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Extending the Ansoff Matrix to Metaverse Tourism: An Artificial Intelligence-Assisted Conceptual Framework for Digital Growth Strategies

Övgü Açıksözlü[1], Merve Aycan Ünal[2]*

[1]Yalova University, Yalova, Turkiye, [2]Istanbul Arel University, Istanbul, Turkiye. *Email: merveaycan@arel.edu.tr

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ABSTRACT

This study develops a strategic framework for examining how metaverse-related technologies may support tourism growth across the four domains of the Ansoff Matrix: Market penetration, product development, market development, and diversification. The research adopts an exploratory conceptual design that combines the Ansoff Matrix with AI-assisted scenario ideation and a narrative, literature-supported plausibility assessment. Ten structured prompts were used to generate candidate scenarios. The outputs were treated as an ideation aid rather than as interviews, expert testimony, or empirical observations. Candidate scenarios were retained only when they were conceptually consistent with the Ansoff categories and supported by relevant academic literature or documented tourism practices. The synthesis identifies five cross-cutting opportunity areas: Hyper-personalised and sensory-responsive experiences; multisensory services and digital twins; accessibility and social inclusion; blockchain-enabled participatory experience economies; and hybrid, sustainability-oriented tourism. The framework positions these opportunities as conditional growth options while highlighting uncertainty, infrastructure constraints, privacy risks, accessibility gaps, and the need for empirical validation. The study extends a classic strategic-growth model to metaverse tourism and offers a structured agenda for destination management organisations, tourism firms, and future research. It does not claim to predict adoption outcomes; instead, it provides a transparent framework for organising and testing alternative strategic pathways.

Keywords: Metaverse Tourism, Ansoff Matrix, Strategic Growth, Scenario Development, Digital Transformation, Artificial Intelligence
JEL Classifications: L83, M21, L25, O32, O33, Z31

1. INTRODUCTİON

Metaverse-related technologies - including virtual and augmented reality, digital twins, artificial intelligence, blockchain, and persistent virtual environments - are expanding the range of experiences that tourism organisations can design, communicate, and commercialise. Their relevance extends beyond fully virtual travel and may include destination preview, interpretation, accessibility, service personalisation, staff training, hybrid events, and post-visit engagement. However, many proposed applications remain experimental, and the strategic conditions under which they create value are not yet clearly organised in the tourism literature.

Existing studies discuss metaverse tourism primarily through technological features, customer experience, sustainability, or future research agendas. Less attention has been paid to how tourism organisations can classify metaverse initiatives according to the relationship between products and markets. Addressing this gap, the present study applies the Ansoff Matrix to metaverse tourism and asks: (1) How can metaverse-related initiatives deepen value in existing tourism markets; (2) how can they support new tourism products or services; (3) how can they extend existing offerings to new user groups and geographic markets; and (4) what forms of diversification may arise when both products and markets are new? The study combines conceptual analysis, AI-assisted scenario ideation, and a literature-supported plausibility

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assessment to develop a conditional strategic framework rather than a deterministic forecast.

2. CONCEPTUAL FRAMEWORK

2.1. The Relationship between the Metaverse and Tourism

2.1.1. Metaverse

The metaverse is commonly understood as a network of immersive and persistent digital environments in which users interact through avatars and in which physical and virtual experiences may converge. It is enabled by a combination of virtual and augmented reality, digital twins, artificial intelligence, cloud and edge computing, the Internet of Things, and, in some applications, blockchain-based infrastructures (Dionisio et al., 2013; Lee et al., 2021; Gursoy et al., 2022). These technologies should not be treated as a single mature system: Their technical readiness, interoperability, accessibility, governance requirements, and commercial value differ substantially across applications.

2.1.2. The relationship between the metaverse and tourism

In tourism, metaverse-related technologies may extend the customer journey before, during, and after travel. Virtual previews and digital twins may support information search and expectation formation; augmented and mixed reality may enrich interpretation at destinations; avatar-based services may enable remote assistance and social interaction; and persistent virtual environments may support hybrid events and post-visit engagement (Buhalis and Karatay, 2022; Buhalis et al., 2023a; Ioannidis and Kontis, 2023). Stakeholder research also identifies barriers such as cost, limited user readiness, privacy and safety concerns, platform dependency, and uncertainty about whether virtual experiences complement or substitute physical travel (Chen et al., 2023; Monaco and Sacchi, 2023).

2.1.3. Strategic opportunities and risks of metaverse applications in tourism

The literature suggests several opportunity areas, but the evidence remains uneven and context-dependent. The following categories summarise the applications most relevant to strategic product-market decisions:

- Pre-trip decision support: Virtual previews, digital twins, and immersive demonstrations may reduce information asymmetry and help prospective visitors compare destinations and services before purchase (Buhalis et al., 2023a; Ioannidis and Kontis, 2023)
- Experience and interpretation: Augmented, mixed, and virtual reality may enrich cultural-heritage interpretation, destination storytelling, and multisensory service design, although accuracy and accessibility require testing (Bekele et al., 2018; Buhalis and Karatay, 2022; Prodinger and Neuhofer, 2022)
- Accessibility and inclusion: Remote and adaptive experiences may extend participation to people facing mobility, health, financial, or geographic barriers, but inclusive design should be developed with intended users rather than assumed (Buhalis et al., 2023b; Rubio-Escuderos et al., 2024)
- Marketing and relationship development: İmmersive environments may create additional brand touchpoints, social participation, customer-service interactions, and post-visit engagement; novelty alone, however, does not demonstrate loyalty or commercial value (Barrera and Shah, 2023; Tsai, 2024)
- Service and operational innovation: Avatar-based guidance, virtual concierge functions, staff training, hybrid meetings, and digital-twin simulations may extend existing tourism services and organisational capabilities (Buhalis et al., 2023; Gursoy et al., 2022)
- Visitor management and sustainability: Virtual previews and hybrid participation may support interpretation, crowd management, or alternatives for selected activities, but net environmental benefits should not be assumed without lifecycle and behavioural evidence (Go and Kang, 2023; Zhao and You, 2023)
- Tokenised and participatory experience economies: Blockchain-based tickets, digital collectables, loyalty assets, and access rights may enable new forms of participation, subject to consumer protection, cybersecurity, regulation, interoperability, and environmental costs (Belk et al., 2022; Folgieri et al., 2025)
- New product-market combinations: Fictional destinations, native virtual events, and tourism-gaming-education hybrids may create diversification opportunities, but demand, willingness to pay, and long-term platform viability remain uncertain (Ioannidis and Kontis, 2023; Yang and Wang, 2025).

These opportunities should be evaluated alongside technological cost, digital inequality, privacy and safety risks, interoperability, intellectual-property concerns, platform dependency, and the environmental footprint of digital infrastructure. A balanced strategic framework is therefore needed to distinguish plausible applications from promotional claims.

Accordingly, this study evaluates metaverse tourism through the four Ansoff growth options and develops a set of literature-supported strategic scenarios. The purpose is not to predict that specific technologies will necessarily be adopted, but to provide a structured basis for managerial evaluation and future empirical research.

2.2. Ansoff Matrix: Strategic Growth Tool

2.2.1. Ansoff matrix

The Ansoff Matrix classifies growth options according to whether a firm addresses existing or new products and existing or new markets. The four resulting strategies are market penetration, market development, product development, and diversification (Ansoff, 1957). The model is parsimonious rather than comprehensive, but it provides a useful structure for comparing the relative novelty and uncertainty of alternative growth initiatives.

Table 1 presents the original Ansoff product–market matrix, illustrating four growth strategies based on existing and new products and markets. Table 2 extends this framework to metaverse tourism by presenting corresponding strategies and practical applications.

2.2.1.1. Market penetration
Market penetration seeks growth by increasing the use, frequency, engagement, or share of existing products within existing markets. In tourism, this may include improving current services, strengthening customer relationships, or creating additional touchpoints for established visitor segments.

2.2.1.2. Market development
Market development takes existing products or services to new geographic areas or customer segments. The strategic task is to adapt communication, distribution, accessibility, or delivery mechanisms without fundamentally redefining the core offer.

2.2.1.3. Product development
Product development introduces new or substantially modified products and services to existing markets. This strategy builds on knowledge of current customers while increasing technological, organisational, and service-design requirements.

2.2.1.4. Diversification
Diversification combines new products with new markets and generally involves the highest uncertainty. It may create new revenue models and experience categories, but it also requires capabilities, partnerships, governance arrangements, and demand evidence that may not exist within the organisation's current business model.

2.2.2. Application of the Ansoff matrix to metaverse tourism
The Ansoff Matrix provides a parsimonious way to classify metaverse initiatives according to whether the tourism product and the target market are existing or new. In this study, the matrix is not presented as a forecasting model. It is used as an organising framework that distinguishes incremental digital extensions from more uncertain forms of product-market diversification.

2.2.2.1. Market penetration in metaverse tourism
Market-penetration initiatives use metaverse-related tools to deepen value for existing customers without fundamentally changing the core tourism product. Examples include virtual previews, loyalty-oriented digital events, remote customer-service touchpoints, and post-visit engagement. Their value should be evaluated through measurable improvements in information quality, conversion, satisfaction, retention, or service efficiency.

2.2.2.2. Market development in metaverse tourism
Market-development initiatives use existing tourism offers to reach new geographic audiences or user groups. Mobile-accessible formats, remote participation, multilingual interfaces, and accessible virtual experiences may reduce some barriers, but affordability, connectivity, digital literacy, and inclusive design remain central constraints.

2.2.2.3. Product development in metaverse tourism
Product-development initiatives add new digital or hybrid services for existing tourism markets. Digital-twin previews, avatar- or AI-supported guidance, multisensory interpretation, and hybrid customer journeys may extend established offers, provided that the digital representation is accurate and aligned with the service ultimately delivered.

2.2.2.4. Diversification in metaverse tourism
Diversification involves new products for new markets, including fully virtual or fictional destinations, native virtual events, tourism-gaming hybrids, and blockchain-enabled digital assets. These options may create new experience economies, but they involve substantial uncertainty regarding demand, regulation, platform dependency, consumer protection, and long-term commercial viability.

Table 2 presents the adaptation of Ansoff's four product–market growth strategies to metaverse tourism, illustrating their potential applications through tourism-specific examples.

Table 1: Product/Market strategy

Markets	Existing products	New products
Existing markets	Market penetration	Product development
New markets	Market development	Diversification

Adapted from Ansoff (1957)

3. METHODS

3.1. Research Design
This study uses an exploratory conceptual design. The analytical framework combines the product-market logic of the Ansoff Matrix with a futures-oriented scenario-development process informed by horizon-scanning principles, including attention to emerging developments, weak signals, opportunities, and uncertainties in rapidly changing sociotechnical environments (Sutherland and Woodroof, 2009; Voros, 2003). The approach is used to organise plausible strategic options; it does not estimate probabilities, causal effects, market demand, or adoption rates.

3.2. AI-Assisted Scenario Ideation
On June 25, 2025, a generative AI system accessed through ChatGPT was used as an ideation tool. Ten structured prompts,

Table 2: Product/Market strategy for the tourism sector in the metaverse

Markets	Existing products	New products
Existing markets	Market penetration in metaverse tourism • Virtual previews and tours for existing customers • Loyalty-oriented virtual events • Virtual service and support touchpoints.	Product development in metaverse tourism • Digital-twin hotel or destination previews • Avatar or AI-supported guidance • Multisensory and hybrid service extensions.
New markets	Market development in metaverse tourism • New geographic audiences • Accessible experiences for mobility-constrained users • Low-bandwidth or mobile entry formats.	Diversification in metaverse tourism • Fully virtual or fictional destinations • Native virtual events and experience economies • Blockchain-enabled digital tourism assets.

The table applies the Ansoff product-market framework to metaverse tourism

reproduced as strategic questions in Table 3, covered the four Ansoff domains. The outputs were condensed into candidate technology and user scenarios. The system was not treated as a participant, interviewer, expert, or independent source of evidence. AI-generated statements were therefore regarded as provisional propositions requiring human interpretation, conceptual classification, and external support.

3.3. Literature-Supported Plausibility Assessment

Candidate scenarios were assessed against relevant peer-reviewed literature in tourism, hospitality, information systems, and human-computer interaction, together with selected documented industry applications. Sources were identified iteratively through combinations of terms such as metaverse tourism, virtual tourism, digital twins, virtual reality tourism, blockchain tourism, accessible virtual tourism, and Ansoff Matrix. Priority was given to peer-reviewed studies and primary documentation of applications. This stage was a narrative plausibility assessment rather than a systematic review, formal triangulation, or empirical validation. A scenario was retained when it (1) fit the relevant Ansoff category, (2) was supported by credible evidence of a related technology, mechanism, application, or tourism implication, and (3) had a clear strategic relevance for tourism organisations. Unsupported or excessively speculative claims were excluded or rewritten in conditional language.

3.4. Thematic Synthesis and Quality Safeguards

The retained scenarios were reviewed manually, coded deductively according to the four Ansoff categories, and then clustered interpretively into five cross-cutting themes by comparing recurring mechanisms, opportunities, and governance requirements. Because the exercise was conceptual and did not analyse participant-derived qualitative data, no intercoder-reliability statistic was calculated. The analysis distinguishes between observed applications, literature-based mechanisms, and forward-looking possibilities.

Table 3: AI-assisted conceptual scenarios and illustrative evidence base

No.	Ansoff domain	Strategic question	Conditional scenario	Illustrative evidence base
1	Existing product=existing market (Market penetration)	How might metaverse tools increase value for current digital tourist profiles?	Personalised tour flows, avatar-based social participation, and virtual customer-service touchpoints could deepen engagement among existing users.	Barrera and Shah (2023); Buhalis et al. (2023); Tsai (2024)
2	Existing product=existing market (Market penetration)	Which personalisation practices could be extended within existing virtual tourism offers?	Behaviour-based recommendations and optional environment adaptation may support relevance, provided that consent, privacy, and bias are actively managed.	Gursoy et al. (2022); Buhalis et al. (2023)
3	New product=existing market (Product development)	Which new metaverse-supported services could be offered to current tourism markets?	Digital-twin concierge functions, virtual previews, and multisensory service extensions could complement existing hotel and destination products.	Buhalis and Karatay (2022); Prodinger and Neuhofer (2022); Monaco and Sacchi (2023)
4	New product=existing market (Product development)	How might AI-guided or avatar-led tours develop?	Multilingual guide avatars and context-sensitive interpretation could extend current visitor services, although accuracy, disclosure, accessibility, and human oversight would be essential.	Bekele et al. (2018); Buhalis and Karatay (2022); Yang and Wang (2025)
5	Existing product=new market (Market development)	How could existing tourism offers reach users in new geographic or resource-constrained markets?	Mobile-accessible, lower-bandwidth, and modular virtual experiences may extend destination access, but infrastructure and affordability remain limiting conditions.	Suanpang et al. (2022); Go and Kang (2023)
6	Existing product=new market (Market development)	How might virtual tourism serve older adults, people with disabilities, or travel-restricted users?	Accessible interfaces and remote participation could reduce some physical barriers and support social participation, while inclusive design must be tested with the intended users.	Rubio-Escuderos et al. (2024); Buhalis et al. (2023b)
7	New product=new market (Diversification)	What opportunities could arise from fully virtual or fictional destinations?	Native virtual destinations and alternate-history environments could create new experience categories that combine tourism, gaming, education, and entertainment.	Gursoy et al. (2022); Ioannidis and Kontis (2023); Yang and Wang (2025)
8	New product=new market (Diversification)	How might multisensory experiences that are not tied to physical locations evolve?	Haptic, auditory, visual, and scent-enabled environments may support new experience formats, but technical feasibility and user acceptance require empirical testing.	Prodinger and Neuhofer (2022); Buhalis and Karatay (2022)
9	New product=new market (Diversification)	Which opportunities and risks accompany blockchain- or NFT-based tourism products?	Digital tickets, collectables, access rights, and loyalty assets could support participatory experience economies, subject to regulation, usability, security, environmental impact, and consumer protection.	Belk et al. (2022); Folgieri et al. (2025)
10	Cross-domain/ hybrid model	How could physical and virtual tourism interact over time?	Hybrid packages may combine virtual previews, physical visits, and post-trip engagement. Substitution effects and environmental benefits should not be assumed without lifecycle and behavioural evidence.	Buhalis et al. (2023a); Go and Kang (2023); Zhao and You (2023)

The scenarios are conditional and illustrative; the evidence base does not constitute empirical validation

Table 4: Cross-cutting themes, strategic possibilities, and governance priorities

Theme	Strategic possibility	Governance and implementation priorities
1. Hyper- personalisation and biometric feedback	Tourism environments may adapt to user preferences, attention, or optional biometric signals.	Use explicit consent, data minimisation, explainable personalisation, bias testing, and GDPR/KVKK-compliant governance; provide a non-biometric alternative.
2. Multisensory experiences and digital-twin services	Digital twins and multisensory cues may support destination preview, service design, interpretation, and hybrid customer journeys.	Test sensory accuracy and accessibility; avoid misleading representations; align digital previews with the service actually delivered.
3. Accessibility and social inclusion	Remote and adaptive experiences may extend participation to users facing mobility, financial, health, or geographic constraints.	Co-design with intended users; comply with accessibility standards; evaluate affordability, device requirements, digital literacy, and potential exclusion.
4. Blockchain and participatory experience economies	Digital ownership and tokenised access may support tickets, collectables, loyalty assets, and co-created events.	Assess consumer protection, cybersecurity, intellectual property, financial regulation, interoperability, environmental costs, and long-term platform dependency.
5. Hybrid and sustainability-oriented tourism	Virtual previews and hybrid participation may complement physical travel and support visitor management.	Avoid assuming net carbon benefits; conduct lifecycle assessment, monitor rebound effects, and evaluate whether virtual use complements or substitutes travel.

The themes summarise strategic possibilities and associated governance priorities

To reduce overstatement, the terms may, could, and potentially are used for propositions that have not been empirically tested. The analytical prompt set, access date, and condensed outputs are reported to support transparency.

4. STRATEGIC SCENARIO SYNTHESIS

Table 3 presents ten candidate scenarios organised by the four Ansoff domains. The scenarios are not forecasts with known probabilities. They are structured possibilities generated through AI-assisted scenario ideation and refined through conceptual and literature-based assessment. The final column identifies an illustrative evidence base rather than claiming that the scenarios have been empirically validated.

The scenario set was clustered into five cross-cutting themes shown in Table 4. These themes summarise recurring strategic possibilities and associated governance requirements. They should be interpreted as a decision-support map: Each recommendation requires context-specific feasibility assessment, user research, legal review, and empirical testing before implementation.

5. DISCUSSION

The principal theoretical contribution of this study is the extension of Ansoff's product-market logic to metaverse tourism. Existing metaverse-tourism research has offered taxonomies, experience frameworks, sustainability perspectives, and future research agendas. The present framework adds a strategic distinction between initiatives that deepen existing markets, extend existing products, reach new markets, and create new product-market combinations. This distinction prevents all digital initiatives from being treated as equivalent innovations and makes the level of strategic uncertainty more visible. Market-penetration options generally build on known users and services, whereas diversification options involve greater uncertainty because both the product and the market are new. The five cross-cutting themes also demonstrate that the same technological capability may support different growth strategies depending on the target customer, value proposition, and implementation context.

5.1. Managerial Implications

For destination management organisations and tourism businesses, the framework can be used as a portfolio-screening tool. Managers should first identify whether an initiative serves an existing or new market and whether it modifies an existing product or creates a genuinely new one. They should then evaluate strategic fit, user value, accessibility, technical readiness, platform dependency, legal exposure, data governance, financial viability, and measurable success criteria. Incremental options such as virtual previews may be tested through limited pilots. Higher-risk diversification options, including fully virtual destinations or tokenised experience economies, require staged experimentation, clear exit criteria, and stronger governance. The framework also cautions against using novelty, immersion, or technological sophistication as substitutes for evidence of customer value.

5.2. Limitations and Future Research

This study has several limitations. First, the AI-assisted scenarios are model-generated propositions rather than expert judgements, participant accounts, or market evidence. Generative AI outputs may reproduce training-data biases, fabricate details, and vary across systems, prompts, and dates. Second, the supporting evidence was assessed narratively and does not constitute a systematic review or formal validation. Third, the Ansoff Matrix simplifies strategic decisions into product and market categories and does not directly account for institutional conditions, platform ecosystems, organisational capabilities, or implementation costs. Fourth, the study does not measure tourist acceptance, willingness to pay, accessibility outcomes, environmental effects, or business performance. Future research should test the framework through Delphi panels, interviews with tourism and technology professionals, consumer experiments, comparative case studies, lifecycle assessment, and longitudinal analysis of implemented projects. Studies should also examine when virtual experiences complement physical travel, when they substitute for it, and for whom they may create new forms of exclusion.

6. CONCLUSION

This study proposes a strategic framework for organising metaverse-tourism opportunities through the Ansoff Matrix. AI-

assisted scenario ideation and literature-supported conceptual assessment produced ten conditional scenarios and five cross-cutting themes: Hyper-personalisation, multisensory and digital-twin services, accessibility and inclusion, blockchain-enabled participation, and hybrid sustainability-oriented tourism. The framework suggests that metaverse technologies may support both incremental service extensions and more radical product-market diversification. These possibilities should not be interpreted as predictions or demonstrated outcomes. Their value depends on user needs, technical feasibility, accessibility, organisational capability, regulation, data governance, and credible evidence of economic, social, and environmental effects. By separating opportunity identification from empirical validation, the framework offers tourism organisations a disciplined basis for pilot design and provides researchers with testable questions about adoption, value creation, inclusion, sustainability, and risk.

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