International Journal of Research in Sociology and Anthropology (IJRSA)
Volume 10, Issue 1, 2025, PP 8-17
ISSN 2454-8677
https://doi.org/10.20431/2454-8677.1001002
www.arcjournals.org

Leveraging ICT to Enable Value Addition and Comprehensive Value Chain Participation for Smallholder Farmers in Kigezi Region: A Case Study of Potato Growers

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Abstract

The study of economic development and the well-being of smallholder potato growers in the Kigezi region was illustrated well to the benefit of readers and the magnitude of the outcome. The study was guided by the following objectives, identifying the main ICT technologies used within the agriculture domain; estimating the value addition of potatoes at different stages in the potato supply chain; identifying the constraints and opportunities in the potato supply chain, and recommending measures for improvement. The study adopted a cross-sectional survey research design, utilizing both quantitative and qualitative approaches. Using simple random and cluster sampling techniques, a total of 285 respondents were selected to participate in the study. The findings reveal varying levels of ICT adoption across the Kigezi region and on value adding the study revealed increasing engagement in direct sales, which could foster stronger market linkages and improve profitability. The constraints limiting ICT adoption among farmers were limited access to affordable internet and low levels of digital literacy among farmers. The regression analysis highlighted significant factors influencing ICT adoption among smallholder farmers. Age (Adjusted $R^2 = 0.713$) affected tailored information access; farm size (Adjusted $R^2 = 0.697$) impacted ICT infrastructure access; and digital literacy (Adjusted $R^2 = 0.527$) with the age. Cost perceptions were influenced by farm size (Adjusted $R^2 = 0.8701$), stressing the need for age-inclusive solutions, infrastructure investment, and affordable ICT tools for small farmers. The study highlighted the need for the government of Uganda, in collaboration with the institutions of higher learning, to design digital platforms that cater to diverse age groups, ensuring usability and relevance for younger and older farmers.

Keywords: *ICT, adoption, value addition, literacy, potatoes, smallholder farmers.*

1. INTRODUCTION

Irish potatoes cover a wider area among the food crops in Uganda and the Kigezi region was among the areas that used to be main growers. Potatoes are mainly grown in Kabale and Kapchorwa in Uganda. In the central region, they are casually grown on the hillsides in Mubende and Mityana. Over 80% of farmers in Kigezi region are involved in the production of Irish Potatoes for both food and income security. The production of Irish potatoes in the Kigezi region accounts for 60% of the national potato production. Potatoes grow best in regions where there is a temperate climate with cool growing weather, ample rainfall, and deep fertile soil (Banerjee et al., 2024). However, in the Kigezi region potato growing is on the decline because of a number of factors and these include: lack of transport since farmers cannot easily access the road; lack of storage facilities, market at the end of harvest; poor quality seedlings; high post-harvest losses due to lack of storage facilities and post-

harvest handling equipment; limited attempts to commercialize value-added products from potato and other farm products; limited coordination among business development service providers and agricultural development organizations, unregulated inputs supply and distribution system.

The main challenges facing farmers in the district include high post-harvest losses due to the lack of storage facilities and post-harvest handling equipment; limited attempts to commercialize value-added products from POTATO and other farm products; limited coordination among business development service providers and agricultural development organizations, unregulated inputs supply and distribution system, high production and price risks because of reliance on rain-fed agriculture, and weak negotiation power among producers. The smallholder farmers have been struggling on their own to search for markets; however, few of them have embraced ICT and other social media platforms in sourcing for markets and publicizing their products.

2. Objectives Of The Study

- To identify the main ICT technologies used within the agriculture domain.
- To estimate the value addition of potatoes at different stages in potato supply chain.
- To identify the constraints and opportunities in the potato supply chain and to recommend measures for improvement
- To identify ways to maximize farm income and enhance Irish potato production

3. Research Questions

- What are the main ICT technologies used within the agriculture domain?
- What is the value addition of potatoes at different stages in potato supply chain?
- What are the constraints and opportunities in the potato supply chain?
- What are the ways to maximize farm income and enhance Irish potato production?

4. Literature Review

4.1. ICT Technologies Used Within the Agriculture Domain

A high proportion of respondents identified ICT adoption challenges as resonating with studies like Campuzano et al. (2023), which attribute barriers to poor infrastructure and lack of training. On the contrary, Moghavvemi et al. (2021) found that mobile-based ICT solutions, when effectively implemented, could reduce such barriers. Internet usage for sourcing farm inputs (40% frequent use) reflected similar findings by Khanal et al. (2021), who noted growing but uneven adoption due to disparities in digital literacy and affordability.

From the current study, most of the respondents agreed with using the internet for selling products and this aligned with Guo et al. (2022), who identified socio-economic divides as a constraint, although other research, such as that by Kopalle et al. (2020), reported significant benefits from digital marketing when coupled with enabling ecosystems.

Nedumaran et al. (2020), who noted that farmers with access to digital platforms could reduce transaction costs and improve market linkages. However, some of the respondents strongly disagreed with using the internet for selling products, suggesting disparities in access and skills for online marketing. This aligned with Sindakis and Showkat (2024), who reported challenges in adopting digital tools in rural areas.

Innovative ICT solutions ranging from computers, radio, television, and mobile phones to advanced technologies such as blockchain, artificial intelligence, cloud computing, Internet of Things (IoT), and big data analytics are among the current trends. These disruptive ICT trends hold the potential to contribute to sustainability transitions in agriculture by increasing efficiency, enhancing transparency, and traceability. Remote sensing using satellite technologies and geographical information systems can be used to increase agricultural output. For example, monitoring and timely information gathering of soil data can help in determining the physical and chemical properties of the soil, and hence the type of crop that can be grown to ensure maximum crop yield. Furthermore, data analytics can be used to provide predictive insights in farming operations, drive real-time operational decisions, and redesign business

processes. With ICT recognized as a significant contributor to the growth and development of agriculture, its application in recent years has gained increasing attention in many developing countries.

4.2. The Value Addition of Potatoes at Different Stages in Potato Supply Chain

There are several supply response studies focusing on smallholder producers in Africa, including (Turyasingura & Chavula, 2022). Xu et al. (2025) analyse crop supply response to changes in price and quantity of inputs and outputs. The approach of many other past studies is to analyse crop supply responses from the standpoint of prevailing institutions, price, technology, and investment. They provide empirical evidence on the role of price signals and other inputs in agricultural crop production based on the analyses of own price elasticity, which help to underpin possible causes of output growth and marketed production in specific agricultural crops. To the extent, therefore, that there is a stronger response to the market price of inputs and outputs, this implies that the market plays a big role in the decision-making process of agricultural production at the household level. In his comprehensive review of the literature, Zhang et al. (2025) established several factors that affect agricultural supply response. These include, among others: risk, farmers' attitude to risk, technology, farm industry structure, and cost of production. The author emphasizes the need to incorporate key information in the analysis of output supply such as changes in prices and changes in factors that shift the supply curve. Arguably, changes in prices, though not always, are shown in economic literature to account for a small proportion of total changes in supply that occur over a period of several years. This implies that short-run changes in supply can be caused by other factors such as weather. Distinctively, long-run changes in supply can be attributed to improvements in technology, and programmes that reduce risk in agriculture. In a recent study in Nigeria, Ajiboye et al. (2018) investigated the role of transaction costs in determining the potato supply response of farmers in Kwara State. The study utilized cross-sectional data of about 120 potato producers to determine the magnitude and direction to which the level of transaction costs influence changes in potato supply in the area; and to estimate the elasticity of potato supply in the study area. Ordinary least squares model was employed to estimate the linearized log transformed estimable equation of quantity of potato supplied. Results of the study show that transaction costs, market price, area of land cultivated, and marketing agents and service have a significant effect on the supply response of potato producers.

4.3. The Constraints and Opportunities in the Potato Supply Chain

Conversely, some scholars have presented alternative perspectives. Smidt and Jokonya (2022) argue that ICT adoption among farmers may be less hindered by digital literacy and infrastructure than by cultural attitudes and trust in technology. They highlight that even with available resources, the uptake can remain low due to resistance to change. Furthermore, Akunuri (2024) found that in some regions, localized ICT solutions are more effective than broad, infrastructure-based initiatives, suggesting that the barriers may not always lie in affordability and literacy but in the appropriateness of ICT tools for the farmers' contexts. The study's findings also align with studies such as those by Soja and Soja (2020), who downplay the role of limited funding and inadequate training for extension workers in ICT adoption. They argue that operational challenges like connectivity and maintenance of ICT tools outweigh funding concerns. However, this study highlights the criticality of institutional investment, as 95% of respondents agreed that limited funding impedes ICT integration (Benson, 2022).

Alam et al. (2019), who suggested that socio-demographic factors such as age and gender significantly influence access to agricultural information, contrary to the negligible impacts observed in this study. The disagreement could stem from contextual differences, as this study focuses on a rural setting where farm operations may take precedence over individual characteristics. These findings reinforce the need to develop scalable, farm-size-specific agricultural information systems to enhance productivity and inclusiveness among smallholder farmers (Saturday et al., 2023; Turyasingura et al., 2024).

Rajkhowa and Baumüller (2024) highlighted that smaller farms are disproportionately affected by inadequate ICT infrastructure due to their limited resources and lower economies of scale. This study also identified widowed farmers as particularly vulnerable, a finding supported by Mapiye et al. (2023), who reported that socially disadvantaged groups often encounter additional barriers to technology adoption. However, critics such as Amin (2024) argue that farm size alone cannot explain ICT infrastructure disparities, emphasizing the importance of community-level factors like rural

electrification and connectivity programmes. The discrepancy indicates a multifaceted nature of ICT access issues, suggesting that interventions must consider individual, farm-level, and community-level challenges to bridge the infrastructure gap effectively.

Low digital literacy across all age groups resonates with findings by Abdulai et al. (2020), who argued that both younger and older farmers often lack adequate digital skills. However, Chandio et al. (2017) posited that younger cohorts are generally more proficient in using ICT tools due to greater exposure, a claim not wholly supported by this study.

5. Research Methodology

The study adopted a cross-sectional survey to gather information from various owners of smallholder farms and panel procedures as well as supplementary interviews as methods of data collection. The sample for this research was attributed to the given formula of Solven's, Where;

$$\frac{N}{1+(N*(e)^2)}$$

n: Sample size

N: Total population = 955

e: margin error = 0.1

$$n = 995$$

$$\frac{995}{1+995(0.0025)^2}$$

$$\frac{995}{1+2.48750}$$

$$\frac{995}{3.4875}$$

280 Respondents

The sample size for famers in the region was 748.4 Respondents

Category	Target Population	Sample	Percentage
Kabale	269	76	28
Kisoro	145	41	17
Rubanda	146	41	17
Kanungu	435	122	44
Total	995	280	100

Source: *Primary Data, 2024*

6. Results

6.1. Respondent Characteristics

Table 1. *Showing the Characteristics of the Respondent*

Variable	Kabale (n=76)		Kisoro (n=41)		Rubanda (n=41)		Kanungu (n=122)
Items	Freq.	%	Freq.	%	Freq.	%	Freq. %
Gender							
Male	51	67	24	59	30	73	69 57
Female	25	33	17	41	11	27	53 43
Age							
18-25	30	39	17	20	20	49	30 25
26-33	24	32	10	4	11	27	56 46
34-41	7	9	7	3	7	17	18 15
42-49	6	8	4	11	3	7	14 11
50 and above	9	1	3	3	-	-	4 3
Education Level							
Primary school	40	53	20	18	18	44	10 8
Certificate	10	13	6	4	4	10	20 7
Secondary Degree	12	16	5	7	7	17	16 13
Bachelor's Degree	6	8	8	10	10	24	40 33
Post graduate degree	8	11	2	2	2	5	30 25
							6 5

Size of farm area							
0-5 acres	14	18.	17	9	9	22	4 3
5-20 acres	15	20	10	7	7	17	8 7
20-100 acres	30	39	3	10	10	24	50 41
Above 100 acres	17	23	11	15	15	37	60 49

The gender distribution data across the four districts Kabale, Kisoro, Rubanda, and Kanungu consistently shows a male majority, with percentages ranging from 59% in Kisoro to 73% in Rubanda. This male predominance may reflect traditional gender roles or economic activities where men are more prominently involved. Educational attainment varies widely across the districts, with Kabale and Kanungu showing a high percentage of individuals with only primary education (53% and 40%, respectively), which might reflect limited access to higher educational opportunities.

6.2. The Adoption of ICT within the Agriculture Domain in Selected Districts in the Kigezi Region

Table 2. *The Adoption of ICT in Agriculture in Kabale District*

Items	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
There are problems with the uptake of ICT	0	00	10	13	3	4	30	40	33	43
Frequently use the internet to source for farm inputs	10	13	6	8	9	12	21	28	30	40
Frequently use internet to sell my farm products	11	14	12	16	13	17	20	26	20	26
Use internet looking for information on prices	11	14	13	17	13	17	14	19	25	33
Internet is not particularly complicated	7	9	9	12	9	13	27	36	24	32
Using the internet can save time	2	3	4	5	7	9	33	43	30	40

The findings reveal that a substantial portion of respondents (40% agreed, 43% strongly agreed) perceived problems with the uptake of Information and Communication Technology (ICT), indicating a significant concern regarding its implementation or accessibility. The relatively high level of agreement suggests that while some individuals were neutral or disagreed (13% and 4%, respectively), the majority experienced or believed there were substantial barriers to effective ICT adoption.

Table 3. *The Adoption of ICT in Agriculture – Kisoro District n=41*

Items	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
There are problems with the uptake of ICT	4	10	6	15	1	2	15	37	15	37
Frequently use the internet to source farm inputs	6	15	2	5	0	0	20	49	13	32
Frequently use the internet to sell my farm products	10	25	0	00	1	2	20	49	10	24
Use Internet looking for information on prices	0	0	2	5	0	0	30	73	9	22
The Internet is not particularly complicated	6	15	4	10	1	2	20	49	10	24
Using the internet can save time	5	13	5	13	0	0	4	10	26	64

In Kisoro District, 37% of respondents agreed and another 37% strongly agreed that there were problems with the uptake of ICT, highlighting a significant concern about ICT adoption in the area. The combined 25% who disagreed or strongly disagreed, along with the 2% neutral, suggests that while some individuals did not perceive major issues, a majority saw substantial barriers.

Table 4. *The Adoption of ICT in Agriculture – Rubanda District n=41*

Items	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
There are problems with the uptake of ICT	2	5	2	5	10	24	17	41	10	25
Frequently use the internet to source farm inputs	0	0.0	1	2	3	7	20	49	18	45
Frequently use the internet to sell my farm products	1	2	1	2	15	37	14	34	10	25

Use the internet to look for information on prices	13	32	0	0.0	0	00	15	36	13	32
The Internet is not particularly complicated	1	2	0	0.0	3	7	30	73	7	18
Using the internet can save time	2	5	5	12	1	2	20	49	13	32

Source: *Primary Data 2024*

In Rubanda District, 41% of respondents agreed and 25% strongly agreed that there were problems with the uptake of ICT, indicating a notable concern regarding ICT adoption. This suggests that while some farmers in Rubanda actively engaged in online sales, others might face barriers such as limited access, digital skills, or effective online platforms. Addressing these challenges through improved digital infrastructure and training could help increase the adoption of online sales channels among farmers.

Table 5. *The Adoption of ICT in Agriculture – Kanungu District n=122*

Items	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
There are problems with the uptake of ICT	2	2	2	2	10	8	100	81	8	7
Frequently use the internet to source farm inputs	0	0.0	1	1	3	2	80	66	38	31
Frequently use the internet to sell my farm products	1	1	1	1	15	12	60	49	45	37
Use the internet to look for information on prices	30	25	20	16	13	11	40	33	19	15
The Internet is not particularly complicated	20	16	30	25	3	2	30	25	39	
Using the internet can save time	10	8	47	40	14	12	25	20	24	20

Source: *Primary Data 2024*

In Kanungu District, 81% of respondents agreed and 7% strongly agreed that there were problems with the uptake of ICT, highlighting a significant perception of barriers to ICT adoption. The very low percentages of disagreement (2% strongly disagree and 2% disagreed) and the minimal neutral responses suggest that the issues with ICT uptake were widely recognized and considered substantial by the majority. This indicates that there might be considerable challenges related to infrastructure, training, or other factors impacting effective ICT use, underscoring the need for targeted strategies to address these obstacles and improve ICT integration in agriculture.

6.3. Value Chain Participation for Small Farmers in Selected Districts in the Kigezi Region

Table 6. *Value chain participation for small farmers – Kabale District n=76*

Items	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Farmers still sell to middlemen and local buyers	11	14	10	13	10	13	25	33	20	27
Farmers sell directly to customers	10	13	11	14	3	4	30	40	22	29
Farmers export to neighboring countries	6	8	15	20	4	5	40	53	11	14
No value addition takes place	4	5	13	17	3	4	30	40	26	34
Marketing channels are unclear	10	13	20	27	4	5	22	29	20	27
Links not yet established with end markets of the productions	13	17	17	22	6	8	15	20	25	33
Government provides support with the markets of the products	5	7	15	20	5	7	20	27	30	40
Participates fully in the procurement of farm inputs like seeds and fertilizers	10	13	10	13	6	8	30	40	20	27

Source: *Primary Data 2024*

In Kabale district, 33% of farmers agreed that they solid to middlemen and local buyers and 27% strongly agreed, indicating a lack of direct market access, which could lead to reduced profit margins as middlemen often took a significant cut. Additionally, 14% disagreed and 26% were neutral. The high percentage of neutral responses may suggest uncertainty or a lack of awareness among farmers about alternatives to middlemen. This means there is a need for training and resources to encourage farmers to explore direct sales or cooperative models that can mitigate middlemen's influence.

6.4. Qualitative Data

6.4.1. Farmers' Views on How to Maximize Farm Income from Irish Produce

We could benefit from organized cooperatives to sell collectively at fair prices, reducing middleman exploitation. Training in post-harvest processing and value addition, like making onion powder or potato chips, would increase earnings. Moreover, better access to storage facilities will minimize post-harvest losses, ensuring we can sell when market prices are favorable.

Access to fair and transparent markets would enable farmers to secure better prices by reducing dependency on middlemen, ensuring equitable value for their produce. Subsidizing fertilizers and seeds, paired with training in modern farming techniques, would enhance productivity and profitability, equipping farmers with the resources and knowledge to optimize their yields effectively.

6.5. Discussion of the Findings of the Study

The findings highlighted key issues and opportunities surrounding ICT uptake and internet usage in agriculture. A high proportion of respondents identified ICT adoption challenges as resonating with studies like Mapiye et al. (2023), who attribute barriers to poor infrastructure and lack of training. On the contrary, Zakerabasali et al. (2021) found that mobile-based ICT solutions, when effectively implemented, could reduce such barriers. Internet usage for sourcing farm inputs (40% frequent use) reflected similar findings who Smidt and Jokonya (2022) noted growing but uneven adoption due to disparities in digital literacy and affordability.

The findings revealed that in Kabale, Kisoro, Rubanda and Kanungu districts, a considerable proportion of farmers still relied on middlemen to sell their produce, limiting their profit margins. Studies such as those by Corsi and Filippini (2023) support this finding, indicating that middlemen often dominate rural markets in developing countries, creating dependency among smallholder farmers. However, the results also highlighted a significant trend of farmers selling directly to customers on engaging in direct sales. This aligns with (Rosol & Barbosa Jr, 2021), who emphasize that direct sales foster stronger market linkages and improve farmers' earnings. On the other hand, Van Nguyen et al. (2022) argue that middlemen provide necessary services, such as aggregation and transportation, that many smallholders cannot manage independently, suggesting that middlemen play an essential, albeit contested, role as in line with (Lestari et al., 2024).

The findings from this study provide significant new insights into the factors limiting ICT adoption across farmers, extension workers, and researchers, contributing to the existing knowledge base. Over 88% of the farmers underscored the critical challenges of affordable internet and ICT devices, along with low digital literacy. This highlights a major gap in digital inclusion and emphasizes the need for targeted capacity-building programmes and policy interventions to bridge digital divides. Unlike previous research that often-generalized ICT challenges, this study delved into specific regional barriers Mpora et al. (2025), offering localized insights into infrastructural and literacy needs in rural areas. For instance, Mapiye et al. (2023) observed similar issues of limited access to affordable internet and ICT devices, particularly in rural areas, as major constraints for farmers.

The findings on lack of tailored agricultural information align with previous studies that emphasize the role of farm size in influencing access to agricultural information. For example, Jayne et al. (2019) observed that medium-scale farmers often require specific information that is not readily provided by generalized agricultural programmes, similar to the challenges highlighted in this study. This underscores the necessity for customized advisory services to address diverse needs across farm sizes. However, contrasting results were presented Alam et al. (2019), who suggested that socio-demographic factors such as age and gender significantly influence access to agricultural information, contrary to the negligible impacts observed in this study.

7. Conclusion And Recommendation

Many farmers recognize the Internet's time-saving potential and find it relatively simple to use, there are significant disparities in accessibility and comfort with ICT tools. These findings emphasize the importance of targeted interventions to address digital divides, enhance digital literacy, and improve internet infrastructure to ensure broader adoption of ICT in agriculture. The study also reveals increasing engagement in direct sales, which could foster stronger market linkages and improve profitability (Mpora

et al., 2023, 2025). The findings align with previous studies that highlight digital divides in rural areas, and they emphasize the need for targeted capacity-building programmes and infrastructure development. Farm size significantly impacts ICT infrastructure access and cost perceptions, with larger farms requiring robust systems while smaller one's face affordability challenges (Mpora et al., 2023). The pervasive issue of low digital literacy across age groups underscores the need for targeted capacity-building programmes.

Develop Age-Inclusive ICT Solutions: Design digital platforms that cater to diverse age groups, ensuring usability and relevance for younger and older farmers. Enhance ICT Infrastructure for Small Farms: Invest in affordable and accessible ICT systems tailored to smallholder needs to bridge the infrastructure gap. Implement Digital Literacy Programmes: Establish community-based training initiatives to improve digital skills across all farmer demographics, particularly older farmers. Subsidize ICT Tools and Services: Promote public-private partnerships to reduce the cost of ICT adoption for smallholder farmers, encouraging widespread utilization. Encourage Direct Marketing and Value Addition: Create policies that support farmers in selling directly to consumers and adding value to their produce through training, infrastructure, and market access (Byamukama et al., 2024). Support Government-Private Sector Partnerships: Facilitate collaboration between the government, private sector, and agricultural cooperatives to improve input access, processing, and marketing channels for smallholder farmers.

REFERENCES

[1] Ajiboye, B. O., Adeyonu, A. G., Faseyi, S. A., & Isitor, S. U. (2018). Factors influencing farmers' choice of agricultural insurance on arable crop production in Kwara State, Nigeria. Nigerian Journal of Agricultural Economics, 8(1), 89–100.

[2] Akunuri, P. (2024). Identifying diverse infrastructure needs, barriers, and opportunities for enhancing food security: a case study of the island of Newfoundland. Memorial University of Newfoundland.

[3] Alam, G. M. M., Alam, K., Mushtaq, S., Khatun, M. N., & Mamun, M. S. A. K. (2019). Influence of socio-demographic factors on mobile phone adoption in rural Bangladesh: Policy implications. Information Development, 35(5), 739–748.

[4] Amin, S. B. (2024). Critical analysis of ICT connectivity in rural Bangladesh: importance, constraints, and the way forward.

[5] Banerjee, A., Ariz, D., Turyasingura, B., Pathak, S., Sajjad, W., Yadav, N., & Kirsten, K. L. (2024). Long-term climate change and anthropogenic activities together with regional water resources and agricultural productivity in Uganda using Google Earth Engine. Physics and Chemistry of the Earth, Parts A/B/C, 103545.

[6] Benson, T. (2022). ICT Supported, Agricultural Extension and Advisory Services in Ethiopia. International Journal of Academic Pedagogical Research (IJAPR) ISSN: 2643-9123, 6(7), 127.

[7] Byamukama, E. M., Komuhangi, J., Miganda, V., & Turyahebwa, A. (2024). Examination of Access to Credit and Performance of Small and Medium Enterprises in Bushenyi District, Uganda. East African Journal of Business and Economics, 7(2), 168–175.

[8] Campuzano, L. R., Hincapié Llanos, G. A., Zartha Sossa, J. W., Orozco Mendoza, G. L., Palacio, J. C., & Herrera, M. (2023). Barriers to the adoption of innovations for sustainable development in the agricultural sector—systematic literature review (SLR). Sustainability, 15(5), 4374.

[9] Corsi, S., & Filippini, R. (2023). From power imbalance to interdependence: a case study of the Chadian sesame supply chain. The European Journal of Development Research, 35(3), 684–714.

[10] Guo, J., Hao, H., Wang, M., & Liu, Z. (2022). An empirical study on consumers' willingness to buy agricultural products online and its influencing factors. Journal of Cleaner Production, 336, 130403.

[11] Jayne, T. S., Muyanga, M., Wineman, A., Ghebru, H., Stevens, C., Stickler, M., Chapoto, A., Anseeuw, W., Van der Westhuizen, D., & Nyange, D. (2019). Are medium-scale farms driving agricultural transformation in sub-Saharan Africa? Agricultural Economics, 50, 75–95.

[12] Khanal, S., Bhattarai, S. B. S., Adhikari, U., Sharma, D., & Pandey, M. (2021). Disparities between developed and emerging economies in digital divide and ICT gap to bring agricultural sustainability. Fundamental and Applied Agriculture, 6(3), 309–322.

[13] Kopalle, P. K., Kumar, V., & Subramaniam, M. (2020). How legacy firms can embrace the digital ecosystem via digital customer orientation. Journal of the Academy of Marketing Science, 48, 114–131.

[14] Lestari, E. P., Prajanti, S. D. W., Adzim, F., Primayesa, E., Ismail, M. I. A.-B., & Lase, S. L. (2024). Understanding technopreneurship in agricultural e-marketplaces. Aptisi Transactions on Technopreneurship (ATT), 6(3), 369–389.

[15] Mapiye, O., Makombe, G., Molotsi, A., Dzama, K., & Mapiye, C. (2023). Information and communication technologies (ICTs): The potential for enhancing the dissemination of agricultural information and services to smallholder farmers in sub-Saharan Africa. Information Development, 39(3), 638–658.

[16] Moghavvemi, S., Mei, T. X., Phoong, S. W., & Phoong, S. Y. (2021). Drivers and barriers of mobile payment adoption: Malaysian merchants' perspective. Journal of Retailing and Consumer Services, 59, 102364.

[17] Mpora, E. B., Kaaya, S., Turyahebwa, A., & Nyangoma, M. (2023). Mobile money usage and financial inclusion in Uganda. Kabale University Interdisciplinary Research Journal, 2(2), 103–117.

[18] Mpora, E. B., Katabaazi-Bwengye, A., Atukunda, E., & Dan, N. R. (2025). The effects of financial distress on financial performance: An empirical analysis of SMEs in Sheema, Buhweju, Rubirizi, and Bushenyi districts.

[19] Nedumaran, S., Selvaraj, A., Nandi, R., Suchiradipta, B., Jyosthnaa, P., & Bose, D. (2020). Digital integration to enhance market efficiency and inclusion of smallholder farmers: a proposed model for fresh fruit and vegetable supply chain. International Food and Agribusiness Management Review, 23(3), 319–337.

[20] Rajkhowa, P., & Baumüller, H. (2024). Assessing the potential of ICT to increase land and labour productivity in agriculture: Global and regional perspectives. Journal of Agricultural Economics, 75(2), 477–503.

[21] Rosol, M., & Barbosa Jr, R. (2021). Moving beyond direct marketing with new mediated models: evolution of or departure from alternative food networks? Agriculture and Human Values, 38(4), 1021–1039.

[22] Saturday, A., Lyimo, T. J., Pamba, S., Kangume, S., & Turyatemba, J. (2023). Public Perceptions of Water Quality in the Lake Bunyonyi Sub-Catchment, Western Uganda. Tanzania Journal of Science, 49(3), 725–740.

[23] Sindakis, S., & Showkat, G. (2024). The digital revolution in India: bridging the gap in rural technology adoption. Journal of Innovation and Entrepreneurship, 13(1), 29.

[24] Smidt, H. J., & Jokonya, O. (2022). Factors affecting digital technology adoption by small-scale farmers in agriculture value chains (AVCs) in South Africa. Information Technology for Development, 28(3), 558–584.

[25] Soja, E., & Soja, P. (2020). Fostering ICT use by older workers: Lessons from perceptions of barriers to enterprise system adoption. Journal of Enterprise Information Management, 33(2), 407–434.

[26] Turyasingura, B., Bekana, D., Niwagaba, C. B., Dejene, S. W., & Ayiga, N. (2024). Climate-smart water management practices for sustainable agriculture in Uganda. Journal of Water and Climate Change, jwc2024471.

[27] Turyasingura, B., & Chavula, P. (2022). Climate-Smart Agricultural Extension Service Innovation Approaches in Uganda: Review Paper. International Journal of Food Science and Agriculture, 6(1), 35–43. https://doi.org/10.26855/ijfsa.2022.03.006

[28] Van Nguyen, C., Schwabe, J., & Hassler, M. (2022). Value chains and the role of middlemen in white shrimp farming in Central Vietnam. Asian Geographer, 39(2), 199–208.

[29] Xu, C., Zhang, W., Fu, Z., Chen, H., Jiang, X., Wang, S., Zhang, B., & Zhang, Z. (2025). Long-Term Spatiotemporal Analysis of Crop Water Supply–Demand Relationship in Response to Climate Change and Vegetation Greening in Sanjiang Plain, China. Remote Sensing, 17(3), 1.

[30] Zakerabasali, S., Ayyoubzadeh, S. M., Baniasadi, T., Yazdani, A., & Abhari, S. (2021). Mobile health technology and healthcare providers: systemic barriers to adoption. Healthcare Informatics Research, 27(4), 267–278.

[31] Zhang, D., Dong, F., Li, Z., & Xu, S. (2025). How Can Farmers' Green Production Behavior Be Promoted? A Literature Review of Drivers and Incentives for Behavioral Change. Agriculture, 15(7), 744.

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Citation: *Eliab Byamukama Mpora et al. "Leveraging ICT to Enable Value Addition and Comprehensive Value Chain Participation for Smallholder Farmers in Kigezi Region: A Case Study of Potato Growers" International Journal of Research in Sociology and Anthropology (IJRSA), vol 10, no. 1, 2025, pp.8-17. Doi: https://doi.org/10.20431/2454-8677.1001002.*