



EFFECT OF INFORMATION COMMUNICATION TECHNOLOGIES (ICT) USAGE ON CASHEW NUT MARKETING EFFICIENCY IN OYO STATE

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ABSTRACT

The study examined the effects of ICT usage on cashew nut marketing efficiency in Oyo State. A multi-stage sampling procedure was used to select a total of 200 respondents. Data were collected using structured questionnaires and analysed using both descriptive and inferential statistics. Findings showed that 88% of respondents were male, with an average age of 47 years. Most (85.5%) of the respondents had secondary education or higher, and 78% relied on cashew marketing as their main occupation, with an average experience of 16.9 years. ICT adoption was highest for mobile apps (92%) and WhatsApp (90%), moderate for Facebook (87.5%) and Instagram (54%), while Twitter and TikTok were not used. Cashew marketing was profitable, with a marketing margin of ₦27,941.46 and MER of 1.333. The findings show that age, marital status, marketing experience, primary occupation, marketing type, and social influence are not significant determinants of ICT use ($p > 0.05$). In contrast, sex, education level, household size, ICT training, and access to credit significantly influence ICT adoption ($p < 0.05$), indicating that capacity-building and resource-related factors drive ICT use. The study recommends subsidized ICT tools, targeted training, more credit access, and stronger digital infrastructure.

Keywords: ICT, Profitability, Efficiency, Cashew Nut, Marketing

INTRODUCTION

Cashew has been a major export crop in West Africa since the late 1990s (Bojang & Gibba, 2021), providing vital income and reducing poverty among smallholders (Ayeni & Adewumi, 2023). Rising global demand has expanded production across more than ten countries and increased reliance on chemical inputs (Swamy, 2021). Nigeria ranks among the world's top five cashew producers—alongside India, Ivory Coast, Vietnam, and Brazil—with annual output of about 220,000 metric tons (Olukunle, 2022; Babatunde *et al.*, 2023). In terms of geographical distribution, cashew marketing is concentrated in several states, primarily in the southeastern and southwestern regions of Nigeria. States such as Anambra, Imo, Ekiti, and Ondo are known for their significant cashew orchards (Azeez, & Olabanji, 2024). Despite strong production, marketing remains constrained by weak infrastructure and limited value addition (Okeagu, 2024). ICT adoption among marketers remains low due to cost, risk perception, and resistance to change, contributing to inefficiencies and lower competitiveness. This study therefore examines marketers' socioeconomic characteristics, ICT usage levels, and marketing efficiency, and evaluates how ICT adoption influences cashew marketing performance in Oyo State.

METHODOLOGY

The Study Area

The study focused on Oyo State's Oyo and Ogbomosho Zones, key economic and agricultural hubs. The Oyo Zone (covering Atiba, Afijio, Itesiwaju, Iseyin, Oyo East, and Oyo West LGAs) is a historical center of Yoruba culture with a population of approximately 736,072. Located between 7.85°N–8.25°N and 3.93°E–4.38°E, it spans roughly 2,427 km². The area has a tropical climate (1,200–1,500 mm annual rainfall, 24°C–



32°C temp) with distinct wet and dry seasons. Its agrarian economy centers on cassava, yam, maize, and fruit cultivation, supported by local commerce. .

Sampling Procedure and Sample Size

A multi-stage sampling technique was used. First, the two zones were purposively selected. Then, two LGAs were randomly chosen from each zone, making four LGAs. In the next stage, three communities were randomly selected from each LGA, giving 12 communities. According to OYSADEP, these communities had 993 registered cashew marketers. Using proportionate sampling, 20% (200 marketers) were selected as respondents for the study.

Table 1: Sampling Procedure and Sample Size

Zone	LGA	Communities	Population of Cashew Marketers	20% of Cashew Marketers
Oyo	Atiba	Owode	78	16
		Ojongbodu	82	16
		Agunpopo	81	16
		Jobele	83	17
	Afijio	Ilorra	69	14
		Akinmooiin	70	14
		Takie	103	21
Ogbomosho	Ogbomoso North	Sabo	76	15
		Oke Aanu	87	18
	Ogbomoso South	Arowomole	113	23
		Apake	79	16
		Caretaker	72	14
2	4	12	993	200

Source: (OYSADEP, 2024)

METHOD OF DATA COLLECTION

Primary data for the study was collected through questionnaires administered to cashew nut marketers. Information gathered covered respondents’ socioeconomic characteristics, available marketing technologies, factors influencing ICT use, marketing efficiency and profitability, extent of ICT adoption, and challenges associated with ICT usage. Data were analyzed using descriptive and inferential statistics. Descriptive tools such as frequencies, percentages, means, and standard deviations described key characteristics and technologies. Technique ranking identified the most commonly used ICT tools. Marketing margin analysis was used to assess the profitability and effectiveness of cashew nut marketing across different levels of ICT usage.

Method of Data Analysis

Marketing Efficiency

Marketing efficiency (ME) was used also to ascertain the performance of cashew nut markets. In an attempt to examine the marketing efficiency of cashew nut in the study area, the following formula used:

$$\text{Marketing Efficiency Ratio (MER)} = \frac{\text{Total Revenue}}{\text{Total Variable Coat}}$$

Where:

- (TR) = Total revenue from sales
- (TVC) = Total variable costs including transportation, loading/unloading, agent fees, ICT costs, and materials

When;

ME = 100%, it implies that the participant has recovered the cost of providing the marketing services. This is the breakeven point for the marketer.

ME > 100% implies that the participant covered the cost of marketing and made a margin above the 100%. This is a profit for the marketer.

ME < 100% indicates that the participant is operating at a loss.

RESULTS AND DISCUSSION

Socioeconomic Characteristic of Respondents by Level of ICT Usage

Age of Cashew Nut Marketers

Cashew nut marketers in Oyo State are mostly middle-aged, with the overall mean age of 47.215 years, and the 31–40 age group dominating low (39.39%) and medium (30.83%) ICT users, consistent with Agbongiarhuoyiet *al.* (2020) and Akinpelu *et al.* (2021). High ICT usage is strongly male-dominated (97.06% males, 2.94% females), reflecting gender gaps in digital access noted by Iroanwusiet *al.* (2023) and Azeez *et al.* (2024). Most marketers are married across all ICT levels (88.24%–93.94%), and education strongly predicts ICT use, with tertiary-educated respondents representing 61.76% of high ICT users, supporting Adeuyi (2024). Smaller household sizes (three to four members) show higher ICT usage (47.06% of high users), aligning with Agbongiarhuoyiet *al.* (2020). Marketing experience is long across groups—15–20 years for 38.24%–48.48% of users, with a mean of 16.925 years—consistent with Akinpelu *et al.* (2021). Cashew nut marketing is the major occupation, especially among medium (81.95%) and high (85.29%) ICT users, showing greater digital adoption among full-time marketers, while low ICT usage is highest among those only partially engaged (33.33%), supporting Adeuyi (2024).

Table 2: Distribution of Respondents based on the Socio-economic Characteristics

Age grp	Low Usage		Medium Usage		High Usage		Mean
	Frequency	%	Frequency	%	Frequency	%	
<=30	1	3.03	5	3.76	2	5.88	
31-40	13	39.39	41	30.83	11	32.35	47.215
41-50	5	15.15	39	29.32	11	32.35	
51-60	5	15.15	26	19.55	8	23.53	
> 60	9	27.27	22	16.54	2	5.88	
Gender							
Male	28	15.15	115	86.47	33	2.94	
Female	5	84.85	18	13.53	1	97.06	
Marital Status							
Single	2	6.06	12	9.02	4	11.76	
Married	31	93.94	121	90.98	30	88.24	
Educational Level							
No Formal	1	3.03	6	4.51	1	2.94	
Primary	9	27.27	12	9.02	0	0	
Secondary	9	27.27	63	47.37	12	35.29	
Tertiary	14	42.42	52	39.10	21	61.76	
Household Size							
3 – 4	11	33.33	33	24.81	16	47.06	
5 – 6	15	45.45	81	60.90	15	44.12	5.04
>6	7	21.21	19	14.29	3	8.82	
Marketing Experience							
≤ 5	7	21.21	26	19.55	5	14.71	
6 – 10	5	15.15	20	15.04	10	29.41	
11 – 15	5	15.15	26	19.55	6	17.65	16.925
15 – 20	16	48.48	61	45.86	13	38.24	
Main Occupation							
Cashew nut marketing	18	54.55	109	81.95	29	85.29	
Farming	11	33.33	19	14.29	2	5.88	
Civil Service	4	12.12	5	3.76	3	8.82	
Total	33	100	133	100	34	100	

Source: Field survey, 2025



Extent of Use of the Information Communication Technology

The table shows heavy dependence on simple ICT tools for cashew marketing in Oyo State, with 83.5% of marketers using WhatsApp, aligning with West African trends noted by Akpa. In contrast, Instagram use (58.5%) mirrors patterns in Sri Lanka reported by Kaluarachchi. Zero use of Twitter and TikTok highlights connectivity and literacy gaps similar to findings in Kenya and Tanzania (Iyioku *et al.*, 2024). Moderate engagement with Facebook (47.5%) and frequent mobile app use (69%) reflects selective digital adoption, supporting Busari *et al.* (2025) on the need for policy interventions to strengthen digital advisory services and reduce marketing inefficiencies. Therefore, the findings imply that policy interventions, training programs, and improved connectivity are essential for expanding ICT adoption. Enhancing digital skills and improving access to advanced platforms could significantly reduce marketing inefficiencies, broaden market access, and improve income opportunities for cashew marketers in Oyo State.

Table 3: The Extent of Use of the Information Communication Technology among Respondents in the Study Area

Variables	Never (%)	Used	Occasional Used (%)	Sometimes Used (%)	Frequently Used (%)
WhatsApp for transaction coordination	9.00		4.00	3.50	83.50
Instagram	2.00		6.00	33.50	58.50
TikTok	100		0	0	0
Twitter	100		0	0	0
Facebook	39.00		47.50	8.00	5.50
Mobile Application	5.00		15.50	10.50	69.00

Source: Field survey42025

Marketing Efficiency and Profitability of Cashew Nut Marketers on Use of the ICT

The analysis shows moderate profitability in cashew nut marketing, using indicators consistent with studies such as Ameh *et al.* (2022) and Busari *et al.* (2025). Most costs come from the purchase price per bag (₦82,219.00; 85.6%), while variable costs like transportation, ICT, and levies contribute very little. With total revenue of ₦110,160.50, the marketing efficiency ratio of 1.333, gross margin of ₦27,519.22, and marketing margin of ₦27,941.46 indicate viable returns. However, the difference between purchased (395.38 bags) and sold quantities (307.10 bags) suggests losses from storage or quality issues, aligning with concerns raised in Nmeragini *et al.* (2023), Obi-Nwandikomet *et al.* (2024), and Adedoja *et al.* (2024).



Table 3: Marketing Efficiency and Profitability of Cashew nut among Cashew nut Marketers

Variable	Quantity (Gross)	Amount per bag (₦)	Cost share %
Quantity purchased (bags) (Qp)	395.38		
Quantity sold (bags) (Qs)	307.10		
Purchased price of cashew per bag (₦) (Pf)		82,219.00	85.6
Selling price per bag (₦) (Sp)		110,160.50	
Transportation cost (₦) (Tr)		174.31	0.18
Loading/offloading cost (₦)		64.09	0.068
Association levy (₦) (As)		13.25	0.016
Agent fee (₦) (Ag)		20.77	0.025
ICT cost (Ic)		75.88	0.079
Material cost (Mc)		73.76	0.089
Total Variable Cost (TVC) (Pf+Tr+As+Ag+ Ic+ Mc)		82,641.28	
Total Revenue (TR) (Sp)		110,160.50	
Marketing Efficiency (TR ÷ TVC)		1.333	
Gross Margin (TR-TVC)		27,519.22	
Marketing Margin (Sp – Pf)		27,941.46	

Source: Field survey, 2025

Where;

Pf = Purchased price per bag (Purchased Cost)

Sp = Selling price per bag (₦) (Sp)

Qp = Quantity purchased (bags)

GM = Gross Margin

Qs = Quantity sold (bags)

TVC = Total Variable Cost

TR = Total Revenue

Factors Influencing ICT Utilization

The findings show that age, marital status, marketing experience, primary occupation, marketing type, and social influence are not significant determinants of ICT use ($p > 0.05$). In contrast, sex, education level, household size, ICT training, and access to credit significantly influence ICT adoption ($p < 0.05$), indicating that capacity-building and resource-related factors drive ICT use. These results agree with earlier studies by Arowosegbe et al. (2024), Bappah et al. (2024), and Busari et al. (2025), which also found that educated marketers with ICT training and credit access are more likely to adopt digital tools. Since several variables are statistically significant, the null hypothesis that demographic and economic factors do not influence ICT use is rejected. Additionally, summary statistics are missing in the Table and should be included because they are essential for understanding the characteristics of the dataset.

Table 4: Socioeconomic Factors Influencing the Use of ICT

Variable	Coefficient	Std. Error	z Value	P> t
Age	-.0001383	.002599	-0.05	0.958
Sex	-.2373509	.0622374	-3.81	0.000
Marital status	-.0675637	.0699625	-0.97	0.335
Level of education	.0793813	.026245	3.02	0.003**
Household size	-.0445795	.0157038	-2.84	0.005**
Marketing experience	.0028763	.0029192	0.99	0.326
Main occupation	-0.0502715	.034075	-1.48	0.142
Type of marketing	-0.0627781	.0348772	-1.80	0.073
Access to training on ICT	0.3348331	.0598676	5.59	0.000
Social influence	0.0226839	.0502315	0.45	0.652
Access to credit	0.1040524	.0444096	2.34	0.020**
Cons	2.711086	.2112183	12.84	0.000

Source: Field survey, 2025

** = 0.05 (significant at 5%)

CONCLUSION AND RECOMMENDATION

The study shows that ICTs significantly enhance marketing efficiency and profitability among cashew nut marketers in Oyo State. Although tools like mobile phones and WhatsApp are widely used, their application remains basic. ICT usage positively influences profitability, driven by factors such as education, training, and access to credit. While profitability is modest, marketing efficiency improves with ICT integration. The study concludes that stronger institutional support, targeted training, and better infrastructure are essential to fully maximize ICT benefits and boost the competitiveness of the cashew marketing sector. Based on the result of this study, the following recommendations were made;

- i. Extension services should offer continuous ICT-focused training because it significantly improves ICT usage among cashew marketers.
- ii. OLS results show ICT training has a strong positive effect ($P = 0.000$), with 97.06% of high users benefiting compared to 66.67% of low users.
- iii. Financial institutions should provide affordable credit schemes to support ICT adoption in cashew marketing.

REFERENCES

- Adedoja, S. A., Rahaman, A., Ayandele, A. O., & Muideen, R. A. (2024). Effect Of Growing and Storage Conditions of Cashew Nuts in Oke Ogun Area of Oyo State, Nigeria. *International Journal of African Innovation and Multidisciplinary Research*, **5**: 232-241.
- Adeuyi, O. O. (2024). Development of Electronic Market Application and Its Potential Adoption Among Cassava Value Chain Actors in Southwest Nigeria (Doctoral dissertation, Department of Agricultural Extension and Rural Development, College of Agricultural Management and Rural Development, Federal University of Agriculture, Abeokuta).
- Agbongiarhuoyi, A. E., Uwagboe, E. O., Agbeniyi, S. O., Famuyiwa, B. S., & Shittu, T. R. (2020). Analysis of farmers' cashew nuts marketing channels and information frequency: Implications for cashew sustainability in Nigeria. *World Rural Observ*, **12**(3): 23-30.
- Akinpelu, A. O., Oluyole, K. A., Adelusi, A. A., & Ogunwolu, Q. A. (2021). Socio economic variables of cashew farmers in Oyo state, Nigeria. *International Journal of Business Marketing and Management*, **6**(5): 17-19.
- Ameh, O. E., Ater, I. P., & Ayoola, J. B. (2022). Market Performance of Cashew Nuts among Marketers in North–Central Geo-Political Zone, Nigeria. *International Journal of Innovative Science and Research Technology*, **7**(2): 479-491.
- Arowosegbe, O. B., Alomaja, O. A., & Tiamiyu, B. B. (2024). The role of agricultural extension workers in transforming agricultural supply chains: enhancing innovation, technology adoption, and ethical practices in Nigeria. *World Journal of Advanced Research and Reviews*, **23**(3): 2585-2602.



- Ayeni, M. D., & Adewumi, M. O. (2023). Food security among cashew farming households in Kogi state, Nigeria. *GeoJournal*, **88**(4): 3953-3968.
- Azeez, K. K., & Olabanji, O. P. (2024). Cashew trees cultivation and management practices in Nigeria. *Journal of Agricultural Research, Development, Extension and Technology*, **6**(1): 18-30.
- Babatunde, O. P., Adeigbe, O., Sobowale, O., Muiyiwa, A., & Balogun, S. (2023). Cashew production and breeding in 5 West African countries. *Journal of Scientific Research and Reports*, **29**(5): 28-39.
- Bappah, F., & Adejoh, S. (2024). Mitigating Post-Harvest Losses to Ensure Food Security in North-West Nigeria. *Academy Journal of Multidisciplinary Doctoral Research*, **2**(2): 118-127.
- Bojang, B., & Gibba, A. (2021). The global competitiveness of West African cashew exporters. *Bulgarian Journal of Agricultural Science*, **27**(6): 23-35.
- Busari, A. O., Alabi, A. A., & Olanrewaju, K. O. (2025). Economics of small-scale cashew nut marketing enterprise: the case of Ejigbo local government area, Osun state, Nigeria. *Agricultural Sciences/AgrarniNauki*, **17**(4): 44-56.
- Iroanwusi, S. O., Osoba, S. B., & Udu, A. A. (2023). E-Commerce and Traditional Open Market Retailers in the Federal Capital Territory of Abuja, Nigeria. *Lafia Journal of Economics and Management Sciences*, **8**: 302-323.
- Iyioku, G., Donkor, E., Mazancova, J., & Hejkrlik, J. (2024). Understanding farmers' motivations for joining cashew marketing cooperatives in coastal Kenya: the moderating role of social capital. *Cogent Food & Agriculture*, **10**(1): 243-256.
- Nmerigini, D. C., Ubokudom, I. A., Chukwu, J., Onyekwelu, R. C., & Eze, O. E. (2023). Profitability of Cashew Nut Processing and Marketing in Enugu State, Nigeria. *Nigeria Agricultural Journal*, **54**(1): 127-132.
- Obi-Nwandikom, C. O., Anyiam, K. H., Okoro, F. N., Enoch, O. C., & Bekee, P. C. (2024). Profit Analysis of Processed Cashew Nuts Marketers in Njaba Local Government Area Of Imo State, Nigeria.
- Okeagu, J. U. (2024). Impact of Higher Transportation Costs on Value Chains, Mobility, And Alternatives to Fuel in Nigeria: A Case Study of Abuja, Nigeria.
- Olukunle, O. T. (2022). Determinants of cashew supplies and prospects for diversification into agro-allied industries in Nigeria. *International Journal of Agricultural Policy and Research*, **11**(1): 67-73.
- Swamy, K. R. M. (2021). Technological Innovations in Cashew nut Production. In the Basics of Human Civilization (pp. 383-417). CRC Press 35.