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Profitability of Palm Kernel Marketing in Southeast Nigeria: The Intervening Role of Information and Communication Technology (ICT)

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Abstract
The actual impact of ICT facilities on the profitability of palm Kernel marketing remains inadequately understood. Thus, this study investigated the intervening role of ICT on the profitability of palm kernel marketing in Southeast Nigeria. Data for this study were collected from 360 palm oil marketers from 30 markets of three randomly selected states of Southeast Nigeria using multistage sampling technique. The collected data were analyzed using descriptive statistics and budgetary techniques. The result on ICT facilities available for marketing of palm kernel revealed that majority of the palm kernel marketers in Abia (65%), Imo (68.3%) and Anambra (86.6%) used social media marketing platform in the marketing of palm kernel in the study area. The findings on the cost and return in the use of ICT in the marketing of palm kernel revealed that the labour constituted the highest percentage (18.10%) of the total variable. Cost of palm kernel marketing in the study area followed by cost of purchases (18.04%), cost of transportation (13.63%) and the least, cost of packaging (2.59%). The return on investment (ROI) realized by the marketers of palm kernel using ICT to aid the business was ₦0.27 implying that for every ₦1 invested in palm kernel marketing in Southeast, a return of ₦0.27 was realized. Evidence from the findings shows that palm kernel marketing with the use of ICT facilities is a profitable enterprise in Southeast Nigeria. It was recommended that marketers awareness on how usage of ICT facilities could improve their marketing returns should be intensified through enlightens campagna and that marketers utilization of ICT facilities for marketing palm kernel should be intensified through training to acquire requisite skills in using these facilities.

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Introduction

The palm kernel nut, derived from the palm's kernels, is a nut that can be used for different purposes. The kernel has a lot of economic importance such as the oil produced from it is a solid vegetable oil with various uses in industries such as soap production, cosmetics, and confectionery Olagunju, 2008; Nzeka 2014. The palm kernel industry in Southeast Nigeria plays a vital role in poverty alleviation, food security, and economic stability, providing income for rural farmers, particularly women (Onwubuya, Ajani and Nwalieji (2012) [14]. However, despite its economic importance, the sector faces various challenges that hinder its optimal performance and profitability. One of the key challenges is the inefficiency in marketing practices, exacerbated by limited access to market information and the underutilization of modern technologies. Nse-Nelson *et al*. (2022) [6] identified inefficiency that exists in the production system for palm kernel processing as the principal factor responsible for the decline in the performance of the country's palm kernel sector. Similarly, Okere, *et al*. (2016) [10] in a study on palm kernel marketing in

Ovia North East local government area of Edo State, Nigeria revealed seasonality of the product, means of transportation, lack of infrastructure, cost of equipment's and financial problems as one of the key constraints to palm kernel marketing in the country. Traditional methods of palm kernel marketing in Southeast Nigeria often involve reliance on informal networks, outdated communication channels, and inefficient distribution systems (Nse-Nelson *et al*. (2022) [6]. Studies such as Okere *et al*. (2016) [10], and Nse-Nelson *et al*. (2022) [6] showed that this results in inefficiencies such as high transaction costs, information asymmetry, and limited market reach, ultimately impacting the profitability of stakeholders along the palm kernel value chain

Moreover, the rapid advancement of Information and Communication Technology (ICT) presents both opportunities and challenges for the palm kernel industry in Southeast Nigeria. While ICT tools and platforms offer the potential to revolutionize marketing practices, enhance market access, and improve decision-making processes (Ogunleye *et al*. 2022) [9], the adoption and integration of these technologies remain uneven and inadequate across the sector (Ahi *et al*. 2022; Ayeni *et al*., 2023) [3, 4].

Thus, there is a pressing need to investigate the extent to which ICT interventions can address the existing challenges and improve the profitability of palm kernel marketing in Southeast Nigeria. Specifically, there is a lack of comprehensive research that systematically examines the availability, accessibility, and utilization of ICT facilities relevant to palm kernel marketing in the region. Furthermore, there is limited empirical evidence on the cost-effectiveness and returns on investment associated with the adoption of ICT in palm kernel marketing activities as available studies reviewed as Ezeoha, *et al*.(2012) [5]; Nse-Nelson *et al*.(2022) [6]; Abdulrahman *et al*. (2017) [1]; Adeniyi and Yekinni (2018) [2]; Nwafor *et al*. (2020) [7]; Okere *et al*. (2016) [10]; Vasa and Trendov (2020) [15]; Ayeni *et al*.(2023) [4] and many others focused on the production and marketing of palm kernel, and the use of ICT in agricultural produce marketing.

Therefore, this study seeks to address these gaps by investigating the profitability of palm kernel marketing in Southeast Nigeria, with a specific focus on the intervening role of ICT. By examining the availability of ICT facilities and assessing the cost and returns of ICT adoption in palm oil marketing, this research aims to provide valuable insights into the potential benefits of leveraging ICT solutions to enhance the economic viability and sustainability of the palm oil industry in Southeast Nigeria.

Methodology

The Study Area

The study was conducted in the South-eastern zone of Nigeria. According to National population commission (NPC) (2007), the population of the Southeast zone is 16,381,729 persons, disaggregated into 8,306,306 males and 8,075,423 females. The region lies in the humid tropical agro-ecological zone of Nigeria, within latitudes 04° 24/N to 07° 00/N and longitudes 05° 34/E to 09° 24/E. The humid tropical ecology is characterized by two distinct seasons, namely, the dry season, which starts from November to late March and the rainy season, which starts from April to October. The general vegetation consists of woodland savannah in the northern part of the zone and mangrove forests in the deep Niger Delta area (Onyeneke and Madukwe, 2010 as cited by Onyeneke *et al*. 2019) [12, 13]

The Southeast region of Nigeria comprises of five states namely: Abia Anambra, Enugu, Ebonyi, and Imo State. The inhabitants of this zone are predominantly farmers, producing mainly food crops like rice, cassava, yam, and maize as well as cash crop like oil palm.

Population of the Study

The population of the study consisted of 3642 registered palm oil marketers obtained in 2023 from the Palm kernel Marketers Association in the Southeast geopolitical zone of Nigeria

Sample Size and Sampling Techniques

A sample size of 360 palm kernel marketers determined using Taro Yamane's method was used for the study. A multistage involving purposive and random sampling technique was used to select the 360 palm oil marketers. The first stage involved the random selection of three States (Abia, Imo and Anambra) out of the five States that makes up the Southeast geopolitical zone of Nigeria In the second stage, five local government areas (LGAs) were randomly selected from each of the three States selected in the first stage to arrive at 15 LGAs. The third stage involved purposive selection of two rural market from each of the 15 LGAs earlier selected making a total of 30 markets. The selection was based on observable evidence of the existence of good numbers of palm kernel marketers. In the fourth stage, random sampling method was employed to select 12 palm oil marketers from each of the 30 markets selected to arrive at a total of 360 respondents for the study. The data for the study were collected using structured questionnaire.

Analytical Technique

The data collected were analyzed using descriptive statistics such as percentages and frequency distribution and budgetary technique specifically the return on investment (ROI). The descriptive statistics were used to describe the ICT facilities available in the marketing of palm oil while ROI was used to determine the costs and returns of palm oil marketing following the usage of ICT.

The ROI was specified as follows

$$ROI = \frac{TR-TVC}{TVC} \quad \ldots\ldots (1)$$

Where:
ROI= return on investment (Naira)
TR= total revenue (Naira)
TVC= total variable cost (Naira)

Results and Discussion

ICT Facilities Available for Marketing of Palm Kenel

The ICT facilities available for marketing palm kernel in the study area are presented in Table 1. Analysis of the results in Table 1 shows that majority of the palm kernel marketers in Abia (83.33%), Imo (78.33%) and Anambra (55.0%) used social media marketing platform in the marketing of palm oil in the area. The dominance of social media marketing could be attributed to the fact that it enables marketers to have a more reliable and faster means of sending information and greater ability to keep track of consignments in transit and on arrival at the market. Zodidi (2022) [16] observed that social media platforms have become the new farmers' market as it

allows for direct transactions between farmers and consumers.

Table 1: ICT Facilities available for marketing of palm kernel in the study area (n= 360)

Items	Abia		Imo		Anambra		Southeast	
	Freq	Percent	Freq*	percent	Freq*	Percent	Freq*	Percent
Social media Marketing	50	83.33	47	78.33	33	55.00	45	73.89
E-commerce platforms Customer relationship	5	8.33	8	13.33	11	18.33	8	13.33
management (CRM) software	5	8.33	9	15.00	8	13.33	7	12.22
Supply chain management	2	3.33	5	8.33	8	13.33	5	8.33
Software Mobile applications	3	5.0	7	11.67	5	8.33	5	8.33
Data analytics tools	3	5.0	6	10.00	11	18.33	13	11.11
Phone calls	6	10.00	10	16.67	13	21.67	10	16.11

Source: Field survey data, 2023. *Multiple response recorded

Costs and returns in the use of ICT in Marketing palm kernel

The output of data analysis on costs and returns in the usage of ICT for the marketing of palm kernel is presented in Table 2 and Table 3. The result in Table 2 shows that the marketers States respectively.

on the average spent total variable costs (TVCs) of ₦ 982,481 ₦ 1,438,761and ₦ 1,429,793 to realize total revenues (TRs) of ₦ 1,217,270.80, ₦1,828,051.60 and ₦ 1,836,853.60 for the marketing of palm kernel in Abia, Imo and Anambra

Table 2: Estimated Profitability of palm kernel marketers

	Abia		Imo		Anambra	
Variables	**Mean (N)**	**% of TVC**	**Mean (N)**	**%of TVC**	**Mean (N)**	**% of TVC**
Total revenue (TR)	1,217,270.80		1,828,051.60		1,836,853.60	
Variable Cost (VC)						
Labour	163,240.00	16.62	359,810.00	25.01	173,950.00	12.17
Storage	107,053.00	10.90	115,453.00	8.02	113,453.00	7.93
Purchase cost	226,610.00	23.07	235,010.00	16.33	233,010.00	16.30
Rent	142,500.00	14.50	150,900.00	10.49	148,900.00	10.41
Packaging cost	21,638.00	2.20	30,038.00	2.09	47,900.00	3.35
Transportation	146,500.00	14.91	143,750.00	9.99	234,800.00	16.42
Energy (electricity, Fuel, kerosene)	15,750.00	1.60	139,650.00	9.71	221,000.00	15.46
Market levy	75,950.00	7.73	84,350.00	5.86	82,830.00	5.79
ICT related expenditure	83,240.00	8.47	179,800.00	12.50	173,950.00	12.17
Total variable cost	982,481.00	100.00	1,438,761.00	100.00	1,429,793.00	100.00
ROI	**0.24**		**0.27**		**0.28**	

Source: Field survey (2023).

Table 3: Cost and return of usage of ICT in the marketing of Palm kernel in the Southeast Nigeria

Variable	Palm kernel	
	Mean (₦)	**% of TC**
Total revenue (TR)	1,627,392.00	
Variable cost (VC)		
Labour	232,333.33	18.10
Storage	111,986.33	8.72
Purchases	231,543.33	18.04
Rent	147,433.33	11.49
Packaging	33,192.00	2.59
Transport	175,016.67	13.63
Power supply	125,466.67	9.77
Levy	81,043.33	6.31
ICT related expend.	145,663.33	11.35
Total Variable Cost	1,283,678.33	100.00
(TVC)		
ROI	0.27	

Source: Field survey 2023

The cost of labour constituted the highest percentage (18.10%) of the TVC of palm oil marketing in the area, followed by cost of purchases (18.04%), cost of transport (13.63%) and the least, cost of packaging (2.59%). This implies that for a palm oil marketer to make more profit, measures must be taken to minimize TVC especially cost of stocking the product and labour.

The ROI were 0.24, 0.27, and 0.28 for Abia, Imo, and Anambra State respectively. This implies that for every ₦1 invested in palm oil marketing, a return of ₦0.24, ₦0.27, and ₦0.28 were realized by these marketers in Abia, Imo, and Anambra State respectively. For Southeast, the ROI realized by the marketers of palm kernel using ICT to aid the business was ₦0.27 implying that for every ₦1 invested in palm kernel marketing in Southeast, a return of ₦0.27 was realized. Going by this result, palm kernel marketing with the usage of ICT by the marketers across the selected States and the study area is a profitable enterprise. This finding agrees with Okere *et al*. (2016) [10] and Nwafor *et al*.(2020) [7]

Conclusion and Policy Implications

Evidence from the findings shows that socio media marketing dominates the ICT facilities used by marketers of palm kernel in the study, this could be attributed to socio media marketing enabling the marketers to send information faster and keep track of consignments on transit and on arrival at the market. The findings also shows that palm kernel marketing with the use of ICT facilities is a profitable enterprise in Southeast Nigeria with a refund on investment of ₦0.27

Based on the findings of the study, the following were recommendation

1. Government should encourage the young people by granting loans and providing infrastructures so as to

encourage more people to be in the business and to reduce urban- rural migration
2. The marketer's utilization of ICT facilities for marketing palm kernel should be intensified by the government and other stakeholders in the palm kernel industry through training targeted at ensuring these marketers acquire the requisite skills in using these facilities for their marketing activities.
3. The marketer's awareness on how usage of ICT facilities could improve their marketing returns should be intensified by the government and other relevant stakeholders in the palm kernel industry through enlightening campaign utilizing state extension services, forth-based organizations and the marketers association.

References

1. Abdulrahman S, Abubakar MC, Suleiman HA, Mohammed M, Idris J. Application of ICT in Agriculture: Opportunities and Challenges in Developing Countries. Int J Comput Sci Math Theory. 2017; 3(1):8-18.
2. Adeniyi RT, Yekinni OT. Use of Information and Communication Technology for Agricultural Marketing Information by farmers in Oyo state, Nigeria. Int J Agric Dev Stud. 2018; 3(2):2-20.
3. Ahi IA, Sinkovics N, Shildibekov Y, Sinkovics RR, Mehandjiev N. Advanced technologies and international business: A multidisciplinary analysis of the literature. Int Bus Rev. 2022; 31(4):101967. doi: https://doi.org/10.1016/j.ibusrev.2021.101967.
4. Ayeni OA, Sennuga SO, Banidele J, Bankole O, Omolayo AF. ICT-based market information and adoption of agricultural seed technologies: insight from Gwagwalada area council, Abuja. Int J Res Innov Soc Sci. 2023; 7(4):94-105.
5. Ezeoha SL, Akubuo CO, Ani AO. Indigenous Design and Manufacture of Palm Kernel Oil Screw Press in Nigeria: Problems and Prospects. Int J Appl Agric. 2012; 7(2):67-82.
6. Nse-Nelson FA, Obinna LO, Mmerife RP, Oke UR. Spatial Pricing Efficiency of Palm Kernel Markets in Southeast, Nigeria. Nigeria Agric J. 2022; 53(3):243-248.
7. Nwafor CU, Ogundeji AA, van der Westhuizen C. Adoption of ICT-based information sources and market participation among smallholder livestock farmers in South Africa. Agriculture. 2020; 10(2):1-44.
8. Nzeka UM. Nigeria Provides Export Market for Oilseeds and Products. GAIN Report, USDA Foreign Agricultural Service. 2014.
9. Ogunleye KY, Adebayo BO, Adeboye FV. Information and communication technology usage for marketing among agricultural produce dealers in Ogbomoso North Local Government Area, Oyo state. Int J Agric Econ Rural Dev. 2022; 12(1):53-58.
10. Okere RA, Nwawe CN, Uwubanmwen IO, Garba ID, Dada M, Eseigbe E. Palm Kernel Marketing in Ovia North East Local Government Area of Edo State, Nigeria. Int J Bus Policy Strat Manage. 2016; 3:69-78.
11. Olagunju FI. Economics of Palm Oil Processing in South-Western Nigeria. Int J Agric Econ Rural Dev. 2008; 1(2):69-77.
12. Onyeneke RU, Madukwe DK. Adaptation Measures By Crop Farmers In The Rain Forest of Nigeria. Sci World J. 2010; 5(1). ISSN 1597-6343.
13. Onyeneke RU, Nwajiuba CA, Emenekwe CC, Nwajiuba A, Onyeneke CJ, Ohalete P. Climate change adaptation in Nigerian agricultural sector: A systematic review and resilience check of adaptation measures. AIMS Agric Food. 2019; 4.
14. Onwubuya EA, Ajani EN, Nwalieji H. Assessment of oil palm production and processing Among Rural Women in Enugu North Agricultural Zone of Enugu state, Nigeria. Int J Agric Sci. 2012; 2(12):322-329.
15. Vasa L, Trendov N. Farmers' experience in adoption and usage of ICT solutions for agriculture in the republic of North Macedonia. APSTRACT. 2020; 14(3-4):25-30.
16. Zodidi C. The effect of ICT uses in enhancing market participation and household welfare outcomes among smallholder farmers in the Eastern Cape province of South Africa. MSc Thesis, School of Agricultural. Natal, South Africa. PP. 142. 2022.