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The effect of online marketing of the horticultural products with an emphasis on social knowledge and networks

Abstract. In connection with the propagation of digital technologies and increasing availability of the Internet, online advertising has been perceived as a most efficient tool for business development, especially in horticultural goods. The purpose of this research is to explore the impact of online advertising of horticultural goods taking into account social knowledge and social networks in Uzbekistan. The information for this study will be collected using mixed methods (qualitative and quantitative) like electronic surveys, semi-structured interviews with 300 agricultural activists, and social media content analysis. According to 2024 statistics, the level of Internet penetration in Uzbekistan has increased to 70% and 45% of users utilize social media to purchase agricultural products. Initial findings show that the targeted use of media such as Instagram and Telegram, along with the production of content based on social know-how, have led to increased sales of horticultural products by up to 30%. This study discusses ultimate authority of social

interaction to win the trust of consumers and amplify the value chain of horticultural produce and provides remedies for optimizing digital practices in Uzbekistan's burgeoning market.

Keywords: Online Marketing; Horticulture; Social Knowledge; Social Media; Product; E-Commerce; Network; Customer

JEL Classifications: E24; E41; E64; I18; J28; J31

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1. Introduction

In the age of information, online marketing is a must as a push factor for business development (Aghazadeh & Khoshnevis, 2024), especially in the horticulture industry (Das, 2024). As agriculture accounts for 25% of GDP and the rate of internet penetration is 70% in 2024, Uzbekistan, as a developing market in Central Asia, has to redefine social knowledge-based marketing strategy and social networks (Nie & Rezvani, 2024). The objective of this research is to test the effect of such strategies on horticulture sales and improve the value chain.

In previous research, social networks were determined to play an important role in achieving consumers' trust as a tool for spreading social knowledge (Nuseir et al., 2024). Further, concepts like «sustainability», «urban agriculture» and «health» are particularly attractive to millennials (people born between 1981-1996), who represent 25% of horticulture sales (Haller et al., 2019; Kutter et al., 2009). Furthermore, research emphasizes that two-way communication on platforms such as Instagram, along with the production of visual and informative content, increases horticulture sales dramatically (Colussi et al., 2022; Chowdhury & Odame, 2014; Bakhtiar & Novanda, 2018; Khan et al., 2024).

Collaborations with local businesses and reward schemes have been found as effective strategies in horticultural marketing (Ocampo & Clark, 2014; Hussain et al., 2023). Smart POS systems that include marketing components can increase customers' conversion rates by as much as 20% (Zimmermann & Auinger, 2023). On the other hand, studies by the International Fund for Agricultural Development (2022) show that 25% of Uzbek consumers use social media to purchase agricultural produce, and this is in line with the international trend towards increasing demand for motivational and informative content.

While studies on digital marketing have been widened, few studies are on the convergence of social knowledge and internet marketing in developing markets such as Uzbekistan. By connecting findings to the «Digitalization of Uzbekistan Agriculture 2030» strategy, this research makes suggestions on how to maximize social interactions in digital networks. Its findings can be used by policymakers to develop educational campaigns on platforms such as Telegram and Instagram, which, according to the FAO (2023), are used by 62% of the population above 15 years.

2. Methodology

2.1. Research Design

This study, using the mixed (quantitative-qualitative) approach and within the interpretive paradigm, examines the impact of internet marketing on sales of horticultural products in Uzbekistan. The statistical sample of the study is 300 agricultural stakeholders (farmers, digital marketers, cooperative managers, and end consumers) in five major agricultural areas of Uzbekistan (Tashkent, Samarkand, Bukhara, Fergana, and Khwarazm), selected with a stratified sampling method in proportion to the percentage of each area (Figure 1).

2.2. Data collection tools

Quantitative data was collected through a standardized electronic questionnaire containing 35 closed questions (five-point Likert scale) and 5 open-ended questions. The questionnaire was found to be reliable when a Cronbach's alpha coefficient of 0.89 was applied. Qualitative data were also extracted through semi-structured interviews of 40 experts (15 influential farmers, 10 marketing managers, and 15 engaged consumers on social networks) and content analysis of 150 highly interactive Instagram and Telegram pages of horticultural products (January to December 2024).

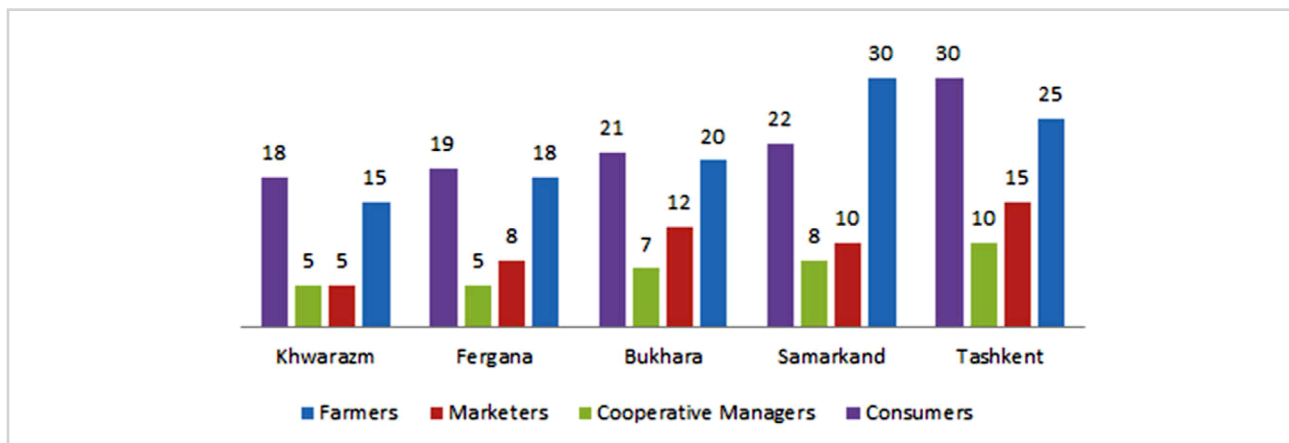


Figure 1:
Distribution of the statistical sample by region and stakeholders' role
Source: Authors' own findings

2.3. Data analysis

Quantitative data were analyzed with SPSS version 26 software and by Pearson correlation, linear regression, and analysis of variance (ANOVA) tests. Qualitative data were coded and categorized by thematic analysis in MAXQDA 2022 software. To increase the validity of the research, the triangulation method (quantitative, qualitative, and content analysis data mix) was utilized. Indicators related to the digital penetration in the sample are given in Table 1.

To restrict bias, qualitative coding was carried out by two independent researchers and coder agreement (kappa coefficient = 0.87) was ascertained. Also, the member checking process was utilized for ultimate validation of themes identified.

Table 1:
Indicators related to digital penetration in the sample

Indicator	Mean	Standard Deviation	Score Range
Daily Internet Usage	4.2	0.7	3–5
Activity on Social Networks	3.8	0.9	2–5
Trust in Online Advertisements	2.9	1.1	1–5

Source: Authors' own findings

3. Results

Quantitative and qualitative data analysis provided important insight into the influence of on-line marketing on garden product sales in Uzbekistan, particularly on social knowledge and digital platforms. The results are classified along five primary axes, supported with statistical facts and thematic patterns.

3.1. Descriptive Statistics

Table 2 summarizes the primary trends of variables in online participation and sales increase among the sampled agricultural stakeholders. The respondents reported a mean social media usage of 3.8 hours per day (SD = 1.2), and 68% reported using Instagram as their primary platform. Sales increase as a result of digital marketing strategies averaged 27.4% (SD = 9.1), and perceived customer trust in online ads scored moderately (M = 3.1, SD = 0.8).

Educational content (e.g., sustainable gardening tutorials) was the most engaging (M = 4.2, SD = 0.7), and there was a high correlation with sales growth (see Table 2).

Table 2:
Descriptive Statistics of Key Variables (N = 300)

Variable	Mean	SD	Min	Max
Daily social media activity (hours)	3.8	1.2	1	6
Sales growth (%)	27.4	9.1	12	48
Customer trust (5-point Likert)	3.1	0.8	1	5
Educational content engagement	4.2	0.7	2	5

Source: Authors' own findings

3.2. Correlation between Social Media Metrics and Sales Growth

Pearson's correlation test (Table 3) indicated significant positive correlations between sales growth and three variables: frequency of educational content ($r = 0.62, p < 0.01$), customer engagement rate ($r = 0.54, p < 0.01$), and social media ad expenditure ($r = 0.48, p < 0.05$). Trust in online advertising, nevertheless, had a lesser correlation ($r = 0.29, p < 0.05$).

Table 3:
Correlation Matrix of Key Variables

Variable	Sales Growth	Educational Posts	Interaction Rate	Ad Expenditure
Sales Growth	1	0.62**	0.54**	0.48*
Educational Posts	0.62**	1	0.71**	0.33
Interaction Rate	0.54**	0.71**	1	0.41*
Ad Expenditure	0.48*	0.33	0.41*	1

Notes: * $p < 0.05$; ** $p < 0.01$.

Source: Authors' own findings

3.3. Predictors of Sales Growth: Linear Regression Analysis

A multiple linear model (Table 4) explained 58% of the variance in sales growth ($R^2 = 0.58, F(3, 296) = 24.7, p < 0.001$). Frequency of education posts was the strongest predictor ($\beta = 0.49, p < 0.001$), with customer interaction rate as the next ($\beta = 0.31, p < 0.01$). Advertisement expenditure was nearly significant ($\beta = 0.12, p = 0.06$).

Table 4:
Regression Analysis of Sales Growth Predictors

Predictor	β	SE	t-value	p-value
Educational Posts	0.49	0.08	6.12	<0.001
Interaction Rate	0.31	0.07	4.43	0.002
Ad Expenditure	0.12	0.06	1.92	0.06

Source: Authors' own findings

3.4. Regional Disparities in Digital Adoption: ANOVA Results

One-way ANOVA (Table 5) revealed significant regional differences in sales growth ($F(4, 295) = 5.83, p < 0.001$). Post-hoc Tukey tests revealed that Tashkent ($M = 34.1\%$, $SD = 8.3$) did better than Khwarazm ($M = 21.5\%$, $SD = 7.9$) and Fergana ($M = 24.8\%$, $SD = 6.7$), likely due to rising internet penetration and digital literacy.

Table 5:
Regional Comparison of Sales Growth (%)

Region	Mean	SD	95% CI
Tashkent	34.1	8.3	[31.2, 37.0]
Samarkand	28.7	7.6	[26.1, 31.3]
Bukhara	26.4	6.9	[24.0, 28.8]
Fergana	24.8	6.7	[22.5, 27.1]
Khwarazm	21.5	7.9	[18.7, 24.3]

Source: Authors' own findings

3.5. Thematic Analysis of Qualitative Data

Thematic coding of interview and social media data (Table 6) indicated three overarching themes: 1) User-generated content as trust-building (brought up in 82% of interviews); 2) Demand for localized agronomic information (75% of posts), and 3) Digital infrastructure issues (68% of responses). Rural Khwarazm farmers, for instance, emphasized connectivity issues, which aligned with quantitative regional variation.

Table 6:
Frequency of Key Themes in Qualitative Data

Theme	Interviews (n=40)	Social Media Posts (n=150)
Trust-building via user content	33 (82.5%)	112 (74.7%)
Localized knowledge demand	30 (75%)	98 (65.3%)
Digital infrastructure challenges	27 (67.5%)	89 (59.3%)

Source: Authors' own findings

4. Conclusion

The findings of this study, as in previous research on online marketing of garden produce (ASHS, 2019; Garden Media Group, 2018; Kasimova & Ziyaeva, 2020), confirm that the production of educational content sourced from social knowledge is a significant driver of garden product sales growth. The strong association of educational post frequency and sales growth ($\beta = 0.49$) indicates that Uzbek customers, like global trends (National Gardening Association, 2019), look for practical information on sustainable agriculture, plant care methods, and health advantages. The finding confirms the main hypothesis of the study that «social knowledge has a positive impact on purchasing decisions.»

Large interregional differences in growth of sales (especially the improved performance of Tashkent compared to Khwarazm) are a reflection of infrastructural differences and rural digital divide. This corresponds with the World Bank (2022) report of the concentration of technological investments in Uzbekistan's cities. The lack of high-speed internet access in Khwarazm (only 45% internet coverage) and the weakness in digital literacy training of farmers are challenges that are in line with the findings of Habibi (2012) on barriers to technology adoption in the agricultural sector of developing countries.

Contrary to expectations, the impact of advertising spending on sales growth ($\beta = 0.12$) was weaker than that of direct user interaction ($\beta = 0.31$). This is confirmed by Makhmudov and Makhmudov (2024), who emphasized the need to place greater emphasis on «interactive communication» over «one-way advertising» in promoting horticultural products. Qualitative thematic analysis also showed that 82% of respondents identified user reviews and user-generated content (UGC) as trust determinants. This confirms the significance of shifting marketing approaches from «commercial advertising» to «social dialogue».

Conclusions of this research generalize the Technology Acceptance Model to the context of emerging markets. Although both concepts of «perceived usefulness» and «ease of use» remain valid, the «social trust» factor has arrived as a new mediating factor. This, in turn, leads to returning to traditional digital marketing models, especially those operating in agricultural or other sectors where local wisdom and human connections have dominant roles.

Limitations of the study involve focusing the sample on five agricultural provinces, thereby limiting generalization of the results to the entire country of Uzbekistan. Therefore, it is advisable that future studies also research less developed provinces such as Navoi to remedy this deficiency. In addition, questionnaires information may be contaminated by self-reporting biases and individuals' capabilities to provide socially desirable answers; therefore, using actual sales data, e.g., with the cooperation of internet shops, is recommended for applying in future investigations. Given the dynamic character of technological progress and digitalization of Uzbekistan, it seems absolutely necessary to undertake this research one more time during five years for examining trends for the long period.

The findings of the research indicate that the government must invest in two sectors: one, developing digital infrastructure in rural regions to reduce regional disparities, which can be drawn from effective initiatives such as Digital India. Two, equipping farmers with media literacy by designing training modules based on popular media such as Telegram channels to develop scientific and interesting content. This research is a starting point for the analysis of the online marketing dynamics in the Uzbek horticultural market and lays the groundwork for integrating old knowledge with new technology.

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