Persian translation of this paper entitled:
شناسایی پیشران‌های کلیدی توسعهٔ گردشگری دیجیتال در استان آذربایجان غربی: رویکرد آینده‌پژوهی
is also published in this issue of journal
DOI: 10.22034/TOC.2026.590490.1237

Original Research Article

Identifying Key Drivers of Digital Tourism Development in West Azerbaijan Province

(A Future Research Approach)

Hero Isavi[1*], Nosratallah Esmaeilzadeh[1], Matin Seyyed Khorasani[1], Mahdi Ghasemi[1], Komeyl Valizadeh[1]

1. Department of Management, Ur. C., Islamic Azad University, Urmia, Iran

Received: 06/06/2026 Accepted: 10/08/2026 Available online: 23/10/2026

Abstract | Digital tourism represents a novel approach to destination management, particularly in the less developed provinces of Iran, necessitating a systematic identification of essential drivers for strategic planning and the efficient allocation of scarce resources. This study seeks to identify and analyze the critical drivers of digital tourism development in West Azerbaijan Province through a foresight methodology. It is applied in nature regarding its objectives and employs a mixed sequential exploratory design in terms of methodology. In the qualitative phase, a systematic literature review revealed 40 initial variables categorized into five dimensions: technological, economic, socio-cultural, institutional-political, and environmental, which were organized within an integrated conceptual framework encompassing the digital tourism ecosystem, foresight, and Rogers's theory of diffusion of innovation. During the quantitative phase, a 40x40 cross-effects matrix was completed by 20 experts in tourism and information technology within the province, and the data were analyzed using MICMAC software through structural analysis. The results indicated that out of the initial variables, eight were classified as drivers, with a notable predominance of institutional-political drivers (four out of eight), marking a significant finding of the research. The most critical drivers identified include inter-institutional cooperation within the digital tourism ecosystem, data governance and cybersecurity, regulations concerning personal data and privacy, and the infrastructure for high-speed internet. Furthermore, the complete absence of the environmental dimension among the key drivers highlights a concerning gap in the province's digital tourism narrative. The findings suggest that the primary obstacle to the advancement of digital tourism in West Azerbaijan Province is not a deficiency in technology, but rather inadequate institutional frameworks, legal deficiencies, and insufficient inter-organizational collaboration. This research provides valuable insights for policymakers and tourism activists in the province by providing a roadmap based on prioritization of drivers.

Keywords: *Digital tourism, future research, key drivers, structural analysis, MICMAC, diffusion of innovation theory*

Introduction| The tourism industry in the contemporary world is one of the main pillars of economic and social development, contributing significantly to GDP, employment generation, and cultural exchanges. At the same time, the rapid developments in digital technologies in the last two decades have transformed all aspects of this industry, from marketing and service distribution to consumer behavior and tourist experience (Filipiak et al., 2023), to the point that experts speak of the emergence of the "digital tourism" paradigm; a paradigm in which technology is the main axis of value creation and competitive advantage of tourism destinations (Kayumovich, 2020). However, many tourism destinations, especially in developing countries, have not yet been able to systematically exploit these capacities. West Azerbaijan Province, with its rich heritage of historical, cultural and natural attractions (Takht-e Suleiman, Qara-Kalisa, Lake Urmia and traditional markets) and geostrategic location on the border with Turkey, Iraq and the Republic of Azerbaijan, is considered one of the potential tourism destinations in Iran. However, the province's share of the country's tourism market does not match its actual and potential capacities, one of the main reasons for which is the

* Corresponding author: +989149744684, hero.isavi@iau.ac.ir

lag in the digitalization of tourism services and the lack of smart infrastructure for introducing, marketing and managing the tourist experience. The importance of focusing on digital tourism in this province goes beyond mere marketing considerations and has broader economic, social and environmental dimensions. The digitalization of tourism helps local businesses thrive by increasing information transparency, reducing transaction costs, and facilitating tourists' access to services (Surya et al., 2022), and digital technologies can reduce excessive pressure on sensitive natural and historical sites in the province, including the fragile ecosystem of Lake Urmia, by intelligently managing tourist flows (El Archi et al., 2023). The pace of technological developments and changing tourist behavior patterns is such that traditional and static planning is no longer responsive; technologies such as artificial intelligence, virtual and augmented reality, the Internet of Things, and blockchain are rapidly penetrating the industry, and destinations that are not ready to accept them will be eliminated from the competitive cycle (Suanpang et al., 2022). Futures research, as a scientific approach to exploring possible, probable, and desirable futures, is an essential tool for tourism planners to chart a clear path for development amidst the multitude of trends and uncertainties (Miller & Torres-Delgado, 2023), because without a forward-looking perspective, today's investments may quickly become ineffective with the emergence of new technologies. In such a context, it is crucial to identify the key drivers that have the greatest impact on the future of a destination's digital tourism; drivers are variables with the least uncertainty and the greatest impact, and their identification allows decision-makers to allocate their limited resources to real priorities (Scott, 2021). Among the wide range of influential factors—from technical infrastructure and digital literacy to regulatory policies and the digital culture of the host society—the fundamental question is which factors have the most power to shape the future of digital tourism in West Azerbaijan Province.

A review of the existing literature shows that despite the relative richness of digital tourism marketing research in Iran, few studies have systematically identified the drivers of tourism digitalization with a futures-oriented approach. Most domestic research is either limited to the impact of a specific technology (Abbasi, 2014) or has stopped at the level of describing challenges (Qasemnezhad et al., 2013) and lacks a holistic and future-oriented perspective. At the international level, although numerous studies have addressed the future of smart tourism (Elkhwesky et al., 2024), their findings are mainly based on the context of developed countries and cannot be directly generalized to provincial contexts. Another theoretical gap is the lack of application of established social science theories in analyzing the dynamics of digital tourism in Iran. Rogers's theory of diffusion of innovation, which provides a powerful framework for understanding how new technologies are adopted in a social system (Acikgoz et al. 2023), explains why some technologies spread rapidly and others face resistance by identifying perceived characteristics of innovation—relative advantage, adaptability, complexity, testability, and observability (Manzelli et al., 2022); however, its application at the level of destination analysis and with a futures approach has been almost neglected, even in international research that has often been limited to the adoption of a technology from the perspective of tourists (Shaw et al., 2022).

The methodological gap is also notable: most studies with descriptive or correlational approaches have only measured the current situation and have not used structured futures research methods such as structural analysis and cross-effects matrices, while the complexity of the tourism system and the multiple interactions of technological, economic, social and institutional factors require the use of such methods (Rahmadian et al., 2022). The structural analysis method with the MICMAC software, which analyzes the cross-effects matrix based on expert opinions, is designed precisely to fill this gap and allows those with both high influence and low dependence to be identified as key drivers from a comprehensive list of variables. From a policy perspective, this research also has an undeniable need. West Azerbaijan province faces limited financial and technical resources to invest simultaneously in all aspects of tourism digitalization, and provincial decision-makers need to prioritize the factors that will yield the highest return on limited investment; otherwise, there is a high risk of wasting resources and missing the opportunity to attract domestic and international tourists—especially from neighboring countries—while digital capabilities can overcome the province's geographical and infrastructural limitations and take it to a market beyond physical borders (Oncioiu & Priescu, 2022). Accordingly, the main issue of the present study is the lack of a clear, systematic, and evidence-based understanding of the key drivers of digital tourism development in West Azerbaijan province. Relying on the diffusion of innovation theory as a theoretical framework and utilizing the structural analysis method, this study seeks to answer the following questions: What are the main variables influencing the future of digital tourism in the province? What are the

interrelationships between these variables? And which, as key drivers, have the most power to shape the future of this system?

Theoretical foundations

The digital transformation in the tourism industry is a multidimensional phenomenon that goes beyond the mere application of technological tools in marketing. Digital tourism can be considered an integrated ecosystem in which interactions between tourists, businesses, destinations, and governments are redefined through digital platforms, big data analytics, artificial intelligence, and immersive technologies such as virtual and augmented reality (El Archi et al., 2023). In this ecosystem, every stage of the tourist journey, from dreaming and searching for information before traveling to sharing the experience after returning, is influenced by digital touchpoints (Kayumovich, 2020). This transformation has blurred traditional boundaries between industry sectors and has created opportunities for mass personalization, intelligent management of visitor flows, and the creation of memorable experiences; However, the transition to digital tourism requires fundamental changes in the mindset of managers, workforce skills, and institutional frameworks, not just the purchase of technology (Filipiak et al., 2023). In this regard, the concept of "digital maturity" has been proposed as a framework for measuring the comprehensive readiness of tourism destinations, which encompasses dimensions beyond technical infrastructure, including organizational culture, digital skills, and strategic integration. Research shows that many tourism destinations, especially in developing countries, are still in the early stages of digital maturity and the gap between investment in technology and its effective exploitation is due to weaknesses in the software and institutional dimensions (Kosomastotti et al., 2024). In addition, contemporary literature emphasizes the concept of a "smart tourism ecosystem" in which value is not created solely through a single platform, but rather through co-creation among multiple actors, including startups, government agencies, universities, local communities, and tourists themselves, in the context of multi-platform digital networks (Suanpang et al., 2022). From here, the concept of digital tourism is linked to sustainability, and researchers speak of the necessity of a "digital and green twin" for the future of destinations; meaning that digital transformation and sustainable transformation must proceed simultaneously and intertwined so that tourism destinations can both benefit from the benefits of technology and manage their environmental footprint (Mio et al., 2022). In the meantime, data governance has become one of the main pillars of the digital tourism ecosystem because the trust of tourists and businesses in digital platforms is directly dependent on how personal data is collected, stored, processed, and shared, and the lack of transparent legal and security frameworks can lead to a collapse of trust in the entire ecosystem (Saputra and Paranoan, 2024).

If we consider digital tourism as a desirable destination for transformation, futures studies provide a methodological framework for mapping the paths leading to it. Unlike forecasting, which seeks to discover a definitive future, futures studies focus on exploring possible, probable, and desirable futures through the systematic identification of trends, uncertainties, and surprises (Miller & Torres-Delgado, 2023). The complexity of interactions between environmental, economic, sociocultural, and technological factors in tourism is such that linear and static approaches are unable to explain future developments (Rahmadian et al., 2022). Futures studies, with tools such as trend analysis, cross-effects analysis, scenario planning, and road mapping, move policymakers from a reactive to a proactive mode; For example, scenario-building on the impact of climate change has shown that destinations that have previously imagined alternative scenarios are more resilient in real crises (Scott, 2021). Therefore, linking futures studies with tourism planning is a strategic necessity for the long-term sustainability of destinations in a world full of uncertainty. At the heart of futures studies, the concept of "drivers" holds a central place; the fundamental forces that determine the path of evolution of a system and without which a different future would emerge (Suanpang et al., 2022). What distinguishes a driver from other variables is the combination of high influence and low dependence on other variables in the system; therefore, intervention in a driver has a cascading reflection on the entire system, and its identification is the first step of any futures studies project (Elkhwesky et al., 2024). In the field of digital tourism, previous studies have shown that drivers are not limited to technological factors alone and that in many destinations, institutional and legal factors have greater weight; for example, research in emerging smart tourism destinations suggests that regulatory frameworks, government support, and investment in communication infrastructure are key prerequisites for the exploitation of advanced technologies such as big data, the Internet of Things, and artificial intelligence (ibid., 2024). In digital tourism, drivers can include technological factors such as the maturity of broadband infrastructure and smartphone penetration, economic factors such as venture capital in startups, socio-cultural factors such as trust in online transactions and digital

literacy, and institutional-political factors such as data protection laws and tax incentives, and their accurate identification requires a holistic view that goes beyond technological reductionism (Kusumastuti et al., 2024). Furthermore, digital resilience has been proposed as an emerging concept in tourism futures literature, which refers to the ability of the tourism system to absorb external shocks such as health crises, natural disasters, or cyber-attacks through digital redundancy, back-up systems, and platform flexibility (Talwar et al., 2023).

To explain the penetration of digital innovations in such a complex ecosystem, Rogers's Diffusion of Innovation Theory is a unique framework that defines the diffusion process as the spread of an innovation through communication channels, over time, and among members of a social system (Acikgoz et al. 2023). The core of this theory is based on five perceived characteristics: relative advantage, which refers to the degree of perceived superiority of the innovation over existing alternatives; compatibility, which measures the degree to which the innovation is consistent with existing values and needs; complexity, which refers to the perceived difficulty of understanding and using the innovation, trialability, which indicates the possibility of limited experimentation with the innovation before full adoption; and observability, which refers to the degree to which the results of the innovation are visible to others (Manzelli et al., 2022). These five characteristics explain why innovations such as online hotel booking, which have a clear comparative advantage, high adaptability, low complexity and observable results, have become widespread rapidly, but technologies such as blockchain, which have high perceived complexity and whose results are less observable to the general public, have encountered resistance. An important point in applying this theory to digital tourism is that the perceived characteristics of innovation are not formed in a vacuum, but in the context of a social system with specific norms, values , and institutional structures; therefore, a digital innovation may have desirable perceived characteristics and spread rapidly in one tourism destination, while in another destination with a different institutional structure, the same innovation may be considered complex and incompatible (Pino & Gomez, 2024). This theory has also shown its flexibility in contemporary research. Its integration with technology adoption models has provided frameworks for measuring AI adoption in educational and organizational settings (Almaya et al., 2022). In the analysis of mobile wallet adoption, institutional trust and cultural norms have been shown to moderate the impact of innovation characteristics (Shaw et al., 2022). In the tourism domain in particular, recent research has shown that the adoption of digital technologies by tourism SMEs is strongly influenced by the observability of successful outcomes by other businesses, as well as the low-cost testability of the technology before full investment (Acikgoz et al. 2023). Longitudinal studies have also shown that the factors influencing initial adoption are not the same as those influencing the persistence and institutionalization of innovation, and this difference is of critical importance, especially in digital tourism, which is facing a high rate of technological change (Zhou et al., 2024). This finding emphasizes the multi-stage and context-specific nature of the diffusion of digital innovations in tourism and suggests that policymakers should not focus solely on the initial adoption of the technology, but should design mechanisms to sustain, deepen, and institutionalize its application throughout the destination ecosystem (Frei-Landau et al., 2022). In the field of education, this theory has also been applied to the adoption of mobile learning, identifying digital self-efficacy and perceived organizational support as key factors in the transition from awareness to sustainable application of the innovation (ibid., 2022). In summary, Rogers's theory of diffusion of innovation, by emphasizing the perceived characteristics of innovation and the determining role of social and institutional context, provides a coherent framework for analyzing why and how digital technologies diffuse (or not diffuse) in the tourism system of a specific destination such as West Azerbaijan Province, and the present study analyzes the key drivers precisely by relying on this explanatory capacity.

Conceptual Framework of Research

The conceptual framework of this research is designed based on the combination of three fundamental theoretical pillars: digital tourism as a technological ecosystem and an institution that is the final destination of the transformation of the province, future studies as a methodological approach to explore alternative future paths, and Rogers' innovation diffusion theory as an explanatory lens to analyze how digital technologies penetrate and expand in the destination system. In this framework, the term "destination biosphere of transformation" means that digital tourism is not only a technical tool or a new marketing channel, but is the ideal situation and the final goal that all planning and policies of the province should be directed towards: a situation in which all components of the province's tourism system (institutions, businesses, local community and tourists) interact with each other

in the form of an integrated digital ecosystem and create sustainable added value. In this framework, digital tourism is defined not as a marketing tool, but as a multi-layered phenomenon that redefines the interactions between tourists, businesses, government institutions, and the host community through digital platforms (El Archie et al., 2023). In addition to the technological layer (including communication infrastructure, digital platforms and smart tools), this ecosystem also has an institutional layer (including laws, regulations, coordination structures and data governance) and a social layer (including digital trust, technological literacy, culture of innovation and local community participation).

Future research also plays the role of the driving engine of the research and through structural analysis with Micmac software, it explores the interrelationships between the identified variables and introduces those variables that have the most influence and the least dependence as key drivers (Miller & Torres-Delgado, 2023). Structural analysis allows the researcher to reduce the complexity of the interactions between dozens of variables to a strategic map and identify which variables are the main levers of change and which are merely the consequences and results of the system (Rahmadiyan et al., 2022). Meanwhile, Rogers' (2003) innovation diffusion theory provides a conceptual framework to categorize and analyze drivers based on five perceived characteristics of innovation, i.e., comparative advantage, adaptability, complexity, testability, and observability (Acikgozet al., 2023) and explains why some digital technologies penetrate the tourism system faster than others and some face obstacles (Menzeli et al., 2022). The innovation of this research is that it advances Rogers' theory from the level of individual analysis (acceptance of a technology by the user) to the level of systemic and destination analysis (acceptance and diffusion of digital innovation in the entire tourism ecosystem of the province) and shows that the perceived characteristics of innovation not only affect the decision-making of individuals, but also affect the macro-system dynamics and power relations between institutions (Palazzo et al., 2022). This three-dimensional framework enables the research to explain, beyond the static listing of factors, the dynamics of diffusion and acceptance of digital drivers in the specific context of West Azerbaijan province, and to avoid the two harms of technological reductionism (which reduces everything to the purchase of technology) and futuristic superficiality (which, without a theoretical understanding of innovation diffusion mechanisms, simply ranks variables). In other words, this framework shows that the path of digital transformation of the province's tourism is not a straight technological line, but a complex process of interaction between technical capabilities (digital ecosystem), alternative paths ahead (future research), and social and perceptual mechanisms of acceptance (Rogers' theory). In the following, the primary drivers identified from the theoretical and empirical literature of the research, which will be the basis for entering the structural analysis stage, are presented in a comprehensive table format. This table links each variable to one of the pillars of the conceptual framework and is documented by reliable sources (Table 1).

Methodology

The present study is applied in terms of purpose and descriptive-survey in terms of data collection, which is implemented within the framework of the pragmatism paradigm and with a sequential exploratory mixed design (qualitative-quantitative). In the qualitative stage, through a systematic review of domestic and international theoretical and empirical literature, 40 key variables in technological, economic, socio-cultural, institutional-political and environmental dimensions were identified and categorized within the conceptual framework of the research (integrating digital tourism ecosystem, futures studies and innovation diffusion theory). These variables were the basis for designing the research tool in the quantitative stage, in which the structural analysis method was used to identify key drivers. The statistical population consists of experts in the fields of tourism and information technology in West Azerbaijan province who have theoretical knowledge and practical experience in the digitalization of tourism services, destination management, or technology policymaking. The sampling was purposeful and snowball-based, based on the principle of theoretical adequacy and expert saturation; based on the background of similar studies (sample size 15 to 25 people for structural analysis), 20 experts, including senior managers of the Provincial Cultural Heritage and Tourism Organization, entrepreneurs and managers of digital tourism startups, university faculty members, and experienced consultants from the private sector, were selected as an expert panel. The data collection tool was the Cross-Effects Matrix Questionnaire (40x40) that measures the direct impact of each variable on other variables on a four-point Likert scale (0: no impact, 1: low, 2: moderate, 3: high, P: potential). Content validity was confirmed by five tourism and futures experts and their proposed

Table 1. Primary drivers affecting the development of digital tourism in West Azerbaijan province. Source: Authors.

No.	Leading variable (Categorized)	Summary Description	Link to Conceptual Framework	Main Sources
1	Digital connectivity infrastructure (Internet, smartphone, IoT, e-payment)	Sustainable access to high-speed internet, penetration of smart devices and payment systems/smart destination management	Digital tourism ecosystem	Filipiak et al. (2023) Shaw et al. (2022) EL. Archie et al. (2023)
2	Emerging technologies (VR/AR, blockchain, metaverse, big data/artificial intelligence)	Application of immersive and analytical technologies for personalization and virtual destination experience	Digital tourism ecosystem	Kachurka et al. (2021) Pranita et al. (2023) Suanpang et al. (2022) Rahmadian et al. (2022)
3	Platforms, content marketing and digital branding	Online reservations, social media presence, multilingual content, destination digital identity and the role of influencers Abbasi (1403); Shea (2023); Mahmoudi et al. (2023)	Digital tourism ecosystem	Surya et al. (2022) Tahmasppour and Abbasi (2024) Mahmoudi et al. (2023)
4	Digital literacy and human resource training	Skill level of managers/employees and digital empowerment programs	Perceived feature: Complexity	Alghamdi (2024) Ghassemnejad et al. (2021)
5	Trust, testability and open innovation	Tourists' confidence in online transactions and their participation in digital co-creation	Perceived feature: testability	Saputra and Paranoan (2024) Alal-Sharif et al. (2023)
6	Culture of innovation and adaptation to local values	Cultural readiness of the host community and compatibility of technology with local norms)	Perceived feature: adaptability	Frei-Landau et al. (2022); Pinho and Gomez (2024)
7	Comparative advantage and observability of digitalization	Stakeholders' belief in the profitability and visibility of digital successes	Other objectives Perceived feature: comparative advantage/observability	Acikgoz et al. (2023) Menzli et al. (2022)
8	Data governance, cyber security and privacy regulations	Legal frameworks for data protection and countering cyber threats	Institutional and policy ecosystem)	Saputra and Paranoan (2024)
9	Inter-institutional collaboration and participatory governance	Coordination of government, private sector, academia and local community in decision-making)	Institutional and policy ecosystem)	Wagenseil et al. (2024); Martin et al. (2023) Almeida et al. (2023)
10	Investment and economic incentives digitalization	Risk financing and government incentives (tax/loan) for tourism businesses	Eco-economy	Almeida and Wasim (2023)
11	Community participation and indigenous knowledge	Involving residents in the creation of digital services and integrating traditional knowledge with technology	Eco-social	Kaur et al. (2022) Hamimah et al. (2022)
12	Sustainability, resilience and digital monitoring of	Applying technology for environmental monitoring, resilience to crisis and measuring sustainability indicators	Eco-sustainable tourism	Talwar et al. (2023); Elkhwesky et al. (2023) Scott (2021) Mio et al. (2022)

amendments; reliability was also verified by examining the stability and consistency of the experts' opinions in supplementary sessions.

Data analysis was performed using the structural analysis method and MICMAC software. By calculating the row sum (impact) and column sum (impact) of each variable, this software determines its position in the scatter plot and classifies the variables into five categories: drivers (high impact, low impact), bimodals (high impact and high effectiveness), independents (both low), dependents (high impact, low impact), and moderators (intermediate variables). The research was organized in five steps: (1) identifying 40 initial variables through a literature review; (2) designing a cross-effects matrix and completing it with an expert panel; (3) analyzing the direct relationships of the variables with MICMAC; (4) drawing and interpreting an influence/dependance scatter plot; and (5) ultimately identifying the key drivers of digital tourism development in the province. This systematic approach ensures the validity of the findings and provides the basis for providing evidence-based policy recommendations.

Research Findings

The first step in the structural analysis was to identify and comprehensively enumerate the primary variables affecting the development of digital tourism in West Azerbaijan Province. Based on a systematic review of theoretical and empirical literature and using an integrated conceptual framework of the research that combines digital tourism ecosystem, futures studies, and the theory of diffusion of innovation, a total of 40 key variables were identified and extracted. These variables were categorized into five main dimensions, including the technological dimension (10 variables), the economic dimension (6 variables), the socio-cultural dimension (8 variables), the institutional-political dimension (9 variables), and the environmental and sustainability dimension (7 variables. The distribution of variables across these five dimensions is shown in Table 2.

An examination of the initial distribution of variables shows that the institutional-political and technological dimensions have the largest share in shaping the province's digital tourism system, accounting for 47.5% of all variables. This indicates that the development of digital tourism in West Azerbaijan Province is not a purely technical phenomenon, but is equally dependent on institutional, political, and regulatory frameworks. In contrast, the relatively lower share of the economic dimension (15%) may seem surprising at first glance, but it should be noted that many economic mechanisms are indirectly present in the institutional and technological variables, and this distinction is made solely for analytical clarity. Also, the presence of 7 variables in the environmental and sustainability dimension (17.5%) indicates that sustainability and environmental responsibility concerns have been seriously raised in the digital tourism literature and cannot be ignored in provincial planning.

After identifying the initial variables, a 40 x 40 cross-effects matrix was designed and provided to a panel of 20 experts. The experts rated the direct impact of each variable on other variables on a four-point scale (0: no impact, 1: low impact, 2: medium impact, 3: high impact), and the average of the opinions was used as the basis for analysis in the MICMAC software. Initial results showed that out of a total of 1,560 possible relationships in the matrix, 847 relationships have non-zero values, indicating a completion rate of 54.3%. This relatively high rate of saturation indicates that the province's digital tourism system is a highly interconnected and complex system, and its variables interact extensively with each other. In other words, any intervention or change in one variable can create unforeseen chain reactions throughout the system, highlighting the need for a holistic and systems-thinking approach in the province's digital tourism policymaking. Table 3 shows the top 10 variables in terms of the strength of their direct influence on other variables.

A very striking point in the ranking of impact is the clear dominance of institutional-political variables at the top of the table. The first three variables, namely inter-institutional cooperation, data governance, and privacy laws, are all institutional in nature, indicating that, from the experts' perspective, the biggest bottleneck in the development of digital tourism in West Azerbaijan Province lies not in the lack of technology or financial resources, but in the weakness of inter-organizational coordination and the void of legal-regulatory frameworks. On the other hand, the presence of high-speed Internet infrastructure in fourth place reminds us that despite the importance of institutional factors, technical infrastructure is still a necessary and inevitable condition for any digital transformation. It is also noteworthy that digital literacy of managers, despite its relatively high impact (45), still has a significant influence (71), and this duality turns it into a strategic variable that can both drive transformation and, if neglected, become a major obstacle.

After calculating the sum of the influence and influence of each variable, the MICMAC software determines the position of each in the two-

dimensional influence-influence coordinate system and classifies it into five distinct zones. This scatterplot, which is the beating heart of structural analysis, allows the researcher to separate variables based on their systemic nature and identify those that have the greatest leverage for change. The distribution of the 40 research variables in these five zones is presented in the Table 4.

Fig. 1. the horizontal axis represents impact and the vertical axis represents impact. The two dotted lines of the mean divide the screen into five zones. The

Table 2. Distribution of primary variables in the five dimensions of the research. Source: Authors.

Dimension	Number of variables	Percentage	Sample variables
Technological	10	25%	High-speed internet infrastructure, virtual and augmented reality, online booking platforms, metaverse, big data analytics
Economic	6	15%	Venture capital, government incentives, electronic payment systems, startup financing
Socio-cultural	8	20%	Digital literacy of managers, digital trust of tourists, innovation culture, digital reference groups
Institutional-political	9	22.5%	Privacy laws, interagency cooperation, participatory governance, data governance and cyber security
Environmental and sustainability	7	17.5%	Sustainability through technology, sustainability indicators, digital life cycle assessment, digital resilience
Total	40	100	

Table 3. Ranking of the top 10 variables based on direct impact. Source: Authors.

Rank	Variable	Total influence	Total dependence	Net Impact
1	Inter-institutional collaboration in the digital tourism ecosystem	87	34	+53
2	Data governance and cyber security in tourism	82	29	+53
3	Laws and regulations governing personal data and privacy	79	31	+48
4	High-speed and broadband internet infrastructure	76	42	+34
5	Venture capital and financing of digital tourism startups	73	38	+35
6	Digital literacy of tourism managers and employees	71	45	+26
7	Economic incentives and government incentives for digitalization	68	41	+27
8	Participatory governance and local communities in digital tourism planning	65	36	+29
9	Digital education and empowerment of local workforce	63	47	+16
10	Local community participation in the design and delivery of digital services	61	39	+22

Table 4. Distribution of variables in the five zones of the influence-dependence map. Source: Authors.

Area	Title	Number of variables	Percentage	Key feature
1	Drivers	8	20%	High impact, low impact: main levers of change
2	Bimodal variables	10	25%	High impact and High effectiveness: unstable catalysts of the system
3	Dependent variables	11	27.5%	High impact, low impact: results and outputs of the system
4	Independent variables	7	17.5%	Low impact and impact: marginal variables
5	Regulating variables s	4	10%	Middle position: moderating variables
Total		40	100	

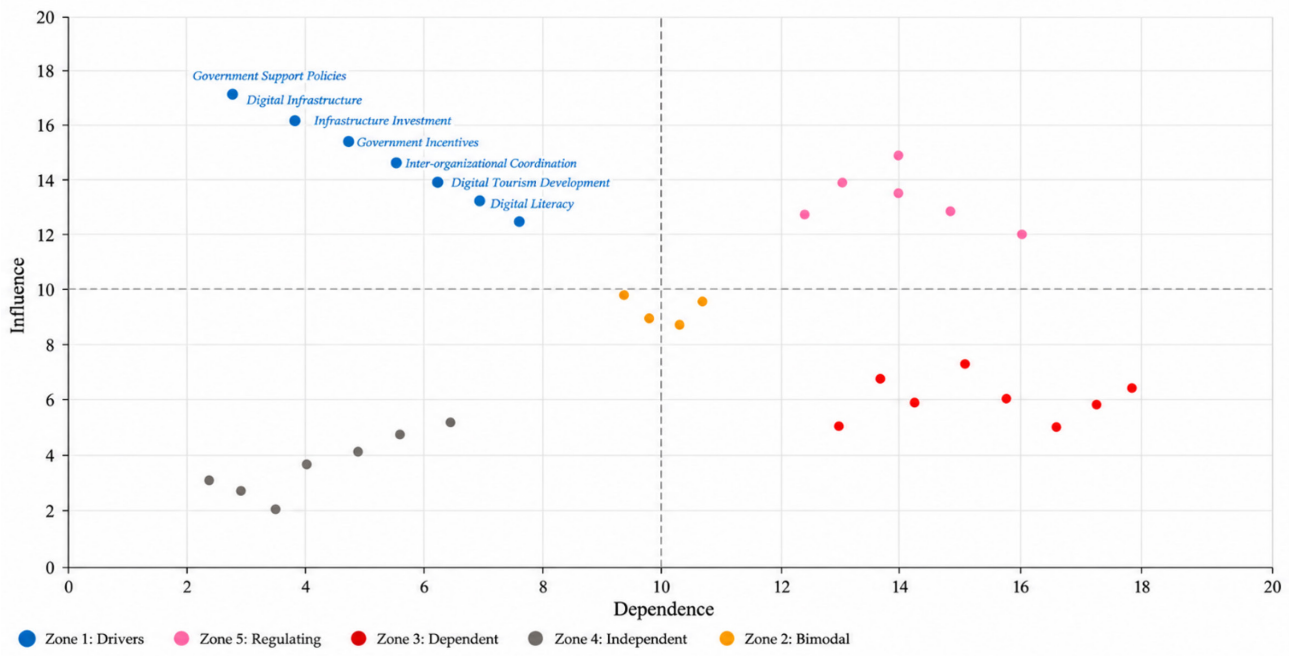


Fig. 1. Scattermap of 40 variables affecting digital tourism in West Azerbaijan Province in the influence-dependence coordinate system (output of MICMAC). Source: Authors.

variables in the upper left zone (high impact-low impact) are the key drivers.

Reflecting on the distribution of variables in these five zones provides valuable insights into the dynamics of the province's digital tourism system. The identification of 8 variables in the drivers zone (20%) indicates that the system under study is structurally dependent on several key variables, which is both an opportunity for focused policymaking and a warning about the potential risks arising from the instability of these variables. On the other hand, the abundance of bimodal variables (10 variables, equivalent to 25%) indicates that a large part of the system is in a state of transition and instability; these variables both affect and are affected by the system, thus facilitating the transmission of change messages throughout the system. Of concern is the presence of 11 variables (27.5%) in the dependent area, which indicates that a significant part of the system is passive and outcome-oriented, with little ability to actively shape its future. Also, 7 independent variables (17.5%), which mainly include very emerging technologies such as block chain and metaverse, as well as concepts such as nomad tourism, indicate that these concepts have not yet reached maturity in the context of the province and do not have a significant impact on the main dynamics of the system. In the following, the variables of each area are examined separately. Table 5 introduces the eight variables located in the drivers area, which are the most important outputs of this research.

Interpreting this pivotal finding requires careful consideration of several key points. First, out of the eight key drivers, four (50%) belong to the institutional-political dimension, and this dominance sends a clear message to provincial policymakers: the main bottleneck in the development of digital tourism is not the lack of technological tools, but rather weaknesses in coordination structures, legal gaps, and the absence of trust-building frameworks for data protection. Second, Internet infrastructure is the only technological driver on this list, which shows that other technologies (virtual reality, block chain, metaverse, etc.), although important, play a prerequisite and platform-building role, and until institutional bottlenecks are removed, investment in them will not be fully profitable. Third, the presence of two economic drivers (venture capital and government incentives) alongside institutional drivers indicates that institutional reforms alone are not enough and must be accompanied by financial and incentive tools. Fourth, and perhaps most importantly, as shown in Table 6, the presence of two variables related to the local community (participatory governance and participation in service design) shows that experts have well understood that digital tourism will fail without the acceptance and support of the host community. The dichotomous variables located in the second zone play the role of catalysts of the system and deserve special attention.

The defining characteristic of dichotomous variables is their two-way and volatile nature; they both

Table 5. Final key drivers (variables of the first area). Source: Authors.

Rank	Driver	Influence	Dependence	Net Impact	Dimension
1	Inter-institutional collaboration in the digital tourism ecosystem	87	34	+53	Institutional-political
2	Data governance and cyber security in tourism	82	29	+53	Institutional-political
3	Laws and regulations governing personal data and privacy	79	31	+48	Institutional-political
4	High-speed and broadband internet infrastructure	76	42	+34	Technological
5	Venture capital and financing of digital tourism startups	73	38	+35	Economic
6	Economic incentives and government incentives for digitalization	71	45	+26	Economic
7	Participatory governance and local communities in digital tourism planning	68	41	+27	Institutional-political
8	Local community participation in the design and delivery of digital services	65	36	+29	Socio-cultural

Table 6. Key dichotomous variables (second zone variables). Source: Authors.

Variable	Influence	Dependence	Dimensions
Digital literacy of tourism managers and staff	71	45	Socio-cultural
Digital training and empowerment of local human resources	63	47	Socio-cultural
Digital trust of tourists in online transactions	59	52	Socio-cultural
Virtual reality and augmented reality in introducing destinations	57	50	Technological
Culture of innovation and technology acceptance in the host society	55	51	Socio-cultural
The role of digital reference groups and tourism influencers	54	49	Socio-cultural
The perceived comparative advantage of digitalization for businesses	52	46	Economic
Electronic payment systems and digital currencies	51	48	Economic
Open innovation and digital co-creation with tourists	49	44	Technological
Big data analysis and tourism business intelligence	48	53	Technological

affect and are affected by the system, and therefore act as a double-edged sword. For example, digital literacy of managers, with an impact of 71 and an impact of 45, can act as both an accelerator of digital transformation and, if ignored, a major bottleneck. The strong presence of socio-cultural variables in this area (5 out of 10 variables) indicates that soft factors such as trust, culture and skills play a decisive role in the success or failure of digital strategies. Interestingly, the presence of the digital trust of tourists variable with a high impact (52) indicates that this variable is strongly influenced by other system developments and that tourist trust will not be achieved until institutional drivers such as data governance and privacy laws are strengthened. In the third zone, dependent variables are located, which are mainly the consequences and outcomes of system developments rather than the factors shaping them. Dependent variables are the mirror of the success or failure of digital strategies. According to Table 7, for example, the memorable digital tourist experience model with the highest impact (62) shows that this variable is, above all, the outcome and end product of the quality of other system variables and that until the key drivers are activated, we cannot expect to create desirable digital experiences for tourists. Destination digital identity and online branding, which are ranked second in impact, emphasize that the digital brand of a destination is not a starting point, but the final fruit of a healthy and dynamic digital ecosystem. Also, the placement of technological variables such as the metaverse and the Internet of Things among the dependent variables is a warning to policymakers not to be attracted to attractive but premature technologies; because these technologies, in the current conditions of the province, require the maturity of other dimensions of the system rather than being drivers. Finally, the variables located in the

fourth and fifth zones, which include the independent and control variables, respectively, are presented in the Table 8.

The placement of variables such as blockchain, metaverse, and nomad tourism in the independent variables area indicates that these concepts have not yet reached the point of impact in the province's planning horizon. This may be due to the newness of these technologies, the lack of the necessary infrastructure, or the province's market maturity to accept them. However, these variables should not be completely ignored, as they may become powerful drivers in the longer term. Regulatory variables, which are located at the border between different regions, also play a moderating and facilitating role, and although they do not have the power to create fundamental change on their own, they can facilitate or disrupt the functioning of other variables.

Fig. 2. shows the distribution of the net impact power of the extracted drivers, which shows a significant difference in their role in the future of digital tourism in the province. According to this chart, drivers such as "government support policies" and "quality of telecommunications infrastructure," with the highest net impact power, play a decisive role as "key variables and drivers" that any policymaking in the field of digital tourism should focus its first priority on. In contrast, the placement of concepts such as blockchain, metaverse, and nomad tourism in the lowest ranks of the chart indicates that these technologies have not yet reached the stage of structural impact in the current context of West Azerbaijan province; a situation that is mainly due to the "emergence of technologies", "lack of technological infrastructure", or "immaturity of the market and social acceptance". However, the analysis of the nature of this diagram indicates that although these variables currently have low impact,

Table 7. Main dependent variables (third zone variables). Source: Authors.

Dimensions	Influence	Dependence	Variable
Digital Tourist Experience Model	62	22	Socio-cultural
Digital Destination Identity and Online Branding	58	25	Technological
Digital Tools for Content Marketing and Social Networks	56	28	Technological
Integrated Digital Marketing Model for Sustainable Urban Tourism	54	24	Economic
Digital Marketing Based on Agritourism and Local Products	51	21	Economic
Multilingual Digital Content and Accessibility for Foreign Tourists	49	23	Technological
Machine Learning and Intelligent Personalization of Tourist Experience	47	20	Technological
Smart Destination Management and the Internet of Things	45	30	Technological
Virtual Tourism Metaverses and Experiences	44	18	Technological
Tourism Sustainability Indicators and Digital Reporting	42	26	Environmental
Digital Lifecycle Assessment of Tourism Services	40	17	Environmental

Table 8. Independent and Control Variables (Fourth and Fifth Zones). Source: Authors.

Area	Variable	Influence	Dependence
Independent	Penetration of Smartphones and Mobile Devices	28	21
Independent	Blockchain Technology and Transaction Security	26	24
Independent	Compatibility of Digital Technologies with Indigenous Values	23	27
Independent	Observability of Successful Results of Digitalization	21	26
Independent	Digital Resilience Against Crises and External Shocks	20	29
Independent	Development of Digital Tourism for Nomads and Remote Workers	18	22
Independent	Digital Supply Chain Management in Tourism	16	20
Regulative	Online Service Reservation and Distribution Platforms	35	33
Regulative	Environmental Sustainability through Digital Technologies	32	34
Regulative	Sustainable Development Based on Indigenous Knowledge and Digital Technologies	30	31
Regulative	Measuring and Monitoring Sustainable Performance with Digital Tools	28	30

their future-oriented nature requires that they be considered in long-term planning as "emerging drivers" so that in future horizons, they can be transformed from a neglected threat or opportunity into transformative tools. Other variables, which are in the middle of this spectrum, act as facilitators and their main function is not to fundamentally change, but to regulate and strengthen the performance of other powerful drivers.

According to Fig. 3, the dimensional distribution of the drivers indicates the absolute dominance of the "institutional-political dimension" with a 50% share in the digital tourism structure of West Azerbaijan province. This high concentration, rather than indicating structural capability, indicates a kind of "institutional rigidity or stuckness" in the system; meaning that the transformation of the province's digital tourism, rather than being a function of technological innovations or market pull (economic dimension), is strongly dependent on governance decisions, upstream laws, and administrative bureaucracy. In other words, until the legal and

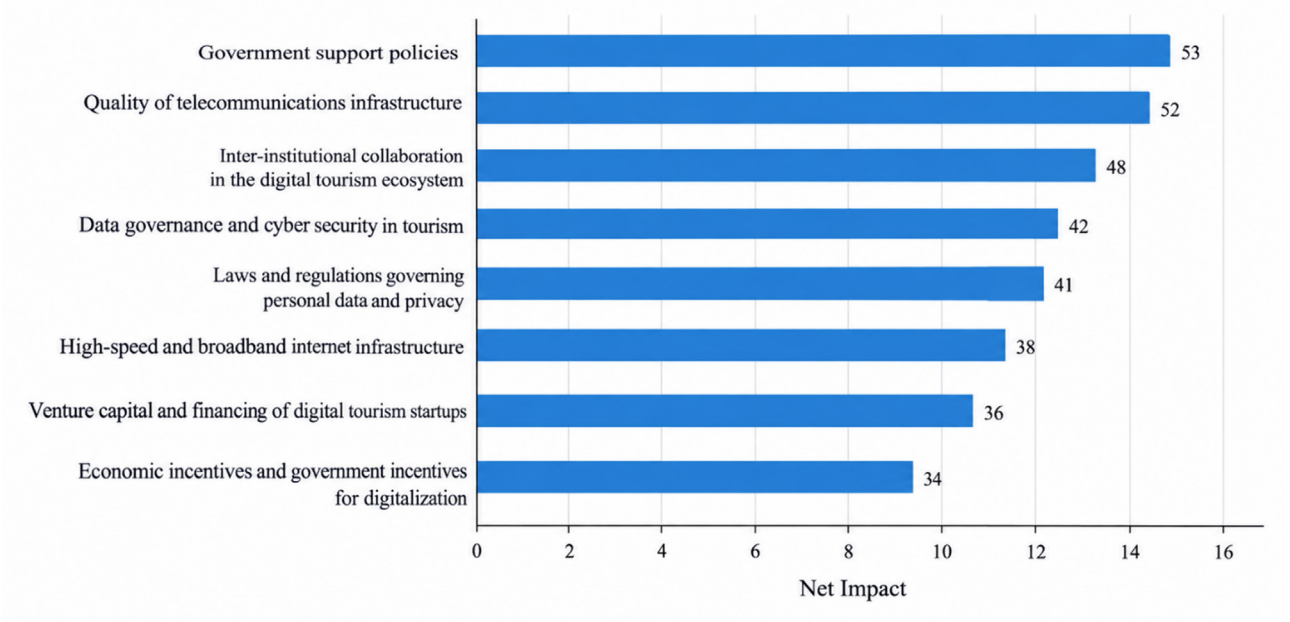


Fig. 2. Bar chart comparing the net impact of eight key drivers of digital tourism in West Azerbaijan Province. Source: Authors.

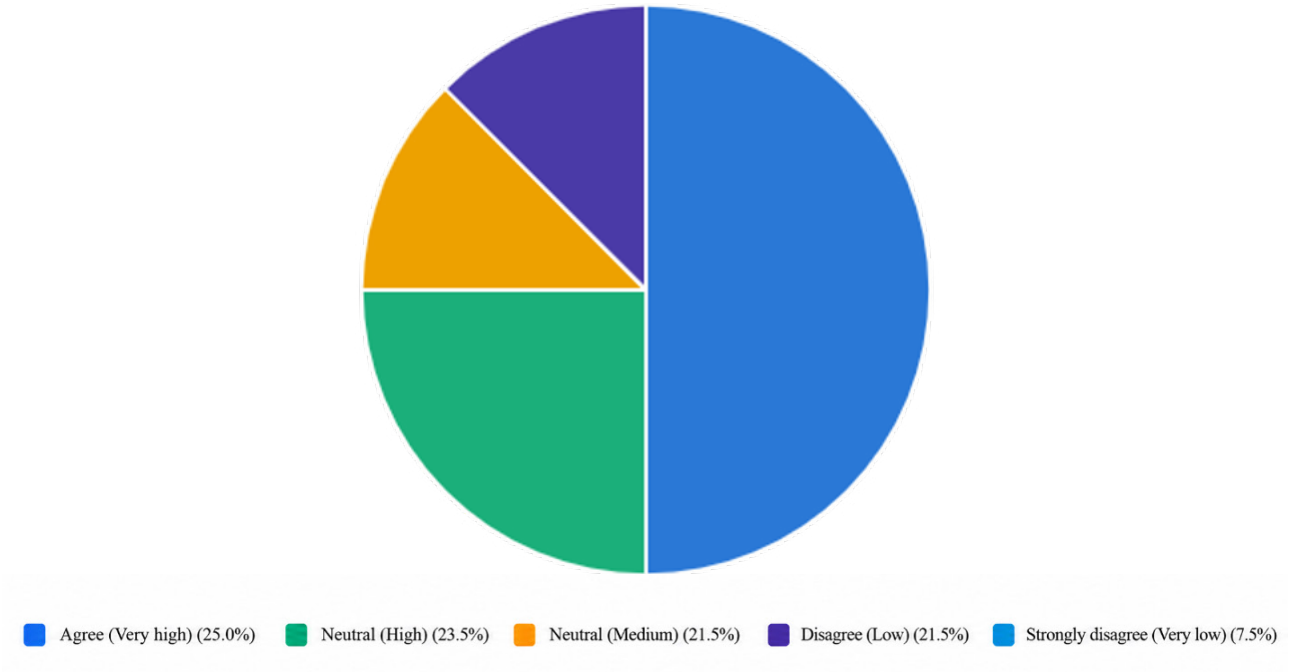


Fig. 3. Pixel diagram of the dimensional distribution of the eight key drivers. Source: Authors.

institutional knots are untied, the potential of other dimensions (technological and economic) will not be able to manifest.

On the other hand, the insignificant share of the technological dimension (12.5%) and the complete absence of the environmental dimension among the key drivers is a sobering finding that shows that the view of digital tourism in the province has not yet passed from the stage of "official policymaking" to the stage of "sustainability and technological penetration". This situation is alarming because it makes the system vulnerable to rapid global technological changes and shows that sustainability and environmental considerations are not yet considered as a serious "driver of change" in the future research horizon of managers and experts in the region. Therefore, breaking away from this institutional dependence and balancing the drivers by relying on economic and environmental dimensions is an undeniable necessity for the transition to smart tourism in the province.

The findings of the structural analysis draw a clear picture of the anatomy of the digital tourism system of West Azerbaijan province. Out of the initial 40 variables, 8 variables were identified as key drivers, which, in order of priority, are: inter-institutional cooperation in the digital tourism ecosystem, data governance and cyber security, laws and regulations governing personal data and privacy, high-speed and broadband internet infrastructure, venture capital and financing of digital tourism startups, economic incentives and government incentives, participatory governance and local communities, and finally, local community participation in the design and delivery of digital services. The clear dominance of institutional-political drivers (50%) over other dimensions reveals the strategic message of the research: the path to digital tourism development in the province requires deep institutional surgery, redefining inter-agency coordination mechanisms, and creating trust-building legal frameworks, rather than requiring technological leaps or large financial injections. The absence of environmental and sustainability dimensions among the key drivers is also a warning that sustainability concerns have not yet reached the core of the province's digital tourism discourse.

To further explain these findings, the lens of Rogers's diffusion of innovation theory was used to determine why these drivers have found such a central place in the specific context of West Azerbaijan province. At the top of the list is "inter-institutional collaboration," which, from Rogers's perspective, is a tangible manifestation of two key features of "adaptation" and "comparative advantage." The fragmentation and insular functioning of the governing institutions are considered the greatest incompatibility of the existing system with any integrated digital innovation, and experts, by placing this variable at the top, have declared that until the institutional structure is "adapted" to the requirements of a digital ecosystem (which requires free flow of data and shared decision-making), no advanced technology will be able to penetrate. Also, the formation of this cooperation itself brings a significant "comparative advantage" for the province, as it greatly reduces the costs of exchange and coordination and increases the speed of adoption of subsequent innovations. The next two drivers, "data governance and cyber security" and "privacy laws", directly affect the "perceived complexity" and "testability" of innovation. In an environment where there is no clear legal framework for the protection of personal data, digital technologies appear "complex" and risky to tourists and businesses, and the possibility of their carefree "testing" is denied. For this reason, experts have prioritized these two variables not as a mere technical requirement, but as a psychological and social prerequisite for building trust and, consequently, the diffusion of innovation.

Further, the "high-speed internet infrastructure" as the only technological driver plays the role of "observability infrastructure". According to Rogers' theory, an innovation whose results are not visible to others has a very low chance of diffusion. In West Azerbaijan province, without sustainable broadband coverage, even the most successful examples of digital tourism will not be "observable" to the mass of stakeholders, and as a result, there will be no incentive to adopt the technology among small businesses and local communities. Two economic drivers, namely "venture capital" and "government incentives", are also directly tied to the characteristic of "comparative advantage"; these financial instruments, by reducing costs and increasing perceived profitability, make the comparative advantage of digitalization tangible and tangible for the province's traditional tourism operators, who often operate with small profit margins. Finally, the two drivers of "participatory governance" and "local community involvement" are manifestations of the "compatibility" of innovation with local values and norms. Digital tourism is accepted in a province if the host community perceives it not as an external

imposition, but as a tool that is consistent with its local culture and interests. Direct participation of people in the design of digital services creates this sense of ownership and compatibility and reduces resistance to change.

In summary, the theoretical analysis of the drivers shows that the main reason why these eight variables have become key drivers is the role that each of them plays in reducing "perceived complexity", increasing "compatibility" and "comparative advantage", and enhancing the "observability" and "testability" of digital innovations in the specific context of the province. In other words, the main bottleneck for the development of digital tourism in West Azerbaijan is not in the technology itself, but in the perceptual and institutional characteristics that Rogers' theory considers as essential prerequisites for the diffusion of any innovation. The absence of the environmental dimension can also be interpreted from this perspective: sustainability concerns have not yet reached a level of perceived "comparative advantage" among the province's stakeholders that can become a driving force for change.

Discussion and Conclusion

The present study aimed to identify and analyze the key drivers of digital tourism development in West Azerbaijan province with a futures research approach, and its findings provided a clear picture of the strategic priorities of this area. The most important achievement of the study is the identification of the decisive dominance of institutional-political drivers over other dimensions; A finding that shows that, contrary to popular belief, the main bottleneck in the digitalization of tourism in underdeveloped provinces of Iran is not a lack of technology or financial resources, but rather weaknesses in coordination frameworks, legal gaps, and the absence of trust-building systems. This result is in line with previous studies such as the study by Ghassemnejad et al. (2000), which emphasized the institutional challenges of digital marketing in Iranian tourism; with its future-oriented and quantitative approach, it goes beyond the level of describing the challenges and provides a precise prioritization of these obstacles. Also, the findings are in line with the study by Elkhwesky et al. (2003), which emphasizes the importance of data governance in smart tourism, with the difference that the present study has grounded this necessity in the context of a border province with specific infrastructural and institutional constraints.

From a theoretical perspective, this study, by integrating the three pillars of the digital tourism ecosystem, futures studies, and Rogers's diffusion of innovation theory, demonstrated the extent to which classical social science frameworks can be useful in explaining the dynamics of digital tourism in less developed contexts. Applying Rogers' theory to the analysis of drivers revealed that each of the eight key drivers somehow targets one of the five perceived characteristics of innovation (comparative advantage, adaptability, complexity, testability, and observability) and, in this way, determines the speed and direction of the diffusion of digital technologies in the destination system. This finding is in line with the research of Acikgoz, Elkhwesky & Oncioiu (2023), which emphasizes the importance of perceived characteristics in the adoption of tourism technologies, and elevates it from the level of individual adoption to the level of systemic and destination analysis. The complete absence of the environmental dimension among the key drivers, although alarming, is consistent with the findings of Mio, Kusumastuti, and Pranita (2022) on the gap between the "digital and green twin" discourse and the implementation realities in tourism destinations, and suggests that this gap is even deeper in Iranian provinces.

From a policy perspective, the main message of this study for managers in West Azerbaijan Province is that the investment priority should shift from purchasing hardware and launching technological platforms to institutional reforms, developing transparent legal frameworks, and creating inter-agency coordination mechanisms. Establishing the provincial Digital Tourism Steering Council, not merely as a ceremonial body, but as a decision-making authority with clear executive powers, is the first and most immediate practical step. Also, the legal vacuum in the area of privacy and data security should be filled by developing provincial regulations (within the framework of national laws) and setting up a Tourism Cybersecurity Operations Center. This will directly reduce the "perceived complexity" and increase the "trust" of tourists, especially international tourists from neighboring countries. In this regard, economic incentive packages should be designed to make the "comparative advantage" of digitalization tangible and tangible for the province's small and medium-sized businesses (such as traditional hoteliers, local guides, and handicraft vendors). Ultimately, any digital strategy without genuine participation from

the local community is doomed to failure, and the creation of people-centered digital tourism villages is the best way to ensure that this innovation is "compatible" with the province's indigenous and cultural values. At the policy and institutional level, the most important measure is the establishment of a "Provincial Digital Tourism Steering Council" chaired directly by the governor and with the membership of the general directors of cultural heritage, information technology, economy, and finance, mayors of city centers, and representatives of the chamber of commerce, universities, and the local community. However, simply issuing a resolution is not enough to form this council; Rather, it is necessary to establish a permanent secretariat for this council in the Cultural Heritage Organization and develop a five-year roadmap with specific quantitative goals (for example, a 30% increase in the share of online reservations for tourism services in the province) and monitor it quarterly. In the second step, this secretariat will be required to conclude a multilateral cooperation agreement between the Cultural Heritage Organization, the provincial telecommunications department, Urmia University, and the Science and Technology Park within the first six months to form a digital tourism innovation ecosystem. To implement this agreement, it is necessary to form a "joint technical working group" with the presence of authorized representatives of each institution, whose meetings are held monthly and whose progress report is submitted to the Steering Council. In the area of data governance and trust-building, it is proposed to develop a "Tourist Digital Rights Charter" modeled after international examples but tailored to the province's domestic laws and local requirements. The responsibility for implementing this can be assigned to a working group consisting of legal experts from the Cultural Heritage Organization, FATA Police, and law professors from Urmia University, who will prepare a draft within four months and submit it to the Steering Council for approval. At the same time, a "Tourism Cybersecurity Operations Center" should be established by allocating a physical space in the Cultural Heritage Organization and providing specialized personnel through cooperation with FATA Police and hiring network security experts. To create an "Integrated Tourism Data Management System," instead of developing it from scratch, it is better to use existing open-source platforms and have a technical team from the Science and Technology Park responsible for its localization and deployment within a one-year period.

In the economic aspect, the establishment of a "Digital Tourism Venture Fund" requires the approval of its statute by the provincial planning council and the provision of initial capital through the allocation of a portion of provincial development credits, the participation of operating banks, and the attraction of private sector investors. The operational mechanism of this fund could be such that digital tourism start-up businesses submit their plans to the fund's investment committee and, after technical and economic evaluation, receive low-interest facilities or direct investment. The proposed incentive package, including tax exemptions and low-interest facilities, should also be approved by the steering council in the form of an "Executive Regulation on Digitalization Incentives," and the provincial General Department of Economy and Finance should be responsible for its implementation. For faster implementation, 50 tourism businesses (including hotels, travel agencies, and handicraft stores) could be selected on a trial basis in the first year to implement electronic reservation and payment systems and provide them with comprehensive technical and financial support. The "Annual Provincial Digital Tourism Award" can also be awarded every year during Tourism Week, with the participation of the Chamber of Commerce and the private sector, and create an incentive for healthy competition among the activists in this field.

In the field of empowering human capital and attracting the participation of the local community, the "Digital Empowerment Program for Tourism Activists" should be designed in cooperation with the technical and vocational organization and universities in the form of short-term skills courses (including digital marketing, data analysis, and cyber security) and held in the technical and vocational training centers of the cities of Urmia, Khoy, Mahabad, and Maku. To encourage tourism activists to participate in these courses, a certificate of completion of the course can be considered as one of the conditions for renewing the license for travel service offices and tourism facilities. Creating "digital tourism villages" in targeted rural areas such as Rabat, Bastam, and Qatour requires a step-by-step, participatory approach: first, facilitating teams of tourism and IT experts identify local needs and capacities during a

few-day stay in the village; then, by holding training workshops, they teach rural youth the skills of digital content production, professional mobile photography, and managing virtual pages; and finally, by providing internet infrastructure and basic equipment, they provide the platform for digital marketing of local attractions and products by the residents themselves. A "digital tourism ambassador campaign" could also be implemented by calling on students from the province, especially those majoring in tourism, management, and IT, and after an intensive training course, these ambassadors would be deployed at the province's entry points and historical sites during peak travel times and help tourists use digital tools.

Despite using a systematic methodology, the present study faces several limitations that also indicate directions for future research. The first limitation is the perceptual and subjective nature of the data collected from the expert panel; although the experts were carefully selected, the expert composition of the panel, which consisted mainly of executives, technology entrepreneurs, and academics, with a smaller proportion of environmental experts, may have influenced the absence of the environmental dimension among the drivers; hence, future research can investigate this gap by expanding the expert panel to include environmental and sustainability experts. The second limitation is related to the static nature of structural analysis, which is unable to display temporal dynamics and delayed feedbacks; To compensate for this shortcoming, it is strongly recommended to use a systems dynamics approach to simulate system behavior over time, as well as to conduct scenario-based research based on eight key drivers identified by methods such as intuitive logic or morphological analysis to develop alternative scenarios for the future of digital tourism in the province over a ten-year horizon. The third limitation is the deep context-based nature of the findings and their connection to the unique characteristics of West Azerbaijan Province, including its border location, ethnic composition, and level of infrastructure development, which makes direct generalization of the results to other provinces cautious; therefore, conducting an inter-provincial comparative study with comparable provinces such as Kurdistan, Lorestan, or Sistan and Baluchestan seems necessary to identify general and specific patterns. The fourth limitation is the theoretical focus on Rogers's innovation diffusion framework and the neglect of other complementary frameworks such as innovation systems theory or digital maturity models. Future research could fill this theoretical gap by empirically testing the precise weight of each of the five perceived innovation characteristics in the adoption of digital technologies by the province's stakeholders, as well as conducting in-depth qualitative studies of institutional barriers using a grounded theory approach. Finally, assessing stakeholders' digital readiness through a large-scale survey among the province's tourism businesses and conducting an intergenerational comparative study to compare the attitudes of traditional managers and young entrepreneurs towards digital tourism technologies are other valuable research directions that can reveal existing generational and operational gaps and provide more precise strategies for managing change in the province's tourism ecosystem.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References List

• Abbasi, Z. (2024). The Impact of Modern Digital Marketing on the Growth and Development of Khuzestan's Tourism Industry in 1403. *Scientific Journal of Modern Research Approaches in Management and Accounting, 8*(29), 1482-1488.

• Acikgoz, F., Elwalda, A., & De Oliveira, M. J. (2023). Curiosity on cutting-edge technology via theory of planned behavior and diffusion of innovation theory. *International Journal of Information Management Data Insights, 3*(1), Article 100152. https://doi.org/10.1016/j.jjimei.2022.100152

• Alghamdi, A. M. (2024). Academic leaders' attitudes toward artificial intelligence applications in leadership work in light of the diffusion of innovation theory: The impact of possession of digital literacy. *Journal of Educational Leadership and Policy Studies, 8*(1). https://eric.ed.gov/?id=EJ1431110

• Allal-Chérif, O., Climent, J. C., & Berenguer, K. J. U. (2023). Born to be sustainable: How to combine strategic disruption, open innovation, and process digitization to create a sustainable business. *Journal of Business Research, 154*, Article 113379. https://doi.org/10.1016/j.jbusres.2022.113379

• Almaiah, M. A., Alfaisal, R., Salloum, S. A., Hajjej, F., Shishakly, R., Lutfi, A., Alrawad, M., Al Mulhem, A., Alkhdour, T., & Al-Maroof, R. S. (2022). Measuring institutions' adoption of artificial intelligence applications in online learning environments: Integrating the innovation diffusion theory with technology adoption rate. *Electronics, 11*(20), Article 3291. https://doi.org/10.3390/electronics11203291

• Almeida, F., & Wasim, J. (2023). Eco-innovation and sustainable business

performance: Perspectives of SMEs in Portugal and the UK. *Society and Business Review, 18*(1), 28-50. https://doi.org/10.1108/SBR-12-2021-0233

• El Archi, Y., Benbba, B., Kabil, M., & Dávid, L. D. (2023). Digital technologies for sustainable tourism destinations: State of the art and research agenda. *Administrative Sciences, 13*(8), Article 184. https://doi.org/10.3390/admsci13080184

• Elkhwesky, Z., El Manzani, Y., & Elbayoumi Salem, I. (2024). Driving hospitality and tourism to foster sustainable innovation: A systematic review of COVID-19-related studies and practical implications in the digital era. *Tourism and Hospitality Research, 24*(1), 115-133. https://doi.org/10.1177/14673584221126792

• Filipiak, B. Z., Dylewski, M., & Kalinowski, M. (2023). Economic development trends in the EU tourism industry. Towards the digitalization process and sustainability. *Quality and Quantity, 57*, 321-346. https://doi.org/10.1007/s11135-020-01056-9

• Frei-Landau, R., Muchnik-Rozanov, Y., & Avidov-Ungar, O. (2022). Using Rogers' diffusion of innovation theory to conceptualize the mobile-learning adoption process in teacher education in the COVID-19 era. *Education and Information Technologies, 27*(9), 12811-12838. https://doi.org/10.1007/s10639-022-11148-8

• Ghasemnejad, Z., Majidi Ghahroudi, N., & Jalilvand, M. R. (2021). Investigating the Challenges of Digital Tourism Development: A Case Study of Tehran. *Urban Tourism, 8*(3), 79-90. https://sid.ir/paper/966574/fa

• Hamimah, T., Nurul Huda, N., Uni Kamlun, K., Rosmalina, A. R., & Jennifer, C. K. L. (2022). Sustainability assessment of mangrove forest as a tourist destination: A case study using GSTC criteria in Kota Belud, Sabah, Malaysia. *IOP Conference Series: Earth and Environmental Science*, 1053, Article 012028. https://doi.org/10.1088/1755-1315/1053/1/012028

• Kachurka, R., Krawczyk, M., & Rachubik, J. (2021). Persuasive messages will not increase COVID-19 vaccine acceptance: Evidence from a nationwide online experiment. *Vaccines, 9*(10), Article 1113. https://doi.org/10.3390/vaccines9101113

• Kaur, R., Kaur Chahal, K., & Saini, M. (2022). Understanding community participation and engagement in open source software Projects: A systematic mapping study. *Journal of King Saud University–Computer and Information Sciences, 34*(7), 4607-4625. https://doi.org/10.1016/j.jksuci.2020.10.020

• Kayumovich, K. O. (2020). Prospects of digital tourism development. *Economics, 1*(44), 23-24.

• Kusumastuti, H., Pranita, D., Viendyasari, M., Rasul, M. S., & Sarjana, S. (2024). Leveraging local value in a post-smart tourism village to encourage sustainable tourism. *Sustainability, 16*(2), Article 873. https://doi.org/10.3390/su16020873

• Mahmoudi, F., Nouri, A. R., & Asghari, H. (2023). Investigating the relationship between the behavior of digital reference groups and tourism development: A case study of tourists in Mashhad. *Tourism and Sustainable Development Research, 24*(6), 21-34. https://civilica.com/doc/1907186

• Martin, A., Fischer, A., & McMorran, R. (2023). Who decides? The governance of rewilding in Scotland 'between the cracks': Community participation, public engagement, and partnerships. *Journal of Rural Studies, 98*, 80-91. https://doi.org/10.1016/j.jrurstud.2023.01.007

• Menzli, L. J., Smirani, L. K., Boulahia, J. A., & Hadjouni, M. (2022). Investigation of open educational resources adoption in higher education using Rogers' diffusion of innovation theory. *Heliyon, 8*(7), Article e09885. https://doi.org/10.1016/j.heliyon.2022.e09885

• Miller, G., & Torres-Delgado, A. (2023). Measuring sustainable tourism: A state of the art review of sustainable tourism indicators. *Journal of Sustainable Tourism, 31*(7), 1483-1496. https://doi.org/10.1080/09669582.2023.2213859

• Mio, C., Costantini, A., & Panfilo, S. (2022). Performance measurement tools for sustainable business: A systematic literature review on the sustainability balanced scorecard use. *Corporate Social Responsibility and Environmental Management, 29*(2), 367-384. https://doi.org/10.1002/csr.2206

• Oncioiu, I., & Priescu, I. (2022). The use of virtual reality in tourism destinations as a tool to develop tourist behavior perspective. *Sustainability, 14*(7), Article 4191. https://doi.org/10.3390/su14074191

• Palazzo, M., Gigauri, I., Panait, M. C., Apostu, S. A., & Siano, A. (2022). Sustainable tourism issues in European countries during the global pandemic crisis. *Sustainability, 14*(7), Article 3844. https://doi.org/10.3390/su14073844

• Pinho, M., & Gomes, S. (2024). Generation Z as a critical question mark for sustainable tourism–An exploratory study in Portugal. *Journal of Tourism Futures, 10*(3), 486-503. https://doi.org/10.1108/JTF-07-2022-0171

• Pranita, D., Sarjana, S., Musthofa, B. M., Kusumastuti, H., & Rasul, M. S. (2023). Blockchain technology to enhance integrated blue economy: A case study in strengthening sustainable tourism on smart islands. *Sustainability, 15*(6), Article 5342. https://doi.org/10.3390/su15065342

• Que, T., Wu, Y., Hu, S., Cai, J., Jiang, N., & Xing, H. (2022). Factors influencing public participation in community disaster mitigation activities: A comparison of model and non-model disaster mitigation communities. *International Journal of Environmental Research and Public Health, 19*(19), Article 12278. https://doi.org/10.3390/ijerph191912278

• Rahmadian, E., Feitosa, D., & Zwitter, A. (2022). A systematic literature review on the use of big data for sustainable tourism. *Current Issues in Tourism, 25*(11), 1711-1730. https://doi.org/10.1080/13683500.2021.1974358

• Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.

• Saputra, K. A. K., & Paranoan, S. (2024). Do cyber security, digitalisation and data visualisation affect the quality of internal environmental audits? Australasian Accounting. *Business and Finance Journal, 18*(2), 158–174. https://doi.org/10.14453/aabfj.v18i2.10

• Saputra, K. A. K., Dewi, A. A., Laksmi, P. A. S., & Dharmawan, N. A. S. (2025). The role of environmental accounting education and renewable energy adoption in advancing sustainable business practices. *Journal Ilmiah Akuntansi Dan Bisnis, 20*(1), 18-35. https://doi.org/10.24843/JIAB.2025.v20.i01.p02

• Scott, D. (2021). Sustainable tourism and the grand challenge of climate change. *Sustainability, 13*(4), Article 1966. https://doi.org/10.3390/su13041966

• Shaw, N., Eschenbrenner, B., & Brand, B. M. (2022). Towards a mobile app diffusion of innovations model: A multinational study of mobile wallet adoption. *Journal of Retailing and Consumer Services, 64*, Article 102768. https://doi.org/10.1016/j.jretconser.2021.102768

• Suanpang, P., Niamsorn, C., Pothipassa, P., Chunhapataragul, T., Netwong, T., & Jermsittiparsert, K. (2022). Extensible metaverse implication for a smart tourism city. *Sustainability, 14*(21), Article 14027. https://doi.org/10.3390/su142114027

• Surya, B., Hernita, H., Salim, A., Suriani, S., Perwira, I., Yulia, Y., Ruslan, M., & Yunus, K. (2022). Travel-business stagnation and SME business turbulence in the tourism sector in the era of the COVID-19 pandemic. *Sustainability, 14*(4), Article 2380. https://doi.org/10.3390/su14042380

• Tahmasb-Pour, A., Farhangi, A. A., Naami, A. Z., & Asayesh, F. (2022). Investigating digital marketing components from the perspective of

tourism industry development (Case study: Hotels in Kish Island). *Strategic Management Researches, 28*(86), 131-156.

• Talwar, S., Kaur, P., Nunkoo, R., & Dhir, A. (2023). Digitalization and sustainability: Virtual reality tourism in a post pandemic world. *Journal of Sustainable Tourism, 31*(11), 2564-2591. https://doi.org/10.1080/09669582.2022.2029870

• Wagenseil, U., Wyss, M., & Huck, L. (2024). The case of sustainable tourism development in alpine destinations: Importance, implementation, and the role of the local DMO. *Tourism Planning and Development, 21*(6), 659-681. https://doi.org/10.1080/21568316.2022.2107561

• Zhou, Y., Chen, L., Zhou, X., & Hu, S. (2024). Key factors and path selection for enterprise digital transformation: Configuration analysis based on fsQCA. *Frontiers in Sustainability, 5*, Article 1366129. https://doi.org/10.3389/frsus.2024.1366129

COPYRIGHTS

Copyright for this article is retained by the authors with publication rights granted to Tourism of Culture journal. This is an open access article disributed under the terms and conditions of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/).

HOW TO CITE THIS ARTICLE

Isavi, H., Esmaeilzadeh, N., Seyed Khorasani, M., Ghasemi, M., & Valizadeh, K. (2026). Identifying Key Drivers of Digital Tourism Development in West Azerbaijan Province: A Future Research Approach .*Tourism of Culture*, *7*(26), 24-41.

DOI: 10.22034/TOC.2026.590490.1237
URL: https://www.toc-sj.com/article_254500.html?lang=en