e-Bangi Faculty of Social Sciences and Humanities Universiti Kebangsaan Malaysia
Journal of Social Sciences and Humanities

eISSN: 1823-884x

*Volume 20, Issue 4, DOI: https://doi.org/10.17576/ebangi.2023.2004.30*

*Article*

# Building a Sustainable Future: Conceptualizing the Sarawak Digital Community Center (DCC) Development Model

Wee Chiat Lee[1,*], Azlina Bujang[2], Sharin bin Sulaiman[3], Siti Hafizah Binti Ambi[4] & Adriana Amanda Anak Nicholas[5]

[1]Sustainable Co-operative Business Group (SCBG), Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Sarawak Branch, Samarahan Campus, 94300 Kota Samarahan, Sarawak, Malaysia
[2]Sustainable Co-operative Business Group (SCBG), College of Computing, Informatics, and Mathematics, Universiti Teknologi MARA (UiTM) Sarawak Branch, Samarahan Campus, 94300 Kota Samarahan, Sarawak, Malaysia
[3]College of Computing, Informatics, and Mathematics, Universiti Teknologi MARA (UiTM) Sarawak Branch, Samarahan Campus, 94300 Kota Samarahan, Sarawak, Malaysia
[4]Academy of Language Studies, Universiti Teknologi MARA (UiTM) Sarawak Branch, Samarahan Campus, 94300 Kota Samarahan, Sarawak, Malaysia
[5]Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Sarawak Branch, Samarahan Campus, 94300 Kota Samarahan, Sarawak, Malaysia

*Corresponding Author: wenchiat@uitm.edu.my

Received: 15 May 2023
Accepted: 29 September 2023

**Abstract:** This research paper endeavors to construct a comprehensive conceptual model for steering the sustainable evolution of Sarawak Digital Community Centers (SDCCs). The main emphasis is on figuring out crucial elements and procedures necessary for long-term sustainability and the constructive transformation of communities. The report examines the current state of Sarawak's Digital Community Centres in-depth and evaluates how they could support the Sustainable Development Goals (SDGs) listed in the 2030 Agenda for Sustainable Development of the United Nations. Three basic pillars—economic sustainability, environmental sustainability, and social sustainability—support our conceptual framework for sustainable development. Within this paradigm, we investigate the crucial functions played throughout the SDCC lifetime by governmental assistance, collaborative efforts, and technology innovation. To ensure relevance in a constantly changing digital environment, we also stress the crucial need of cybersecurity education and adaptability to emerging technology. Using a mixed-methods approach that combines thematic analysis and phone interviews, the Sarawak Digital Community Centres want to acquire insights into the strengths, weaknesses, opportunities, and dangers they are currently facing. The SWOT analysis framework draws on this assessment to generate its suggestions and policy directives for sustainable development. In conclusion, Sarawak's Digital Community Centres have enormous potential to strengthen local communities, promote inclusivity, and promote societal and economic growth. The suggested model offers stakeholders and policymakers a road map for strengthening SDCCs and maximizing their impact on sustainable community development in the age of the digital economy.

**Keywords:** Sarawak Digital Community Center (SDCC); Sustainable Development Goals (SDGs); SWOT analysis; Economic Sustainability, Environmental Sustainability; Social Sustainability

## Introduction

Digital Community Centers (DCCs) in Sarawak serve as pivotal hubs for empowering local communities through technology. The terms "digital community center" and "telecenter" are used interchangeably to describe these essential community-based facilities, providing underserved and marginalized populations with access to information and communication technologies (ICTs). Conveniently situated within communities, these centers offer computer technology and internet connectivity, ensuring easy access for community members (Prado and Janbek, 2013). Their primary function is to introduce technology to the community and promote its practical application in daily life (Halim & Noor, 2021). DCCs, equipped with computers and internet access, transcend geographical barriers to bring digital connectivity and online services to remote and rural areas in Sarawak, Malaysia. Their primary mission is to bridge the digital divide, ensuring that information and communication technologies are accessible to all while strategically catalyzing socio-economic development through digital inclusion initiatives. This paper embarks on a journey to construct a comprehensive conceptual model for the sustainable development of the Sarawak Digital Community Center. The model will delineate the fundamental components and intricate processes essential for fostering the center's long-term viability and its profound positive impact on the community it serves. Measuring the sustainability of the Sarawak Digital Community Center will revolve around its capacity to generate revenue through ICT-enabled services, ensuring its enduring presence within the community and its contribution to socio-economic well-being (Noor, 2021 & Tan et al., 2020).

In the context of Malaysia, telecenters, known under various names like Rural Internet Centre (Pusat Internet Desa or PID), USP Communication Centre (UCC), and Rural Broadband Library, play a similar role (Tahir, Malek, & Ibrahim, 2016). The Rural Internet Program, initiated in March 2000, started as a pilot project in Selangor's Sungai Air Tawar and Sarawak's Kanowit, subsequently expanding to other regions. Operated under the Communications Sector of the Ministry of Energy, Water, and Communications, this program aims to bridge the digital divide and ensure equitable access to information and knowledge for communities. Moreover, DCCs, with their focus on digital literacy and connectivity, hold immense potential for contributing significantly to multiple Sustainable Development Goals (SDGs) outlined in the United Nations' 2030 Agenda for Sustainable Development. These centers can address No Poverty (SDG 1) by imparting digital skills, enabling access to online job opportunities, and facilitating participation in the digital economy, ultimately enhancing livelihoods. Additionally, they support Quality Education (SDG 4) by serving as digital education hubs, offering extensive online learning resources, e-learning platforms, and training programs, particularly benefiting remote and underserved regions. Furthermore, DCCs promote Gender Equality (SDG 5) by ensuring gender-inclusive access, thereby helping to bridge the digital gender gap. They also foster Industry, Innovation, and Infrastructure (SDG 9) by fostering innovation and collaboration, serving as tech incubators, and providing access to digital tools and resources. Moreover, DCCs enhance Sustainable Cities and Communities (SDG 11) by offering digital services and resources that boost community engagement and support sustainable urban development. Finally, they contribute to Peace, Justice, and Strong Institutions (SDG 16) by providing access to information and e-government services, facilitating citizen engagement with government institutions, enhancing transparency, and promoting inclusive governance. The establishment and operation of DCCs necessitate collaborative efforts among government entities, the private sector, and civil society organizations, making them crucial for advancing the SDG Partnership for the Goals.

This paper aims to examine the current landscape of Sarawak's Digital Community Centers and develop a robust conceptual model for their sustainable development. The resulting insights will inform the formulation of policies and targeted solutions to enhance the sustainability of the Sarawak Digital Community Center. As multifaceted instruments, DCCs hold the potential to substantially contribute to multiple SDGs, fostering social and economic development, promoting inclusivity, and empowering communities with essential digital skills and resources. The findings will also serve as a guiding compass for policymakers and stakeholders, aiding in the creation of effective strategies to promote digital inclusion and sustainable development through these transformative centers**.**

## Literature Review

In line with the State's digital economy transformation initiative, one of the main objectives of establishing DCCs is to empower the community, especially in rural areas. Sarawak has introduced digital literacy programs at DCCs to help individuals, particularly those from underserved communities, gain essential digital skills. These programs cover basic computer literacy, internet usage, online safety, and more advanced skills such as coding, graphic design, and digital marketing. Initially, the Sarawak Digital Center was set up as a solution for the digital divide. Telecenters contribute significantly to rural community development in terms of economic, social, and educational aspects (Skaletsky, 2013). They also facilitate community access to ICT services (Halim & Noor, 2021). The facilities and services offered by telecentres can have a profound impact on the lives of people in underserved areas, empowering them with knowledge, connectivity, and access to various opportunities in the digital age. Based on a literature review, this paper addresses previous research studies that highlight various contexts of the conceptual framework for the sustainable development of telecenters. These conceptual frameworks will serve as the foundation for our suggested frameworks within the context of Sarawak, a state that is progressively moving towards a digital economy by the year 2030.

Figure 1 shows the conceptual model of technical change for telecenter effectiveness illustrates the connections between the three processes. These connections were drawn using the Linear Model of Innovation. When there is advancement in R&D or governmental policies, invention exists in terms of the involved procedures and telecenter efficacy. Invention is also aided by the effective use of technological knowledge. Innovation happens in addition to invention when there is technological sustainability, cooperation, and knowledge. The provision of suitable technological facilities to enable service delivery improves the rate of effectiveness and necessitates updated technical knowledge on effective services in terms of technological sustainability. This in turn raises the bar for both creation and innovation (Makri et al., 2010). To create uniqueness, innovation strives to improve or develop the quality of goods, procedures, or services. ICT infrastructure, the status of technology at the time, and market demand for services can all be categorised as factors of innovation in the context of telecenter operations (Crespi & Pianta, 2008). When innovation is at a high level, prices are reasonable, and services are of a high standard, diffusion takes place. This might increase motivation to use, and if it does so consistently over time, personal motivation will increase, resulting in efficacy.

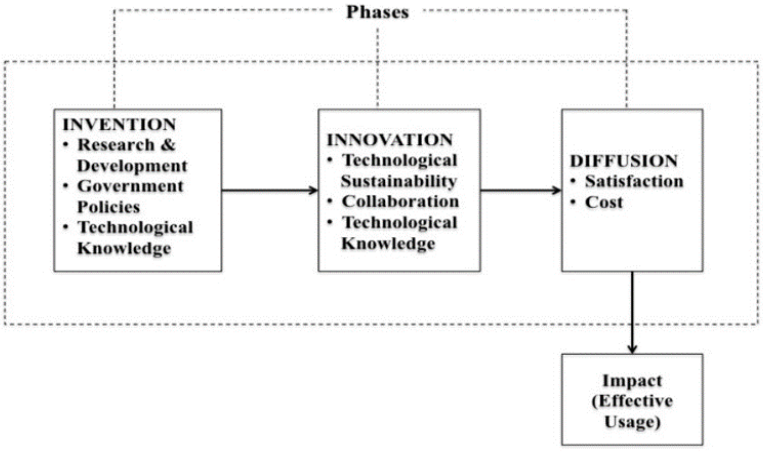


Figure 1. Conceptual model of technological change for telecenter effectiveness

A conceptual model for the psychological empowerment of telecenter users was put forth by Zahurin Mat Aji (2010). It provides academics with a conceptual framework for investigating the psychological empowerment of telecenter users. This model is built using the intrapersonal, interpersonal, and behavioural empowerment constructs, which are consistent with PE Zimmerman's theory to respond to the subsequent research inquiries: (i) How might intrapersonal elements contribute to telecenter users' empowerment? How might interactional aspects help telecenter users feel more empowered? How might behavioural aspects help telecenter users feel more empowered?. This conceptual framework focuses on the telecenter based on the

product life cycle, which is divided into four main stages; introduction, growth, maturity, and decline, which can be illustrated below:

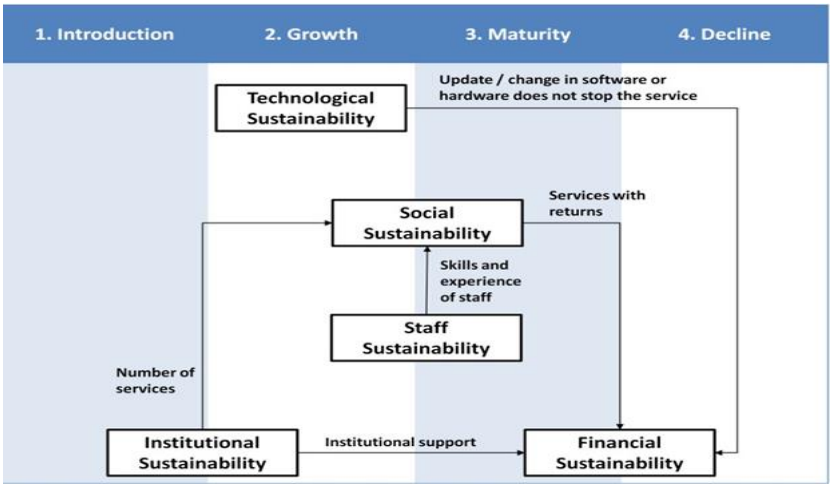


Figure 2. The key relationships between the different types of sustainability across the four stages of the telecenter lifecycle

According to Niranjan M. (2009) and Chong et al. (2020), "the sustainability concept of DCCs is the capacity to generate enough revenue from ICT enabled services to ensure continued existence in the community, fulfilling the socio-economic well-being of society." A Digital Community Center's sustainability idea centres on ensuring its long-term viability, relevance, and beneficial effects on the community it serves. Beyond initial deployment, a sustainable Digital Community Centre focuses on ongoing development, adapting to shifting demands and technologies, and ensuring the resources required for its operation. Economic sustainability, social sustainability, and environmental sustainability are its three foundations. Employment possibilities, eradicating poverty, maintaining economic growth, and building out infrastructure are all aspects of economic sustainability (Van Dyk, 2018). In the context of DCC, social sustainability refers to social activity that focuses on forging bonds and establishing bridges amongst rural communities. Rural communities must have equal access to the facilities of DCCs, and their welfare must be protected. According to Van Dyk (2018) also, environmental sustainability refers to the management and prudent level of exploitation and use of finite natural resources.

In addition to natural resources, the DCCs or telecentres element of environmental sustainability also considers human resources, the geographic placement of telecentres, and the fundamental infrastructure offered (Noor, 2021). A strong ecosystem must be created to support the implementation of the DCCs by all stakeholders and policymakers who are concerned with developing the DCCs. The good ecosystem comprises good infrastructure that supports the DCCs' operations as well as good access to electricity, the internet, and other utilities. The DCCs can't work well without a strong ecology. Additionally, the DCCs' environmental sustainability must support eco-friendly programmes that adhere to the Sustainable Development Goal of the UN. The green initiatives emphasise preventing resource waste and using renewable energy to support the use of clean, sustainable energy.

## Methodology

In this research paper, the methodology section describes the research design, data collection procedures, and data analysis strategies used to assess the contribution of the Sarawak Digital Community Centre (SDCC) to closing the digital divide. The telephone interview method was used to obtain participant comments, and all telecenters around Sarawak were contacted, with only 57 responding from the staff. The method was employed to determine the crucial components of the SWOT analysis, which depicts a table with four quadrants for the representation of opportunities, threats, weaknesses, and strengths. The SDCC's strengths and weaknesses were compiled based on thematic analysis, with strengths being internal elements that enhance value. The potential and risks presented by the SDCC were revealed by content analysis. The sections that follow will go over the findings, provide a SWOT analysis methodology, and make some recommendations to give readers

a thorough knowledge of the center's role in sustainable community development within the context of the digital economy. To ensure clarity, a large amount of detail is presented in sub-sections according to topic.

## Findings and Discussion

The SWOT analysis is important to evaluate the Digital Community Centers (DCCs) competitive position and to develop strategic planning for the DCCs to ensure their sustainability. Four categories of SWOT analysis—strengths, weaknesses, opportunities, and threats—are identified and discussed as shown in Figure 3.

| **Strengths** | **Threats** |
|---|---|
| 1. Professional and well-trained digitally savvy staff.<br>2. Strong government support for programmes.<br>3. Personalized competency programs. | 1. Competition from other Internet tools.<br>2. Cybersecurity risks |
| **Weaknesses** | **Opportunities** |
| 1. Limited staff and class modules to train rural communities.<br>2. Limited computer facilities for growing rural population. | 1. Growing population of E-commerce and online users in rural areas.<br>2. Emergence of new technologies such as TikTok and Lazada platform. |

Figure 3. SWOT analysis of the Sarawak Digital Community Center

The success of the DCCs lies in their professional and well-trained staff who are committed to helping the communities in the area use the internet and computers at the DCCs. The staff teaches these communities how to use computers and the internet, and the services are provided for free to rural communities. Moreover, there is strong government support for the programs at DCCs. The DCC staff administers a variety of free programs for rural communities, including the entrepreneurship and ICT programs. The staff effectively collaborates with the government to develop and implement good programs for rural communities. However, the limited number of staff in the DCCs results in a lack of and limited class modules. In some rural areas with a large population, the limited number of class modules and staff may not adequately benefit the communities in the area, leading to a lack of staff to handle programs for the communities. Moreover, there is a limited budget for the DCC's staff to organize big programs that cater to a large population. The small rooms at DCCs may not be able to cater to large populations. It is advisable for the DCC's staff to calculate the number of populations attending the programs and have a good plan for programs throughout the year. Then, the DCC's financial managers can request funding from the government to organize programs that benefit the local communities.

New and emerging technologies, such as the Tik Tok and Lazada platforms, can enable local communities to market their products and services in the international market. The DCC's staff can teach the local communities to use the Tik Tok and Lazada platforms and increase the usage of computers and internet facilities at the DCCs. The growing rural population's interest in using an e-commerce platform to market their products is also an opportunity for DCCs. DCCs can create awareness of e-commerce and educate the communities to use e-commerce technologies to increase the market share of the products produced by the rural communities. As internet access improves and new mobile tools emerge, this poses a challenge and threat to the use of DCCs. The increase in possession of new mobile tools and better internet access as a result of government rural internet initiatives reduces the number of rural communities visiting DCCs for internet usage. By planning more community-beneficial entrepreneurship and ICT programs and offering the training those rural communities need, DCCs can work in conjunction with the government to increase the number of visits from rural communities to DCCs. Another threat is cybersecurity. The increase in cybersecurity crimes such as online theft, Macau scams, and love scams can threaten the security of internet users. Thus, the DCC's staff can teach the local rural communities about the importance of cybersecurity and data protection through

a campaign. DCC's staff also needs to ensure internet users' data is protected by using sophisticated security protection features on their computers located at DCCs.

Proposed conceptual framework (Figure 4) for sustainable DCCs identifies three pillars of sustainability: economic, environmental, and social. The economic pillar focuses on creating sustainable economic development for the local community, while the environmental pillar focuses on reducing the environmental impact of DCCs. The social pillar focuses on promoting social progress that recognizes the needs of everyone in the community. The framework emphasizes the importance of interdisciplinary and multi-stakeholder relations to achieve sustainable development. The DCCs need to plan and implement programs that address these three pillars of sustainability to ensure their long-term success.

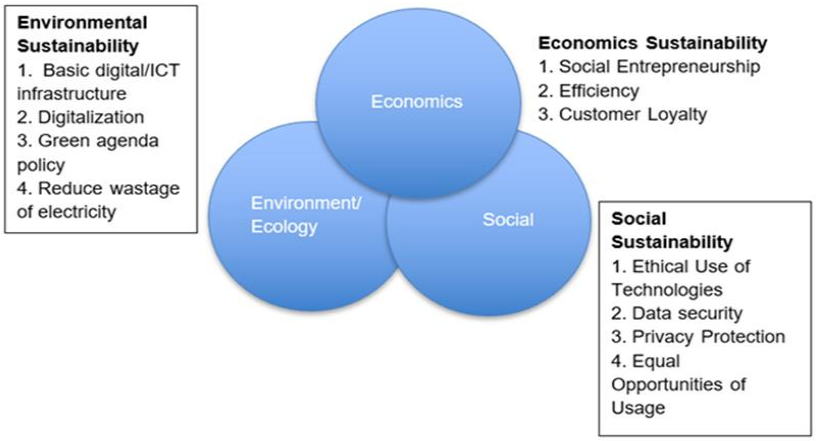


Figure 4. Sustainable Sarawak Digital Community Centre (DCC) Conceptual Model

In the realm of economic sustainability, the concept encompasses a multifaceted approach aimed at fostering employment opportunities, alleviating poverty, nurturing sustained economic growth, and bolstering infrastructure development (Van Dyk, 2018). Within the context of this research, economic sustainability is intricately linked with the sphere of social entrepreneurship. The Digital Community Centers (DCCs) are envisioned to yield outcomes encompassing job creation, enhanced community infrastructure, the perpetuation of income generation avenues for local entrepreneurs, and the promotion of improved educational prospects within local communities. These components collectively epitomize the dimensions of economic sustainability that are inherent in the Digital Community Center initiative. Furthermore, it is imperative for these centers to demonstrate the capability to generate wealth autonomously, given the constraints of limited government funding. This financial self-sufficiency is a pivotal element in ensuring the sustained viability of these Digital Community Centers.

Moving on to environmental sustainability, this facet pertains to the responsible management and judicious utilization of scarce natural resources (Van Dyk, 2018). In the context of DCCs, environmental sustainability extends its purview to encompass not only natural resources but also human resources, geographical considerations, and fundamental infrastructure provisions. Crucial infrastructure elements such as reliable access to electricity, robust internet connectivity, telecom infrastructure, and a well-developed road network play pivotal roles in facilitating the successful operation and enduring environmental sustainability of DCCs. Empirical studies have underscored that the absence of robust infrastructure and inadequate power supply can imperil the viability of these centers. The limitations in ICT infrastructure and the challenges associated with inconsistent electricity supply and limited internet access stand as formidable barriers to achieving environmental sustainability (Lwoga and Chigona, 2019). It is imperative to recognize that the provision of basic infrastructure is indispensable, as it directly influences the commitment of DCC managers and, consequently, the effectiveness of the DCCs. Furthermore, Digital Community Centers possess the potential to align with the green agenda policy and contribute to the Sustainable Development Goals outlined by the United Nations (UNSDG 2030) by implementing measures to curtail electricity wastage and harnessing

Information, Communication, and Technology for environmental monitoring and climate change mitigation. These concerted efforts are pivotal in safeguarding the environment.

Lastly, social sustainability encompasses a spectrum of dimensions such as equality, equity, access to fundamental services, healthcare, safety, education, food security, and the overall quality of life (Van Dyk, 2018). In the context of DCCs, social sustainability converges on the concept of social capital, with a particular emphasis on bonding and bridging capital. This pertains to the cultivation of trust, close-knit relationships, acquaintanceships, and shared beliefs within the local community. The social sustainability of DCCs hinges upon the presence of robust trust and a cohesive relationship between their staff and the local community. This synergy serves as a catalyst for collaborative endeavors geared toward achieving predefined objectives, such as the successful execution of program initiatives. In essence, social sustainability within the realm of Digital Community Centers revolves around fostering a sense of social cohesion and collective commitment, which are indispensable for the realization of desired outcomes.

To be socially sustainable, DCCs must also respect and defend human characteristics. For instance, the DCCs must guarantee online users' data security and privacy protection, responsible technology use, and equal access to computers and the internet for all communities. To achieve social sustainability, there must be strong relationships between the management committees and the DCC managers in addition to respect for all communities. The efficacy of telecentres/Digital Community Centres is also influenced by the calibre of contacts between telecentre managers and management committees (Murray et al., 2001). The level of commitment between telecentre managers and management committees has been shown to be negatively impacted by low or inadequate levels of engagement between telecentre managers and management committees (as well as the lack of management committees). As opposed to this, other significant stakeholders have productive working relationships (Raul and Colle, 2002).

## Conclusion

The possibility for sustainable growth of Digital Community Centres (DCCs) in Sarawak has been examined in this research report. In order to close the digital divide and give isolated and rural populations in Sarawak access to information and communication technology, DCCs function as crucial hubs for digital connectivity and online services. The study also offers a thorough conceptual framework for the long-term growth of the Sarawak Digital Community Centre. This model describes important elements and procedures required for the centre's long-term success and beneficial effects on the community. The ability of the centre to make profits from ICT-enabled services, assure their continuous existence, and make a positive impact on the socioeconomic well-being of the surrounding community are indicators of sustainability. Additionally, the study found that DCCs are crucial to the accomplishment of numerous Sustainable Development Goals (SDGs) listed in the 2030 Agenda for Sustainable Development of the United Nations. These objectives include, among others, reducing poverty, ensuring high-quality education, promoting gender equality, encouraging industry and innovation, and fostering sustainable urban development.Also included in the framework for sustainable digital community centres in Sarawak are three pillars for sustainability: social, environmental, and economic. Economic sustainability entails fostering entrepreneurship, expanding employment options, and maintaining local income generating. Environmental sustainability places a strong emphasis on sensible resource management, including both human and natural capital. Building ties in the community, fostering trust, and providing fair access to resources and services are the cornerstones of social sustainability. The study emphasises the value of ongoing government assistance.

***Acknowledgement:*** This study did not receive any funding from any organisation and the study and write-up are entirely the efforts of the authors. However, the authors acknowledge the time provided by Universiti Teknologi MARA (UiTM) Sarawak branch to write this paper.

## References

Ab Halim, A., & Mohd Noor, M. (2021). Capability of telecentre in developing rural community. *E-Proceedings of the 8th International Conference on Public Policy and Social Sciences (ICoPS) 2021,*

Universiti Teknologi MARA (UiTM) Seremban Campus, Malaysia., 1-15. https://ir.uitm.edu.my/id/eprint/54192/1/54192.pdf

Aji, Z. M., Yusop, N. I., Ahmad, F., Ab Aziz, A., & Jawad, Z. M. (2016). Conceptual model of technological change on telecentre effectiveness. *Journal of Computing and Information Science, 9*(2), 10-18, https://doi.org/10.5539/cis.v9n2p10 .

Lwoga, E. T., & Chigona, W. (2019). Perception, usage and barriers towards the utilization of the telecentre among rural women in Tanzania. *Journal of Information, Communication, and Ethics in Society, 17*(1), 2-16. https://doi.org/10.1108/JICES-01-2018-0004.

Mat Aji, Z., Mohd Affendi, S. A., Sheik Osman, W. R., & Yusop, N. I. (2010). A conceptual model for the psychological empowerment of telecenter users. *Computer and Information Science Journal*, *3*(3), 71-79. https://doi.org/10.5539/cis.v3n3p71

Mishra, G. (2018). Understanding the role of rural entrepreneurs in telecentre sustainability: A comparative study of the Akshaya and eSeva projects in India. *Technology Innovation Management Review*, *8*(1), 16-23.

Murray, B., Murray, C., & Brooks, S. (2001). Training telecentre managers, staff, and users. In L. Colin & W. David (Eds.), *Perspectives on distance education telecentres: Case studies and key issues* (pp. 1-247). The Commonwealth of Learning Publisher.

Noor, M. M. (2021). A sustainable rural telecenter concept on sustainability pillars. *Journal of Sustainable Development, 14*(6), 42-53. https://doi.org/10.5539/jsd.v14n6p42

Prado, P., & Janbek, D. M. (2013). Telecenter web portals in Latin American and Arab Nations: A comparative analysis. *The Journal of Community Informatics*, *9*(1). https://doi.org/10.15353/joci.v9i1.3186

Raul, R., & Colle, R. D. (2002). *Themes and issues in telecenter sustainability*. Development Informatics (Working Paper No.10). Institute for Development Policy and Management, University of Manchester.https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=75e3c798d9dd45852773595d089e261651d9b2c6

Skaletsky, M. (2013). *Essays on the digital divide-explorations through global, national, and individual lenses* [PhD Thesis, Bentley University]. Massachusetts, USA. https://scholars.bentley.edu/cgi/viewcontent.cgi?article=1001&context=etd_2013

Tahir, Z., Malek, J. A., & Ibrahim, M. A. (2016). Developing smart ICT in rural communities in Malaysia through the establishment of telecenters. *e-Bangi Journal of Social Sciences and Humanities*, *11*(1), 227–242.

Tan, C. E., Bala, P., Lau, S. P., & Wong, S. M. (2020). The TPOA telecentre: A community sustainable telecentre architecture. *International Journal of Advanced Computer Science and Applications*, *11*(8), 182-192. https://doi.org/10.14569/IJACSA.2020.0110824

Van Dyk, L. (2018). The manifestation of sustainability in social enterprises. *The International Journal of Sustainability Policy and Practice*, *14*(1), 1-16. https://doi.org/10.18848/2325-1166/CGP/v14i01/1-16