



RESEARCH ARTICLE

Use of social media in the marketing of agricultural products and farmers' turnover in South-South Nigeria [version 1; peer review: 2 approved with reservations]

Henry Inegbedion ¹, Emmanuel Inegbedion², Abiola Asaley ³,
Eseosa Obadiaru ⁴, Festus Asamu⁵

¹Department of Business Studies, Landmark University, Omu Aran, Kwara, +234, Nigeria

²Registry Department, Nigeria Broadcast Academy, Lagos, Lagos, +234, Nigeria

³Department of Economics, Landmark University, Omu Aran, Kwara, +234, Nigeria

⁴Department of Accounting and Finance, Landmark University, Omu Aran, Kwara, +234, Nigeria

⁵Department of Sociology, Landmark University, Omu Aran, Kwara, +234, Nigeria

V1 First published: 09 Oct 2020, 9:1220
<https://doi.org/10.12688/f1000research.26353.1>

Latest published: 12 Mar 2021, 9:1220
<https://doi.org/10.12688/f1000research.26353.2>

Abstract

Background: The study investigated the use of social media in the marketing of agricultural products and farmers turnover in South-South Nigeria. The purpose of the study was to determine the extent to which the usage of social media in the marketing of agricultural products in Nigeria can enhance efficiency and farmers' sales turnover.

Methods: It employed the survey research design and data were collected with the help of a structured questionnaire. Research data were analysed using t-test and least square method. **Results:** The results showed that the use of social media (Facebook, WhatsApp and Instagram) in the marketing of agricultural products enhances efficiency and turnover of farmers through a significant reduction in the cost of marketing agricultural products as well as increased awareness and the attendant increase in demand for agricultural produce.

Conclusions: The use of social media (WhatsApp and Instagram) in the marketing of agricultural products significantly influences cost reduction and hence efficiency in marketing as well as enhances turnover of farmers through increased demand for agricultural products. Thus, the adoption of social media in the marketing of agricultural products enhances the efficiency of agricultural marketing and sales turnover of farmers in south-south of Nigeria but only the use of WhatsApp and Instagram predict efficiency and sales turnover of farmers.

Open Peer Review

Approval Status

	1	2	3
version 2 (revision) 12 Mar 2021		 view	 view
version 1 09 Oct 2020	 view	 view	

1. **Lauri M Baker** , University of Florida, Gainesville, USA
2. **Philip Olasupo Alege**, Covenant University, Ota, Nigeria
3. **Dr.K. Lokeswari** , PSG College of Arts and Science, Coimbatore, India

Any reports and responses or comments on the article can be found at the end of the article.

Keywords

Agricultural marketing, efficiency in marketing, optimal sales turnover, social media marketing, demand for agricultural products



This article is included in the **Agriculture, Food and Nutrition** gateway.

Corresponding author: Henry Inegbedion (inegbedion.henry@lmu.edu.ng)

Author roles: **Inegbedion H:** Conceptualization, Formal Analysis, Funding Acquisition, Methodology, Supervision, Writing – Original Draft Preparation; **Inegbedion E:** Project Administration, Writing – Review & Editing; **Asaleye A:** Data Curation, Investigation; **Obadiaru E:** Project Administration, Writing – Review & Editing; **Asamu F:** Supervision

Competing interests: No competing interests were disclosed.

Grant information: This work was funded by Landmark University Centre for Research and Development.

The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Copyright: © 2020 Inegbedion H *et al.* This is an open access article distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

How to cite this article: Inegbedion H, Inegbedion E, Asaleye A *et al.* **Use of social media in the marketing of agricultural products and farmers' turnover in South-South Nigeria [version 1; peer review: 2 approved with reservations]** F1000Research 2020, 9:1220 <https://doi.org/10.12688/f1000research.26353.1>

First published: 09 Oct 2020, 9:1220 <https://doi.org/10.12688/f1000research.26353.1>

Introduction

In many countries of the world, the agricultural sector is regarded as a stimulant of economic development (Food and Agricultural Statistics, 2004). There is evidence to show consistently that it is not possible for any country to successfully attain industrialized status without first achieving significant success in agricultural performance since the green revolution (investment in food production) is crucial to the industrial revolution (Inegbedion *et al.*, 2020; as well as (Inegbedion *et al.*, 2018). The “agricultural sector performance, particularly through improved productivity, is one of the major ways of reducing poverty in developing countries” (Nebo & Ejionueme, 2017), which is consistent with the key macroeconomic goals of any economy and two of the United Nation’s Sustainable Development Goals: “No Hunger” and “No Poverty”.

Over time, the agricultural sector has suffered neglect in Nigeria that it is largely unattractive to the current generation of youths. It is for this reason that a different type of agricultural marketing deserves to be given due attention to ensure that the earnings potential of agriculture is not undermined. Given the popularity of the use of social media across the different age grades in Nigeria, it is logical to expect that its use in the marketing of agricultural products will make a significant impact on the demand for agricultural products and thus on sales. This explains the rationale for this study.

Objectives of the study

The main objective of this study was to investigate the impact of the adoption of social media in agricultural marketing by farmers in South-South Nigeria on major performance indicators Such as cost of marketing, demand for agricultural products and turnover of farmers.

Literature review

Channels of advertisement

The traditional marketing of agricultural products consists of determining the farm products, producing in the right quality, storing to ensure that the products are available, and transporting the products to the places where they are required. It consists mainly of non-verbal communication between the producer and the consumer. The producer (farmer) conceives a product that is required by consumers, produces it in a manner perceived to be consistent with customers’ requirement, stores it, and distributes to locations perceived to have adequate demand.

Use of print and electronic media in advertising. Beyond the product-price-storage-distribution strategy, large organisations and government have been known to market their products through advertisements in print and electronic media. The essence of such advertisements is to create awareness of the availability of the products, the locations where they are available as well as the expected benefits of using those products, especially if the products can be substituted for other products.

Adoption of social media for agricultural marketing in South-South Nigeria.

Given the shortcomings of the print and electronic media in marketing agricultural products, the need for a more efficient strategy has been long overdue. The rapid growth of the mobile phone use around the world in the last few decades provided a viable marketing alternative for agricultural products in Nigeria and other emerging economies. Mobile phones have contributed significantly to the empowerment of people in developing countries in spreading information networking coverage in remote areas. Consequently, many rural areas are getting great benefit out of its usage in various spheres of endeavour. This has culminated in the improvement of the living standard of poor farmers in developed nations.

Theoretical review

Technology acceptance model (TAM)

As one of the frequently used theory to underpin Internet usage, the major thrust of TAM is that the users’ beliefs in perceived usefulness and perceived ease of use of the Internet can be used to explain their acceptance of Internet (Chuttur, 2009; Dwivedi *et al.*, 2017). Thus, the extent to which the user believes that technology is useful for the cause and the extent to which he feels that he can easily use technology are critical to his/her willingness to use it. Recent modifications and refinement to TAM have culminated in the extension of its use to enable a better understanding of users’ intention to use Internet technology.

Theory of agricultural marketing cooperatives

This theory visualizes a model that studies how an agricultural marketing cooperative (AMC), specifically an AMC that is made up of many farmers as members, can adopt a direct selling approach. Under this arrangement, the farmers who are the members of the AMC can sell their products either to the cooperative or in a local market. The model shows that if the farmers decide to sell to the AMC, the decision will induce an anti-competitive effect on the direct selling market, whereas, the option of direct selling has the propensity to create a “healthy emulation” among farmers (Agbo *et al.*, 2013). This will then stimulate production and ultimately benefit the cooperative.

Theoretical framework

This study adopts the TAM and the theory of agricultural cooperatives as its framework because the ease with which the farmers feel they can utilize social media to market their products and the usefulness of social media marketing to the attainment of their marketing goals are critical to the adoption of social media in the marketing of their products. Furthermore, the cooperative societies to which the farmers belong can play a critical role in the marketing of the farmers’ products.

Empirical review

The empirical review focuses on cost of marketing agricultural products as well as sales turnover.

Use of social media in marketing agricultural products and cost of marketing

Balkrishna & Deshmukh (2017) investigated the “role of social media in agriculture marketing and its scope.” They employed questionnaire and in-depth interviews to collect data. Results indicated that social media is very useful in agricultural marketing.

Vassiliadou *et al.*, (2011) investigated “the use of social media among students of Technology Agriculture and their role in promoting agribusiness.” The results showed that social media usage enhances facilitation and flow of knowledge/information, as well as cheap advertisement of products.

Use of social media in agricultural marketing and sales turnover

Mwangi & Wagoki (2016) surveyed leading media groups to investigate “the effect of social media on the performance of advertisement business in the mainstream media in Kenya.” They employed stratified random sampling to select 82 respondents. A questionnaire served as the research instrument. Descriptive and inferential statistics were employed. The findings indicate that the interactivity of social media had a significant positive relationship with the performance of the advertisement. Lashgarara *et al.*, (2011) examined “ICT capabilities in improving the marketing of agricultural productions of Garmsar Township, Iran.” The survey research design was employed with questionnaire serving as the research instrument. The results indicated that ICT capabilities determined 57% variance of agricultural products marketing. Therefore, the following null hypotheses were formulated:

H_{0_1} : There is no significant relationship between the use of social media in agricultural marketing and cost of marketing agricultural products

H_{0_2} : There is no significant relationship between the use of social media (Facebook, WhatsApp and Instagram) in agricultural marketing and farmers’ turnover from agricultural products

Other related studies are “use of information communication technologies among agricultural extension officers in Lesotho” (Akintunde & Oladele, 2019), “adoption of agricultural e-marketing,” (Alavion *et al.*, 2017), as well as the studies of Eze *et al.* (2019), among others.

Gap in the literature. Adoption of social media and other communication technologies in the marketing of agricultural products is not deficient in the empirical literature. White *et al.* (2014); Balkrishna & Deshmukh (2017) as well as Khou & Suresh (2018), investigated use of social media for agricultural marketing; Akintunde & Oladele (2019) and Alavion *et al.* (2017) examined determinants of ICT usage in the marketing of agricultural products. Jose & Lokeswari (2018) investigated users and non-users of mobile communication technologies in agricultural marketing; Lashgarara *et al.* (2011) examined ICT capabilities in improving the marketing of agricultural productions, Ogunniyi & Ojebuyi (2012) investigated “Mobile phone

use for agribusiness by farmers in Southwest Nigeria while Mwangi & Wagoki (2016) investigated the effect of social media on the performance of advertisement business in Kenya. Although a few of the studies investigated the use of social media, none appears to have focused on the implications of the usage of social media in agricultural marketing on marketing efficiency; neither is there adequate empirical evidence on how the use of social media in the marketing of agricultural products can impact on efficiency and sales turnover. Besides, related studies on the research problem in South-South Nigeria are either scant or non-existent. This study sought to fill these gaps.

Methods

The study employed the quantitative research method. Specifically, the conclusive research design consistent with Inegbedion (2018); Inegbedion *et al.*, (2018) and Inegbedion *et al.*, (2016) was employed while the survey method was used in data collection. The study was conducted over July-September, 2019

Participants

The population of the study consisted of 4280 farmers registered in cooperative societies. Of this number, 1620 are from Edo State, 1460 are from Ondo State and 1200 are from Delta state. Yamane’s formula was used to estimate a sample size of 366 (Yamane, 1967) and proportional allocation was used to assign 139, 125 and 102 to Edo, Ondo and Delta States, respectively. Of the 366 respondents that were sampled, 246, representing 67.2% of them voluntarily participated in the study. The participants were randomly selected from farmers’ cooperative societies in the three states (a lottery method was used to achieve randomisation after stratifying the farmers on the basis of crop, poultry and fish farming). Subsequently, the farmers were contacted through any of the social media that they use (Facebook, WhatsApp or Instagram). The major inclusion criterion was membership of farmers’ cooperative while the exclusion criterion was the non-usage of any of the three social media platforms (Facebook, WhatsApp or Instagram). The choice of these states was informed mainly by convenience. Specifically, samples were taken from the current members of the cooperative societies. The sample consisted of the crop, poultry and fish farmers with evidence of usage of social media (Facebook, WhatsApp or Instagram). The sampling frame was requested from the management of the cooperative societies.

Request for consent of respondents to participate in the study

After the sampling of the respondents, the verbal consent of the management of the cooperative societies was sought. Having obtained the consent of the leaders of the cooperatives, the consents of all the 366 sampled respondents across the three States were sought through the social media. Following the request to participate in the study, through social media 120 of them across the three states declined to participate in the study through their response to the social media message requesting their participation. While a few cited personal reasons for declining, majority of them did not advance any reason,

they just refused to respond to the request. Of those approached, 246 gave their consent and thus participated in the study.

Materials

Based on the sampling frame, a sample of respondents was selected. Thereafter, the sampled respondents were requested to participate in the study through social media. A survey was constructed and used to examine the use of social media in agricultural marketing and its implication for efficiency and sales turnover through the administration of a questionnaire, which served as the research instrument. The questionnaire contained bio-data questions and 5-point Likert scale questions dealing with social media usage in agricultural marketing and its implication for efficiency and sales turnover in South-South Nigeria. Information was elicited from the respondents via structured questionnaires through the social media channels (Facebook, Instagram and WhatsApp). The questionnaire is available as *Extended data* (Inegbedion *et al.*, 2020).

Validity of instrument

A pilot test was conducted on 20 of the sampled respondents. Based on the results obtained from the pilot test, validity and reliability of the instrument were determined. For validity, two approaches were used. First, the instrument was given to experts in management and marketing in the authors’ institution for their expert opinion, this served to fulfil the condition for face validity. Thereafter, content validity index (CVI) was computed. Both scale and item content validity measures were used. The results obtained were 0.66 for scale and 0.67 and 0.67 item CVI of use of social media in marketing agricultural products and cost reduction as well as use of social media in the marketing of agricultural products and farmers’ turnover respectively, thus showing that the instrument was valid since all the values are approximately 0.7 and a value of 0.7 is indicative of a valid instrument (see Table 1).

Reliability of the instrument

Cronbach’s alpha (α) was used to determine the reliability of the instrument. The computed Cronbach alpha values were 0.70 and 0.75 for use of social media and cost reduction as well as use of social media and sales turnover respectively while the computed alpha of the entire instrument was 0.84. These values were considered significant since they are approximately 0.7 or more, thus indicating that the items in the instrument are internally consistent. In other words, the instrument is reliable. The foregoing indicates that the instrument is valid and reliable (see Table 2).

Table 1. Content validity index.

Construct	Item-CVI	Scale-CVI
Use of social media and cost reduction	0.67	
Use of social media and sales turnover	0.66	
Entire Instrument		0.67

Table 2. Instrument reliability.

Construct	Cronbach alpha of Constructs	Cronbach alpha of the entire instrument
Use of social media and cost reduction	0.70	
Use of social media and sales turnover	0.75	
Entire Instrument		0.84

Model specification

$$CMAP = f(UFB, UWA \text{ and } UINS) \dots (1)$$

$$DAP = f(UFB, UWA \text{ and } UINS) \dots (2)$$

In specific terms, equations 1 and 2 yield

$$CMAP = \beta_0 + \beta_1 UFB + \beta_2 UWA + UINS + e \dots (3)$$

$$DAP = \beta_0 + \beta_1 UFB + \beta_2 UWA + UINS + e \dots (4)$$

Where

CMAP = Cost of marketing agricultural products;

DAP = Demand for agricultural products;

UFB = usage of Facebook;

UWA = usage of WhatsApp;

UINS = usage of Instagram; and

e. = random error observed along with the variables

Statistical analysis

Research data were analysed using the one-sample t-test and least-squares regression. One sample t-test was used to test for significance of the usage of social media constructs in cost reduction and sales turnover while the least-squares method was used to test for the predictive power of the entire constructs (collectively) with respect to cost reduction and sales turnover; besides, the signs of the coefficients of the constructs in the regression model were used to infer the direction of the relationships between usage of social media in agricultural marketing and cost of marketing agricultural products on one hand as well as usage of social media in agricultural marketing and sales turnover on the other hand. Data analysis was conducted with SPSS 20.

Ethical approval

The authors sought and got ethical approval to conduct the study from the Landmark University Research Ethical Board. Furthermore, the authors complied with conventional ethical standards in conducting the study, including the request for the consent of the sampled respondents to participate in the study.

Results

The results focus on the impact of social media usage on cost reduction in the marketing of agricultural products and on sales

turnover of the farmers. *Underlying data* are available from Dryad (Inegbedion *et al.*, 2020).

Social media usage and reduction in cost of advertising agricultural products

A comparison of the usage of Facebook in agricultural marketing with cost reduction in marketing of agricultural products revealed that respondents who agreed that the usage of Facebook enhances cost reduction had a mean score 3.11. Given the five-point Likert scale, a test value of 3 was used. The computed t- and p-values were 2.04 and 0.046 respectively. This shows that the test was significant at P<0.05. We thus conclude, at the 95% confidence level, that usage of Facebook for marketing agricultural products significantly reduces the cost of marketing (see Table 3).

A comparison of the usage of WhatsApp in agricultural marketing with cost reduction in marketing of agricultural products revealed that respondents who agreed that the usage of Facebook enhances cost reduction had a mean score 3.59. Given the five-point Likert scale, a test value of 3 was used. The computed t- and p-values were 14.58 and 0.001, respectively. This shows that the test was significant at the one per cent

level. We thus conclude, at the 99% confidence level, that usage of WhatsApp for marketing agricultural products significantly reduces the cost of marketing (see Table 3).

A comparison of the usage of Instagram in agricultural marketing with cost reduction in marketing of agricultural products revealed that respondents who agreed that the usage of Facebook enhances cost reduction had a mean score 3.09. Given the five-point Likert scale, a test value of 3 was used. The computed t and p values were 1.99 and 0.048, respectively. This shows that the test was significant at the five per cent level. We may thus conclude, at the 95% confidence level, that usage of Instagram for marketing agricultural products significantly reduces the cost of marketing (see Table 3).

A regression model of usage of social media in the marketing of agricultural products and cost of marketing agricultural products revealed that the R² value was 0.48, thus implying that 48% of the variation in the cost of marketing agricultural products is explained by variation in the usage of social media channels (see Table 4). The ANOVA table shows a calculated F of 10.94 with an associated significant probability of p < 0.001, thus indicating that the F value is significant. The implication is that the overall significance of the model is good (see Table 4). The regression coefficients show that the computed t-values and associated p-values were 3.152 (0.002), 0.337 (0.076), 5.015 (p < 0.001) and 2.570 (0.011) for constant, Facebook usage, WhatsApp usage and Instagram usage, respectively (see Table 4). The implication is that the explanatory variables, consisting of the usage of social media channels (WhatsApp and Instagram) are significant and are thus predictors of cost reduction in the marketing of agricultural products. However, Facebook usage is not significant and is thus not a predictor of cost reduction in the marketing of agricultural products.

Table 3. Use of social media in marketing agricultural products and cost reduction.

Channel	Mean	SD	Mean Diff	Test Value	T	Sig. 2-tailed	N
Facebook	3.11	0.41	0.11	3.00	2.04	0.046	246
WhatsApp	3.59	0.63	0.59	3.00	14.58	0.000	246
Instagram	3.09	0.454	0.09	3.00	1.99	0.048	246

Table 4. Usage of social media and cost of marketing agricultural products.

Model Summary					
R	R-square	Adjusted R Square	Std. Error of Estimate	Durbin-Watson	
0.694	0.48	0.43	0.707	1.67	
ANOVA					
F =10.935			Sig. = 0.000		
Coefficients					
Model	B	Std Error	Beta	t	Sig
Constant	1.334	0.423		3.152	0.002
Facebook cost reduction	0.020	0.059	0.020	0.317	0.076
WhatsApp cost reduction	0.360	0.071	0.304	5.015	0.000
Instagram cost reduction	0.257	0.100	0.155	2.570	0.011

Social media usage and sales turnover from agricultural products

A comparison of the usage of Facebook in agricultural marketing with sales turnover of farmers revealed that respondents who agreed that the usage of Facebook enhances farmers' sales turnover had a mean score 3.214. Given the five-point Likert scale, a test value of 3 was used. The computed t and p values were 5.44 and P < 0.001 respectively. This shows that the test was significant at p < 0.05. We thus conclude, at the 95% confidence level, that usage of Facebook for marketing agricultural products significantly enhances the sales turnover of farmers (see Table 5).

A comparison of the usage of WhatsApp in agricultural marketing with sales turnover of agricultural products revealed that respondents who agreed that the usage of Facebook enhances sales turnover had a mean score 3.289. Given the five-point Likert scale, a test value of 3 was used. The computed t and p values were 5.84 and 0.000, respectively. This shows that the test was significant at the one per cent level. We thus conclude, at the 99% confidence level, that usage of WhatsApp for marketing agricultural products significantly optimises the sales turnover of farmers (see Table 5).

A comparison of the usage of Instagram in agricultural marketing with sales turnover of agricultural products revealed that respondents who agreed that the usage of Facebook enhances sales turnover had a mean score 3.115. Given the five-point Likert scale, a test value of 3 was used. The computed t and p values were 4.32 and P < 0.001 respectively. This shows that the test was significant at P < 0.01. We thus conclude, at the 99% confidence level, that usage of Instagram in marketing agricultural products significantly optimises the sales turnover of farmers (see Table 5).

A regression model of usage of social media and turnover of agricultural products revealed that the R² value was 0.58, thus implying that 58% of the variation in turnover of agricultural products is explained by variation in the usage of social media (see Table 6). The ANOVA table shows a calculated F of 7.21 with an associated significant probability of P < 0.001. The implication is that the overall significance of the model is good (see Table 6). Lastly, the regression coefficients show that the computed t and associated significant probabilities were 12.58 (0.00), 0.816 (0.415), 2.77 (0.006) and 4.614 (p < 0.001) for constant, Facebook usage, WhatsApp usage and Instagram usage, respectively (see Tables 6). The implication is that WhatsApp and Instagram usage are predictors of turnover of agricultural products.

Table 5. Use of social media in marketing agricultural products and sales turnover.

Channel	Mean	SD	Mean Diff.	Test Value	t	Sig. 2-tailed	N
Facebook	3.214	0.62	0.214	3.00	5.44	0.000	246
WhatsApp	3.289	0.78	0.289	3.00	5.84	0.000	246
Instagram	3.115	0.418	0.115	3.00	4.32	0.000	246

Demographic variables and social media usage

F test was conducted to compare respondents' perception of the use of social media in the marketing of agricultural products with their demographic variables. A comparison of respondents' perception of usage of social media in cost reduction and demographic variables had the following computed F and associated significant probabilities 1.12 (0.348), 1.36 (0.25), 0.673 (0.671) and 1.28 (0.28) for age, sex, educational qualification and farm categories, respectively. The implication is that respondents' perception of the significance of the usage

Table 6. Usage of social media and turnover of agricultural products.

Model Summary					
R	R-square	Adjusted R Square	Std. Error of Estimate	Durbin-Watson	
0.76	0.58	0.47	0.528	1.966	
ANOVA					
F = 7.209			Sig. = 0.000		
Coefficients					
Model	B	Std Error	Beta	t	P-value
Constant	2.436	0.264		18.79	0.000
Facebook Turnover	0.038	0.044	0.82	0.816	0.415
WhatsApp Turnover	0.123	0.044	0.254	2.77	0.006
Instagram Turnover	0.322	0.070	0.358	4.614	0.000

of social media in the reduction of agricultural marketing cost is not influenced by demographic variables (see Table 7).

Lastly, a comparison of respondents' perception of the significance of the usage of social media in enhancing the turnover of agricultural products had the following computed F and associated p-values 0.29 (0.83) 1.26 (0.27), 0.961 (0.51) and 0.734 (0.73) for age, sex, educational qualification and farm categories, respectively. The implication is that respondents' perception of the significance of the usage of social media in enhancing the turnover of agricultural products is not influenced by demographic variables (see Table 8).

Discussion

Results of the study indicate that the use of Facebook, WhatsApp and Instagram in the marketing of agricultural products has a significant influence on the reduction of the cost of marketing agricultural products. However, while the use of WhatsApp and Instagram were found to be significant predictors of reduction in the cost of marketing agricultural products, the use of Facebook was not found to be significant. The implication of the significance of social media channels (WhatsApp and Instagram) in the reduction of the cost of marketing agricultural products is that the use of social media channels in the marketing of agricultural products enhances efficiency in the marketing of agricultural products. The results are consistent with the findings of Balkrishna & Deshmukh (2017); Mwangi & Wagoki (2016); Ogunniyi & Ojebuyi (2012); White *et al.*, (2014); as well as Vassiliadou *et al.*, (2011). Results of the study further indicate that the use of social media channels (Facebook, WhatsApp and Instagram) in the marketing of agricultural products has a significant influence on the enhancement of the turnover of farmers. However, just like in the previous model, the use of Facebook did not demonstrate a significant predictive power on sales turnover. Thus, only the use of WhatsApp and Instagram have strong predictive powers on sales turnover. The results are consistent

with the findings of Mwangi and Wagoki, Khou & Suresh (2018) as well as Ogunniyi & Ojebuyi (2012).

The first regression model shows that WhatsApp and Instagram usage in the marketing of agricultural products are significant predictors of cost reduction in the marketing of agricultural products while Facebook was not significant. Thus, usage of WhatsApp and Instagram in the marketing of agricultural products has significant implications on the marketing of agricultural products. This tends to suggest that the usage of Facebook by farmers in the marketing of agricultural products is minimal compared to the usage of WhatsApp and Instagram. The coefficient of determination of 0.48 shows that 48% of the variation in advertising cost of farmers is attributable to the usage of social media in advertising. In the same vein, the second regression model shows that the usage of WhatsApp and Instagram are significant predictors of enhanced sales turnover from agricultural products because the two channels of social media help in speedy dissemination of information about the agricultural products to a wide audience of customers, thus leading to increased demand on the short-run. The two regression models indicate that WhatsApp and Instagram are predictors of efficiency of cost of marketing agricultural products and sales turnover from agricultural products.

Proposed model of usage of social media and expected outcomes

Based on the research findings, a model of social media marketing of agricultural products, efficiency of agricultural marketing and sales turnover was proposed. The model shows that two social media channels (WhatsApp and Instagram) predict social media impact on the marketing of agricultural products in terms of efficiency and enhanced turnover. The model shows that the use of social media (WhatsApp and Instagram) leads to optimal marketing cost and thus efficient marketing of agricultural products. The optimal cost of marketing agricultural products translates to cost savings and hence optimal turnover in agricultural products. Also, effective use of social media (WhatsApp and Instagram) stimulates demand which also results in optimal sales turnover from agricultural products (see Figure 1).

Conclusions

Given the problem definition and findings, the research concludes that: The use of social media (Facebook, WhatsApp and Instagram) in the marketing of agricultural products significantly influences cost reduction and hence efficiency in marketing as well as enhances turnover of farmers through increased demand for agricultural products. Thus, the adoption of social media in the marketing of agricultural products enhances the efficiency of agricultural marketing and sales turnover of farmers in south-south of Nigeria but only the use of WhatsApp and Instagram predicts efficiency of agricultural marketing and sales turnover of farmers.

This study has made significant contributions to marketing and management knowledge. First, it is among the few studies that have examined the influence of social media marketing on

Table 7. Demographic variables and respondents' perception of cost reduction.

	Age	Sex	Educational Qualification	Farm Category
F	1.12	1.36	0.673	1.28
Sig.	0.348	0.25	0.671	0.28

Table 8. Demographic variables and respondents' perception of turnover.

	Age	Sex	Educational Qualification	Farm Category
F	0.29	1.26	0.961	0.734
Sig.	0.83	0.27	0.51	0.730

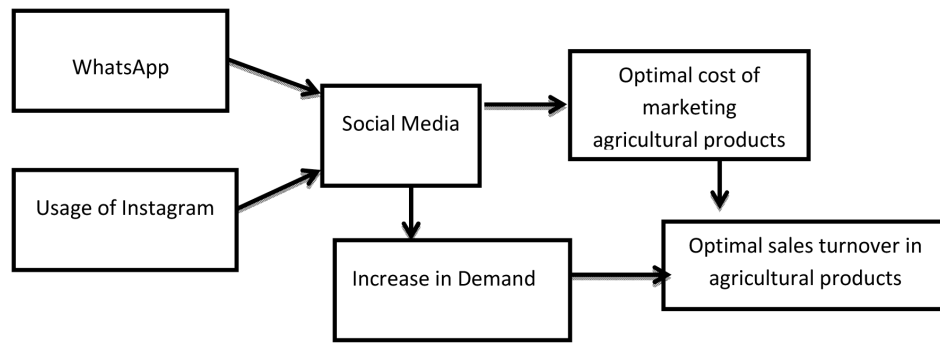


Figure 1. A model of social media marketing of agricultural products and sales turnover.

marketing efficiency and farmers' sales turnover in Nigeria. Secondly, it is among the very few studies to have studied the adoption of social media in agricultural marketing in south-south Nigeria. Thus, a major point of departure of this study from previous studies is its examination of the implications of the usage of social media usage in agricultural marketing on marketing efficiency and sales turnover. It has thus made a concerted effort in reinforcing the interest of farmers in the use of social media in the marketing of agricultural products in south-south Nigeria.

The study is not without limitations which indicate the need for further studies to minimize the constraints associated with this study. Out of six South-South states in Nigeria, only three were studied. It is uncertain if the three states will adequately represent the six states in the region. The tendency of the three states to inadequately represent the six South-South states is a limitation to the results of this study. Furthermore, the use of only members of the farmers' cooperative society constitutes a limitation to the results of the study. Farmers who do not belong to the cooperative society may have some dissenting perceptions from those of the members of a cooperative society.

Implication of findings/recommendation

The significance of the use of social media in the marketing of agricultural products to marketing efficiency and sales turnover implies that policy makers in government and strategic managers of agro-allied firms can embrace the use of social media in the marketing of agricultural products to minimize the cost of marketing and enhance turnover from the sales of agricultural products. Growth in the agricultural sector has implications on a nation's gross domestic product and by implication, on national development. Given the problem definition and research findings, the following recommendations are suggested. Policymakers in government should be concerned about increasing agricultural production as well as the marketing of agricultural products to enhance earnings from agricultural production. This will attract many unemployed youths to the agricultural sector and thus help to guarantee

food security as well as drastically reduce the level of unemployment in the country. Consequently, policymakers in government and other stakeholders like managers of cooperative societies and other farmers' associations should promote the adoption of social media in agricultural marketing through sensitization of the farmers as well as the outright provision of modern communication gadgets to farmers at subsidized prices.

Future studies should attempt to minimize limitation associated with cultural bias by including more south-south states in the sample as well as try to include non-members of the farmers' cooperative society in the sample.

Data availability

Underlying data

Dryad: Use of social media in the marketing of agricultural products and farmers' turnover in South-South Nigeria. <https://doi.org/10.5061/dryad.jwstqjq76> (Inegbedion *et al.*, 2020).

File 'Data-Use_of_Social_media_in_Agric_Markt-22' contains basic demographic information, questionnaire responses and social media use data from each participant.

Extended data

Dryad: Use of social media in the marketing of agricultural products and farmers' turnover in South-South Nigeria. <https://doi.org/10.5061/dryad.jwstqjq76> (Inegbedion *et al.*, 2020).

File 'Questionnaire-Use_of_Social_Media_in_Agric_Marketing.docx' contains a blank copy of the questionnaire used in this study.

Data are available under the terms of the [Creative Commons Zero "No rights reserved" data waiver](https://creativecommons.org/licenses/by/4.0/) (CC0 1.0 Public domain dedication).

Acknowledgement

We are grateful to the management of Landmark University for providing the necessary funding for this study.

References

- Agbo M, Rousselière D, Salanié J: **A Theory of Agricultural Marketing Cooperatives with Direct Selling**. Working Papers 1331, Groupe d'Analyse et de Théorie Economique Lyon St-Étienne (GATE Lyon St-Étienne): Université de Lyon. Handle: *RePEc:gat:wpaper: 1331*. 2013.
- Akintunde MAO, Oladele OI: **Use of Information Communication Technologies among Agricultural Extension Officers in Lesotho**. *Journal of Agricultural Extension*. 2019; **23**(3): 50–65.
[Publisher Full Text](#)
- Alavion SJ, Allahyari MS, Al-Rimawi AS, et al.: **Adoption of agricultural e-marketing: Application of the theory of planned behaviour**. *Journal of International Food Agribusiness Marketing*. 2017; **29**(1): 1–15.
[Publisher Full Text](#)
- Balkrishna BB, Deshmukh AA: **A study on the role of social media in agriculture marketing and its scope**. *Global Journal of Management and Business Research: E-Marketing*. 2017; **17**(1): 1–5.
[Reference Source](#)
- Chuttur M: **Overview of the technology acceptance model: Origins, developments and future direction**. *All Sprouts Content*. 2009; 290.
[Reference Source](#)
- Dwivedi YK, Rana N, Jeyaraj A, et al.: **Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model**. *Information Systems Frontiers*. 2017.
[Publisher Full Text](#)
- Eze SC, Chinedu-Eze VC, Bello A, et al.: **Mobile marketing technology adoption in service SMEs: a multi-perspective framework**. *Journal of Science and Technology Policy Management*. 2019; **10**(3): 569–596.
[Publisher Full Text](#)
- FAOSTAT: **Online Statistics from the Food and Agriculture Organisation of the United Nations (FAO)**. 2004.
- Inegbedion HE, Obadiaru E, Obasaju B, et al.: **Financing Agriculture in Nigeria through Agricultural Extension Services of Agricultural Development Programmes (ADPs) [version 3; peer review: 2 approved]**. *F1000Res*. 2018; **7**: 1833.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Inegbedion HE: **Factors that Influence Customers' Attitude toward Electronic Banking in Nigeria**. *Journal of Internet Commerce*. 2018; **17**(4): 325–338.
[Publisher Full Text](#)
- Inegbedion HE, Obadiaru DE, Bello DV: **Factors that influence consumers' attitude towards internet buying in Nigeria**. *Journal of Internet Commerce*. 2016; **15**(4): 353–375.
[Publisher Full Text](#)
- Inegbedion H, Inegbedion E, Asaleye A, et al.: **Use of social media in the marketing of agricultural products and farmers' turnover in South-South Nigeria, v2, Dryad, Dataset**. 2020.
<http://www.doi.org/10.5061/dryad.jwstqjq76>
- Jose AM, Lokeswari K: **A study on users and non-users of ICT among the farming community**. *Global Media Journal*. 2018; **16**(31): 1–5.
[Reference Source](#)
- Khou A, Suresh KR: **A Study on the role of social media mobile applications and its impact on agricultural marketing in Puducherry Region**. *J Manage*. 2018; **5**(6): 28–35.
[Publisher Full Text](#)
- Lashgarara F, Mohammadi R, Najafabadi MO: **ICT capabilities in improving the marketing of agricultural productions of Garmsar Township, Iran**. *Annals of Biological Research*. 2011; **2**(6): 356–363.
[Reference Source](#)
- Nebo GN, Ejionueme N: **Adopting Agricultural Marketing Approach for Improving Agricultural Sector Performance in Nigeria**. *Journal of Business and Management*. 2017; **19**(4): 4–17.
[Reference Source](#)
- Ogunniyi MD, Ojebuyi BR: **Mobile Phone Use for Agribusiness by Farmers in Southwest Nigeria**. *Electronic Journals Service(EJS)*. 2012; **20**(10): 172–187.
[Reference Source](#)
- Mwangi MW, Wagoki J: **Effect of social media on the performance of advertisement business in the mainstream media in Kenya: A survey of leading media groups in Kenya**. *International Journal of Economics, Commerce and Management*. 2016; **4**(4): 159–177.
[Reference Source](#)
- Vassiliadou S, Vogiatzi M, Amygdalas T, et al.: **The use of social media among students of Technology Agriculture and their role in promoting agribusiness**. In: M. Salampasis, A. Matopoulos(eds.): *Proceedings of the International Conference on Information and Communication Technologies for Sustainable Agri-production and Environment(HAICTA 2011)*: Skiathos. 2011.
[Reference Source](#)
- White D, Meyers C, Doerfert D, et al.: **Exploring agriculturalists' use of social media for agricultural marketing**. *Journal of Applied Communications*. 2014; **98**(4): 1–14.
[Reference Source](#)
- Yamane T: **Statistics, an introductory analysis**, Harper and Row. 1967.
[Reference Source](#)

Open Peer Review

Current Peer Review Status: ? ?

Version 1

Reviewer Report 23 February 2021

<https://doi.org/10.5256/f1000research.29091.r73490>

© 2021 Alege P. This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Philip Olasupo Alege

Department of Economics and Development Studies, Covenant University, Ota, Nigeria

Abstract:

The Abstract is too long. It should be brief and sharp. The content should include the following: background/motivation; objective of the paper, methodology, data, results and interpretation. It must also include contribution to knowledge. This component of the study should not be more than 250 words.

Introduction:

This is well written. However, the authors should take another look at line three and check the sentence for consistency. It should be "there are evidences...." You cannot use only one observation to conclude on an issue. Also, there is no need to create a sub-section for "Objective of the Study"

MAJOR COMMENTS

This is mainly on the Structure of the paper. I will suggest the Sections should be numbered for ease of referencing between the different parts of the report. This is also important for the readers.

An insight into this is given in what follows:

1. Literature Review
 1. Channels of advertisement
 2. Theoretical Review
 1. Technology acceptance model (TAM)
 2. Theory of agricultural marketing cooperatives
 3. Empirical review
 1. Use of social media in marketing agricultural products and cost of marketing
 2. Use of social media in agricultural marketing and sales turnover

1. Methods

1. Study Population: Issues of request for consent, validity and Reliability must be discussed here.
 2. Model Specification
 3. Estimation Technique instead of Statistical Analysis
 4. Data Sources instead of Materials and Ethical Matters should be here
2. Estimation Results and Discussion
 1. Results
 2. Discussion
 3. Conclusion

MINOR

There are a few typographical errors to be attended to. The authors should check the [soft copy](#).

GENERAL COMMENTS

The paper addresses a very pertinent question in this era of New Normal on the need for the adoption of social media in the marketing of agricultural products. The recommendations are the ways to go. However, if the idea captured in **"Figure 1: A model of social media marketing of agricultural products and sales turnover"** is a result emanating from this study, then it should be discussed earlier under Section 4.2.

Besides, the paper is well written and had made a tangible contribution to knowledge.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 24 Feb 2021

Henry INEGBEDION, Landmark University, Omu Aran, Nigeria

Comment: The Abstract is too long. It should be brief and sharp. The content should include the following: background/motivation; objective of the paper, methodology, data, results and interpretation. It must also include contribution to knowledge. This component of the study should not be more than 250 words.

Response: F1000Research provided the template for the structure of abstract. In any case, the abstract has been reduced to below 250 words as suggested

Comment: This is well written. However, the authors should take another look at line three and check the sentence for consistency. It should be "there are evidences...." You cannot use only one observation to conclude on an issue. Also, there is no need to create a sub-section for "Objective of the Study"

Response: The sentence has been revised for consistency and the section on "objective of the study" has been removed as suggested

Comment: This is mainly on the Structure of the paper. I will suggest the Sections should be numbered for ease of referencing between the different parts of the report. This is also important for the readers. An insight into this is given in what follows:

Response: The paper has been restructured and the sections of the paper have been numbered as suggested by the reviewer

Comment: **There are a few typographical errors to be attended to. The authors should check the soft copy.**

Response: These have been worked on

Comment: **A model of social media marketing of agricultural products and sales turnover" is a result emanating from this study, then it should be discussed earlier under Section 4.2.**

Response: This section has been merged with section 4.2 as suggested

Competing Interests: The Authors have no competing interest

Reviewer Report 16 February 2021

<https://doi.org/10.5256/f1000research.29091.r76594>

© 2021 Baker L. This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Lauri M Baker 

Agricultural Communication, University of Florida, Gainesville, Florida, 32611, USA

This study is extremely interesting with regard to understanding social media use in agriculture in Nigeria and contributes to the body of knowledge more largely in the area of marketing agricultural products online.

Since this is the first time I am reviewing for this journal, I wasn't sure what to expect, but there is a fair amount of copyediting that needs to be done in this manuscript. I have made note of some major issues here in my review, but there are others. Also, perhaps it is acceptable in this journal, but I was trained that in research writing each paragraph needs a minimum of three sentences, and some sentences in this article are shorter than that. Additionally, some of the language used within the article isn't inclusive. I know many journals now have a stance on this, I am not sure if this journal does or not. The present article uses "he" or he/she instead of they or other neutral pronouns in some places.

I have the following specific feedback:

- The end of the second sentence of the manuscript isn't finished. It ends with "as well as".
- The first paragraph and first sentence of the literature review has a grammatical error in this section "ensure that is the products are available". It is unclear exactly what the authors mean because of the sentence structure.
- The first sentence under theoretical framework – theory should be theories.
- Internet is capitalized throughout, but it is no longer considered a proper noun in most style formats.
- The first sentence of the theoretical framework is difficult to understand. I see the authors are trying to convey how they applied this framework, but how that was done is unclear as written.
- The majority of the empirical review section lacks flow and is choppy. It seems the authors have made more of an annotated bibliography instead of synthesizing and apply how each of these studies relates to their present work.
- Participants were described in present tense instead of past tense. This section was also missing commas in the numbers.
- Sampling procedure was explained well and was adequate, but again the writing in this section should be improved.
- I appreciate that the reliability is presented so clearly for each construct, but Tables 1 and 2 are overly complicated. I don't think you need the 3rd column if you adjust the headings accordingly.
- "analysed" is misspelled. It should be analyzed.
- There are places in the results where a capital P is used for significance level. In my training typically a lowercase p is used as in $p < .05$ and the authors do use this in some cases. I would advocate for the lowercase, but above all consistency.
- Rounding in the results section is not consistent.
- The use of the Oxford comma in this manuscript is not consistent.

- The conclusions and discussions and implications make sense from the results presented, and I believe the findings provide value in this context. However, the writing in these final sections is difficult to follow and has similar grammatical and flow areas, like the rest of the manuscript.

I would like to see the authors do some serious work in the writing of this manuscript. I hate to reject any article that clearly represents a solid study that can add to the literature in this area, but MAJOR improvements are needed in writing quality, editing, and flow.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Agricultural communication, social media strategy, marketing

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 24 Feb 2021

Henry INEBEDION, Landmark University, Omu Aran, Nigeria

Comment: but there is a fair amount of copyediting that needs to be done in this manuscript.

Response: Significant copyediting has been done

Comment: Also, perhaps it is acceptable in this journal, but I was trained that in research writing each paragraph needs a minimum of three sentences, and some sentences in this article are shorter than that.

Response: The paragraphs have been adjusted accordingly

Comment: Additionally, some of the language used within the article isn't inclusive. I know many journals now have a stance on this, I am not sure if this journal does or not. The present article uses "he" or he/she instead of they or other neutral pronouns in some places.

Response: Efforts have been made to enhance the inclusiveness of the language used

Comment: I have the following specific feedback:

The end of the second sentence of the manuscript isn't finished. It ends with "as well as".

Response: This has been corrected

Comment: The first paragraph and first sentence of the literature review has a grammatical error in this section "ensure that is the products are available". It is unclear exactly what the authors mean because of the sentence structure

Response: This has been corrected - "ensure that the products are available"

Comment: The first sentence under theoretical framework - theory should be theories.

Response: This has been corrected

Comment: Internet is capitalized throughout, but it is no longer considered a proper noun

in most style formats.

Response: This has now been corrected

Comment: The first sentence of the theoretical framework is difficult to understand. I see the authors are trying to convey how they applied this framework, but how that was done is unclear as written.

Response: It is actually an attempt to justify the use of the two theories as framework, clarification has been provided. The how has been explained in the theoretical review.

Comment: The majority of the empirical review section lacks flow and is choppy. It seems the authors have made more of an annotated bibliography instead of synthesizing and apply how each of these studies relates to their present work

Response: Some level of synthesis has been provided to link the empirical literature to the study

Comment: Participants were described in present tense instead of past tense. This section was also missing commas in the numbers.

Response: The tenses and the missing commas have been corrected

Comment: Sampling procedure was explained well and was adequate, but again the writing in this section should be improved.

Response: The section has been improved upon

Comment: I appreciate that the reliability is presented so clearly for each construct, but Tables 1 and 2 are overly complicated. I don't think you need the 3rd column if you adjust the headings accordingly.

Response: The headings have been adjusted and the third column has been removed

Comment: "analysed" is misspelled. It should be analyzed

Response: This has been corrected

Comment: There are places in the results where a capital P is used for significance level. In my training typically a lowercase p is used as in $p < .05$ and the authors do use this in some cases. I would advocate for the lowercase, but above all consistency.

Response: This has been corrected

Comment: Rounding in the results section is not consistent

Response: Done

Comment: The use of the Oxford comma in this manuscript is not consistent.

Response: This has been addressed

Comment: The conclusions and discussions and implications make sense from the results presented, and I believe the findings provide value in this context. However, the writing in these final sections is difficult to follow and has similar grammatical and flow areas, like the rest of the manuscript.

Response: The grammatical flaws have been significantly addressed

Comment: MAJOR improvements are needed in writing quality, editing, and flow

Response: The quality of the paper has been enhanced

Competing Interests: The authors have no competing interest

The benefits of publishing with F1000Research:

- Your article is published within days, with no editorial bias
- You can publish traditional articles, null/negative results, case reports, data notes and more
- The peer review process is transparent and collaborative
- Your article is indexed in PubMed after passing peer review
- Dedicated customer support at every stage

For pre-submission enquiries, contact research@f1000.com

F1000Research