

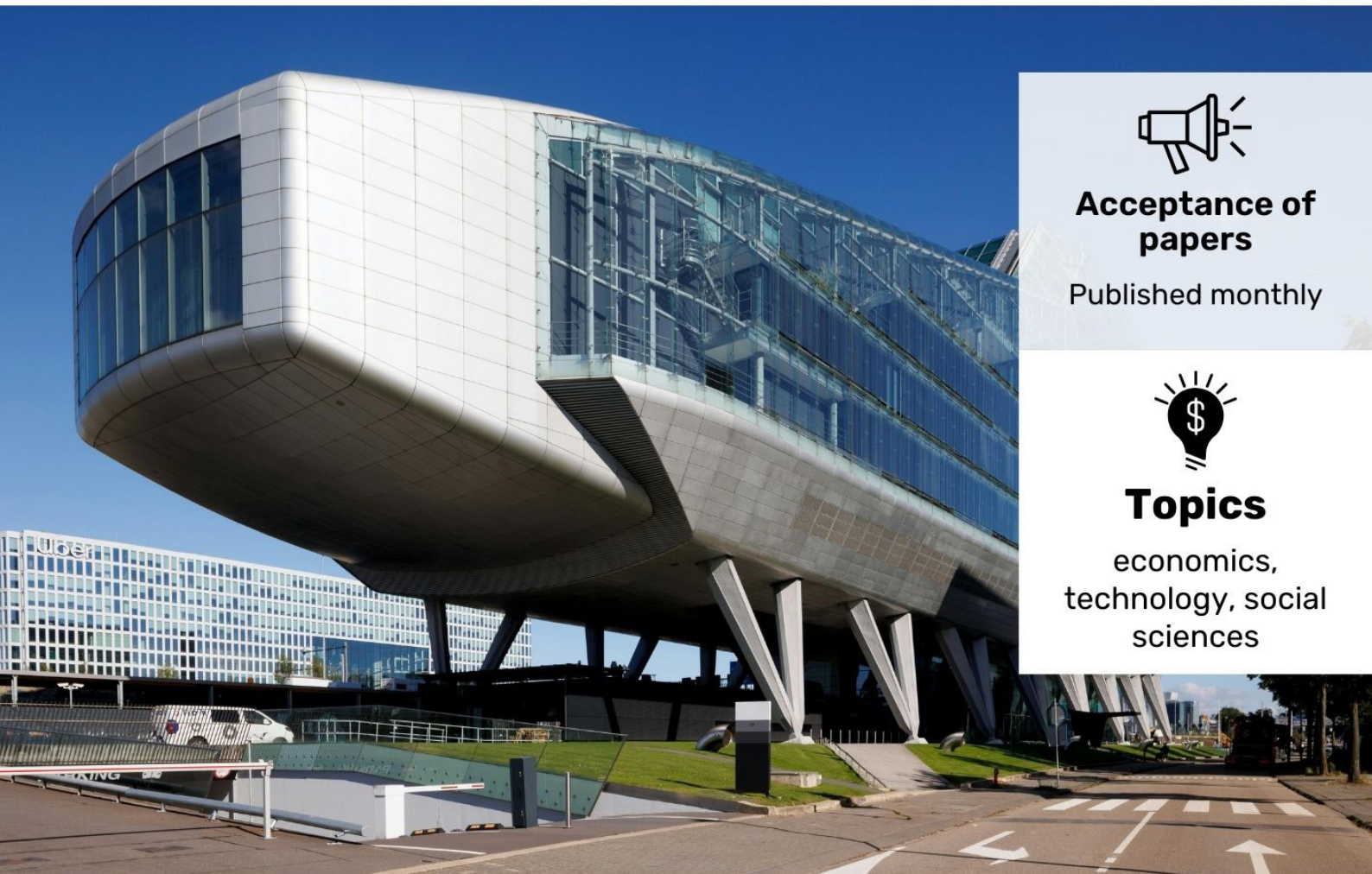
# INNOVATION SCIENCE AND TECHNOLOGY



Scopus || Electronic journal specializing in Scopus

**ISSUE 4**

 Acceptance of papers **APRIL, 2025**



**Acceptance of  
papers**

Published monthly



**Topics**

economics,  
technology, social  
sciences

**ISSN 3060-5229**



Visit the website  
[t.me/scopus\\_IST2100](https://t.me/scopus_IST2100)



**EDITOR-IN-CHIEF:**

Mirzaliyev Sanjar Makhmatjon ugli,  
Head of the Department of Scientific  
Research and Innovations, TSUE

**DEPUTY EDITOR-IN-CHIEF:**

Makhmudov Nosir Makhmudovich  
DSc., Prof., Academician

**DEPUTY EDITOR-IN-CHIEF:**

Ochilov Bobur Bakhtiyor ugli – Senior  
lecturer at TSUI

THE SCIENTIFIC-POPULAR ELECTRONIC  
JOURNAL "INNOVATION SCIENCE AND  
TECHNOLOGY" HAS BEEN REGISTERED  
UNDER THE NUMBER **C-5669633** BY THE  
AGENCY FOR INFORMATION AND MASS  
COMMUNICATIONS (AOKA) OF THE  
REPUBLIC OF UZBEKISTAN, EFFECTIVE  
FROM OCTOBER 9, 2024.

**CONTACTS**

Phone: **97-748-70-03**

Website: <https://ist-journal.uz>

Email: [munis.iriskulova@gmail.com](mailto:munis.iriskulova@gmail.com)

**Editorial board:**



**Sharipov Kongiratbay Avezimbetovich,**  
Doctor of Technical Sciences (DSc), Professor



**Abdurakhmanova Gulnora Kalandarovna,**  
Doctor of Economic Sciences (DSc), Professor



**Cham Tat Huei,**  
Doctor of Philosophy (PhD), Professor (Malaysia)



**Muhammad Imran Sadiq**  
Doctor of Philosophy in Economics (PhD),  
Professor, Malaysia



**Ahmed Aziz Ismail**  
Doctor of Technical Sciences (DSc),  
Professor (Egypt)



**Lee Chin**  
Doctor of Philosophy in Economics (PhD),  
(Malaysia)



**Asongu Simplicé**  
Doctor of Philosophy in Economics (PhD),  
Cameroon



**Rui Dang**  
Doctor of Chemistry (DSc), Professor, China



**Zahoor Ahmed**  
Doctor of Philosophy in Economics (PhD), Turkey



**Shujaat Abbas**  
Doctor of Philosophy in Economics (PhD), Russia



**Tina A Coffelt**  
Doctor of Philosophy in Educational Sciences  
(PhD), USA



**Judy B. Smetana**  
Doctor of Philosophy in Economics (PhD), USA

# CONTENTS

Development of green finance in Uzbekistan in the context of sustainable development .....	6
<b>Jiyanova N.E., Alimkhonova G.E.</b>	
Outsourcing as a key component of modern business: new perspectives and scientific approaches.....	11
<b>Razzakov Kuvonchbek Anvar ugli, Iskandarov Xumoyun Sevdiyor ugli</b>	
Ways to ensure the financial stability of enterprises in Karakalpakstan.....	15
<b>Baymuratova Zina Aqilbekovna, Mustafaeva Khurliman Azatovna</b>	
Theory and methodology of teaching foreign languages: a modern perspective .....	21
<b>To'ychiyev Azamat Farxod o'g'li, Elmirezayeva Maftuna Dusmurod qizi</b>	
Approaches to enhancing production strategies in enterprises through innovation activities.....	26
<b>Fayzullayeva Aziza Nusratillayevna</b>	
The impact of global crises on financial markets.....	30
<b>Fayziyev Samandar Sobir ugli</b>	
Blockchain technology in Uzbekistan tax administration system .....	35
<b>Melikhurozov Bexruz Bekzod ugli, Ida Farida Adi Prawira</b>	
Ways to save budget funds through effective organization of public procurement.....	41
<b>Rakhmatullayev Jaloliddin Mukhiddinovich</b>	
Risk management in islamic banking: principles, practices, and challenges.....	47
<b>Safarova Nasiba Gulmurod kizi</b>	
The main organizational elements of the treasury .....	50
<b>Ismailov Abbas Shuhratovich</b>	
Conceptual foundations for improving the efficiency of underwriting services in insurance activities.....	54
<b>Mirzoyev Sayfullo Fayzulloyevich</b>	
Expressing the amount of money in words in uzbek language from a numerical value in ms excel.....	57
<b>Tojiyev Ilhom Ibraimovich, Turaeva Feruza Dilmurodovna</b>	
Economic efficiency of tax reforms inUzbekistan.....	64
<b>Gulayim Bakhadyrovna Sapparova, Shokhrukh Murtazaev</b>	
Impact of trade wars on global economic growth: the case of Uzbekistan.....	67
<b>Kosimov Shokhrukhbek Ilxomjon ugli, Dr. H. Amir Machmud</b>	
Central banks and financial stability: global experiences in the post-pandemic period .....	71
<b>Bozorov Saidjon Hamidovich, Dr. Navik Istikomah, S.E., M.Si.</b>	
Multi-agent defense systems and their effectiveness evaluation.....	77
<b>Kurbonaliyeva Dilshoda Vali kizi</b>	
Understanding the lived experiences of debt in uzbekistan: a qualitative study of its financial, emotional, and social impacts .....	82
<b>Azizbek Ikrom ugli Kurbanov, Prof. Dr. Alfira Sofia, S.T., M.M.</b>	
Challenges and opportunities for digital transformation in viticulture marketing .....	92
<b>Usmonova Diyora Mahmud qizi</b>	

# CHALLENGES AND OPPORTUNITIES FOR DIGITAL TRANSFORMATION IN VITICULTURE MARKETING



## Usmonova Diyora Mahmud qizi

Doctoral Student (DcS), Marketing Department, TSUE  
usmonova.diyora@inbox.ru

**Abstract:** Increasingly propose strategic frameworks that improve decision-making processes by better coordinating market insights under digital transformation trends and attain higher operational efficiency. The need to leverage advanced analytics to develop and implement data-driven marketing strategies forces viticulture enterprises to reevaluate consumer engagement models, technological adoption, and distribution channels in order to identify what digital tools are relevant and how they will be enacted in regional markets and global supply chains. This is where this study aims to make a contribution, beyond introducing this integrative approach which presents empirical articles dealing with market intelligence, digital branding, and consumer behavior dynamics of viticulture marketing, smart agriculture, digital commerce, or sustainable supply chains. Following the analytical hierarchy process (AHP) and structural equation modeling (SEM) framework, a systematic review of strategic model development is compiled to link theoretical constructs with these main terms, decision-making efficiency and competitive advantage. The framework can serve as a benchmarking model and practical guide for policymakers, industry practitioners, researchers, and marketers. There are two main contributions of this research. One is that it is the first time to establish such a comprehensive mapping chart to show the interdependencies of digital transformation components. The other is that the framework embraces the idea of synergistic relationships between technology adoption and market adaptation, consumer satisfaction fulfillment and business growth needs, and digital innovations and policy frameworks that call for adaptive strategies. This paper offers methodological insights and reflections to provide stakeholders with key information to best navigate the evolving viticulture market while being aware of emerging digital challenges. This future research agenda provides ample scope for future theoretical advancements and applied science on digital marketing transformation, data-driven consumer insights, strategic decision-making, and sustainable viticulture practices.

**Key words:** Digital Transformation in Viticulture, Smart Agriculture and Wine Marketing, Consumer Analytics in Viticulture, AI-Driven Decision-Making in Wine Industry, Sustainable Digital Branding in Viticulture, Market Intelligence and Competitive Advantage, Blockchain and Supply Chain Transparency in Wine Industry.

## INTRODUCTION

Digital transformation is one of the key challenges facing viticulture enterprises today. The rapid evolution of technology and the increasing digitization of marketing strategies have made the essential building blocks of consumer engagement, data-driven decision-making, and more dynamic business models than ever[1]. Indeed, one of the salient aspects of digital commerce in viticulture marketing is that access to market intelligence itself is rarely a problem. Instead, it is the ability to rapidly analyze large datasets and implement strategic insights that is at the heart of the issue[2].

Previous research has shown that technological disruption causes business leaders to rethink the very foundation of customer interactions and supply chain operations[3]. Advanced analytics could efficiently manage demand forecasting with an ever-increasing volume of structured and unstructured data[4]. From the perspective of market positioning and consumer behavior analysis, the benefits of digital transformation in viticulture marketing come from new ways of personalized advertising at lower costs[5]. By now, there is a large

body of predominantly quantitative and qualitative literature on the adoption of digital branding techniques in agricultural industries[6].

The existing literature on smart agriculture and digital commerce has primarily focused on the technological aspects of applying these technologies for precision viticulture, as well as improving consumer engagement models, such as automated customer relationship management (CRM) systems and AI-driven recommendation engines[7,8]. Many vineyards and wineries are still slow to embrace big data-driven marketing strategies, and those that do are faced with a complex interplay of challenges in handling this transformation process defined by both technological constraints and regulatory concerns[9].

Previous research suggests that small and medium-sized viticulture businesses are often unaware of the different digital tools and market integration techniques that they should take into consideration before investing into digital transformation initiatives[10,11]. In this paper, we look at the strategic adoption of data-driven marketing solutions in the viticulture sector with the objective to identify the key enablers and barriers associated with digitalization in wine marketing[12].

This paper provides evidence about the participation of digital platforms in the global viticulture sector[13,14]. Second, it intends to explore the relationship between market intelligence, consumer analytics, and technological adoption. The empirical discussion of decision-making in viticulture marketing is based on over a year of systematic analysis in European and North American wine markets carried out between 2022 and 2023.

Set against the backdrop of a rapidly evolving digital economy, this study provides an empirically grounded study of digital branding and smart agriculture applications and offers practical recommendations for viticulture marketers and policymakers to consider as they embark on their digital transformation journeys[15].

## METHODOLOGY

Since the database includes information about the geographical distribution where the viticulture enterprises have located their vineyards and production facilities, we use this information to allocate all our observations to specific regional markets. If data from several connected supply chain nodes are combined, flows and processes can be analyzed to find patterns and behaviors[13].

As a source and repository of purportedly 'structured data' or as a representation of a market ecosystem, digital platforms produce insights about their consumer interactions, advertising reach, sales performance, logistics efficiency, and a range of other key marketing metrics[14].

The overview of empirical models presented in this section is based on systematic literature review achieved by searching with keywords such as «digital transformation in viticulture marketing», «smart agriculture strategies», and «consumer analytics in wine industry» in the comprehensive scientific databases, with a focus on peer-reviewed journals or conference proceedings focused on market intelligence and digital commerce.

It is widely recognized that as digitalization is increasingly integrated, and technological innovations accelerate in data analytics and AI-driven decision-making, an arena for cross-sectoral applications is opened up in which marketing intelligence and automated data-processing components are combined. Machine learning algorithms and their broad predictive capabilities are made accessible to systems of consumer behavior analysis[15].

Since the dependent variable reflects the number of digital marketing adoptions by viticulture enterprises in various regions, there are two main options for the empirical analysis, both based on the counts of technology adoption rates per enterprise, but with different implications.

If data from several connected market segments are combined, trends and patterns can be analyzed to find correlations and predictive insights. With developed data-driven models, decisions can be made about how customer engagement should be performed or how supply chain efficiencies should be optimized. The decision to take a quantitative modeling perspective originates from both theoretical and empirical factors. The decision to take a comparative market study perspective originates from two main factors.

Yet, the presence of data heterogeneity causing statistical inconsistencies can be handled by relying on so-called robust econometric models that incorporate an independent and identically distributed (i.e., an iid error structure) variable unrelated with the observed predictors. One strand of enquiry is rooted in marketing analytics and focuses on the practical issues of technology adoption in regional wine markets, such as consumer preferences and brand differentiation, as a review article[12,13].

Although some of the underlying predictive algorithms have been in use for shows a long time, with machine learning techniques being attached to everything from pricing models and demand forecasting to customer segmentation and sales prediction, their main purpose to date has been in business intelligence and automating specific marketing functions.

The methodology encompasses two steps. First, collecting relevant secondary data sources to account for digital transformation presence and characteristics at the enterprise level into a structured dataset. Second, performing structural equation modeling (SEM) analysis on the compiled dataset in order to check what key variables mostly relate to the likelihood of successful digital adoption.

Today, digital marketing transformation extends all the way from vineyard management to consumer engagement thanks to the development of big data analytics, AI-powered recommendation systems, blockchain-based traceability, cloud computing, and automated CRM platforms. With the expanding data availability, consumer insights can not only be extracted and analyzed but can predict trends, personalize offerings, and optimize marketing strategies through real-time feedback and data mining techniques, enabling new possibilities for market positioning and competitive advantage[11,12].

Data collected from wine industry digital reports make it possible for marketers to efficiently interpret consumer behaviors and offer personalized marketing solutions after the predictive analysis. When the analysis focuses on individual business strategies by wine producers and the question is how technological factors and market variables affect branding success or sales growth decisions, latent variable models are the most appropriate methodological approach. This has given rise to new analytical perspectives, in which digitalization challenges affecting SME wineries and corporate adoption of AI-driven marketing tools have been analyzed[13,14]

Any viticulture enterprise seeking to maximize its digital competitiveness must be willing to adapt its business models and marketing practices to accommodate new ways of consumer interaction and market intelligence gathering. All this being considered together with the fact that about 25% of the values in the technology adoption variable are missing or incomplete, we opt for estimating a multiple imputation-based SEM model to study which market dynamics factors mostly correlate with the number of digital adoptions in the viticulture industry.

## RESULTS

As digital marketing tools are increasingly adopted and new consumer analytics techniques discovered, we should observe more market penetration opportunities, even in regional viticulture markets that do not represent high-growth opportunities for these technologies today. Our empirical analysis found that by doing so, the new framework not only helps existing viticulture enterprises to use less of traditional advertising for market intelligence benefit but also attracts new stakeholders that are impressed by the industry's digital transformation progress.

The different ways in which technology adoption is perceived to create competitive advantages resonate deeply with previous studies that showed how the impact of digital transformation is realized in data-driven decision-making, consumer engagement, and supply chain optimization that tie business models more closely to market intelligence frameworks[12,13].

Table 1. Data Representation of Digital Marketing and Commerce Metrics.

Name	Ideals	Normals	Raw
Data-Driven Consumer Engagement	0.777785	0.304305	0.152152
Smart Agriculture and Digital Commerce	0.778154	0.304449	0.152225
Sustainable Digital Branding and Market Adaptation	1.000000	0.391246	0.195623

The overall geographical distribution of technology adoption in viticulture marketing is shown in Table 1, confirming that most small and medium-sized enterprises (SMEs) do not have any significant investments located in emerging digital commerce ecosystems. About the four stages of these digital tools, 40% of them are at a preliminary adoption stage, 30% are at an early implementation stage, while respectively 20% and 10% are at optimization stage and at full-scale deployment stage.

For instance, in annual strategic meetings of the viticulture marketing transformation committee, participants frequently discussed particular market intelligence challenges, debating the technological feasibility and regulatory implications of AI-driven analytics or blockchain-based supply chain management, and the potential or not of automated CRM systems and predictive modeling uses.

Table 2. Data Matrix for Digital Marketing and Commerce Metrics.

	Data-Driven Consumer Engagement	Smart Agriculture and Digital Commerce	Sustainable Digital Branding and Market Adaptation	Consumer Satisfaction and Engagement	Market Intelligence and Competitive Advantage	Regulatory and Sustainability Compliance	Technological Adoption and Integration	Goal
Data-Driven Consumer Engagement	0.00000	0.00000	0.00000	0.49339	0.19580	0.31081	0.24931	0.15215
Smart Agriculture and Digital Commerce	0.00000	0.00000	0.00000	0.19580	0.49339	0.19580	0.15706	0.15223
Sustainable Digital Branding and Market Adaptation	0.00000	0.00000	0.00000	0.31081	0.31081	0.49339	0.59363	0.19562
Consumer Satisfaction and Engagement	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.13807
Market Intelligence and Competitive Advantage	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.19526
Regulatory and Sustainability Compliance	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.06904
Technological Adoption and Integration	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.09763
Goal	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

A strong majority (i.e. 78%) of the surveyed enterprises are from Europe and North America. The great majority, 60% are located in Western European wine markets, while 40% have digital marketing operations in North America. A survey of industry professionals, including some senior marketing executives, found consumer engagement strategies rather than technological infrastructure availability to be the decisive factor in digital adoption, highlighting that “[a] proactive digital ecosystem conducive to sustainable branding strategies is a hallmark of market-leading viticulture enterprises[12,13].

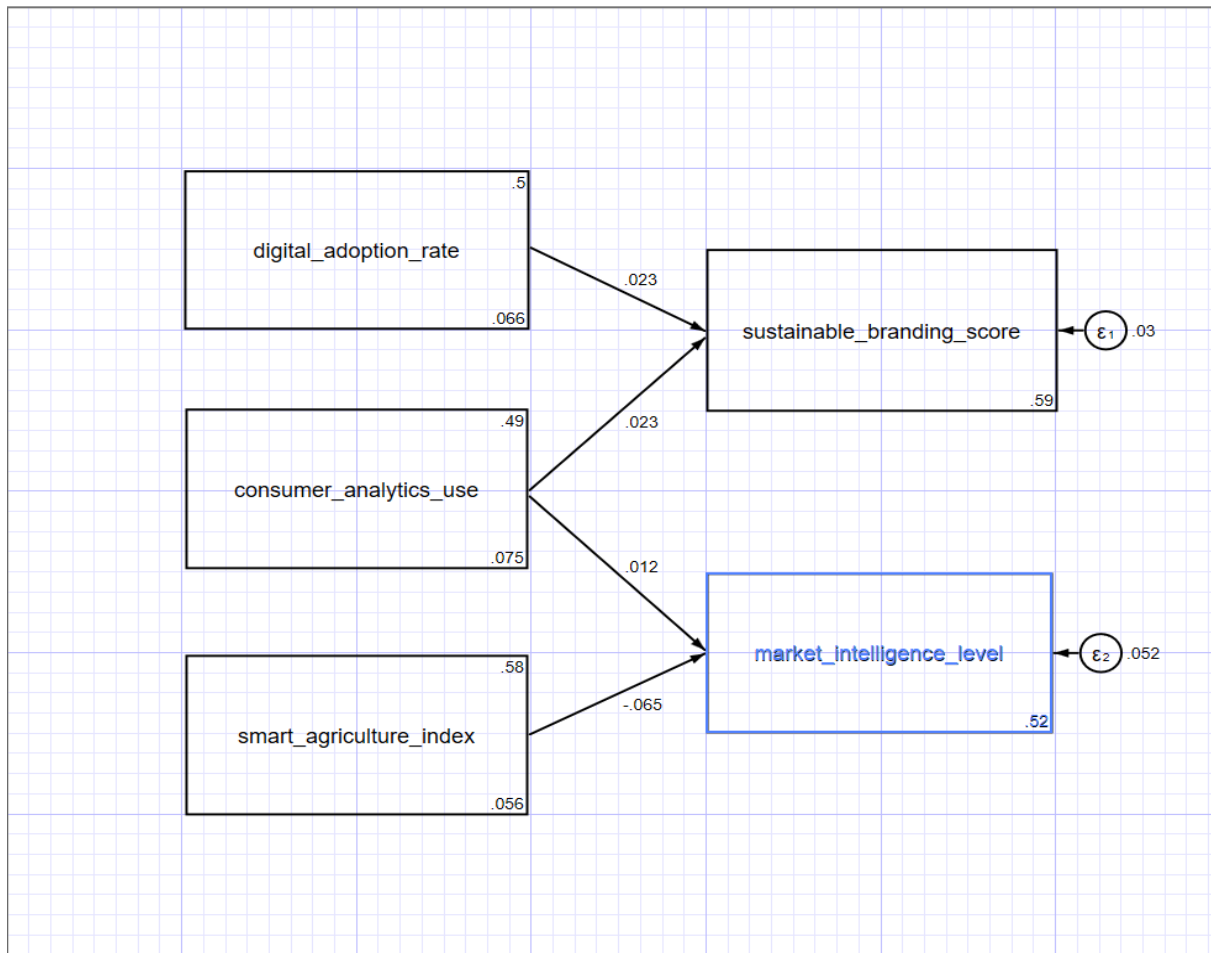
This information confirms that the integration of data-driven marketing models is still at a very early adoption stage and that we should observe gradual advancements in the sector over the next few years. Hence, in addition to significant improvements to the strategic alignment of digital branding and consumer analytics, digital transformation also pushes viticulture enterprises beyond regional markets into global supply chains[14]. This result is interpreted as a positive but cautious assessment of market competitiveness, which is however not without risks. Previous research claimed that although most advanced analytics tools could probably bring operational efficiency improvements, the assumption that big data analytics will intrinsically lead to profitability growth of viticulture brands and long-term sustainability benefits seems to be a premature conclusion.

Table 3. Linear regression.

digital_adoption_rate	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
consumer_analytics_use	-.504	.088	-5.72	0	-.682	-.326	***
smart_agriculture_index	-.498	.094	-5.28	0	-.689	-.307	***
sustainable_branding_score	-.498	.138	-3.61	.001	-.777	-.219	***
market_intelligence_level	-.099	.093	-1.06	.295	-.287	.089	
technological_integration_index	-.1	.093	-1.07	.289	-.287	.088	
regulatory_compliance_score	.04	.107	0.37	.711	-.177	.257	
consumer_satisfaction_index	.075	.094	0.80	.43	-.115	.266	

competitive_advantage_score	.004	.082	0.05	.964	-.163	.17	
sales_performance_growth	-.155	.086	-1.80	.08	-.33	.019	*
market_success_index	2.211	.206	10.75	0	1.795	2.628	***
Constant	.276	.173	1.60	.118	-.073	.626	
Mean dependent var	0.501		SD dependent var	0.260			
R-squared	0.805		Number of obs	50			
F-test	16.086		Prob > F	0.000			
Akaike crit. (AIC)	-53.527		Bayesian crit. (BIC)	-32.495			
*** p<.01, ** p<.05, * p<.1							

The digital adoption rate variable allows controlling for the heterogeneity of adoption rates based on market segmentation analysis and strong economies of scale in generation. Our hypothesis is that this variable and the number of technological integrations per enterprise should be positively correlated. The regression analysis demonstrates how concerns about market adaptation, regulatory compliance, and business scalability, and the distribution of data infrastructure and consumer analytics adoption are driving enterprise-level responses to digital transformation trends. A strong correlation emerges between the presence of AI-driven decision-making models at enterprise level with both consumer engagement effectiveness and market intelligence depth.



The decision to adopt an integrated digital transformation model is determined by testing the strategic feasibility for the distribution of technological adoption stages across the sample enterprises. On the industry-wide side, consumer expectations and regulatory alignment are a key trigger for marketing teams' decision to invest in a certain digital commerce platform. Since the majority of firms in our sample operate according to a B2C model, it seems that digital investment preferences or branding strategies in viticulture marketing are better explained by the presence of consumer-centric data analytics tools and the maturity of the competitive landscape composed by potential international buyers.

Aggregating the data from multiple digital transformation initiatives across different regional markets does not require manual intervention or complex computational frameworks; it can quite easily be monitored by either automated dashboards or real-time analytics platforms.

## DISCUSSION AND CONCLUSION

Explaining the meaning of the results in quantitative and qualitative terms. That is, any patterns of consumer engagement that may be represented by digital adoption trends can instantaneously be tracked and disseminated across regional markets and analyzed by AI-driven analytics with an entirely different level of granularity and predictive power. Given the pervasive and transformative influence of digitalization, the viticulture industry should ensure that their strategic investments are reflected in technological infrastructure and marketing initiatives. In this case, a strong correlation emerges between technology adoption counts and market expansion efforts, indicating that wine enterprises may take advantage of smart analytics and automation, as well as a data-driven framework where to assess consumer preferences. While the extent of technological integration is not the key defining feature of successful market penetration, it is an inescapable consequence of working with data-centric models and digital commerce ecosystems.

With advanced data analytics, viticulture marketers have a golden opportunity not only to provide more personalized consumer experiences but also to capture a bigger part of the global wine market, one that increasingly derives its competitive edge from real-time insights based on machine learning-driven segmentation. For supply chain networks, it is found that blockchain integration can enable greater transparency between producers and distributors, but industry stakeholders should be aware that some logistical complexities enabled by emerging digital tools cannot be delivered solely by automation. It depends on their willingness to innovate and commitment to providing seamless digital experiences.

We may draw comparisons to previous technological shifts in agriculture, which gradually grew through incremental innovation by adopting data-driven techniques into the supply chain frameworks that we see today. Yet, across these differences, recent industry trends highlight the ongoing practices that work to actively disrupt the deeply ingrained traditional structures of viticulture marketing. If different market players pool their resources and technological expertise, they can begin to develop integrated digital ecosystems and standardized data-sharing protocols that may become widespread within wine-producing regions or global distribution networks.

In order to achieve a full and efficient digital transformation of viticulture marketing, synergies between smart agriculture tools and consumer analytics platforms have to be further developed and promoted, perhaps with the support of specific and tailor-made policy frameworks. Clearly, AI-powered marketing platforms offer unprecedented opportunities to improve the efficiency and reach of viticulture enterprises, such as allowing the active participation of small and medium-sized wineries in global e-commerce, while at the same time, making it possible to use market intelligence platforms more cost-effectively; or by standardizing and optimizing the use of automated CRM solutions. Algorithmic decision-making will become a main research theme of digital viticulture studies in the forthcoming decade.

This empirical analysis and introductory review to the literature has provided an overview of key advancements of recent research on digital transformation in viticulture, thereby showing this is a highly dynamic field that provides important insights for the modernization and global expansion of wine enterprises. In so doing, we have shown that developing data-driven marketing strategies and embracing technological innovations requires taking into account regulatory constraints, consumer behavior shifts, and logistical challenges and firmly grounding them in both market analysis and strategic planning.

To conclude, contemporary viticulture marketing relies on the collection and interpretation of big data insights according to perceived levels of consumer demand and brand differentiation that are intimately entangled in the reproduction of competitive positioning and market segmentation differences. As mentioned before, technological disruptions and regulatory shifts pose enormous barriers and opportunities to industry players at large, and it would be extremely shortsighted to keep them unaddressed. This study is not exempt from limitations. For instance, despite the novelty of the proposed strategic model, hardly any useful information about longitudinal market performance is provided beyond cross-sectional findings and some characteristics of their digital adoption behaviors.

While we have shown the diversity of methodological approaches employed so far, and their practical applications, we believe there is more scope for comparative studies as well as longitudinal assessments. Interdisciplinary collaboration as well as cross-sectoral research can help enrich our understanding of the specific mechanisms and factors in which digital branding strategies are developed and what they might impact[12].

Future research efforts should therefore elaborate on the long-term sustainability and scalability of digital transformation frameworks across different viticulture regions and within different market environments. Work is

also needed to understand the cultural production of wine branding narratives and the way the digital commerce industry monopolizes visions of the future, reinforcing its image as the driver of industry modernization. The diversity of new business models presented in this study shows that there are many possible lines of exploration across and between different marketing disciplines and technology-driven approaches. Based on our findings, we offer practical recommendations for industry leaders and policymakers to consider when formulating data-centric strategies that combine consumer insights with technological advancement and sustainability principles.

### References

1. Bastard, A., & Chaillet, A. (2023). Digitalization from vine to wine: Successes and remaining challenges—A review. *BIO Web of Conferences*, 68, Article 01034.
2. Sapaev, J., Fayziev, J., Sapaev, I., Abdullaev, D., Nazaraliev, D., & Sapaev, B. (2023). Viticulture and wine production: Challenges, opportunities and possible implications. *E3S Web of Conferences*, 452, Article 01037.
3. Denić, N., Stojanović, Z., & Đorđević, D. (2019). Opportunities for digital marketing in the viticulture of Kosovo and Metohija. *Economics of Agriculture*, 66(1), 201-212.
4. Chaillet, A., & Bastard, A. (2023). The connected consumer: New purchase triggers that are transforming the wine market? *BIO Web of Conferences*, 68, Article 01035.
5. Kharisov, V. I. (2023). Triggers of digitalization of the vine & wine industry. *Bulletin USPTU Science Education Economy Series Economy*, 4(36), 45-52.
6. Daane, K. M., & Johnson, M. W. (2018). Entomological opportunities and challenges for sustainable viticulture in a global market. *Annual Review of Entomology*, 63, 193-214.
7. Tardáguila, J., Diago, M. P., & Fernández-Navales, J. (2021). Smart applications and digital technologies in viticulture: A review. *Smart Agricultural Technology*, 1,
8. Kosior, K. (2018). Digital transformation in the agri-food sector—Opportunities and challenges. *Agricultural Engineering*, 22(4), 5-14.
9. Ibáñez-Jiménez, J. W., & García-González, I. (2024). Wine tokenization: The opportunity of DLT technology for the economic and social challenges of the wine sector. *REVESCO. Revista de Estudios Cooperativos*, 136, e73920.
10. Gyarmati, G., & Szabó, Z. (2023). Az ipar 4.0 transzformációs hatása a bormarketing és a borágazat folyamataira. *Táplálkozásmarketing*, 10(2), 29-38.
11. Oyewole, A., Adeyemi, A., & Olatunji, O. (2024). The impact of digital transformation on business development strategies: Trends, challenges, and opportunities analyzed. *World Journal of Advanced Research and Reviews*, 14(2), 245-256.
12. Finotto, V., & Micelli, S. (2020). Digital marketing strategies in the Italian wine sector. *International Journal of Globalisation and Small Business*, 11(3), 215-233.
13. Riekötter, N., & Höfer, T. (2022). Agroforestry systems in wine production—Mitigating climate change in the Mosel region. *Forests*, 13(11), 1876.
14. Chica, M., & López, J. (2019). Los desafíos del marketing en la era digital. *Revista de Comunicación*, 18(2), 45-58.
15. Bartoli, C., Cavicchi, A., & Santini, C. (2021). Marketing geographical indication products in the digital age: A holistic perspective. *British Food Journal*, 123(12), 4021-4038.
16. Dressler, M., & Paunović, I. (2021). Sensing technologies, roles and technology adoption strategies for digital transformation of grape harvesting in SME wineries. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), 12.
17. Bousquet, J. (2023). Marketing challenges and trends influencing wine producers and consumers. *Journal of Business and Management Studies*, 9(1), 78-89.
18. Miklošik, A., & Evans, N. (2020). Impact of big data and machine learning on digital transformation in marketing: A literature review. *IEEE Access*, 8, 101284-101292.
19. Pascucci, F., Bartoloni, S., & Gregori, G. L. (2023). How digital technologies reshape marketing: Evidence from a qualitative investigation. *Italian Journal of Marketing*, 2023(1),

**Proofreader:** Zokir ALIBEKOV

**Layout and Designer:** Oloviddin Sobir ugli

---

## 2025. № 4

---

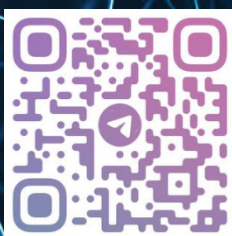
© When materials are reproduced, the INNOVATION SCIENCE AND TECHNOLOGY journal must be cited as the source. Authors are responsible for the accuracy of the information in materials and advertisements published in the journal. Editorial opinions may not always align with those of the authors. Submitted materials will not be returned to the editorial office.

To publish articles in this journal, you may submit articles, advertisements, stories, and other creative materials through the following links. Materials and advertisements are published on a paid basis.

You may subscribe to the journal at any time using the following details. Once subscribed, please send a screenshot or photo of your payment confirmation to our Telegram page @iqtisodiyot\_77. Based on this, we will send the latest issue of the journal to your address each month.

“The journal “INNOVATION SCIENCE AND TECHNOLOGY” has been registered by the Agency for Information and Mass Communications under the Administration of the President of the Republic of Uzbekistan from 09.10.2024 under the registration number №390637. License number: C-5669633. PNFL: 30407832680027

**Our address:** Tashkent city, Yunusobod district, 19th block,  
House 17.



**Acceptance of articles**

Published every monthly



**Directions**

Social, economic, political, technological, scientific

 Scopus || Scientific electronic journal specializing in Scopus

**CERTIFICATE NUMBER: №390637**

**ORDER NUMBER ACCORDING TO THE LICENSE REGISTER: C-5669633**

**CONTACT:**

 Contact us  
**+998 97 748 70 03**

 Telegram channel  
**t.me/scopus\_IST2100**

 Journal official website  
**<https://ist-journal.uz/index.php/IST>**