Telecenters and the expansion of human capabilities among rural women

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Abstract

Purpose – This study aims to assess the contribution of telecenters in expanding the capabilities of rural women to achieve their development outcomes in three rural districts in Tanzania.

Design/methodology/approach – The study conducted 12 focus group discussions with 37 rural women users and 36 rural women non-users of telecenters and semi-structured interviews with telecenter managers in the selected districts. The framework for the study is based on Sen’s capability approach.

Findings – The study noted that telecenters may enable rural women to build some capabilities (social, financial, human and political capabilities), and inhibit others, resulting in diverse development outcomes, based on the choices made and conversion factors. These conversion factors included institutional factors (inadequate computers, space and personnel, unreliable electrical power and slow internet connectivity) and individual factors (multiple responsibilities, status, low-level of education, language barrier, lack of information and communication technology (ICT) skills and technology efficacy and inability to afford ICT short courses). Other conversion factors (e.g. availability of affordable ICTs) enabled rural women to build their capabilities.

Originality/value – This is a comprehensive study that provides findings for rural telecenters to plan and allow rural women to expand their capabilities and achieve their development goals in Tanzania or other settings with similar conditions.

Keywords Gender, Women, ICT, Africa, Tanzania, Information and communication technology, Developing country, Telecenter

Paper type Research paper

Introduction

Information and communication technologies (ICTs) such as telecenters have become widely available to rural communities, and they can enable women to achieve what they value most in their lives. The telecenter is a “public place where people can access computers, the Internet, and other digital technologies that enable people to gather information, create, learn and communicate with others” (Aji et al., 2010). Research shows that the use of telecenters enabled some women to improve their economic standards, which led to individual empowerment in social, and psychology (Alao et al., 2017), and information and economic dimensions (Alao et al., 2017; Hansson et al., 2010). Therefore, telecenters can create opportunities for women to make informed decisions and achieve what they value most in their lives.

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Before embarking on assessing the contribution of telecenter for development research, it is critical to conceptualize how the research is situated within the development context. The notion of development is still contested. A recent review of ICT studies conceptualizes development as either expanded digital inclusion or freedom or increased economic growth or well-being (Chipidza and Leidner, 2019). Further, Zheng et al. (2017) conceptualize the role of ICT for development as it should not only focus on technology adoption or diffusion but also on complex socio-technical processes. One of the most prominent definitions of development in an ICTD context is based on Sen’s (1999) work on the capability approach. Similar to Sen’s (1999) capability approach and other ICTD studies (Hatakka et al., 2010), this study views development as human development. Sen (1999) conceptualizes development as a process of expanding freedom that people value, which depends on social and economic arrangements, political and civil rights and other determinants.

Most rural women in developing countries are, however, disadvantaged in terms of access to and use of telecenters. Most studies found that men are more likely to use telecenters than women in the rural areas of developing countries (Chilimo et al., 2011; Mbangala and Samzugi, 2014). There are several factors that contribute to inequality. Most rural women have high productive workload, which may inhibit use of telecenters (Idris, 2018; United Republic of Tanzania, 1997). For instance in Tanzania, rural women still form a slightly large part of agricultural workforce (52 per cent females vs 48 per cent males), whereby agriculture accounts for the largest share of employment in Tanzania (Idris, 2018).

Further, there is still unequal of ICTs among women. A recent scoping review of ICT and gender reported that most women use ICTs for increased communication and spread of information and increased productivity. The same scoping review found limited evidence regarding women using ICTs as scientific instruments, as outsourced employments and ICTs commodifying women (Williams and Artzberger, 2019). Other challenges are related to discrimination and gender-based violence (Idris, 2018), limited voice and agency (Idris, 2018; United Republic of Tanzania, 1997), cultural rules, norms and values, low education level, high reproductive workload and childcare concerns, restricted access to productive resources (Idris, 2018) and poor ICT infrastructure in telecenters (Geora et al., 2015; Mbangala and Samzugi, 2014).

At the same time, there is a paucity of studies that assess the impact of telecenters on rural women’s capabilities to attain their development outcomes in Tanzania. Most studies in Tanzania have either assessed use and non-use of telecenters by both men and women (Chilimo et al., 2011; Lwoga, 2010; Mbangala and Samzugi, 2014; Mtega and Malekani, 2009) or the impact of ICTs on poverty reduction (Sife et al., 2010) or the role of telecenters in agricultural development (Lwoga, 2010) or the role of telecenters for socio-economic development (Mbangala and Samzugi, 2014). Theoretical frameworks adopted by the studies are also eclectic and derived from a sustainable livelihood framework (Chilimo et al., 2011; Sife et al., 2010). Methodologically, most studies either used ethnography, case study or survey or mixed methods. Therefore, this study focused on women’s voices and choices, to understand the contribution of telecenters for expanding rural women’s capabilities to attain their development outcomes in Tanzania. This study used Sen’s (1999) capability approach, and it deployed a multi-case study research design. The study was conducted in three rural districts surrounding the telecenters in Kongwa, Sengerema and Kilosa districts of Tanzania.

Theoretical framework

The theoretical framework for this study is based on the capability approach (CA) (Sen, 1999; 2003), and drew on other two studies that operationalized Sen’s CA, namely, choice
framework approach (Kleine, 2010) and capability approach framework (Hatakka et al., 2014). Unlike other frameworks that focus on people’s happiness, or on income and expenditure, Sen’s capability approach primarily pays attention to people’s capabilities (Zheng et al., 2017). “Functionings” and “capabilities” are the major constituents of the capability approach (Zheng et al., 2017). Capability refers to a person’s freedom and opportunity to attain various functioning combinations (doings and beings) (Robeyns, 2005). A functioning is an:

[... ] achievement of a person: what he or she manages to do or to be, and any such functioning reflects, as it were, a part of the state of that person” (Sen 2003, p. 44).

Goods and services as a means can enable people to generate capabilities, influenced by three sets of conversion factors – personal, social and environmental characteristics (Sen, 1999). Conversion factors influence both the achievement of potential functioning (capabilities) and the ability of people to use the potential functioning to make choices (Hatakka et al., 2014).

The choice framework focuses on the choice aspect for human beings (Kleine, 2010). It focuses how individuals draw on a resource portfolio to negotiate a given social structure to make a choice to achieve their development outcomes (i.e. primary and secondary outcomes) (Kleine, 2010). The primary development outcome is the freedom of choice itself. The secondary outcomes rely on what individuals choose to value in their lives, which may include easier communication, increased knowledge, greener environment, increased income, increased mobility, more time, more voice and more autonomy (Kleine, 2010).

Hatakka et al. (2014) theorized technology and its supportive features (e.g. training) as means to enabling functionings, and how they affect the conversion factors. Conversion factors (personal, social and environmental) can influence both potential functioning and the ability of people to use the potential functioning (i.e. their ability to make choices). The achieved functionings, in turn, affect the conversion factors, and therefore, enable individuals to make other choices (Hatakka et al., 2014).

These studies (Hatakka et al., 2014; Kleine, 2010), together with the capability approach (Sen, 1999; 2003), provide analytical tools for assessing the role of telecenters in enabling individuals to achieve their freedom. Kleine (2010) focuses on the choice aspect for human beings, while Hatakka et al. (2014) focuses on the variations between capabilities and achieved functionings and the context in which they operate in. Our study, therefore, looked at the means to achieve (goods and services) which, in this context, are the internet and its supportive features (i.e. training), and the differences between substantive freedom (capability set) and outcomes (achieved functionings). Measures of achieved functionings include primary (i.e. choice) and secondary outcomes (Kleine, 2010). This study focuses on choice aspect as conceptualized by Hatakka et al. (2014), which focuses on:

[... ] why do people choose to utilize the functioning and what prevents them from making the choice) and the outcome of their choices (i.e. expansion of peoples freedoms as achieved functioning).

Our study analyzed how the conversion factors affect capability formation and the ability of rural women to use the potential functioning to make choices, and the outcome of their choices as primary and secondary outcomes as highlighted by Kleine (2010) (Figure 1). Further, the study analyzed how telecenters can influence conversion factors.

Methodology
The study used a multi-case study research design in three rural districts surrounding the telecenters in Kongwa, Sengerema and Kilosa districts. These telecenters were selected
because they were rural-based; they had been in operation for more than one year; and they offered a variety of services such as the internet, information services, and computer training. Similar criteria for selecting telecenters had been used in other previous studies (Chilimo et al., 2011; Lwoga, 2010).

We conducted focus group discussions (FGDs) from September to December 2014. In total, we had six FGDs with 37 rural women altogether. Each FGD had between six and seven participants. We purposely selected participants for FGDs through informal discussions with village leaders and telecenter managers. The study developed FGD questions based on existing instruments (Hatakka et al., 2014; Kleine, 2010). We interviewed three telecenter managers – one manager per telecenter to supplement data gained from FGDs.

The Ethical Review Board of Muhimbili University of Health and Allied Sciences (MUHAS) granted the approval to conduct the study. We used an informed consent form to facilitate voluntary participation in the study.

We analyzed data by using thematic content analysis. Two researchers coded the transcripts independently and developed the categories of themes contained in data. The two researchers shared the analysis, discussed and agreed on constructed categories and sub-categories. Finally, the two researchers agreed on the write-up process. We added the quotations to include the respondents’ voices in the results section. We coded and analyzed data using a computer-supported analysis tool – Nvivo.

Case description
The study was carried out in Kongwa, Sengerema and Kilosa.

Sengerema telecenter
It is located in Sengerema district, a rural district in the Mwanza region, a northwestern part of the country. The total population is estimated at 663,034, whereby there are more female (i.e. 333,016) than male (330,018) (City population, 2012). The district income largely depends on agriculture (80 per cent), and the agricultural sector uses 90 per cent of the population (Economic and Social Research Foundation, 2015). In this district, women are principally engaged in household activities, family welfare and agricultural activities, while men are engaged in farm and off farm income-generating activities (Economic and Social Research Foundation, 2015; United Republic of Tanzania, 1998).

Sources: Adapted from several studies (Hatakka et al., 2014; Kleine, 2010; Sen, 2004)
In 2001, the government established the Sengerema telecenter in partnership with various international partners. It has 25 computers, five printers, two scanners and an internet connection. The telecenter offers the following services: internet, secretarial services, ICT training, community radio and television, information services, renting a room for conferences, photo studio and air ticket booking.

**Kilosa rural services and electronic communication**

It is located in a rural district of Kilosa, in the Morogoro region, the eastern part of the country. Kilosa district has an estimated population of 438,175, whereby there are more women (i.e. 219,797) than males (i.e. 218,378) (City population, 2012). Similar to Sengerema district, women in this district are largely involved in farming activities but also they are increasingly engaged with non-farm income-generating activities (Lyimo-Macha and Mdoe, 2002).

In 2000, Robinson Cooperate Corporation established the KIRSEC telecenters as a for-profit business. It has ten computers, three printers, a photocopier, three scanners, one fax machine, one laptop, one laminating machine and broadband. It offers the following services: information services, mobile money service, electronic postbox, micro-finance, internet facilities, computer training, internet connection services to other institutions and a spoken English course.

**Songambele maarifa center**

It is located in the rural district of Kongwa, in the Dodoma region, the central part of the country. The total population is estimated at 309,973, whereby there are more female (i.e. 160,752) than male (149,221) (City population, 2012). Most people are involved in livestock keeping only, followed by crop and livestock production (National Bureau of Statistics and Ministry of agriculture and Food Security, 2007). According to Chenyambula et al. (2012), men largely own livestock, while few women are engaged in livestock practices.

In 2012, the ALIN NGO, in collaboration with DONNET established the Songambele Maarifa center. The center has five computers, a printer, a modem, camera, solar panel (12-panel) and wind-power backup. The center offers the following services: library services, internet, secretarial services, ICT training, information services and a blog (songambele maarifa center blog).

**Results**

The results are presented according to the following themes: use of telecenter and supportive services, the capability sets gained, the conversion factors that affected the capability formation and choices made and the development outcomes (achieved functionings) attained by rural women. Further, the study presents various negative outcomes (achieved functionings) due to the use of telecenters and its supportive services.

The results are presented as follows: numbers will mean sequence of study participants, while […] will mean that some words have been skipped in the quotations. Moreover, RW refers to rural women, TM means telecenter manager and FGD refers to focus group discussion.

On the demographic characteristics of the respondents, the results indicated that more than half (62 per cent, \( n = 23 \)) of rural women had ordinary secondary-school education. Most respondents (72.2 per cent; \( n = 26 \)) had a semi-annual household-level income below 50,000 Tshs (US$25), and they were aged between 26 and 45 years (62 per cent; \( n = 23 \)) (Table I).
The findings from the focus group discussions indicated that rural people in all districts used telecenters for attending computer courses, accessing internet services and communicating with distant relatives/family. For instance, one respondent said, “I mainly use telecenters to learn how to use computer” (RW 3, FGD 1). Respondents from Kilosa used the internet to search information for various purposes. Typical responses include: “access information especially on the issues related to women rights” (RW 2, FGD 3) and to “obtain

Table I. Profile of respondents in FGDs

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>No.</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25 years</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>26-35 years</td>
<td>13</td>
<td>35</td>
</tr>
<tr>
<td>36-45 years</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>46-55 years</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>56 years and above</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td><strong>Highest education level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have never gone to school</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Primary</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>Ordinary-level secondary education</td>
<td>23</td>
<td>62</td>
</tr>
<tr>
<td>High-level secondary education, e.g. college, university</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Post-secondary education</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td><strong>Semi-annual</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 50,000 Tshs</td>
<td>25</td>
<td>68</td>
</tr>
<tr>
<td><strong>Income level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50,001-100,000 Tshs</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>100,001-300,000 Tshs</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>300,001 and above Tshs</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sengerema district</td>
<td>12</td>
<td>32.4</td>
</tr>
<tr>
<td>Kongwa district</td>
<td>13</td>
<td>35.1</td>
</tr>
<tr>
<td>Kilosa district</td>
<td>12</td>
<td>32.4</td>
</tr>
</tbody>
</table>

Notes: Use of telecenters and supportive services. Interviews with telecenter managers showed that Sengerema Telecenter had a large number of both men and women who attended computer training (n = 40), while Kilosa telecenter had a large number of both men and women (n = 15) who used internet services (Table II)

Table II. Number of telecenter users

<table>
<thead>
<tr>
<th>KIRSEC</th>
<th>Songambele</th>
<th>Sengerema</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both men and women</td>
<td>Women</td>
<td>Both men and women</td>
</tr>
<tr>
<td><strong>Average number of internet users per day</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td><strong>Average number of trained participants per day</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-15</td>
<td>7-8</td>
<td>24-30</td>
</tr>
<tr>
<td><strong>Internet charges for an hour</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45 cents (USD)</td>
<td>75 cents (USD)</td>
<td>45 cents (USD)</td>
</tr>
</tbody>
</table>

The findings from the focus group discussions indicated that rural people in all districts used telecenters for attending computer courses, accessing internet services and communicating with distant relatives/family. For instance, one respondent said, “I mainly use telecenters to learn how to use computer” (RW 3, FGD 1). Respondents from Kilosa used the internet to search information for various purposes. Typical responses include: “access information especially on the issues related to women rights” (RW 2, FGD 3) and to “obtain
information on crop prices” (RW 5, FGD 4). Rural women also used telecenters for secretarial services such as designing and printing invitation cards, typing examinations and mobile money services.

**Capability sets**
The use of telecenters and their supportive services (training) enabled the following capabilities: financial, human, political and social capabilities as summarized in Appendix.

**Financial capability**
The telecenters built the financial capability of some women through self-employment in the ICT sector, access to job opportunities, access to information on markets and business loans, ability to place an order online. However, rural women were concerned with internet fraud, which could disable them to build their financial capability.

Some women found new employment after completing the computer courses at the telecenter. A respondent applied for a job “by sending my job application letter through email” (RW 4, FGD 2). Some women established stationery shops and internet cafés after attending computer courses at the telecenters. One informant reported that:

I studied the computer basics at the telecenter. After that course, I applied for a loan and […] started my business of offering secretarial services (RW 4, FGD 4).

Telecenter managers in Kongwa and Sengerema noted that some women secured employment in internet cafés or stationary businesses after attending the computer training. The managers noted that computer training enabled women to advance their careers. For example, one interviewee said:

One woman who was the Ward Education Coordinator attended computer training at the center. Thereafter, she was promoted from Ward Education Coordinator to District Education Director of the town council in Kongwa district (TM, Telecenter 3).

The use of the internet and printing services through telecenters enabled rural women to advertise their products and services and to access new markets. Some women used the telecenter to design printed advertisements and post them either on telecenters’ notice boards (e.g. Sengerema Telecenter) or circulated them via email, WhatsApp or other social media. Talking about this issue an interviewee said:

[...] together in our farmers’ group that cultivate and pack maize and sorghum flour we were able to acquire new markets from Mwanza [region] for our product after designing our advert in the telecenter and sharing it through WhatsApp (RW 6, FGD 1).

The use of telecenters physical notice boards’ and websites’ enhanced access to information on markets among rural women in some telecenters. The Kilosa telecenter searched online for prices for farm produce and posted them on their notice board. This initiative saved the farmers the effort of searching for the same information online. Similarly, the Sengerema telecenter advertised farmers’ produce on their website. In addition, the telecenter taught groups of women, who grew cassava, sunflowers and rice, on how to use cell phones to search for markets and sell their produce online.

Some rural women secured business loans through contacts made from within and outside Tanzania via the internet at the telecenters. The telecenters’ internet services enabled women to access information on business loans with favorable terms. A women’s
group in Sengerema secured a loan from a USA-based agency through the internet at the telecenters to fund their business of grinding and milling grain.

To a limited extent, very few rural women were able to order a car online with the assistance of telecenters, as it was specified in Kilosa: “I ordered a car from Japan without incurring cost of traveling to Dar es Salaam to buy a car from showrooms” (RW 5, FGD 3).

However, the results from the FGDs indicated that some people can mis-represent themselves and send a scam message on social media services that are available through internet in telecenters to trick them, which can lead to loss of money. Some rural women in Kilosa acknowledged to have received messages about new business opportunities on social media. After they consulted the telecenter manager, they realized that those messages were not authentic and, instead they wanted to steal money from them.

Human capability

The use of the internet through telecenters enabled rural women to access information on health, education and human rights, as was indicated by four FGDs in Kongwa and Sengerema, save documents online and increase work efficiency. This helped to build their human capability. Further, the results indicated that some rural women were concerned with the prolonged use of computers that can lead into health problems.

On access to information, some women accessed information on disease symptoms and treatment from the internet through telecenters. Other respondents in Sengerema used the internet through telecenters to search for education opportunities. The comment below illustrates:

I use internet at telecenters to search and retrieve information on various universities and colleges, and scholarships for my field of studies. This information has enabled me to apply for various colleges and universities across the globe (RW 6, FGD 1).

The telecenter manager gave an example of how women used their telecenter to search online for information about women’s rights and broadcast it on the community radio through a program known as “dira ya mwanamke” or “women vision”. It was also indicated in one FGD that some women were able to access online information about women rights through a telecenter, as it was indicated in Kongwa.

On saving documents online, only one telecenter manager indicated some rural women were able to use their emails through the telecenter to save documents online and ensured the safety of their documents, as indicated in Sengerema. Commenting on this matter, one of the interviewees said:

Women can save their documents online through email, and thus giving them new strategies on how to keep their documents safe and avoid printing costs (TM, Telecenter 2).

On work efficiency, only data from focus group discussions in Kongwa showed that computer training enabled teachers to compile examination results of their primary and secondary schools and to prepare government reports, within a short time. The comments below illustrate:

Before the ICT training, teachers required up to seven days to compile examination results[...]. Now they do it within a few hours in one day (RW 5, FGD 5).

We trained Ward Executive Coordinators on how to use ICT and they are now competent and can prepare their monthly reports electronically within a short time (RW 3, FGD 6).
However, some rural women felt that the use of telecenters can lead into health problems, thus disabling their human capability. As one interviewee put it: “I have seen people who developed back problems and loss of vision due to prolonged use of computers” (RW 4, FGD 1).

**Political capability**

There was limited political participation by rural women. The internet through telecenters assisted some women to be aware of political issues and raise their concerns.

Some rural women acknowledged that the use of internet through telecenters enabled them to become familiar with political issues; this was mentioned in four FGDs in the three districts. At the time of data collection, there was a high interest in political information, because it was a year before the 2015 general election in the country and, at that same time, there was a process to reform the national constitution in the country. Hence, most people accessed online information related to elections, parliament meetings, progress in constitutional reformation and global political issues. Responses to this issue included:

I use internet through telecenters to search for various political issues and I follow some of the political dialogues online just for the purposes of becoming aware of political issues (RW 1, FGD 5).

I usually search internet through telecenters to access information on general elections issues, especially general election of leaders to be conducted in October 2015 (RW 4, FGD 3).

Access to internet-based political news through telecenters motivated some rural women to vote in the election, as indicated in one FGD in Sengerema. One participant commented:

through the use of the internet, I got a better understanding upon the qualification of leaders, which motivated me to vote for the best candidate to lead us in our ward (RW 3, FGD 2).

On the ability to raise their concerns, only one telecenter manager in Sengerema reported that they assisted women to voice their concerns through social networks. The telecenter posted various topics, including women’s issues, on social networks, and then monitored how people perceived and contributed to the topic. Thereafter, they discussed issues raised on the social networks on a live discussion on the community radio.

**Social capability**

Some women used the internet through telecenters to communicate with their families/friends, and thus, building their social capability. Further, rural women used internet through telecenters to play online games, access to immoral content and tarnish other people’s images, and thus, disabling their social capability.

Rural women used through email and social media through telecenters such as Facebook to communicate with their families/friends, as indicated in three FGDs. As one interviewee put it: “I shared my problems with my friends on Facebook and […] found a solution from ideas brought forward by my friends” (RW 2, FGD 6). Another respondent from Kilosa narrated the importance of social media in communication: “I share my opinions on social networks such as Facebook on the matters that are brought on the forum for discussion” (RW 5, FGD 4). The telecenter managers also noted that some women who used the telecenter communicated with their distant relatives and friends through email and social media. The Sengerema telecenter assisted women to create free email accounts. Songambele telecenter also assisted women to communicate with their distant relatives by using social media.
However, it was perceived that prolonged use of internet at telecenters encouraged idleness such as playing online games and chatting on social media, as indicated in all FGDs. As one interviewee put it: “[…] most students spend a lot of time chatting in telecenters instead of studying” (RW 5, FGD 3). Another respondent commented:

I have seen some people spend a lot of time uploading pictures on social media instead of using the internet to access information that is relevant for their productive activities (RW 6, FGD 4).

The use of internet services through telecenter encouraged accessibility of immoral content among rural women as reported in one FGD:

Use of the internet in a telecenter has motivated young women to access immoral content that has led into decline of their good behaviour and values (RW 5, FGD 2).

Further, it was indicated in all FGDs that it was easier for people to tarnish the image of others in the local communities. For example, one interviewee said: “[…] someone can write bad issues about you, which are not true, on the internet, just for the sake of destroying your status in the community” (RW 3, FGD 1).

Conversion factors
The rural women’s choices to convert their capabilities into achieved functionings were influenced by a number of conversion factors as summarized in Appendix. On the one hand, some of the conversion factors (free or low-cost ICT courses and internet services) enabled rural women to build their capabilities and ICT skills. The telecenter managers offered free or low-cost ICT courses and internet services, specifically targeting rural women, to enable use of telecenters. Sengerema telecenter offered free ICT courses to women every last week of the month; Kilosa telecenter provided free courses to four women every year and also assisted women to create email accounts at no cost; Songambele telecenter charged women a lower fee for ICT courses compared to men and also charged women lower fees for internet usage (US$0.25 for women and US$0.5 for men). The ICT courses enabled some rural women to build their ICT skills. The telecenter manager in Kongwa said that their ICT training improved women’s ability to use ICT for teaching at nearby primary and secondary schools. Similarly, telecenters enabled some women to attend further training after acquiring basic ICT training. Talking about this issue an interviewee said:

We have conducted ICT training for teachers from different schools who had no prior knowledge of computer […] they did not know even how to use the mouse […] at the end of the training they became competent and they are now teaching ICT subjects in their respective schools (RW 1, FGD 5).

Some rural women were able to use the computer and internet after attending ICT courses offered in telecenters. Typical responses to this matter include:

[…] before computer training, I could not switch on the computer. I was so scared to even touch the computer. But now I’m can switch on the computer and send email” (RW 5, FGD 6).

I have improved my skills on how to search information materials on the internet. Now I can search and retrieve online information that I’m interested in (RW 2, FGD 5).

Despite the availability of the affordable ICT courses and internet services, rural women still faced institutional and individual constraints in using telecenters.

Some institutional factors were local to the telecenters, while others were at a macro level. First, the inadequate number of computers in telecenters inhibited rural women from using
the centers. For instance, one participant said: “[...] there are only five computers, which are few as compared to large number of people who are using this computer center” (RW 2, FGD 5). Second, an inadequate number of trainers also inhibited the respondents from attending training or accessing internet services. For instance, Kongwa telecenter had only one staff member in the telecenter who also served as a trainer; sometimes the telecenter closed if this staff member was not available. Third, lack of adequate space in the telecenters also inhibited rural women from attending ICT courses or accessing the internet more effectively, as indicated in four FGDs in Kongwa and Sengerema. As one participant put it: “The size of the class is very small as compared to the number of students who use the computer center per day” (RW 3, FGD 5).

At a macro-level, the country, especially the rural areas, were bedeviled by frequent electrical power outages. This also inhibited women from using telecenters. For example, one respondent reported that: “Frequent power outages limit us from using the internet effectively” (RW 4, FGD 4). Poor internet speed also inhibited the use of telecenters as indicated in Kongwa. One participant commented: “[...] poor internet speed [...] limits us from accessing online information materials” (RW 6, FGD 6).

Individual factors inhibiting women from using telecenters to build their capabilities included the women’s perceptions of self and of the telecenters, busy schedules of women in rural areas, language of both the content and training instruction, limited levels of ICT literacy, low self-efficacy and financial challenges.

The women’s perception of their social status and their perception of the telecenters shaped who could use the telecenter. The majority perceived that the telecenters were meant for specific groups of people such as hardworking, courageous, confident and elite. Rural women in three FGDs framed telecenters as places for women who were more intelligent. As one participant put it: “places for women who are very brave and confident” (RW 2, FGD 3). Other respondents perceived telecenters as places for women who were better in terms of economy. One respondent commented that: “[...] for women who are well-developed or women who have made a step forward on development” (RW 3, FGD 4). Telecenter managers also noted that rural women perceived telecenters as places for educated people only. This attitude constrained uneducated women from using the telecenter.

The busy work schedule of the women inhibited them from using telecenters. This issue was indicated in two FGDs in Kongwa and Kilosa and by all the telecenter managers. For example, one participant said: “We have a lot of work at home, and thus, we do not have much time to use the telecenter” (RW 3, FGD 5). The Kilosa telecenter manager stated that women mainly used the telecenter after working hours from 5 p.m. to 6 p.m., due mainly to multiple responsibilities such as household chores and farming activities.

Rural women noted that the language used to operate computers and most of the content on the internet was in English and most of the respondents were not comfortable with the English language. Typical response was that: “The language used in computers is English, while most of us do not understand this language” (RW 3, FGD 6). The challenges with the language also affected the ability to attend and benefit from the ICT courses. Even when the language of instruction was Kiswahili, the computer terminologies remained in the English language. Commenting on this issue, one of the interviewees said:

Even if the course instructor would use our mother tongue language to conduct training, still those terminologies which they are using are difficult to explain and understand them (RW 2, FGD 6).

Lack of ICT skills limited rural women from using the telecenter, as indicated by four FGDs in all districts. Linked to lack of skills was the low efficacy in technology. This was noted in
four FGDs in all districts. For instance, one participant reported that: “I do not believe on myself that I can use computers in the telecenter” (RW 6, FGD 1).

Finally, most rural women struggled financially and could not afford the computer courses, thus could not overcome the lack of skills and low technology efficacy. Rural women had several competing personal and social commitments, and therefore, could not afford computer courses. This was noted by four FGDs in all districts. As one participant commented:

Some of us are divorced/widowed and thus it is difficult to provide for our families and at the same time save money to pay for computer training course [...] while other social responsibilities like funerals, and wedding ceremonies, are waiting for us to take part and contribute money [...] (RW1, FGD 3).

Choices and achieved functionings of new technologies

The data from the interviews indicated that rural women could make a choice to transform some of the capabilities into achieved functionings (development outcomes) as summarized in Appendix. It was evident that the primary outcome was improved choice.

The data showed that rural women made a number of choices. For example, in deciding on purchasing a car or seeking an education opportunity, women made a choice between: “no physical visit to the city” and “a virtual visit to specific websites to access information and services”. Other choices were between “sending letters through post offices” and “sending email” or “use social media to communicate” or between “not to purchase newspapers” and “to read online political information”. Other choices were adoption of more formal employment such as working in an internet café or stationery shops and attending computer training in telecenters.

In this study, the women’s choices led to several functionings (secondary outcomes). It was evident that the use of telecenters increased women’s choices to generate income, reduce transport or printing costs, and, to a limited extent, to save time and voice their concerns. The computer training enabled some rural women to establish ICT-related businesses such as stationery shops and internet cafés, and thereby increase their income. One informant commented:

I did not have any knowledge of computer before, but [...] after attending computer training, I decided to establish my own stationery shop. I am currently serving as the computer operator and the general administrator of the stationery shop and I’m now earning some money which helps me to fulfil my responsibilities (RW 2, FGD 5).

The use of the internet through telecenters enabled some rural women to save money by accessing online information such as on human rights, instead of incurring extra time and transport costs to get the same information/service. For example, one respondent said:

I searched for information about an organisation that dealt with women rights and accessed all the details including their contacts [...] I contacted them for assistance regarding the women rights issues (RW 3, FGD 6).

Equally, telecenter managers in Kilosa and Sengerema noted that the use of the internet-enabled women to reduce transport or printing costs, by ordering cars online, saving their documents online through emails, posting application letters, and/or accessing affordable internet services. Typical comments include:

Women can send their application letters quickly and cheaply inside the country (TM, Telecenter 2).
The affordable internet services in our community have enabled women to reduce transport costs of travelling to the city to access the internet services (TM, Telecenter 1).

The use of the internet through telecenters helped a minority of women to save time that they would have used to compile examination results and prepare government reports, especially for working-class women as explained in the human capability section. There was limited evidence of the ability of rural women to voice their concerns. Only one telecenter manager in Sengerema reported that they assisted women to voice their concerns through social networks as it was already explained in the political capability section.

Achieved functionings of new technologies: challenges

It was evident that the use of telecenters led into various challenges (Appendix). In terms of human capability, rural women felt that the use of telecenters could lead into health problems, such as loss of vision and back problems, thus disabling their human capability; as it was indicated previously in the human capability section.

Socially, there was a perception in all FGDs that the internet accessed through telecenters made it easier for people to tarnish the reputation of others in the community. As one informant put it: “People who hate you can create a bad image of you on social media” (RW 3, FGD 6). Further, it was perceived that prolonged use of internet at the telecenters, such as playing online games and chatting on social media, may result in reduced individual productive activities, as it was indicated previously in the social capability section. In addition, rural women felt that access to immoral content through internet at the telecenters may lead to engagement in undesirable behavior; as it was indicated previously in the social capability section.

Financially, some rural women reported that internet fraud is common through internet services provided in telecenters. Internet fraud can lead to loss of money through misrepresentation and impersonation, as indicated in all FGDs. One participant said: “I have received a lot of messages on social media about new investment opportunities abroad, but I realized that it was a hoax after I consulted the telecenter manager” (RW 4, FGD 3).

Discussion of study findings

The study findings demonstrate that the use of telecenters and their supportive services (training) enabled some rural women to build their capabilities, including social, financial, political and human capabilities.

First, the telecenters enabled some rural women to build their financial capabilities such as, access to markets and business loans and opening up of new job opportunities. Comparable to other prior studies, Alao et al. (2017) found that telecenters enabled rural women to secure employment opportunities, and apply for a loan or funds. The literature showed that most rural women in Sengerema, Kongwa and Kilosa were transforming from being engaged only on farming activities to non-farm income-generating activities and other new economic opportunities (Chenyambuga et al., 2012; Economic and Social Research Foundation, 2015; Lyimo-Macha and Mdoe, 2002). Therefore, these findings necessitate a need for telecenters to support women to engage on both farm and non-farm income-generating activities by using opportunities presented online. Telecenters need to assist women to form groups that can also use online groups to look for markets, and thus, bypassing middlemen, and further be able to access business-related information, job opportunities and capital.
Second, the telecenters extended the human capability of rural women in terms of skills, knowledge, ability to labor through access to information on health, education and human rights. Similar findings were reported in other studies that women used ICT as a medium for accessing information (Williams and Artzberger, 2019). Since most study participants had ordinary secondary education, it was interesting to see that rural women were using telecenter to increase their level of knowledge on several areas that are important to them. There is, therefore, a need to enhance access to quality digital information that would enable women to make informed decisions regarding their welfare.

Third, the telecenters enabled some rural women to build their social communication capability by contacting their families/friends through email and social media. Congruent findings were noted in other studies (Alao et al., 2017; Cummings and Neil, 2015; Williams and Artzberger, 2019) that use of telecenters strengthened social communication. Indications are that rural women can benefit socially through the use of internet at the telecenter to strengthen their communication with families/friends, apart from their heavy productive workload as highlighted by other studies (Chenyambuga et al., 2012; Economic and Social Research Foundation, 2015; Lyimo-Macha and Mdoe, 2002).

Finally, there was limited political participation by rural women through the use of telecenter in this study. Few rural women accessed political information, which motivated them to participate in the election process. This study supports evidence from previous observations that there is limited evidence of the women’s voices in influencing government policy and actions through telecenters (Alao et al., 2017; Cummings and Neil, 2015). Since most rural women are marginalized, telecenters can to conduct regular assessment to gain insight into the issues affecting women. In addition, telecenters need to conduct education sessions aiming at building up women’s capacity to voice their concerns and participate in the decision-making processes in their families and communities. This also necessitate a need for telecenters to introduce programs, (such as online groups) that will encourage women to raise their concerns by using telecenters facilities and other digital means.

On conversion factors, the most obvious finding to emerge from the analysis was the availability of affordable training and internet services in telecenters, which enabled rural women to build their capabilities. This finding is consistent with that of Alao et al. (2017) and Kleine (2010), who found that free training courses enabled rural women to use telecenter services with confidence. Another interesting finding was that the ICT courses enabled rural women to build their ICT skills in the selected telecenters. Therefore, telecenters with good policies and supportive services such as training can promote e-literacy in the rural communities.

The results of this study, however, indicated that the availability of affordable training was impeded by institutional and individual factors. Institutional factors (inadequate computers, space and personnel, unreliable electrical power and slow internet connectivity) limited women from using telecenters. This is consistent with other studies (Chilimo et al., 2011; Gcora et al., 2015; Mbangala and Samzugi, 2014). These institutional factors may affect the availability and quality of telecenter services, and discourage rural women from using the services.

It was interesting to note that individual factors (multiple responsibilities, social status, low-level of education, language barrier, lack of ICT skills and affordability) featured in this study as important conversion factors.

First, education and ICT skills emanated as important conversion factors because most of the study participants had ordinary secondary school education, and ICT as a subject is not taught in most schools. Despite the enactment of the ICT policy for basic education in Tanzania in 2007, most secondary schools in Tanzania are still lagging behind in teaching
ICT as a subject (Crallet et al., 2016; Olan’g, 2015). These results match those observed in earlier studies – that the lack of ICT skills limited the use of telecenters amongst rural women (Gcora et al., 2015). As one of the objectives of a telecenter is to impart ICT skills, this finding points to a need for further research in this area.

Second, the inability to understand the English language, which is used in computers limited some rural women to use the telecenter. Most of the study participants had ordinary secondary education, and thus, they were more comfortable reading and writing in the Swahili language as compared to the English language. Therefore, language (i.e. computer terminologies remaining in English) seems to connect to larger issues about the need to better localize communication technologies too.

Third, similar to previous studies (Gcora et al., 2015), the cost of accessing a telecenter also limited use of the services in this study. Most of the women in this study were small-scale farmers and they had low-level semi-annual incomes of below US$25, therefore, the use of the telecenter appears secondary.

Fourth, it was evident that the women’s perception that they were not eligible to use telecenters affected their use of telecenter in the current study. This is similar to findings of other studies (Gcora et al., 2015; Mbangala and Samzugi, 2014). These perceptions could be a result of “educated women” who attended the computer training offered at the telecenters having been the early users of the telecenters. Therefore, it is important for telecenters to conduct education sessions accompanied with regular assessment to the communities to determine the reasons why they do not use the centers.

Fifth, the finding that rural women lacked time to use telecenters due to their multiple responsibilities, was similar to the findings of other studies in Chile (Kleine, 2010) and Tanzania (Mbangala and Samzugi, 2014). Rural women bear most of the burden of running households and, as such, they have limited time to use telecenters and other self-development activities. Therefore, learning about new technology appears secondary. It is, therefore, imperative to consider all these factors to enhance the use of technology and capability formation in rural communities, otherwise new inequalities could be introduced.

On one hand, rural women were able to convert some capabilities (potential functionings) into achieved functionings, based on choices made to deploy available opportunities. The primary outcome was improved choice, whereby rural women chose to access opportunities online, instead of accessing the same services physically. Other choices were adoption of more formal employment such as working in internet cafés or stationery shops and attending computer training in telecenters. Similarly, Kleine (2010a) found that a respondent in rural Chile made a choice to use the telecenter to virtually visit a friend, instead of having no visit at all. The secondary development outcomes included increased level of income, ability to save money and, to a limited extent, the ability to save time and voice their concerns. This finding broadly supports the work of other studies in this area – that women could increase their level of income, while they had limited opportunities to voice their concerns (Alao et al., 2017; Cummings and Neil, 2015).

On the other hand, an interesting finding was the lost opportunities due to choices made, including health problems, encouraged idleness, access to immoral content, community conflicts and loss of money. Consistent findings from Kenya showed that the use of internet games encouraged idleness and reduced individual productivity (Ndung’u et al., 2011). Consistent findings were reported in Tanzania that some rural women accessed immoral content via telecenters, which motivated them to engage in undesirable behaviors (Mbangala and Samzugi, 2014). Although prolonged use of internet or access to immoral content can occur through several ways such as mobile phones, telecenters need to play a
key role in this. Telecenters need to establish programs that would educate women on benefits and adverse effects of the internet.

**Policy, practical and theoretical implication of the study findings**

The study findings have several policy and practical implications. On policy implications, both national and local government authorities should consider to:

- provide front-end e-government information and services in the local language to encourage use of telecenters; and
- enhance supply of electricity and internet bandwidth in the rural areas.

The practical implications are five-fold, whereby telecenters should:

- Conduct regular assessment to understand rural women needs through various means, such as periodic interviews and questionnaire to the users and non-users of telecenters. This would enable rural women to change the perception that telecenters are meant for an exclusive group of women.
- Guide rural women on how to access relevant websites according to their needs. This initiative can be done through print and electronic fliers, and personal guidance to telecenter users. This would enable rural women to build their human capabilities on the issues that affect their welfare.
- Introduce demand-driven short courses including literacy programs to encourage even women with low-levels of education to use telecenters. This can be done in collaboration with primary and secondary schools to develop such literacy programs.
- Introduce gender-sensitive ICT training programs to build the ICT capacity of rural women. These programs should be flexible to accommodate rural women’s busy schedule.
- Collaborate with public and private organizations and rural communities to develop local content to motivate rural people to use the internet. This content can be disseminated on the telecenter websites, social media and local media such as radio and TV.
- Explore alternative power sources (e.g. solar power) and improve ICT infrastructure in partnership with other public and private organizations.

**Conclusion**

Our findings indicated that rural women used the telecenter and its supportive functions (e.g. internet, training) to build their capabilities through expansion of opportunities in financial, social, human and to a limited extent, political capabilities. However, these capabilities were influenced by a number of conversion factors, which led to different achieved functionings. On the one hand, rural women increased level of income, ability to save money, and to a limited extent, saved time and voiced their concerns. On the other hand, rural women lost opportunities due to choices made to deploy several opportunities offered on the internet, including health problems, prolonged use of internet, which encouraged idleness, access to immoral content, individual conflicts and loss of money. Our analysis indicates that through the capability approach, women could generate few new potential functionings, could use
even fewer achieved functionings, and could lose some opportunities. These findings pointed to larger implications on social and economic asymmetries and new inequalities generated by telecenters. The results are useful for rural telecenters to plan and operate their services to enable rural women to achieve their development outcomes, based on the choices made.

This paper has some limitations. The study assessed the impact of telecenters for building rural women’s capabilities. To adequately demonstrate whether these factors are unique to women, future research should involve both men and women. This study is based on self-reports of rural women, and thus, future research should assess the actual use of ICT, the role of conversion factors on choices, and the effects of individuals’ outcomes on the whole community. An action-mixed research involving an intervention for rural people around technology such as mobile phones and telecenters would be useful.

References


City population (2012), “City population”, available at: www.citypopulation.de/


## Table AI.
Results on the contribution of telecenter for rural women capabilities

<table>
<thead>
<tr>
<th>Capabilities</th>
<th>Conversion factors that influenced capability formation</th>
<th>Conversion factors that affect capability formation</th>
<th>Choices made</th>
<th>Achieved functionings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial capability</td>
<td>Institutional factors free or low-cost ICT courses</td>
<td>Institutional factors inadequate number of computers and trainers</td>
<td>adoption of more formal employment</td>
<td>generate income, save costs on transport and posting letters, loss of money</td>
</tr>
<tr>
<td>self-employment in the ICT sector, access to job opportunities, access to information on markets and business loans, ability to place an order online, internet fraud</td>
<td>affordable internet services</td>
<td>lack of adequate space in the telecenters</td>
<td>attending computer training in telecenters</td>
<td></td>
</tr>
<tr>
<td>Human capability</td>
<td>Business perception</td>
<td>frequent electrical power outages</td>
<td>a virtual visit to specific websites to access information</td>
<td></td>
</tr>
<tr>
<td>access to information on health, education and human rights, compile examination results and prepare reports quickly, prolonged use of computers</td>
<td>language of both the content and training instruction, ICT literacy, low self-efficacy, financial challenges</td>
<td>Individual factors perceptions</td>
<td>“to read online political information”</td>
<td>Limited ability to voice their concerns</td>
</tr>
<tr>
<td>Political capability</td>
<td>Institutional factors limited awareness of political issues, Limited use of social networks to voice their concerns</td>
<td>attending computer training in telecenters</td>
<td>“sending email” or “use social media”</td>
<td>encouraged idleness, decline in good behavior, tarnish the reputation of others</td>
</tr>
<tr>
<td>Social capability</td>
<td>Institutional factors limited awareness of political issues, Limited use of social networks to voice their concerns</td>
<td>limited awareness of political issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>communicate with their families/friends through social media, playing online games, access to immoral content, tarnish other people’s images</td>
<td>attending computer training in telecenters</td>
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