors in rural municipalities who are directly involved in the use of Multipurpose Community Telecentres (farmers, fishermen, craftspeople, youths/students, teachers, local businessmen), as well as sports associations and various cooperatives. Ideally, World Bank estimates show a target population between 15 and 70 years old in rural sub-Saharan Africa, which corresponds to the demographic sample in our study [25]. With this methodological approach, we hope to receive at least 475 respondents to be able to conduct important analyses and make projections. Thus, we have already started discussions with various stakeholders concerned by the study and so far, the feedback is rather positive as for the impact of the study at the local level (municipality), up to the national level. Several local associations have agreed to send the survey to their members, who will be able to participate

either with a version of the online questionnaire or by completing the physical questionnaire which will be sent to them. The development mechanisms of the instrument is organized according to [26]. The parameters are collected on the basis of the scale existing in the emerging literature in order to consider valid allegories of each constructs so as to harmonize them with the research environment on the adoption of technologies and the digital divide [27]. Several constructs from our study are evaluated individually in order to reflect the impression of an individual using Likert scale graduated from 1 to 7. The constructs resulting from the intention to use [22], UTAUT [11], are adopted from [28], which contextualized the variables significantly in the acceptance of technologies in an environment marked by the permanent unavailability of technological infrastructures. Thereafter, constructs associated with accessibility [29], Trust [30], and reliability [31] are borrowed from [32]. They have effectively been used in the literature to investigate various barriers (emotional, structural) that can justify the non-adoption of technologies in sub-Saharan Africa [33]. This methodology implies the use of statistical tools in order to derive the results. we will use Partial Least Squares Structural Equation modelling (PLS-SEM) with SmartPLS 3.2.8 [34]. This analysis methodology will allow us to evaluate the Path models which imply the latent constructs, observed abruptly by several hierarchical constructs [35]. It will facilitate ideation of a structured model through the iterative assignment of the manifest variables [36].

After the quantitative analysis, will then proceed with a qualitative analysis which is also adapted to our study context regarding the exploration that we wish to conduct on real life in rural areas with the use of technology in order to better appreciate social phenomena [37]. It concentrates on dealing with the " how " and the " why " of social observations carried out, drawing its foundations from the experiences of individuals from rural communities as agents giving an explanation to their daily lives [37]. Also, it is a scientific research method used to gather non-numerical data and focuses on human demeanour from an agent's point of view [37]. This method is adopted in our study to explore in depth the adoption of Technologies in rural areas in a context where there is a lack of technological infrastructure, a constant absence of the internet, and also a gender difference in the use of technology due to the culture of the communities [38]. It will allow us to formulate a theory to better understand the preferences, culture, motivations and even the lifestyle of a group of target individuals regarding its mainly inductive stages. We will start with focus groups of 10 people per sector of activity (farmers, fishermen, craftspeople, youths, teachers, local businessmen) as suggested by [39] in order to obtain open responses from participants, responses which thus reflect feelings, thoughts, and experiences. The objective is to obtain more open information, regarding the unpredictable results that we can obtain at the level of quantitative analysis. This Focus group will allow the different participants to express themselves in a clear and open manner and to share opinions that could not be detected in terms of quantitative analysis [39]. Depending on the interactive nature of the focus group, the debates will therefore be more fluid, participants will be inspired by the remarks and comments of others to stimulate their own [39].

4 Results

A needs analysis study was conducted by AMBERO-Zebralog, a German consultancy firm on digitalisation needs in the North and South West regions. The purpose of this qualitative study was to be able to highlight the real needs in terms of digitalization of digital services based on the realities observed in the municipalities. A workshop was held in each municipality to which the concerned mayors or their representatives as well as a selection of municipal employees had been invited. Furthermore, several focus groups were held per municipality with local stakeholder groups identified beforehand. The focus groups addressed local actors from different social groups, namely farmers and merchants, students and teachers, employment seekers, moto-taxi drivers as well as groups of women and young people. The focus groups were conducted to (1) discover the strengths and weaknesses of the current provision of services in the municipality from the point of view of the citizens (phase 1). (2) make the participants aware of the opportunities offered by digitalisation and the potentials of digital services for the municipality by presenting start-of-the-art digital tools to ease communication between citizens and the state (phase 2). (3) Collect ideas for new digital services and discuss conditions for their successful implementation (phase 3). (4) find out the most suitable tools and places to access these services for the users (phase 4).

Following the results, the overall use of Internet in the intervention municipalities is not very widespread. This varies slightly, for example digital literacy seems higher in urban or suburban areas (compared to rural areas) as well as in the South West (compared to the North region). Close to 50% of all participants (n=155) of the focus groups claim that they never use the internet. Only little more than 20% state that they are regular users of the internet.

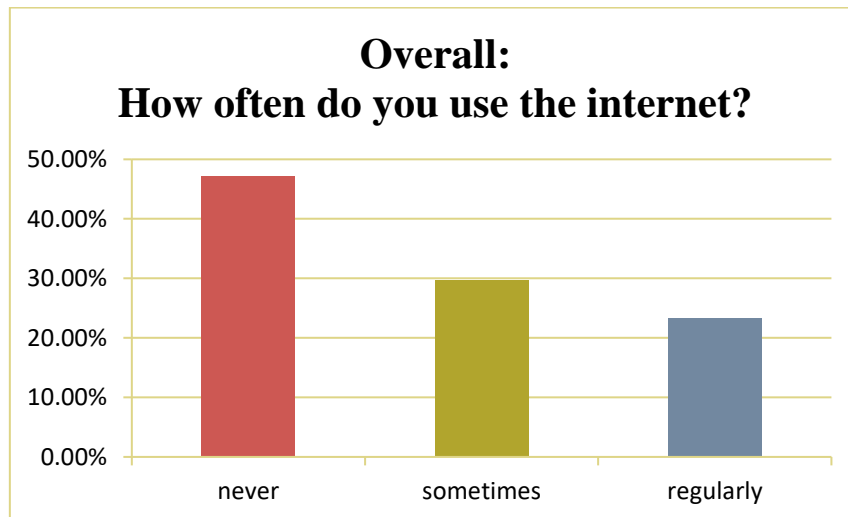


Figure 3. Responses of participants in focus groups in both the North and the South West Region when asked about their internet use / n=155 - September 2018

The lack of internet and adequate telecommunication infrastructure could therefore be a main obstacle for the successful implementation of new digital services. It was already in the discussion in the workshops, as the debates were sometimes extremely far away from the everyday lives of the participants. It was rather difficult to talk about potential digital services in a context where most participants lack access to the internet or digital tools. How many users will be able to value the discussed innovations, also compared to others in the same socio-professional category? The accessibility of the future services will determine its acceptability.

As the numbers collected in the workshops also show, mobile use is more common via SMS than via smartphone-powered messenger services such as WhatsApp. The preferred means of access to future digital services is by far the telecentre, followed by mobile means (mobile phone/ smartphone). Telecentres are seen as an important asset for the digitalization of certain services, because they are a place that could serve both to access information on the internet but also where people can be trained can learn how to make use of digital services and, as a result, improve their digital literacy.

Hence, it might be wise to make use of tools and technologies people already use, such as mobile money services. For example, participants frequently suggest the replacing of the stamp-based payment system used in municipalities with e-payment-systems (such as mobile money). highlights preferred means of access for future digital services for the North and South West regions.

This issue is also reflected in statements of the participants. Their most and major concern is the lack of connectivity, especially in the rural areas. Many participants state that creating access is key before developing municipal services. We concur with this assessment and suggest to first solve the problem of connectivity (e.g. through local community networks, well-equipped and functioning telecentres or a sufficient number of access points offered by private sector providers).

Interestingly, what is being prioritized in terms of “digitizable” services heavily depend on whom you ask. For example, municipal staff often thinks first of internal processes (such as archiving or electronic personnel files) and the provision of more strongly regulated services such as the provision of civil status documents. On the other hand, most citizens rather think of services that might help them in their everyday life. Among others, this concerns the delivery of information by the municipality (such as municipal website), but also affects policy areas such as health and sanitation, education, infrastructure, public safety or e-payments for a variety of municipal services.

Also, several citizens expect important benefits from the digitalization or, more precisely, the de-personalization of services. Some participants, especially young people or groups of farmers and merchants perceive a lack of transparency in the current proceedings. They feel they are not being treated fairly when it comes to the distribution of grants or social support programs. By shifting the process of application, decision-making and publication of results from a municipal agent to a transparent, electronic system, these participants see the chances of cheating, fraud, and favoritism heavily reduced. As a result, this may boost the confidence of citizens in the problem-solving capabilities and fairness of the state.

What is more, different speeds in digitalization in rural areas on the one hand and urban/ suburban areas on the other account for the divergence in perceived benefits of

digital services. In rural areas (such as in Bibémi or Mayo-Oulo), long trips to the town hall or other institutions can be reduced or even completely avoided by digital payment and handling systems (for permits, certificates, applications etc.). This benefit is estimated to be less pertinent in urban areas.

For citizens, it is often not self-evident which level of state is responsible for which service, especially in a decentralizing multi-level governance system such as the Cameroonian. Consequently, participants often made suggestions for changes in services that are rather in the sovereignty of the national level.

5 Implications, Limitation & Future Research Direction

This research will allow organizations and governments engaged in the process of breaking the digital divide to be equipped with concepts in order to carry out their work [40]. It will also enable future research to focus on the environmental and social and economic factors that contribute to the acceptance of telecentres in rural areas. Furthermore, several organizations will be able to understand the different approaches to increase the rate of use of technologies in disadvantaged villages and communities by offering them a catalog of services adapted to their needs. In terms of theoretical implications, the study will serve as a theoretical basis for carrying out quantitative analyzes related to the acceptance of technologies in rural areas, according to cultural indicators. The qualitative analyzes carried out will allow the next quantitative studies to adopt a better analytical approach.

However, this work has several limitations. Firstly, given the experimental nature of our study and the strong correlation between variables of the research model, expanding the sample size remains useful in order to obtain relevant results and thus ensure external validity. In the future, we plan to further expand the research model considering several technological, environmental, and psychological backgrounds. We will also study the existing disparities between men and women which are linked to current culture and practices regarding the use of ICT in households and disadvantaged communities in sub-Saharan Africa [41].

6 Conclusion

This research aims to be an addition to the emerging and existing literature by conducting empirical investigations on the key determinants of adoption and use of Multipurpose Community Telecentres to create value and contribute to economic, social and cultural development in rural areas in sub-Saharan Africa. We conducted a qualitative study (digital service needs analysis) in rural areas of North and South West Cameroon in order to be able to collect digital service needs of underprivileged communities. Also, we present a theoretical representation which is an extension of the UTAUT model, to which we have associated cultural factors. The development and deployment of digital tools and the increase of digital culture in rural areas are therefore a strong response to the various problems of rural exodus observed in villages[41]. With the arrival of digital solutions at telecentre, marginalized and disadvantaged communities will be able

to take the train of digital culture, thereby developing their digital potential, important for socio-economic development and fulfilment. The Telecentres will therefore be a center for developing skills, creating value and culture for rural areas.

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