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Influence of Social Media Platforms and Mobile Applications in Agricultural Marketing

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Abstract

This study explores the influence of social media platforms and mobile applications on agricultural marketing practices among farmers in the Erode district of Tamil Nadu, India. In an era marked by digital transformation, the integration of Information and Communication Technologies into agriculture offers significant opportunities to improve market access, promote agricultural products, and enhance communication between farmers and consumers. To gather data on the use, benefits, and challenges of digital platforms in marketing practices, a structured questionnaire was administered to 365 farmers. Factor analysis was employed to identify the key dimensions influencing the adoption of digital tools. The Kaiser-Meyer-Olkin value of 0.869 and a significant Bartlett's Test of Sphericity confirmed the suitability of the data for factor analysis. The results revealed four key components: digital trust and infrastructure, mobile convenience and accessibility, platform usability, and customer engagement through social media. Together, these factors accounted for 54.893% of the total variance, indicating a strong explanatory power. The study concludes that digital marketing tools have the potential to revolutionize agricultural marketing by empowering farmers with real-time information, expanding their customer base, and increasing marketing efficiency. These findings provide valuable insights for policymakers, extension agents, and technology providers to develop targeted strategies that support the digital inclusion of farmers, especially smallholders, in the evolving agricultural economy.

Keywords: Digital Marketing, Agricultural Marketing, Social Media, Mobile Applications and Factor Analysis

Introduction

Food is critical to human existence. It is one of the most fundamental needs, as captured in Maslow's hierarchy of needs. Before individuals can engage in other activities, they must first address the issue of hunger. It is for this reason that no country can afford to neglect agriculture and related sectors. The agricultural sector has been described as the engine of economic development in many countries. The potential of digital marketing in rural areas remains largely unexplored. Consumers in these regions face numerous challenges when it comes to online shopping, which can impact their overall experience. Given that the majority of India's population resides in rural areas, this study focuses on this demographic. The ability to penetrate rural markets is crucial for the success of any product or service. The "Digital India" initiative aims to empower a knowledge-based economy and society through the use of digital technologies. The primary driver behind the digital push in rural areas is the increasing accessibility of the internet and smartphones. With nearly 70% of India's population living in rural

regions, traditional marketing methods are poised to be superseded by digital media. The advent of digitalization has contributed to improved living conditions for people in these areas.

Digital marketing is revolutionizing market dynamics by connecting consumers and businesses across geographical boundaries, effectively transforming the entire planet into a unified marketplace. This introduction aims to provide an overview of the influence of social media platforms and mobile applications on agricultural marketing among farmers. The digital age has ushered in a new era of interconnectivity, where information and communication technologies have become indispensable tools for businesses and individuals alike. In the realm of agriculture, digital marketing presents both opportunities and challenges, particularly for farmers who need to adapt to the rapidly evolving technological landscape. The effectiveness of agricultural extension services has been enhanced through the integration of communication technologies, allowing for continuous engagement with farmers via social media and other ICT platforms. Digital marketing plays a pivotal role in rural transformation by utilizing ICT devices to enhance agricultural value-added, underscoring its importance in modernizing agricultural practices. The utilization of Information and Communication Technology in agricultural marketing offers considerable advantages to farmers, facilitating access to crucial market information and enabling the promotion of agricultural products. The digital transformation impacts the integration of marketing and sales, which ultimately has repercussions on organizational performance, highlighting the interconnectedness of various business functions in the digital age.

Influence of Social media and mobile apps

Social media has emerged as a crucial tool in farming, enabling connections between farmers and agribusiness professionals across vast geographical distances. The benefits can be as significant or modest as farmers choose, contingent on their time investment. Social media plays a pivotal role in enhancing interactions and information flows among diverse stakeholders involved in agricultural innovation, while also fortifying the capabilities of agricultural extension and advisory service providers. There is a consensus that effective extension services improve agricultural productivity by equipping farmers with information to optimize their limited resources. (Muyanga & Jayne, 2006) Social media platforms provide an opportunity to connect and interact with one's audience in agriculture, educating them and helping them learn more about the industry. These platforms make the promotion of extension programs easier, allow real-time interaction with clients, help extend outreach to new audiences, and promote the development of relationships among actors in Agricultural Innovation Systems.

Social media platforms, such as Facebook, Twitter, and Instagram, have become powerful channels for farmers to connect directly with their target audience. These platforms enable farmers to share information about their farming practices, showcase their produce, and engage in real-time discussions with consumers. The interactive nature of social media allows farmers to build brand awareness, cultivate customer relationships, and gather valuable feedback from their audience. Similarly, mobile applications have become indispensable tools for farmers in the digital age. Farmers can utilize apps to access up-to-date market prices, weather forecasts, and agricultural best practices. These applications also facilitate the seamless exchange of information between farmers, extension agents, and other agricultural stakeholders. By leveraging mobile technologies, farmers can make more informed decisions, optimize their production processes, and streamline their marketing efforts. The integration of social media and mobile applications has profoundly impacted the agricultural sector, empowering farmers to navigate the evolving technological landscape and adapt their marketing strategies

accordingly. These digital tools have the potential to enhance the efficiency, reach, and effectiveness of agricultural marketing, ultimately benefiting both farmers and consumers.

Review of Literature

The integration of digital platforms into agricultural value chains in developing regions is catalyzing a transformation in how farmers access information, markets, and financial services (Ezeomah & Duncombe, 2019). E-commerce platforms have shown promise in enhancing market access for smallholder farmers, leading to improved price discovery and reduced post-harvest losses (Morepje et al., 2024). Digital marketing techniques, by overcoming geographical barriers, are essential for maximizing impact and engagement in rural regions, where digital illiteracy, dispersed markets, and language barriers present unique challenges (Nadkarni, 2022; Ravi & Rajasekaran, 2023). The proliferation of mobile technologies and internet access in rural areas has bridged the connectivity gap, enabling virtual interactions between manufacturers and rural consumers and fostering a 'global village' (M Dhanyashree, 2023). However, the effectiveness of digital agricultural initiatives is contingent on addressing existing disparities in digital literacy and infrastructure. Understanding the determinants of technology adoption, such as perceived usefulness, ease of use, and compatibility, is critical to designing effective interventions (Ravi & Rajasekaran, 2023). The need for institutional support and governance to ensure fair competition and prevent the exploitation of smallholder farmers in digital marketplaces also needs to be addressed (Nadkarni, 2022).

The evolution of digital marketing has provided a cost-effective avenue for businesses to market their offerings (Nayak, 2021). This approach enables businesses to effectively reach untapped rural markets, promoting efficiency and market penetration (Ravi & Rajasekaran, 2023). The rise of digital marketing in the agricultural sector is particularly relevant in agriculturally rich nations, where the sector directly or indirectly supports a significant portion of the population (Ravi & Rajasekaran, 2023). This shift towards digital platforms not only facilitates market expansion but also improves information dissemination and access to resources. The transmission of agricultural information through mobile technologies has demonstrated tangible benefits, including increased yields and higher adoption rates of recommended agrochemical inputs (Xie et al., 2021). However, the degree of advantage realized by farmers through the sale of agricultural products in regulated markets differs across regions due to variations in market spread and infrastructure (Dabbara et al., 2020).

Digital technologies are enabling sustainable agricultural practices by promoting the efficient use of resources, optimizing supply chains, and increasing the resilience of agricultural systems. The application of digital technology in agriculture opens up new markets and business prospects, which strengthens nations' positions in the global economy (Zambrano et al., 2023). This underscores the importance of bridging the digital divide to foster a more advanced, sustainable, and internationally competitive agricultural sector (Zambrano et al., 2023). Despite the potential benefits of digitalization, challenges such as high costs, reliability, and scalability need to be addressed (Shamshiri et al., 2024). Digital platforms play a pivotal role in reshaping stakeholder engagement through partnerships and climate change adaptation strategies (Ravi & Rajasekaran, 2023). The transition to digital platforms is not without its challenges, as the digital divide exacerbates inequalities, particularly in low-income communities (Tabe-Ojong et al., 2024). Understanding consumer behavior in the digital age is essential for tailoring marketing strategies and enhancing customer satisfaction. The digital transformation of agriculture is essential for developing countries, but it may lead to a "digital divide" between small

farms and large farms (Xie et al., 2021). Digital marketing, with its array of strategies and platforms, offers businesses the opportunity to identify effective approaches and adapt accordingly (M Dhanyashree, 2023). The transformative potential of digitalization in agriculture is being constrained by a complex interplay of factors, including limited infrastructure, inadequate training, and farmer resistance (Mhlanga & Ndhlovu, 2023).

The review highlights the potential benefits of using digital technologies in agriculture, such as better market access, improved information sharing, and more sustainable farming. However, it also identifies critical research gaps that need further investigation. These include understanding the factors that drive or hinder smallholder farmers' adoption of digital technologies, evaluating the impact of digital marketing platforms on their livelihoods and market participation, and exploring ways to design effective digital agriculture interventions that address the unique challenges faced by small-scale producers. Additionally, research is needed to examine the role of institutional support and governance in ensuring fair competition and equitable participation in digital marketplaces, as well as the implications of the digital divide and how to bridge it. Addressing these research gaps is crucial to unlocking the transformative potential of digitalization in agriculture, especially in developing regions.

Methodology

The study employed a factor analysis approach to investigate the key factors influencing the adoption of digital platforms and mobile applications in agricultural marketing among farmers. Data was collected through a structured questionnaire survey of 365 farmers in the Erode district of Tamil Nadu, India. The questionnaire captured information on the types of digital platforms used, frequency of use, perceived benefits, and challenges faced. The factor analysis technique was used to identify the underlying dimensions that drive the adoption of digital technologies in agricultural marketing. This approach provides insights into the critical factors that enable or hinder the effective integration of digital solutions within the agricultural value chain.

Results and Discussion

Factor analysis is a crucial tool in understanding the influence of social media platforms and mobile applications in agricultural marketing among farmers. This statistical technique enables researchers to identify the underlying factors that drive the adoption and impact of digital technologies in the agricultural sector. By applying factor analysis, scholars can uncover the key determinants that influence the use of social media and mobile apps for marketing agricultural products. This includes assessing the relative importance of factors such as perceived usefulness, ease of use, and compatibility with existing practices.

Understanding these driving forces is essential for designing effective interventions and policies that can harness the transformative potential of digitalization in agriculture. Also, factor analysis can shed light on the interplay between various digital marketing strategies and their influence on farmer outcomes, such as improved market access, price discovery, and reduction in post-harvest losses. This knowledge can guide the development of tailored digital solutions that cater to the specific needs and challenges faced by smallholder farmers in different regions. The integration of factor analysis in the study of digital agricultural marketing can provide valuable insights to policymakers, extension services, and technology providers. By identifying the critical factors that shape the adoption and impact of digital

platforms, stakeholders can make informed decisions to bridge the digital divide and foster a more inclusive, sustainable, and globally competitive agricultural sector.

Table 1.0 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.869
Bartlett's Test of Sphericity	Approx. Chi-Square	3237.052
	df	171
	Sig.	.000

The results of the Kaiser-Meyer-Olkin test and Bartlett's Test of Sphericity indicate that the data is suitable for factor analysis. The KMO value of 0.869 is considered "great" according to the guidelines, suggesting that the partial correlations among the variables are sufficiently high to perform factor analysis. Additionally, Bartlett's Test of Sphericity is statistically significant ($p<0.001$), meaning that the correlation matrix is not an identity matrix, and factor analysis can be appropriately applied to the data. In the realm of agriculture, digital marketing presents both opportunities and challenges, particularly for farmers who need to adapt to the rapidly evolving technological landscape (White et al., 2014). The effectiveness of agricultural extension services has been enhanced through the integration of communication technologies, allowing for continuous engagement with farmers via social media and other ICT platforms (Sandeep et al., 2020). Digital marketing plays a pivotal role in rural transformation by utilizing ICT devices to enhance agricultural value-added, underscoring its importance in modernizing agricultural practices (Ogbeide-Osaretin & Ebhote, 2020). The utilization of Information and Communication Technology in agricultural marketing offers considerable advantages to farmers, facilitating access to crucial market information and enabling the promotion of agricultural products (Dabbara et al., 2020).

Table 2.0 Communalities

	Initial	**Extraction**
Social media makes agricultural marketing easier.	1.000	.454
Mobile apps help in quick product listing and order management.	1.000	.506
Farmers can access buyers anytime, anywhere.	1.000	.552
Digital platforms reduce the need for physical travel.	1.000	.717
Mobile apps are user-friendly and easy to learn.	1.000	.639
Social media connects farmers to a wider network of buyers.	1.000	.406
Online platforms support direct interaction with customers.	1.000	.515
Mobile apps expand agricultural sales beyond local markets.	1.000	.405
Buyers respond quickly to digital promotions.	1.000	.507
Customer feedback through online channels improves product quality.	1.000	.632
Social media marketing is more affordable than traditional methods.	1.000	.490
Digital platforms reduce dependence on middlemen.	1.000	.512
Online advertising is cost-effective for small-scale farmers.	1.000	.438
Free marketing tools are available on various digital platforms.	1.000	.662
Online payment systems are generally safe for transactions.	1.000	.502

Verified profiles and reviews increase trust in online buyers.	1.000	.630
Digital platforms protect sellers' personal information.	1.000	.628
Basic training helps farmers adopt digital marketing tools.	1.000	.617
Digital skills enhance agricultural marketing effectiveness	1.000	.620
Extraction Method: Principal Component Analysis.		

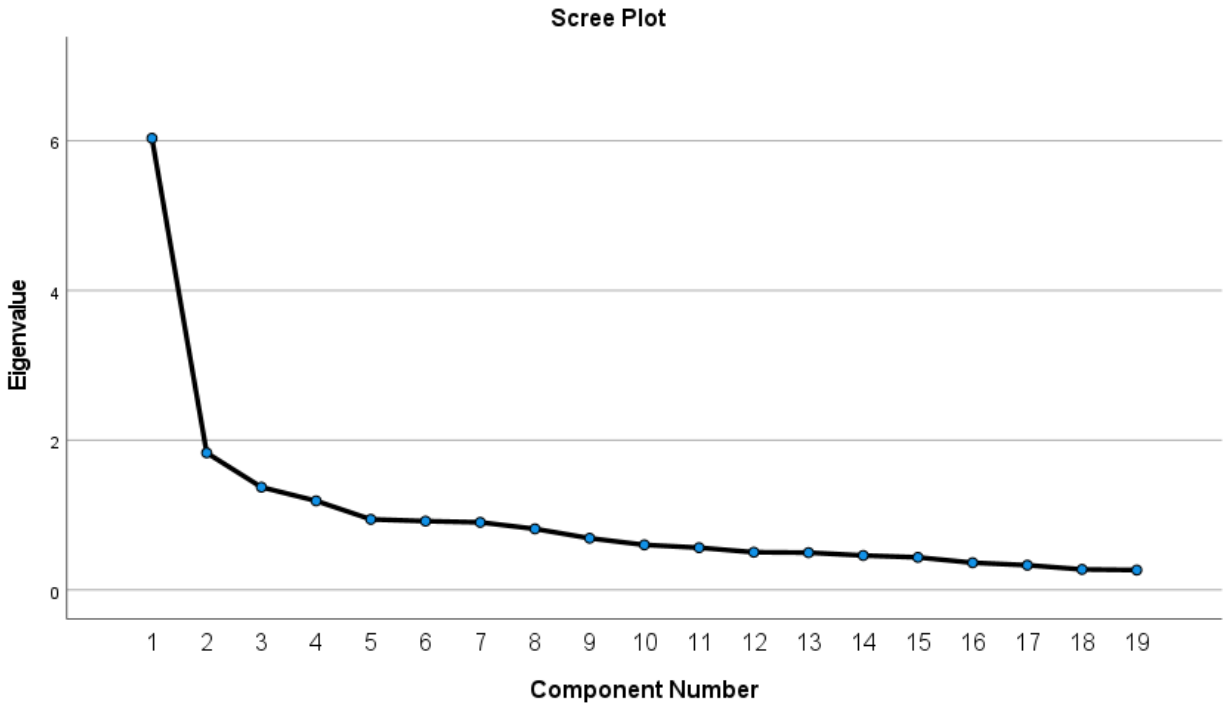

Figure 1 Screen Plot

Table 3.0 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.035	31.763	31.763	6.035	31.763	31.763	4.323	22.750	22.750
2	1.832	9.640	41.403	1.832	9.640	41.403	2.154	11.337	34.087
3	1.373	7.226	48.629	1.373	7.226	48.629	2.110	11.105	45.192
4	1.190	6.264	54.893	1.190	6.264	54.893	1.843	9.701	54.893
5	.943	4.965	59.857						
6	.919	4.838	64.696						
7	.903	4.753	69.449						

8	.816	4.294	73.744						
9	.691	3.636	77.380						
10	.602	3.169	80.549						
11	.564	2.971	83.519						
12	.504	2.652	86.171						
13	.498	2.622	88.794						
14	.460	2.422	91.216						
15	.435	2.290	93.506						
16	.364	1.914	95.420						
17	.331	1.740	97.160						
18	.274	1.444	98.603						
19	.265	1.397	100.000						
Extraction Method: Principal Component Analysis.									

The *Total Variance Explained* table 3.0 reveals that four components have eigenvalues greater than 1.0, indicating they are statistically significant and retained for analysis based on Kaiser's criterion. The **first component** has an initial eigenvalue of **6.035**, accounting for **31.763%** of the total variance. This suggests it is the most influential factor in explaining variation in the data. The second, third, and fourth components have eigenvalues of **1.832 (9.640%)**, **1.373 (7.226%)**, and **1.190 (6.264%)** respectively, bringing the **cumulative variance explained** to **54.893%**. This means that these four factors together explain over half of the variability observed in the responses, which is considered a strong and acceptable result in social science research.

In the **Extraction Sums of Squared Loadings**, the same values are repeated because Principal Component Analysis (PCA) was used, which retains the same eigenvalues during extraction as in the initial phase. However, in the **Rotation Sums of Squared Loadings**, the explained variance is redistributed more evenly across the four components due to the use of **Varimax rotation**, which aims to make interpretation cleaner and more meaningful. After rotation, the first component explains **22.750%** of the variance, followed by the second (**11.337%**), third (**11.105%**), and fourth (**9.701%**), still totaling **54.893%**. This redistribution helps ensure that no single factor dominates the solution and allows each factor to represent distinct, interpretable clusters of variables.

Table 4.0 Rotated Component Matrix

Rotated Component Matrix[a]				
	Component			
	1	2	3	4
Verified profiles and reviews increase trust in online buyers.	.778			
Digital skills enhance agricultural marketing effectiveness	.767			
Free marketing tools are available on various digital platforms.	.765			
Digital platforms protect sellers' personal information.	.756			

Basic training helps farmers adopt digital marketing tools.	.752			
Online payment systems are generally safe for transactions.	.646			
Digital platforms reduce dependence on middlemen.	.553			
Online advertising is cost-effective for small-scale farmers.	.531			
Mobile apps help in quick product listing and order management.		.707		
Buyers respond quickly to digital promotions.		.662		
Farmers can access buyers anytime, anywhere.		.555		
Mobile apps expand agricultural sales beyond local markets.		.534		
Mobile apps are user-friendly and easy to learn.			.737	
Digital platforms reduce the need for physical travel.			.716	
Social media makes agricultural marketing easier.			.602	
Online platforms support direct interaction with customers.				.683
Social media marketing is more affordable than traditional methods.				.624
Customer feedback through online channels improves product quality.				.573
Social media connects farmers to a wider network of buyers.				.570
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 7 iterations.				

The Rotated Component Matrix resulting from the Principal Component Analysis reveals four distinct factors influencing the adoption of digital marketing tools in agriculture. The first component, with high factor loadings such as verified profiles and reviews (.778), digital skills (.767), access to free tools (.765), protection of personal information (.756), and basic training (.752), reflects the importance of **digital trust, skills, and infrastructure**. This component captures how trust, safety, and foundational skills contribute to farmers' willingness to engage with digital platforms. Statements related to safe online payment systems, reduction in dependence on middlemen, and cost-effective advertising also load moderately on this factor, highlighting its broad relevance to secure and practical digital usage. The second component emphasizes the **convenience and accessibility offered by mobile applications**. Strong loadings include mobile app assistance in product listing and order management (.707), quick buyer response to promotions (.662), and the ability to access buyers anytime and from anywhere (.555). This factor underlines the mobility and flexibility that digital tools provide, enabling farmers to reach wider markets with ease.

The third component is centered around the **user-friendliness and operational efficiency** of digital platforms. Statements such as the ease of learning mobile apps (.737), reduced need for physical travel

(.716), and the role of social media in simplifying marketing tasks (.602) load strongly here. This suggests that when platforms are intuitive and reduce physical effort, adoption rates improve, especially among small-scale or geographically isolated farmers. The fourth and final component pertains to **customer engagement and the affordability of social media marketing**. High loadings on statements like direct customer interaction (.683), affordability compared to traditional methods (.624), improvements through customer feedback (.573), and broader buyer networks via social media (.570) indicate that this component represents how digital channels, particularly social media, support interactive and cost-effective marketing.

Farmers commonly utilize social media for agricultural purposes, including production, marketing, and other related areas. Social media has become a platform to access knowledge regardless of educational background. However, farmers face challenges such as high data prices that strain their budgets and poor network connectivity. Educating farmers on social media usage can foster innovative ideas and creativity for their production and marketing activities. Collaboration among the government, NGOs, and other stakeholders can address current constraints and create opportunities for social media-based agricultural marketing.

Conclusion

From reviews and findings of the survey, it is clear that social media and mobile applications are fast becoming integral parts of agricultural communication and are being readily accepted as the next big thing in agricultural extension service. Though agricultural organizations are slowly adapting to the changing scenario, faster actions are required to better utilize these digital tools. Extension specialists need to take personal initiative to use social media and mobile apps as part of their job within the norms of institutional guidelines. Continuous engagement at the individual level is needed for mass influence and to carry out fruitful discussions and encourage rural communities to get involved. Encouraging farmers, agricultural entrepreneurs, and agribusinesses to directly connect with consumers through social media and mobile platforms can raise awareness about agriculture in the general public and increase income. The dramatic changes that have taken place in the last decade in ICT have touched almost every field of human activity, and agriculture is not an exception. Social media and mobile apps have tremendous potential to revolutionize the way information, knowledge, and new technology is managed, developed, and delivered to farmers. E-Agriculture can revamp the Extension Advisory Service by providing proper training to extension personnel on ICT and its application in agricultural extension.

This study underscores the transformative impact of digital marketing, particularly through social media platforms and mobile applications, on agricultural marketing practices among farmers. The integration of Information and Communication Technologies has empowered farmers to access real-time market information, engage with consumers directly, and promote their products more effectively, thereby reducing their reliance on intermediaries and enhancing market reach. The factor analysis identified four pivotal components - digital trust and infrastructure, mobile convenience, user-friendliness of platforms, and customer engagement via social media - that significantly influence the adoption of digital tools in agriculture. These findings underscore the multifaceted nature of digital adoption, where both technological capabilities and user perceptions play crucial roles. The robust statistical analysis, as evidenced by the high Kaiser-Meyer-Olkin value and significant Bartlett's Test, confirms the reliability of the data for factor analysis, while the Total Variance Explained indicates that the four extracted components provide a comprehensive understanding of the underlying factors. Ultimately, the insights

gained from this study can guide policymakers, extension services, and technology developers in designing targeted interventions and support systems to enhance digital adoption among farmers. Such efforts are crucial for building a more inclusive, efficient, and resilient agricultural sector that leverages digital innovations to address emerging challenges and seize new opportunities in the global marketplace.

References

1. Dabbara, R., Chandrakumar, M., Anandhi, V., & Muruganandhi, D. (2020). Data Driven Marketing Applications for Agriculture Services. International Journal of Current Microbiology and Applied Sciences, 9(2), 2914. https://doi.org/10.20546/ijcmas.2020.902.331
2. Ezeomah, B., & Duncombe, R. (2019). The Role of Digital Platforms in Disrupting Agricultural Value Chains in Developing Countries. In IFIP advances in information and communication technology (p. 231). Springer Science+Business Media. https://doi.org/10.1007/978-3-030-18400-1_19
3. M Dhanyashree. (2023). A study on digital marketing and its impacts on rural marketing in India. International journal of novel research and development (www.IJNRD.org), ISSN:2456-4184, Vol.8, Issue 7, page no. a465-a471, July-2023.
4. Mhlanga, D., & Ndhlovu, E. (2023). Digital Technology Adoption in the Agriculture Sector: Challenges and Complexities in Africa. Human Behavior and Emerging Technologies, 2023, 1. https://doi.org/10.1155/2023/6951879
5. Morepje, M. T., Sithole, M. Z., Msweli, N. S., & Agholor, I. A. (2024). The Influence of E-Commerce Platforms on Sustainable Agriculture Practices among Smallholder Farmers in Sub-Saharan Africa. Sustainability, 16(15), 6496. https://doi.org/10.3390/su16156496
6. Nadkarni (2022), "Exploratory research on challenges faced by marketers in digital marketing in rural areas", Stochastic modeling and application, Vol.26(3),2022.pp.499-504.
7. Nayak, P. (2021). A Study on: How Digital Marketing has changed the Life Style of Rural People. International Journal of Research in Business Studies, 6(1), 125-134.
8. Ogbeide-Osaretin, E. N., & Ebhote, O. (2020). Does digital marketing enhance rural agricultural transformation in Nigeria? An empirical investigation. Asian Journal of Agriculture and Rural Development, 10(1), 450. https://doi.org/10.18488/journal.1005/2020.10.1/1005.1.450.462
9. Ravi, S., & Rajasekaran, S. R. C. (2023). A Perspective of Digital Marketing in Rural Areas: a Literature Review. International Journal of Professional Business Review, 8(4). Tutor Treinamento e Desenvolvimento. https://doi.org/10.26668/businessreview/2023.v8i4.1388
8. Ravi, S., & Rajasekaran, S. R. C. (2023). A Perspective of Digital Marketing in Rural Areas: a Literature Review. International Journal of Professional Business Review, 8(4). Tutor Treinamento e Desenvolvimento. https://doi.org/10.26668/businessreview/2023.v8i4.1388
10. Sandeep, G. P., Prashanth, P., Sreenivasulu, M., & Madhavilata, A. (2020). Social Media in Agriculture – A Profile Analysis. International Journal of Current Microbiology and Applied Sciences, 9(7), 2727. https://doi.org/10.20546/ijcmas.2020.907.322
11. Shamshiri, R. R., Sturm, B., Weltzien, C., Fulton, J. P., Khosla, R., Schirrmann, M., Raut, S., Basavegowda, D. H., Yamin, M., & Hameed, I. A. (2024). Digitalization of agriculture for sustainable crop production: a use-case review. Frontiers in Environmental Science, 12. Frontiers Media. https://doi.org/10.3389/fenvs.2024.1375193

12. Tabe-Ojong, M. P. Jr., Salama, Y., Abay, K. A., Abdelaziz, F., Zaccari, C., Акрамханов, A., Menza, G., & Anarbekov, O. (2024). Harnessing digital innovations for climate action and market access: Opportunities and constraints in the CWANA region. Global Food Security, 41, 100763. https://doi.org/10.1016/j.gfs.2024.100763
13. White, D., Meyers, C., Doerfert, D. L., & Irlbeck, E. (2014). Exploring Agriculturalists' Use of Social Media for Agricultural Marketing. Journal of Applied Communications, 98(4). https://doi.org/10.4148/1051-0834.1094
14. Xie, L., Bi-liang, L., & Zhong, W. (2021). How Are Smallholder Farmers Involved in Digital Agriculture in Developing Countries: A Case Study from China. Land, 10(3), 245. https://doi.org/10.3390/land10030245
15. Zambrano, P. V. M., Pérez, L. P. T., Valdez, R. E. U., & Orozco, Á. P. F. (2023). Technological Innovations for Agricultural Production from an Environmental Perspective: A Review. Sustainability, 15(22), 16100. Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/su152216100