Empowering Women through Digital Cooperation: A Case Study of Sarawak Women's Cooperatives and ICT Integration

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Abstract
This conceptual case study explores the transformative potential of Information and Communication Technology (ICT) in empowering women, focusing specifically on women's cooperatives in Sarawak, Malaysia. Women's cooperatives in Sarawak serve as crucial platforms for addressing gender disparities and economic inequalities. This study investigates how the integration of ICT can enhance the capacity, outreach, and impact of these cooperatives. By examining successful global examples and the specific challenges faced by cooperatives, the paper highlights how ICT tools can improve communication, capacity building, market access, and resource management. It also addresses obstacles such as digital divides, the need for effective training, and cultural and linguistic barriers. The aim is to provide insights into leveraging ICT to create more inclusive and equitable opportunities for women in Sarawak, showcasing technology as a catalyst for socio-economic empowerment and advancement.
Keywords: Women's Cooperatives, Ict Integration, Women's Empowerment, Gender Equality, Case Study, Digital Cooperation.

Introduction
The rapid advancement of Information and Communication Technology (ICT) has transformed numerous sectors, yet its potential to drive women's empowerment through cooperative models remains underexplored. Women's cooperatives, designed to combat gender disparities and economic inequalities, have emerged as vital platforms for fostering economic and social advancement among women. These cooperatives are instrumental in providing women with collective resources, skills development, and market access, thereby addressing systemic barriers and promoting gender equality (Khumalo, 2014; Sen, George, Ostlin &

Ramos, 2007). In this context, the integration of ICT into the operations of women's cooperatives presents a promising avenue for enhancing their effectiveness and reach. By leveraging digital tools and strategies, these cooperatives can significantly improve their operational efficiency, expand their outreach, and amplify their impact. ICT can facilitate better communication, streamline administrative processes, and open up new opportunities for market engagement and knowledge sharing. This study focuses on women's cooperatives in Sarawak, Malaysia, aiming to explore the transformative potential of ICT integration within these groups. Understanding how ICT can be effectively incorporated into their activities is crucial for several reasons. Firstly, it offers insights into overcoming existing challenges and harnessing the benefits of technology to create more inclusive and equitable environments for women. Secondly, the study provides valuable lessons for similar cooperatives globally, illustrating how technological advancements can support women's economic empowerment and social progress. By examining successful implementations and addressing the challenges faced, this research aspires to highlight the significant utility and effectiveness of ICT in women's cooperatives. It seeks to provide actionable recommendations for leveraging digital tools to enhance the capabilities of these cooperatives, ultimately contributing to broader gender equity and sustainable development goals.

Problem Statement
Despite the growth of women's cooperatives as vehicles for addressing gender disparities and economic inequalities, there remains a critical gap in understanding the full potential of integrating Information and Communication Technology (ICT) within these cooperatives to enhance their capacity and to empower women. In the era of rapidly advancing digital technology, women's cooperatives hold immense potential for fostering gender equality and women's economic empowerment (Sarkki et al., 2021). Women entrepreneurship in particular, has attracted a lot of definitions and basically, the women entrepreneurs in Sarawak would start with a small business before they got involved with bigger ones (Kasuma et al., 2015). In the same study, four areas are seen to be positively correlated to women's involvement in cooperative business and the areas are interest, life having necessary skills and environmental influence. However, the life impulse and having necessary skills have a high contact force against their involvement. Thus, recognizing the importance of the role of women in the cooperative movement cannot be denied, especially within Sarawak's diversity of races and ethnicities.

While women's cooperatives have emerged as vital platforms for addressing gender disparities, the challenges and barriers encountered during the integration of ICT remain inadequately explored. There is a pressing need to understand the obstacles and hurdles that women's cooperatives encounter when adopting digital technologies, such as access issues, digital literacy gaps, and cybersecurity concerns (Chaudhari & Bansal, 2022). The limited availability and affordability of ICT infrastructure and resources, as well as the lack of digital literacy skills among women in cooperatives, hinder their ability to fully integrate and harness the power of ICT tools in their daily operations (Ogato, 2013; Warschauer, 2004).

Besides, the women's cooperatives may lack the necessary skills and knowledge to effectively utilize ICT tools in their daily operations (ESCAP, 2007; Obayelu & Ogunlade, 2006). Another challenge is the lack of technical support and training opportunities that are specifically tailored to women's cooperatives (Dodson, Sterling & Bennet, 2013; London, Anupindi &

Sheth, 2010). This research aims to identify and analyse the challenges and opportunities associated with ICT integration in the women's cooperatives, with a focus on how this synergy can promote economic and social empowerment for women. By investigating successful cases and obstacles faced globally, this study seeks to provide actionable insights that can inform policies and strategies for leveraging digital cooperation as a catalyst for gender inclusivity and equitable opportunities within women's cooperatives.

Literature Review

Women's cooperatives have long been recognized as a powerful tool for empowering women and promoting gender equality. These cooperatives provide women with opportunities to collaborate, support each other, and collectively participate in economic activities. They allow women to gain economic independence, build networks, and enhance their entrepreneurial skills. Furthermore, the integration of Information and Communication Technology in the daily operations of women's cooperatives has been identified as a potential avenue for further empowerment. According to a study conducted by the United Nations, groupings of women in cooperatives could enable them to overcome economic barriers and actively contribute to their families and organizations' well-being (Theeuwen et al., 2021).

One example of the impact of women's cooperatives is seen in the case of Turkey. Through their contribution to women's ability to earn a living, women's cooperatives have the potential to make a significant contribution to their empowerment (Joshi, 2022). In addition to their historical significance, women's cooperatives have also achieved notable achievements in empowering women. For example, studies have shown that women who are part of cooperatives experience increased income, improved access to markets, and enhanced decision-making power within their cooperatives (Bharti, 2021; Dohmwirth & Liu, 2020; Tesfay & Tadele, 2013; Ghebremichael, 2013). These achievements highlight the transformative potential of women's cooperatives in promoting women's empowerment.

ICT tools have become increasingly important for women's cooperatives, offering a wide range of benefits while also presenting certain challenges. One key area where ICT tools have been utilized by women co-operatives is in improving access to information and knowledge (Fatah, Asnawi, Segaf, & Parmujianto, 2023). Studies have shown that access to information is crucial for women's empowerment and can contribute to their socioeconomic advancement (Chatterjee, Gupta & Upadhyay, 2020). By utilizing ICT tools, women co-operatives can access valuable information on market trends, best practices in their industries, and relevant government policies (Verma, 2020). Furthermore, ICT tools enable women co-operatives to connect with a wider network of resources and partners, fostering collaboration and knowledge sharing (Kayabaş, 2020). The impact of ICT tools on gender social relations within women co-operatives cannot be overlooked. Research has shown that the adoption of ICT tools within women co-operatives can lead to positive changes in gender dynamics. For example, ICT tools can provide women with a platform to express their voices and opinions, allowing them to challenge traditional gender roles and norms within the cooperative (Bala & Singhal, 2018). Here's a review of the ICT tools commonly embraced, their benefits, integration challenges, and emerging trends:

Table 1
ICT Tools, Benefits, Challenges and Emerging Trends

ICT Tools	Benefits	Challenges	Trend
Mobile Application	Mobile apps provide convenient access to resources, training materials, and networking opportunities. They enable cooperative members to engage in online marketplaces, access financial services, and participate in e-learning initiatives (Fatah et al., 2023).	Limited access to smartphones and mobile networks in certain regions may hinder adoption. Ensuring digital literacy among members is crucial (Chatterjee et al., 2020).	There's a growing trend towards developing user-friendly, localized mobile apps tailored to the specific needs of women's cooperatives.
Social Media Platforms	Social media facilitates communication, marketing, and networking. Cooperatives can use platforms like Facebook, Instagram, and LinkedIn to connect with customers, share success stories, and promote products (Verma, 2020).	Maintaining consistent online presence and addressing negative feedback can be time-consuming. Additionally, privacy and security concerns may arise.	Cooperatives are increasingly using social media for advocacy, branding, and crowdfunding campaigns (Mikwa, 2020).
Cloud Computing	Cloud services enable data storage, collaboration, and remote work. Cooperatives can access shared documents, manage finances, and conduct virtual meetings (Haselmann, Vossen, Lipsky & Theresia, 2011).	Limited internet connectivity and cybersecurity threats are concerns (Fares and Mamine, 2023). Data privacy and confidentiality must be rigorously maintained.	More cooperatives are adopting cloud-based accounting and project management tools to streamline operations (Calzada, 2021).
E-learning Platforms	E-learning platforms offer training and skill development opportunities. Members can access courses on entrepreneurship, financial literacy, and cooperative management (Kayabaş, 2020).	Ensuring digital literacy and providing access to necessary devices can be challenging, especially in rural areas (Chatterjee et al., 2020).	Customized e-learning modules catering to the specific needs and goals of women's cooperatives are on the rise.
Online Marketplaces	Online marketplaces expand market reach, enabling cooperatives to sell products globally. They reduce intermediaries thus increasing profits (Li, Zhang, Chiu, Liu & Sethi, 2019).	Trust and reputation-building on e-commerce platforms are vital. Logistic challenges, payment gateways, and digital marketing expertise are areas that require attention (Li et al., 2019).	Women's cooperatives are increasingly leveraging online marketplaces, focusing on eco-friendly and handmade products.
Data Analytics and Artificial Intelligence	Data analytics and AI help cooperatives make data-driven decisions, predict market trends, and optimize supply chains (Chukkapalli et al., 2020).	Resource constraints and lack of expertise in data analysis can be barriers (Chukkapalli et al., 2020).	A growing trend is the use of AI chatbots for customer support and predictive analytics to forecast demand (Lee, 2020).

In summary, ICT tools offer significant benefits to women's cooperatives, including enhanced market access, capacity-building, and more efficient operations. For Sarawak's women's cooperatives, these advantages are particularly impactful as they help address regional challenges and expand opportunities for local women. However, challenges related to digital literacy, connectivity, and cybersecurity would still remain, particularly in rural and underserved areas of Sarawak. The trend has shifted towards developing more tailored and localized ICT solutions that address the unique needs of Sarawak's women's cooperatives. Such targeted approaches hold the potential to foster greater empowerment and economic independence among women in Sarawak, contributing to broader socio-economic progress in the region and beyond.

Research Questions

1. What are the challenges that hinder the integration of ICT into the operations of the activities of women's cooperatives?
2. What are the potential benefits of ICT integration into the operations of women's cooperatives?

Objectives

1. To identify and analyse the challenges hindering the integration of ICT into the operations of women's cooperatives in Sarawak.
2. To evaluate the potential benefits of ICT integration for enhancing the operations and impact of women's cooperatives in Sarawak.

Methodology

This conceptual case study paper will employ a qualitative research methodology to examine the integration of ICT into the operations of women's cooperatives in Sarawak. The research will include a thorough literature review, document analysis, and in-depth interviews with key stakeholders from selected Sarawakian women's cooperatives that adopted and planning to use ICT tools.

The study will focus on cooperative initiatives across diverse sectors such as agriculture, crafts, finance, and education, providing a comprehensive perspective on how ICT is being utilized in these areas. By highlighting successful examples and gathering insights from local experiences, this paper aims to offer a nuanced understanding of the impact of ICT on the operations and outcomes of women's cooperatives in Sarawak.

Analysis

To grasp the challenges in deploying Information and Communication Technology (ICT), refer to Figure 1 which summarizes four key issues based on interview results. The figure highlights problems with infrastructure (like poor internet and unreliable electricity), digital literacy (such as lack of training and resistance to new tech), financial constraints (high costs and ongoing expenses), and technical support (difficulty accessing help and managing complex systems). These issues provide a clear overview of the main obstacles to effective ICT use. The Sarawak government played a major contribution in providing and fulfilling the digital divide in terms of infrastructure and training centre. Lee et al. (2023) emphasised this through the

potential of Sarawak's Digital Community Centres to enhance local communities, promote inclusivity, and drive both societal and economic development.
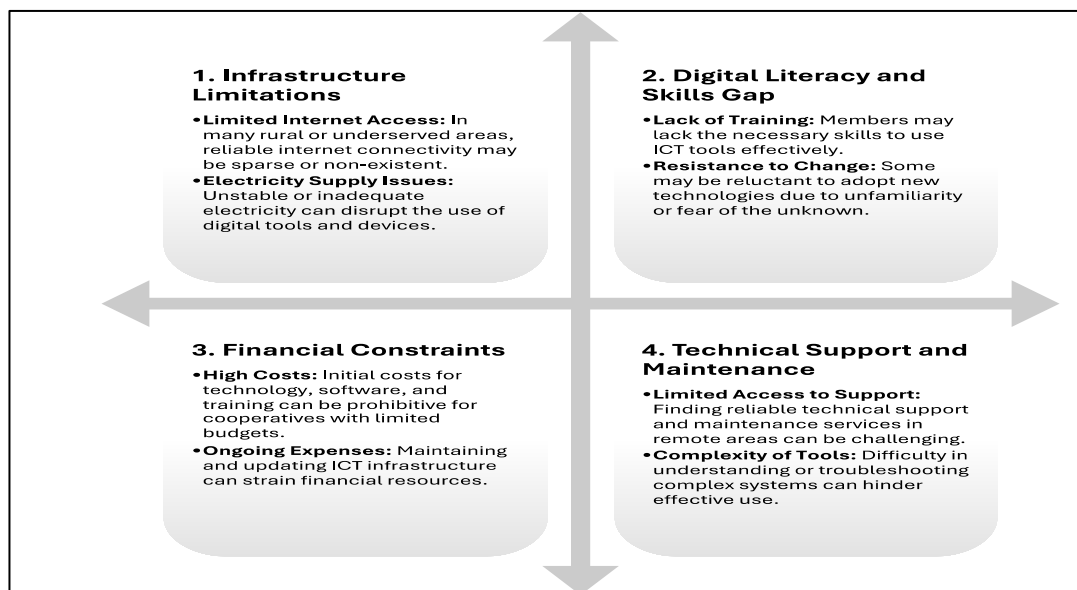

Figure 1. Key Challenges in ICT Integration for Women's Cooperatives in Sarawak
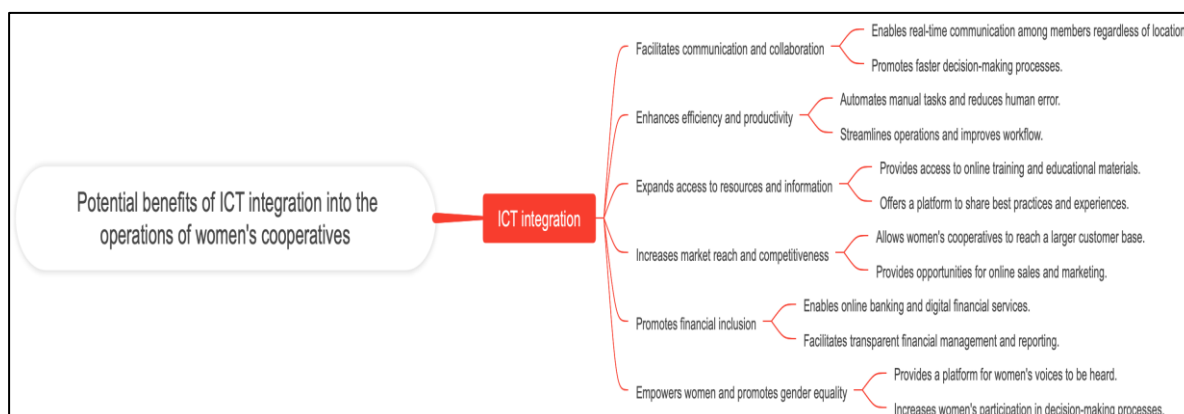

Figure 2. *Potential Benefits of ICT Integration for Women's Cooperatives in Sarawak*

Based on the insights gathered from the interview and illustrated in Figure 2.0 above, integrating Information and Communication Technology (ICT) into women's cooperatives offers substantial benefits, including enhanced market access through e-commerce and digital marketing, improved operational efficiency with automation and streamlined communication, and increased financial inclusion via mobile banking and management software. It supports knowledge and skill development through online resources and training, facilitates better data management and informed decision-making, and strengthens community networks by connecting cooperatives and support organizations. ICT boosts productivity and innovation, improves customer service through better engagement and personalization, enhances resilience and adaptability by enabling remote work, and empowers women by increasing their visibility and influence in the business world. Ibrahim et al. (2023) underscore the significant role of ICT in knowledge dissemination and in empowering individuals, with a particular emphasis on advancing gender equality.

Conclusion

This paper explores the transformative potential of Information and Communication Technology (ICT) within the context of women's cooperatives, with a particular focus on Sarawak. By integrating ICT tools and strategies, women's cooperatives in Sarawak can address significant challenges and leverage opportunities for enhancing their operations and impact. The study highlights how ICT can act as a catalyst for empowerment, providing vital benefits such as improved market access, capacity-building, and operational efficiency.

The case studies will offer offer practical examples of successful ICT integration, illustrating the potential for these technologies to drive positive change in Sarawakian women's cooperatives. These examples serve as valuable insights for policymakers, development organizations, and cooperative leaders, offering strategies to effectively harness ICT for women's empowerment.

Furthermore, this research underscores the need for continued exploration into bridging the gender digital divide within cooperative movements. By focusing on the intersection of women's cooperatives and ICT, this paper sheds light on the untapped potential for digital tools to foster social change and economic independence among women in Sarawak. The findings aim to inspire further research and action to develop innovative solutions that can enhance the role of technology in supporting women's collective enterprises and advancing gender equity in the region.

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