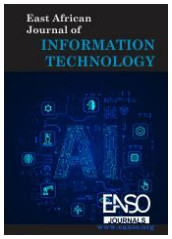

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Original Article

Access and Application of Digital Technologies in Information Dissemination within the Fishing Communities and Managers of Lake Victoria in Uganda

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Digital Technologies, Information Dissemination, Information Access, Information Application, Fishing Communities, Lake Victoria, Uganda.

ABSTRACT

This study examines the access and application of digital technologies in the dissemination of information among fishing communities and managers around Lake Victoria, Uganda. This study employed a mixed-methods approach, merging both qualitative and quantitative research methods. This approach was to allow for a comprehensive understanding of the digital technologies used in information dissemination among fisher communities. Data was collected using structured questionnaires, Focus Group Discussions (FGDs) and Interviews administered to a sample of fisher community members. The research highlights how mobile phones, internet services, and other digital tools are pivotal in enhancing communication, accessing market information, and conducting financial transactions. These technologies facilitate the timely distribution of critical information regarding fishing practices, market prices, weather forecasts, and regulatory updates. By exploring the various ways in which these communities and managers utilize digital technologies, the study reveals a significant improvements in decision-making processes and overall management efficiency. It also identifies the barriers to effective technology adoption and provides recommendations for overcoming these challenges. The findings underscore the potential of digital technologies to foster sustainable livelihoods and economic growth within the fishing sector, promoting a more resilient and informed community.

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INTRODUCTION

Lake Victoria is one of the largest freshwater lakes in the world with a surface area of 68,870 Km², supporting millions of people who depend on fishing for their livelihoods, (LVBC, 2022). Lake Victoria accounts for more than 1% of global capture fisheries and the lake and its fisheries have been studied widely, (Mpomwenda et al., 2022). The fishing communities of Lake Victoria in Uganda depend heavily on the lake for their economic well-being and sustenance. However, these communities face numerous challenges that hinder their ability to fully harness the potential of the lake's resources. Aura et al. (2019), revealed that financial barriers, including transaction fees, high costs of data plans, and expensive repairs for digital devices, emerge as significant challenges hindering digital technology access in fishing communities in the Lake Victoria Basin. Among these challenges is the access to and application of digital technologies, which have become essential tools for modern communication, market access, and financial transactions. Digital technologies, particularly mobile phones and internet services, have revolutionized many sectors globally by improving information dissemination, fostering connectivity, and enhancing economic opportunities. Digital technology has transformed nearly every aspect of modern life (Forgeard, 2023). It is rare to find an electronic device that doesn't integrate digital technology in some way. In the context of fishing communities, these technologies can play a pivotal role in accessing timely market information, weather forecasts, and regulatory updates, which are critical for making informed decisions.

Importance of Digital Technologies in Modern Information Dissemination

Digital tools ensure fishing communities receive timely and accurate information on weather forecasts, fishing zones, and market prices, which helps them make informed decisions. Communication is enhanced among the fishing communities by the use of technologies like mobile phones and messaging apps. This improves communication among fishermen, managers, and stakeholders, fostering collaboration and coordination. They enable faster information dissemination from one person to another, leading to increased awareness. Digital platforms disseminate knowledge on sustainable fishing practices, conservation, and regulations, empowering communities to protect their resources and environment. They provide capacity building by providing access to online training programs and educational materials, which enable fishermen and managers to acquire new skills and adapt to changing industry needs. In the area of data sharing and analysis, digital technologies enable the collection, sharing, and analysis of data, which supports better resource management and policy-making. They also facilitate faster communication during emergencies, such as sudden weather changes or accidents, and ensure the safety of fishermen. Market Accessibility and connection have been made faster by the use of digital tools, which connect fishermen to buyers, reducing

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middlemen, increasing profits, and fostering fair trade.

Digital tools for information transmission in Uganda are still very rudimentary around fishing communities near Lake Victoria. Most of the fishers rely on informal, face-to-face communications on weather updates, changes in the market, and official regulations; thus, incongruities in information delivery trigger delays in implementing actions. While the government of Uganda has shown interest in the extension of access to ICTs in rural areas, the coverage in fishing communities is still minimal; this is partly because of a restrictive budgetary allocation and the absence of specific programs targeting fisheries. Against this background, this study attempted to fill an important knowledge gap by assessing the factors impeding the effective dissemination of digital information among Lake Victoria fishers in Uganda by basing analysis on such issues as infrastructure, costs, and levels of digital literacy. It follows, therefore, that this understanding of barriers can inform policy and development initiatives in developing digital platforms that are accessible, relevant, and meet the specific needs of fishing communities, thereby supporting improved livelihoods and sector resilience.

Problem Statement

Innovations within digital technologies have enhanced access to information, made possible with a free and interconnected Internet for information to be disseminated. The access and application of digital technologies within the fishing communities has enabled them to access timely information on all aspects of fisheries, enabling them to improve their livelihoods, faster decision making, and information exchange on all aspects of the fishery. Researchers, NGOs' and fishery managers have developed various ICT applications to help them effectively disseminate information to the fisher communities in Lake Victoria, Uganda. However, ICTs as part of the digital technologies are very beneficial for fishing communities, and their use in the fishing communities cannot be separated from the role of relevant stakeholders such as the marine and fisheries service, fishing groups, and academics, Suciati and Susilowati. (2022). While these technologies play a crucial role, the extent of their accessibility, usage, and impact on information access and dissemination among Lake Victoria's fishing communities requires further investigation. There is a need to investigate their application in information access and dissemination among the fisher communities of Lake Victoria, Uganda.

Knowledge Gap

The literature review showed no evidence of studies done on the application of digital technologies in information dissemination among the fishing communities of Lake Victoria in Uganda. Nothing focused on establishing the application of digital technologies in information dissemination within the fishing communities and assessing the impact of digital technologies on knowledge sharing for resource management in these communities. This calls for the need for further investigation into information access and information dissemination sources used for sustainable livelihoods in the fisher communities of Lake Victoria, Uganda.

Objectives of the Study:

- To identify the current digital technologies used for information dissemination in Lake Victoria's fishing communities.
- To examine the accessibility of digital technologies among the fisher communities of Lake Victoria.
- To evaluate the effectiveness of digital technologies in improving communication within fishing communities.
- To recommend strategies for enhancing the use and accessibility of digital technologies among the fishing communities of Lake Victoria.

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- To assess the impact of digital technologies on knowledge sharing and resource management in Lake Victoria's fisheries.

SCOPE OF THE STUDY

The study was conducted among the fishing communities around Lake Victoria in Uganda. It covered a diverse range of individuals within these communities, including fishers, boat builders, fish processors, traders, and managers. The study considers various digital technologies, particularly mobile phones, internet services, and mobile money platforms. The research focuses on access and application of digital technologies in information dissemination, while also considering historical context and future trends.

Justification for the Study

This study is crucial because it will identify digital technologies that are used in information dissemination among the fishing communities. It will also establish whether the digital technologies for information dissemination among the fisher communities are suitable and their application for different dissemination efforts. Digital technologies have the potential to transform the way fishing communities access and share information, improving livelihoods and sustainability. Traditional methods of information dissemination in fishing communities may be slow and unreliable. Digital technologies, such as mobile apps and social media, provide timely access to critical updates on weather conditions, market prices, and regulations. Digital platforms can amplify the voices of fishing communities, enabling them to participate in discussions on policies that affect their livelihoods. This can lead to more inclusive decision-making at the local and national levels. Studying the access and application of digital technologies in information dissemination will provide insights into current challenges, opportunities, and best practices, guiding efforts to ensure equitable digital inclusion and sustainable development.

Access and Application of Digital Technologies in Information Dissemination and Its Impact on the Fishing Communities

With the advent of digital communication, information dissemination has evolved from radio and television and is now using mobile and internet technologies (Schmied, 2021). Knowledge is usually stored in digital form on a digital platform and disseminated by digital means, i.e. the internet tools of knowledge dissemination that provide access to information for digital communities. Within the agricultural and fisheries sectors, digitalization is seen as a ‘game changer’ for transforming the sectors in low and middle-income countries (Commonwealth, 2023). Digital channels encompass ICT technologies used in the dissemination of information to various group audiences. Digital is defined as using a system of receiving and sending information as a series of ones and zeros, showing whether an electronic signal is there or not. Digitization refers to changing information from analogue to digital formats and involves the use of digital technologies to achieve the process (Pellicelli, 2023). Lord *et al.* (2023) indicated that once digitization is done correctly, it becomes more inclusive and sustainable for the benefit of all actors, including the small-scale fishers.

He defined digitalization in the fisheries context as referring to the use of digital technologies, innovations, and data to transform the business models and practices across the fisheries value chain and address the biological, social and economic bottlenecks across the fisheries value chain. It is therefore right to suggest that when one thinks of digital, it means digital communication channels and gadgets that enable digital communication to happen. Digital communication channels include: video-calling interfaces like Zoom, Skype, Google Meet, Webmax, Microsoft GoToMeet, and Microsoft Teams, while the other non-video calling interfaces include: TVs, radios, mobile phones, recorders, and cameras. Digital

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channels encompass ICT technologies used in the dissemination of information to various group audiences. Ponelis & Holmner (2015), postulated Information and Communication Technology (ICT), including modern technologies that are used to aid the electronic capture, processing, storage, and dissemination of information. Among the digital platforms that have exploded in recent times include the use of Zoom and video communications, telephones and Apps, which are applications developed with information downloaded on smartphones. Bharath *et al*. (2020) stated that multiple ICT platforms were the most preferred platforms allowing the users to access the information to their fullest benefit.

Digital technologies are increasingly driving how information flows in all sectors, indeed, in fisheries. Other examples include blockchain, data mining, and artificial intelligence; such technologies could help build confidence in the fisheries sector by improving the transparency and availability of information from net to plate. Probst (2020), affirms that each of these three technologies is currently experiencing an enormous boost in technological development and real-world implementation and is predicted to increasingly affect many aspects of fisheries and seafood trade. Like any economic sector acting on a global scale, fishing and seafood production are often challenged with a lack of trust along various steps of the production process and supply chain. Consumers are often not well informed on the origin and production methods of their product; management authorities can only partly control fishing and trading activities, and producers can be challenged by low market prices and competition with peers.

Emerging data technologies can improve trust among agents within the fisheries sector by increasing transparency and availability of information from net to plate. Technology enables real-time communication and knowledge sharing, hence transforming the world across the globe. For instance, technologies for information dissemination, like mobile apps and online platforms, have aided several parts of the world in updating the fishing community on weather, market prices, and changes in regulations relevant to making informed decisions and managing risks. Kelly *et al*. (2022) affirmed that Fish Guider, a web-based decision support tool, aimed to integrate fishers' knowledge and data to support sustainable fishing and foster bidirectional information flow between research and fishing activities. Furthermore, fishers' knowledge is part of the best available information needed for sustainable harvesting of stocks, marine spatial planning, and large-scale monitoring of fishing activity. It is estimated that these digital channels enhance the fishers' levels of response to environmental and market changes, increasing safety, productivity, and stability in income. The global challenge is to reach out to such services to the most remote communities, particularly in developing regions where both digital infrastructure and literacy remain low.

Recently, there have been increased efforts regionally to deploy digital technologies in support of the fishing sector in East Africa (Abdalla *et al.*, 2022). Despite the gains that could be possible, the pace of adoption of such technologies by the fishing sector in the region still lags behind other sectors, such as agriculture (Mbunda & Kapinga, 2021). Commonly cited reasons for this include limited infrastructure, digital literacy gaps among fishers, and inconsistent connectivity in fishing communities. According to Kusyama *et al.* (2022), for instance, in Kenya and Tanzania, the mobile-based information systems reveal to the fishers the current localized weather, market prices, and fishery regulations through SMS. The findings from this study indicated that short message service (SMS) and cellular phone calls are most effective for fishers. Mobile applications, cellular phone calls, websites, and SMS are effective for fish traders and fisheries officers. However, cellular phone calls were not cost-effective compared to mobile

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applications and websites. Several projects like M-Fish have enabled fishers in Kenya to receive, through SMS, the market prices, increasing their bargaining power and reducing post-harvest losses. Similarly, in Tanzania, initiatives have explored the use of SMS to share weather forecasts and warnings to fishers, contributing to safer fishing practices.

Technologies for this kind of purpose enable even less-literate users to access very important information without the use of the internet. However, their regional application to the fishing sector is still low compared to other sectors like agriculture, partly due to infrastructure gaps and a general lack of digital skills among fishers. According to ITU (2021), although some progress has been recorded, regional studies have shown an irregular reach and limited impact that such tools give, especially in communities without stable connectivity and government support.

Digital platforms are combinations of hardware and software intended to aid in collecting, archiving, sharing, and using data for local or larger-scale assessment, planning, and decision-making (Noor *et al*., 2021). This was further articulated by Frost *et al*. (2021), who said that governments worldwide were using digital infrastructure to reach households and informal workers. The fisher communities form part of the informal workers (Tripathi *et al*., 2017; Ikoja *et al*., 2001) who have to be reached out to with information. Digital platforms may also create possibilities for interlinking with other data platforms (Pulsifer *et al*., 2012; Eicken *et al.,* 2014). Digital platforms can process and transform data to create meaningful information products and representations for different users (Pulsifer & Taylor, 2005; Thanos, 2014; Pulsifer *et al.,* 2020). Digital platforms are highly scalable; they can be thought of as matchmakers that help different groups of users find one another, (Frost, *et al.,* 2021). The fisheries sub-sector in Uganda has benefited from digital communication platforms by enabling the continuous provision of information to fisher communities, training, and electronic marketing of produce and products. The Lake Victoria Fisheries Organization, LVFO (2018) stated that knowledge and information sharing impacted how fisheries and aquaculture businesses are conducted, developed, and economically valued. Several online marketing platforms have been developed for marketing Agricultural products where physical gathering of people is not needed to access services (Payne *et al.*, 2021). Omar *et al*. (2011) stated that the use of ICT among the fishermen community is increasing day by day, which impacts their income.

Information Communication Technology (ICT) has been widely used to disseminate information to fishers in Uganda. This is in line with Khodamoradi & Abedi (2011), who conceded that information and communication technology was an essential component that exposes the different worldwide information to society. Omar & Chhachhar (2012**)**, further alluded to this by stating that information and communication technology networks can preserve order and disseminate information to rural communities. This was further postulated by Barkatullah *et al*. (2014), who stated that through the use of ICT, fishermen could get related information from all over the world and that ICT was being used in a wide range of applications in the fishing world. FAO & WorldFish (2020), further conceded to this by stating that ICTs could positively influence small-scale fisheries through two primary mechanisms: information provision and financial services. Information provision through the digital channels to fisher communities makes them knowledgeable and improves their ability to make informed decisions on aspects of policy making, market, health, and access to government programs.

This was further noted by Li *et al.* (2010), who acknowledged that the uptake of scientific information by fishers complemented their local knowledge and provided them with a stronger basis for better engagement with fisheries scientists and managers, thereby facilitating the incorporation of

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their knowledge and values in the management process. The importance of Information dissemination was conceded by Chandra (2010), who said that effective information dissemination and services to the fishers' community would ultimately result in the growth of the fisheries sector. Access to fisheries information involves many elements, including real and virtual access to resources as well as the personal capacity to locate and use appropriate information (FAO, 2005). The Fisheries Management Plan for Lake Victoria (FMP III) further emphasized leveraging Information, Communication Technology (ICT) for managing the fisheries and establishing a network platform/system for information sharing (LVFO, 2016).

Haambiya *et al*. (2020), mentioned that Information Communication Technology (ICT) was a powerful means in mobilizing communities to take charge of their development, support 'best practices' and offer fishing communities access to the same type of services and advantages. FAO (2007) observed that digital and other electronic technologies were transforming our economies, societies, and lives, with an especially profound impact on the information and communications activities that are central to sustainable development. Barkatullah *et al*. (2014) further mentioned that through ICT, important information and knowledge could be shared among fishing communities in making decisions on different matters from whether to be involved in specific fishing operations for trading at a local market. Marciniak (2010) further alluded to this by agreeing that the responsible use of ICTs could contribute constructively both to livelihood enhancement and poverty reduction in fishing communities.

This happens when they can access and exchange key information through various digital technologies, which enable them to make informed decisions about fishing activities. Marciniak (2010) outlines the benefits of accessing and exchanging information as assisting fishing communities in making informed decisions on a variety of matters, from whether to engage in specific fishing operations to trading at a local market and participating in a meeting. Which decisions can help them reduce their vulnerability and improve their opportunities? This is further conceded by Chandra (2010), who stated that effective information dissemination and services to the fishers' community would ultimately result in the growth of the fisheries sector. McMahon (2021) found that Information and communication technologies (ICTs) have diverse applications in sustainable development and that ICTs can be used to improve data collection on informal small-scale fisheries and reveal their true contributions to food and nutrition security. LVFO (2021), provides for the strengthening dissemination of scientific information to support the evidence-based decision-making process and increased dissemination and sharing of fisheries and aquaculture research results. It also provides for enhanced knowledge management, information sharing, awareness creation, and participation of the East African citizens on fish matters.

Barkatullah *et al.* (2014) identified mobile phones as enabling the application of modern information communication technologies (ICT) in the spread of information and knowledge among fishermen and farmers, with fishermen especially preferring to use the mobile phone to connect with their friends, community, and market for selling their product. The importance of mobile phones was further echoed by Adejoh *et al.* (2017) in their study on the use of mobile phones for information dissemination among fish marketers in Nigeria recommended that the government should invest further in increasing the availability of mobile signals in rural areas. This was further supported by Kapange (2010), who acknowledged the importance of ICT tools and offered the opportunity for rapid and cost-effective dissemination of fishery information and knowledge to remote locations and diverse populations. Bharath *et al*. (2020) found out the

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program disseminated information on potential fishing zones (PFZ) majorly through audio messages to mobile phones and WhatsApp, and that the advantage of information dissemination through WhatsApp over other mediums was to enable the implementation team to be able to form a homogenous group of fishermen using WhatsApp.

Strategies to Improve the Dissemination of Information to These Communities

Effective information dissemination in the communities requires strategies that need to be adopted by various stakeholders on the ground. These strategies have been outlined below:

1. Utilization of multiple communication channels

This involves the use of multiple communication channels to disseminate information to the target audience. The communication channels selected should be suitable for the message to be transmitted to a particular audience. The channels have been further elaborated below:

Community Barazas/ Meetings: These require organizing regular community meetings where fishers can gather to receive updates, share experiences, and discuss challenges they face. Radio Broadcasts can be done using local radio stations to broadcast relevant information about market trends, weather forecasts, and fishing regulations, as radio remains an accessible medium in many coastal areas. Printed Materials can be distributed using brochures, flyers, and posters in local languages that summarize key information about sustainable practices, market access, and safety guidelines.

2. Leverage Technology

Mobile Applications:

These should be developed and promoted to provide real-time updates on market prices, weather conditions, and fishing regulations. Ensure these apps are user-friendly and available in local languages**.** SMS alert systems should be implemented to deliver timely and critical information directly to fishers' phones, covering topics such as market changes, weather warnings, and regulatory updates.

3. Community Information Centers

Establish community information centres where fishers can access resources, attend workshops, and receive assistance with understanding regulations and market dynamics. Digital Kiosks should be installed in the fishing communities that provide access to online resources and databases relevant to fisheries and livelihoods.

4. Training and Capacity Building

Regular workshops and training sessions on sustainable fishing practices, financial literacy, and market access should be conducted while tailoring the sessions to the specific needs and knowledge levels of the community. Local fishers should be trained as peer educators to help in disseminating information and sharing best practices within their communities.

5. Community Engagement and Participation

Fishers should be involved in the design and implementation of information dissemination strategies by soliciting their input on preferred communication methods and information needs.

6. Collaborate with Local Organizations

There is a need to work with local NGOs that have established relationships with fisher communities to facilitate information dissemination and provide training. Fisheries cooperatives should be leveraged as platforms for information sharing, providing regular updates and collective training opportunities for members.

7. Use Visual and Audio-Visual Materials

Short videos or documentaries should be produced showcasing sustainable fishing practices, success stories, and market information should be distributed to the community. Infographics and

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visual aids should be created to provide information that is easy to summarize and easy to understand.

8. Enhance Online Presence

A centralized online platform or Web portal should be developed to provide comprehensive information on fishing regulations, market trends, and resources for fishers. There is a need to create and manage social media groups where fishers can share experiences, ask questions, and receive updates from experts and peers.

9. Feedback and Assessment

Feedback Mechanisms: Implement systems for fishers to provide feedback on the information they receive, including its relevance and effectiveness. This can help adjust dissemination strategies as needed. Periodic assessments should be conducted to evaluate the effectiveness of information dissemination efforts and identify areas for improvement.

10. Advocacy for Policy Support

There is a need to engage in Policy dialogues that advocate for government policies that prioritize information dissemination and support for fisher communities, including funding for educational programs and resources. Promoting investment in digital and communication infrastructure in landing sites to enhance access to online resources and improve connectivity will go a long way in increasing information access and dissemination.

RELEVANT THEORIES AND MODELS THAT INFORMED THE STUDY

The study's theoretical framework was drawn from the Diffusion Theory and Wilson’s macro model of information-seeking behaviour in 1999. It integrates key processes: identifying information needs, seeking relevant information, exchanging insights, and applying knowledge. Wilson's theory was applied to understanding the information exchange and dissemination among the communities and how fishing communities access and use information to address their specific needs. While the diffusion theory was used to understand how personalized interventions and community participation may foster the widespread adoption of digital technology for information dissemination as a precondition for enhancing access and consumption of information in fishing communities. The diffusion theory outlines how new technologies and other advancements spread throughout societies and cultures, from introduction to widespread adoption. The theory seeks to explain how and why new ideas and practices are adopted, including why the adoption of new ideas can be spread out over long periods. Theory enhances information dissemination efforts through the available new digital technologies existing in the community.

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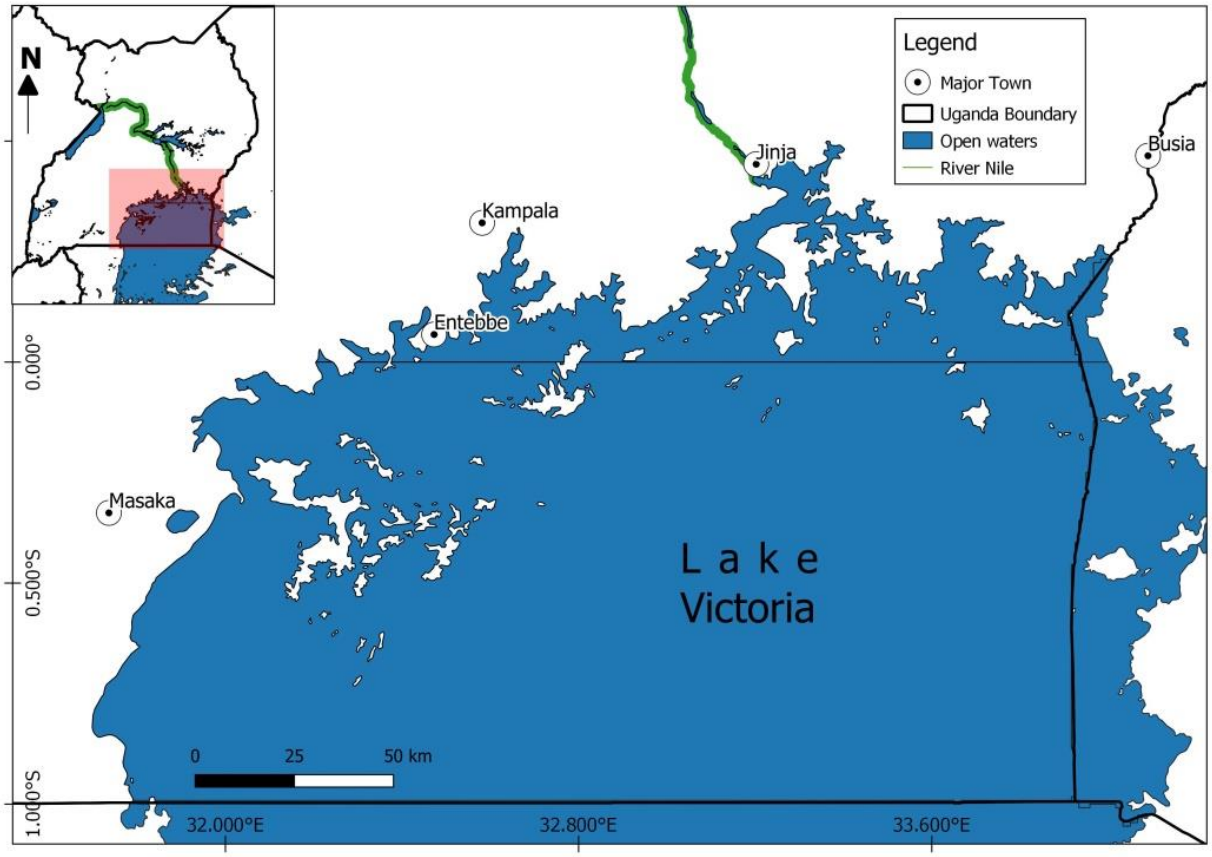
Figure 1: Map of Study Area



MATERIAL AND METHODS

This study employed a mixed-methods approach, merging both qualitative and quantitative research methods. This approach was to allow for a comprehensive understanding of the digital technologies used in information dissemination among fisher communities. Data was collected using structured questionnaires administered to a sample of fisher community members. The questionnaires included both closed and open-ended questions that were used to gather data on digital technologies used in information dissemination among fisher communities. In-depth interviews were conducted with key informants, including community leaders, representatives from local institutions, and government officials. These interviews provided detailed insights into the digital technologies used in information dissemination processes. Focus Group Discussions (FGDs) were held with different groups within the fisher communities, such as men, women, and youth, to understand the digital technologies they use to access and disseminate information among fisher communities. This method helped in validating and triangulating the data collected through surveys and interviews. Direct observation was used to gain a deeper understanding of the daily activities of the fisher communities. This included observing interactions at community meetings and other relevant settings.

Study Population

The researcher targeted a study population of 194 participants who were from the 5 riparian districts of Busia, Buikwe, Jinja, Mayuge, and Mukono for the study. The study population was selected from the fishing communities of Lake Victoria, Uganda. The sample size covered men, youth, and women

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engaged in fishing, research/ management, processing, and marketing.

Sampling Criteria

Inclusion and exclusion criteria were used to select the sample population. Inclusion criteria helped in identifying the community of interest using the age, gender, and education levels of the various participants to be included in the study (Bell *et al.*, 2022). The inclusion criteria involved respondents between the ages of 25 and 55 who had acquired adequate information on the study topic. Exclusion criteria involved fishermen below the age of 25, and those who were fishing at the time of data collection at the time of the study.

Data Analysis

Survey data was analysed using the statistical software Stata. Descriptive statistics (mean, median, mode, standard deviation) and inferential statistics (correlation, regression) were used to identify patterns and relationships between variables. Interview and FGD transcripts were analysed using thematic analysis. Key themes and patterns were identified, coded, and categorized to understand the information access and dissemination processes within the fisher communities.

FINDINGS

Demographic Characteristics

Table 1: Distribution by District

District/Landing Site	Female		Male		Total	
	f	%	f	%	f	%
Buikwe	**7**	**20.0%**	**28**	**80.0%**	**35**	**18.0%**
Kalega	3	50.0%	3	50.0%	6	3.1%
Kiyindi	3	15.0%	17	85.0%	20	10.3%
Senyi	1	11.1%	8	88.9%	9	4.6%
Busia	**9**	**22.0%**	**32**	**78.0%**	**41**	**21.1%**
Majanji	7	28.0%	18	72.0%	25	12.9%
Nalyoba	2	12.5%	14	87.5%	16	8.2%
Jinja	**1**	**2.5%**	**39**	**97.5%**	**40**	**20.6%**
Masese		0.0%	25	100.0%	25	12.9%
Wairaka	1	12.5%	7	87.5%	8	4.1%
Wanyange		0.0%	7	100.0%	7	3.6%
Mayuge	**12**	**30.0%**	**28**	**70.0%**	**40**	**20.6%**
Buluuba	12	48.0%	13	52.0%	25	12.9%
Musoli		0.0%	15	100.0%	15	7.7%
Mukono	**15**	**39.5%**	**23**	**60.5%**	**38**	**19.6%**
Bulebi	5	38.5%	8	61.5%	13	6.7%
Katosi	7	41.2%	10	58.8%	17	8.8%
Kiziru	3	37.5%	5	62.5%	8	4.1%
Grand Total	**44**	**22.7%**	**150**	**77.3%**	**194**	**100.0%**

Table 1 above illustrates the distribution of respondents by district, revealing that Busia District constituted 41 respondents (21.1%), Jinja District and Mayuge District each had 40 respondents

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(20.6%), Mukono District had 38 respondents (19.6%), and the least representation was from Buikwe District with 35 respondents (18%). This trend indicates a relatively balanced representation across the five study districts, ensuring that the data collected is representative of the different geographical areas and can provide a comprehensive overview of the population's characteristics and responses within the study's scope.

Table 2: Demographic Categories

Age of respondents	Frequency	Percent (%)
15-19 years	2	1.0%
20-24 years	17	8.8%
25-30 years	43	22.2%
31-35 years	33	17.0%
36-40 years	42	21.6%
41-45 years	27	13.9%
46-49 years	5	2.6%
50-55 years	17	8.8%
56-60 years	4	2.1%
61-65 years	4	2.1%
Marital status		
Divorced	11	5.7%
Married	149	76.8%
Other	1	0.5%
Single	33	17.0%
Gender of respondents		
Female	44	22.7%
Male	150	77.3%
Level of education		
None	9	4.6%
Primary	62	32.0%
Primary School Dropout	48	24.7%
Secondary	44	22.7%
Secondary School Dropout	21	10.8%
Tertiary	10	5.2%
Occupation (multiple occupation)		
Boat builder	25	12.9%
Boat builder, Fisherman	3	1.5%
Fish Processor	11	5.7%
Fish Processor, Fish Trader	13	6.7%
Fish Trader	50	25.8%
Fish Trader, Fish Processor, Boat builder	1	0.5%
Fish Trader, Fisherman	3	1.5%
Fisherman	83	42.8%
Fisherman, Boat builder	5	2.6%

Age of Respondents

The age distribution shows that the majority of respondents are between 25-40 years, with 22.2% aged 25-30 years and 21.6% aged 36-40 years, indicating significant engagement from middle-aged adults. This demographic is likely in active professional and personal life stages, contributing to their high representation. Smaller percentages are

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seen in the younger age groups, with only 1.0% aged 15-19 years and 8.8% aged 20-24 years. As age increases beyond 40, participation declines, with only 13.9% aged 41-45 years, 2.6% aged 46-49 years, and 2.1% each in the 56-60 and 61-65 age groups. This trend suggests that middle-aged adults are most engaged in the fishing value chain, while younger and older individuals are less represented.

Marital Status

Most respondents are married, accounting for 76.8% of the sample, which suggests strong traditional family structures within the community. Single individuals make up 17.0%, indicating a notable portion, likely comprising younger adults or those prioritizing their careers. Divorced respondents are relatively few, at 5.7%, while only 0.5% identify with other marital statuses. This distribution underscores the predominance of marriage and potentially stable family environments among the respondents in the fishing communities.

Gender of Respondents

The gender distribution reveals a significant disparity, with males representing 77.3% and females only 22.7% of the respondents. This indicates a potential gender imbalance in participation within the fishing communities surrounding Lake Victoria. The lower representation of women might reflect underlying socio-cultural dynamics or barriers that limit female engagement in the fishing value chain.

Level of Education

Education levels among respondents vary, with 32.0% having completed primary education and 24.7% being primary school dropouts. Secondary education is completed by 22.7%, while 10.8% are secondary school dropouts, highlighting issues with education retention. Only 5.2% have attained tertiary education, indicating limited access to higher education. A small segment, 4.6%, has no formal education, which suggests barriers to educational access and completion within the community. The level of education may affect access to information through digital channels.

Occupation

The occupational distribution shows that fishing is the predominant activity, with 42.8% of respondents identifying as fishermen. Fish trading is the second most common occupation at 25.8%, while boat building is practised by 12.9%. A smaller percentage, 5.7%, are fish processors, with some combining roles such as fish processing and trading (6.7%), and fishing and boat building (2.6%). A minimal number engage in multiple roles, like fish trading, processing, and boat building (0.5%). This indicates a strong reliance on the fishing industry, with some diversification into related activities.

Table 3: Means of Receiving Information

Means of receiving information	Frequency	Percent (%)	Cumulative frequency
Phones	50	26%	50
Radio	80	41%	130
TV	37	19%	167
Village Radio	23	12%	190
Other	3	2%	193
Other Apps, Google	1	1%	194
Total	**194**	**100%**	

Table 1 shows that the majority (80, 41%) received information using radios, 50 (26%) received via their phones, 37 (19%) used TVs to receive information, 23 (12%) used other devices like computers to receive information while the least 1 (1%) use other apps housed on tabs. This entails that people in the fish value chain use a range of digital technologies to receive information, affirming that

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people have preferences for their choices on the means of how to obtain information.

Table 2: Information Sought

	Information sought	Frequency	Percent (%)	Cumulative frequency
1.	Fish Catch Statistics	57	29%	57
2.	Health Information	47	24%	104
3.	Legal and Illegal Gears	51	26%	155
4.	Government Programs	32	16%	187
5.	Marketing Information	47	24%	234
6.	Other	3	2%	237
	Total	194	**100%**	

****These totals represent the number of occurrences of each category within the provided data**

The majority (57, 29%) indicated that fish catch statistics were mentioned frequently among the respondents, revealing that respondents use digital technologies to access information on monitoring and reporting on fishing activities are significant aspects. Access to information related to the capture of fish, including quantitative information such as the volume of fish caught, affirms the importance of understanding trends in fishing activity within the fishing communities surrounding Lake Victoria.

It was also revealed that 51(26%) of the respondents highlight the significance of using digital technologies to access information on legal and illegal gear used in fishing activities, indicating a focus on regulatory aspects of fishing and the enforcement of laws governing fishing activities. This category encompasses information about the equipment, tools, or methods used in fishing, distinguishing between legally permitted gear and gear that may be prohibited or used in illegal fishing practices.

47(24%) revealed that they have access to health information, indicating a recognition of the importance of understanding the health implications of fishing practices. Health information in this context likely pertains to data regarding the health of marine ecosystems, fish populations, and possibly human health aspects related to fishing activities, such as consumption advisories or occupational health risks for fishermen.

Likewise, the study findings also revealed that 47(24%) use digital technologies to access marketing information, which reflects the economic dimensions of fishing activities and the importance of market dynamics in shaping fisheries management decisions. It affirms that the respondents use digital technologies to source information related to the marketing and distribution of fish products, including market trends, consumer preferences, pricing information, and promotional strategies.

The respondents who access digital technologies soliciting government interventions and policies constituted 32(16%), representing an important aspect of information services. This indicates the role of governance in shaping fishing practices in the communities surrounding Lake Victoria. Government programs refer to initiatives, policies, regulations, and interventions implemented by governmental authorities such as MAAIF and NaFIRRI to manage fisheries, conserve marine resources, or support fishing communities.

The least 3(2%) affirmed that they use digital technologies to access information related to other miscellaneous aspects of their lives that they deem necessary for people participating in the fish value chain. While this proportion represents a smaller proportion of the sample population compared to the other more clearly defined categories, the other information may be inclusive of additional aspects of fishing activities but present on the digital

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technologies, including though not limited to, weather forecast, security, fish licensing, social media, and water temperature.

Digital Technologies Used in Information Dissemination

Across all five sectors, mobile phone apps were the most common content delivery channel.

Types of Digital Technologies Accessed and Applied:

Access to Digital Technologies

The research results unveiled that every participant, constituting 100% of the surveyed population, possessed access to an array of digital technologies encompassing television sets, radios, smartphones, and similar devices. This comprehensive access suggests that all individuals within the sample frame confirmed their capability to utilize digital platforms, thereby implying their potential to retrieve information disseminated through these mediums. The ubiquitous presence of such technologies among respondents underscores the pervasiveness of digital connectivity in contemporary society, emphasizing the significance of digital literacy and access in facilitating information dissemination and communication. This finding not only highlights the widespread adoption of digital tools but also underscores the necessity for ensuring equitable access to digital resources to promote inclusivity and empower individuals in accessing and engaging with information in today's digitally driven world.

Table 3: Digital Technologies Accessed

Technology Category	Frequency	Percent (%)	Cumulative Frequency
Phones	112	58%	112
Radio	90	46%	202
Through WhatsApp	42	22%	282
Village Radio	24	12%	226
Cameras	11	6%	240
Computers	3	2%	229
TV	26	13%	308

****Respondents have access to multiple digital technologies**

The data depicted in the table underscores the prevalence of digital technology access among respondents within fishing communities. Over half of the participants (112, 58%) possessed phones, facilitating connectivity and access to information on the go. Additionally, a significant portion (90, 46%) had access to radios, serving as a traditional yet effective medium for communication and information dissemination. The widespread adoption of digital platforms is evident, with 42 individuals (22%) having access to WhatsApp, further enhancing communication and information exchange. Access to village radios (24, 12%) reflects localized information dissemination, catering to community-specific needs. Furthermore, a smaller yet notable percentage (11, 6%) had access to cameras, while the least (3, 2%) had access to computers. This diversified access underscores the multifaceted nature of digital connectivity within fishing communities, offering avenues for accessing diverse information sources and facilitating community development.

Use of Digital Technologies

The respondents revealed different uses of digital technologies that suit their orientation, including, though not limited to, the following, as explained below:

Business Communication and Marketing

The study findings revealed that mobile phones were used to call customers, business partners, and fellow fishermen for various purposes like

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buying/selling fish, coordinating, and market research. While radios were used for announcements, news updates, and for receiving education on fishing practices. It was revealed that TVs were being used for watching news updates, educational programs, and entertainment.

Information Access and Sharing

The study established that accessing information about fish prices, fishing practices, market updates, and weather conditions was done via phones, radios, and TVs. WhatsApp where used for communication, sharing fish pictures, receiving orders, and conducting business transactions in addition to gaining knowledge about fish preservation, legal fishing, and fish farming was done through various media channels.

Community Engagement and Support

The study found that participating in community discussions and sensitization programs was done through radio and village radio. Phones were used for connecting with fellow fishermen, customers, and community members for social interactions, support, and collaboration in addition to raising awareness about fish prices, business updates, and safety measures among community members.

Technological Utilization

The results revealed that digital technologies were being utilized for purposes such as employing phones for various purposes such as calculations, time management, entertainment, and accessing mobile savings. While TVs were utilized for educational purposes, news updates, and entertainment, in addition to utilizing social media platforms like TikTok for business marketing and content creation.

Financial Management

The study revealed that mobile money transactions were used for savings, loans, and business transactions in addition to calculating profits, managing finances, and conducting mobile money transactions through phones.

The above uses illustrate the fundamental role of digital tools like phones, radios, TVs, and social media platforms in empowering fishing communities. Through these technologies, communication flows seamlessly, enabling efficient sharing of information vital for business operations and community development. Whether it's coordinating with customers, accessing market updates, or disseminating educational content, digital platforms serve as catalysts for connectivity and progress. Moreover, they foster community engagement, encouraging collaboration and knowledge exchange among fishermen. Through the effective utilization of these technologies, fishing communities can enhance their technological prowess, leading to the adoption of more sustainable practices and enhanced livelihoods within the dynamic digital environment.

Table 4: Digital Technologies Transforming Livelihoods

Response	Frequency	Percent (%)	Cumulative Frequency
Yes	189	97%	189
No	5	3%	194
Total	**194**	**100%**	

Field survey data, 2024

In Table 4 above, the majority (189, 97%) asserted that digital technologies had transformed their livelihoods, while the remainder (5, 3%) refuted the notion. This implies that digital technologies had a remarkable impact on the individual livelihoods of the respondents, thus affirming their significance in development.

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The respondents highlighted how digital technologies transformed their livelihoods as outlined below:

Effective Communication and Customer Interaction

The results revealed that digital technologies had improved communication with clients through phone calls and increased customer access and engagement, leading to wider market reach and increased income. In addition, it also enabled building good relationships with customers through effective communication channels.

Information Access and Awareness

The findings established that digital technologies provided access to business news and information about legal fishing practices. The results revealed that digital technologies were helping in awareness creation about current affairs and issues related to the lake and the fishing community. In addition, they also provided for learning and adopting improved fishing techniques and practices through various media channels.

Business Operations and Efficiency

It was revealed that fishing communities leverage digital technologies to enhance business coordination and management, leading to increased income. In addition, they also helped in simplifying tasks such as calculations and providing service delivery through mobile technologies. The study revealed that digital technologies improved market technology utilization and marketing strategies, leading to business growth.

Educational and Entertainment Benefits:

The study revealed that digital technologies were being used for children's education and entertainment through TV programs, cartoons, and games in addition to learning about new technologies and ideas outside Uganda through the internet. The results further affirmed that digital technologies were being used for entertainment and stress relief through radio programs and social media platforms.

Financial Management and Savings

The findings revealed that digital technologies provided access to mobile money and credit facilities, easing financial transactions and savings. In addition, they also helped in the reduction of unnecessary expenses, such as transport costs, through effective communication.

Community Engagement and Empowerment

The study results revealed that digital technologies increased community awareness about hygiene, legal fishing, and sanitation practices. They also enabled the adoption of digital tools for communication, education, and social interaction, promoting community development.

Impact of Access and Application of Digital Technologies in Information Dissemination

Table 5: Possession of Challenges when Accessing and Using Digital Technologies

Response	Frequency	Percent (%)	Cumulative Frequency
No	115	59%	115
Yes	79	41%	194
Total	**194**	**100%**	

Field survey data, 2024

In Table 5 above, the majority (189 respondents, 97%) asserted that digital technologies had transformed their livelihoods, while the remainder (5 respondents, 3%) refuted this notion. This overwhelming consensus implies that digital technologies have had a remarkable impact on the individual livelihoods of the respondents, underscoring their importance in fostering

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development. The notion strongly suggests that integrating digital technologies can significantly enhance the quality of life and economic opportunities, validating their critical role in modern advancements, especially in fishing communities surrounding the shores of Lake Victoria.

Table 6: Suggesting Recommendations for Government and Policy Makers

Response	Frequency	Percent (%)	Cumulative Frequency
Yes	121	62%	121
No	73	38%	194
Total	**194**	**100%**	

Field survey data, 2024

The study findings revealed that a majority of respondents (121, or 62%) suggested recommendations for government and policymakers, while 73 respondents (38%) did not offer such suggestions. This indicates that a significant portion of the respondents recognized the need for governmental and policy interventions to enhance access to digital technologies in fishing communities. These recommendations likely include policy adjustments, increased funding, infrastructure development, and educational programs to improve digital literacy. The findings highlight that respondents have diverse perspectives, but there is a clear call for targeted efforts by authorities to address digital information dissemination challenges in the fishing sector.

Suggestions Made by the Respondents in Regards to Improving Access to Digital Technologies Used in Information Dissemination in Fishing Communities:

Participants were requested to propose solutions that they thought would help to improve access to digital technologies used in information dissemination in fishing communities.

1. Reduce Costs

The study revealed the need to lower prices for airtime, data, phones, TVs, radios, smart devices, and digital technologies. This should be done by reducing taxes on these items to make them more affordable.

2. Government and NGO Support

It was revealed that the government and NGOs need to provide loans or subsidies for fishermen and community members to buy digital devices in addition to distributing phones, TVs, radios, and computers on loan. NGOs should assist with providing communication devices and education on digital technology usage.

3. Network and Infrastructure Improvements

The study proposes enhancing network connectivity and signal strength in fishing communities. It suggests introducing new technologies to ensure stable and reliable internet access and establishing community radios and TV services for information dissemination.

4. Education and Sensitization

The study suggests developing programs to educate fishermen on the use of digital technologies and promoting awareness about the importance and benefits of digital tools in the fishing industry.

5. Policy Recommendations

The study proposes creating communication platforms for better information flow and allowing fishing activities to support the economic capacity to afford digital devices. It recommends implementing laws to prevent the misuse of the internet and social media.

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6. Tax and Price Revisions

The study proposed lowering taxes on data bundles, mobile money, and digital gadgets. It recommends providing tax incentives to make digital devices more accessible and reconsidering policies to reduce costs related to TV subscriptions and electricity.

7. Community and Development Programs

The study revealed the need to organize radio programs related to fishing and improving communication channels through government and NGO collaboration. It suggests the need to ensure the availability of affordable digital tools in every community.

The purpose of the recommendations above is to target these specific areas to achieve the goal of significantly enhancing the accessibility and utilization of digital technologies within fishing communities. This will improve their ability to communicate and interact with one another, in addition to improving their economic well-being and overall quality of life.

DISCUSSION OF THE FINDINGS

Examine the Access and Application of Digital Technologies in Information Dissemination within the Fishing Communities and Managers of Lake Victoria in Uganda

The results support Yue & Shen's (2022) research by highlighting the vital information needs of fishing villages surrounding Lake Victoria, especially in relation to market and weather information. Fishermen must have access to up-to-date information on market pricing, demand variations, and weather to make wise judgments that will maintain both safety and economic stability. These observations are in line with Neil's (2022) theories, which highlight the need for trustworthy access to up-to-date market trends and comprehensive weather reports for sustainable fishing methods. The study also confirmed the findings of Haambiya *et al.* (2020), which showed that financial assistance in the form of loans, government subsidies, and tax breaks for fishing gear is crucial for increasing sustainability and productivity. Additionally, Andronova & Belova's (2019) research emphasized the significance of education regarding sustainable harvesting methods, innovative fishing methods, and quality control measures. Providing fishermen with the skills to use digital tools efficiently improves access to vital information, which promotes efficiency and long-term growth. Therefore, digital literacy programs, in addition to financial and infrastructural support, are required to maximize the benefits of digital technologies in fishing communities within the Lake Victoria basin.

The results of this study support the findings of Aura *et al.* (2019), which highlighted the important role that digital technologies play in meeting the information needs of fishing communities. These technologies give fishermen the tools they need to access timely and relevant information, which ultimately improves decision-making and economic outcomes. The study confirmed the hypotheses of Haambiya *et al*. (2020), which stated that digital channels like televisions, mobile phones, and radios are essential for disseminating fishing regulations, weather updates, and market trends. By promoting real-time communication, enabling market research, and assisting with regulatory compliance, these digital tools increase operational efficiency and profitability, which is consistent with the findings of Nanyonjo *et al.* (2024).

However, the study also found significant flaws in the way information is currently disseminated, whereby even if access has been made easier by digital technology, certain obstacles still stand in the way of fair information dissemination, including poor connectivity, problems with affordability, and low levels of digital literacy. To guarantee that all fishermen profit from technology improvements, these gaps point to the need for better infrastructure, reasonably priced internet access, and specialized

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training programs. To ensure that full information is available, it will be essential to extend digital access and boost digital literacy programs, as suggested by Aura *et al.* (2019). Resolving these issues will improve fishing communities' resilience, sustainability, and production even more.

RECOMMENDATIONS

1. Digital Training for Fishers

There is a need to provide digital training for fisher communities on the use of Apps and digital technologies. Targeted training on digital literacy should be implemented for fishers in addition to ensuring that fishers have access to vital information on health, safety, fish breeding grounds, accounting, and marketing of their fish.

2. Addressing Information Dissemination Challenges

There is a need to improve methods for sharing information among fishers by providing timely information through the right dissemination channels and also address obstacles that affect information dissemination such as poor connectivity, affordability issues, and low digital literacy.

3. Infrastructure and Internet Accessibility

Develop digital infrastructure to support technological improvements and offer reasonably priced internet access to enhance accessibility. To ensure information access and dissemination is effective, it will be essential to extend digital access and boost digital literacy programs among the fishing communities. This will go a long way in ensuring effective information access and dissemination.

CONCLUSION

Digital technology, particularly mobile phones, plays a crucial role in information dissemination, thereby enhancing economic opportunities and financial transactions. For fishing villages around Lake Victoria, these advancements improve market access, communication, and community engagement. By integrating digital tools into daily operations, fishermen can expand networks, boost productivity, and adopt safer, more sustainable practices, hence enhancing their information access and dissemination efforts. Ultimately, these innovations will contribute to economic empowerment and the long-term growth of Uganda's fisheries sector.

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