

Blockchain and Metaverse Technologies in Tourism Destination Management: Their Impact on Tourism Marketing Mix and Consumer Behavior

Stelios Ioannidis  

Type: Doctoral dissertation summary

Supervisor: Dr. Alexios-Patapios Kontis

Institution awarding the Ph. D. Degree: University of the Aegean, Greece

Date of defence: 20th of May 2026

Citation: Ioannidis, S. (2026). Blockchain and Metaverse Technologies in Tourism Destination Management: Their Impact on Tourism Marketing Mix and Consumer Behavior. Doctoral dissertation summary. *ROBONOMICS: The Journal of the Automated Economy*, 7, 102

¹ Department of Tourism Economics & Management, School of Business, University of the Aegean, Greece;

Email: sioannidis@aegean.gr

 Corresponding author

Publication history

Received: 09/06/2026; Revised: 13/06/2026; Accepted: 15/06/2026; Published online: 15/06/2026;

Volume date: 31/12/2026



© 2026 The Author(s)

This work is licensed under the Creative Commons Attribution 4.0 International (CC BY 4.0).

To view a copy of this license, visit <https://creativecommons.org/licenses/by/4.0/>

Goal and Objectives

Disruptive technologies are transforming the ways in which tourism destinations are experienced, managed, and marketed. However, their adoption within destination marketing and management remains at an early stage. Blockchain technology and the metaverse have emerged as two of the most promising of these technologies (Dwivedi et al., 2023). Nevertheless, the theoretical and empirical knowledge required for their effective integration into the tourism industry remains underdeveloped. To this end, the dissertation examines how blockchain applications and the metaverse can contribute to the management and marketing of tourism destinations, while assessing their influence on the tourist decision-making process. To address this goal, six research questions are developed, as follows:

- R₁: What new potential emerges from the integration of blockchain technologies into the management of tourism destinations?
- R₂: What new potential emerges from the integration of the metaverse into the management of tourism destinations?
- R₃: What are the adoption drivers of blockchain and metaverse from the tourism supply side?
- R₄: How does the integration of blockchain and the metaverse shape the marketing mix of tourism destinations and enterprises?
- R₅: How does the adoption of blockchain and the metaverse affect the formation of users' image of the physical destination?
- R₆: How does the adoption of the metaverse (supported by blockchain) affect users' intention to physically visit the destination?

Methodology

Given the infant state of these technologies in tourism (Buhalis et al., 2023; Dwivedi et al., 2022) and the scarce prior literature, the study adopted an exploratory design within the critical-realism paradigm, which allowed a well-established concept for tourism destinations (the 8Ps marketing mix model of A. Morrison) to be re-evaluated in the new environment of virtual worlds (tourism destinations in the metaverse with integration of blockchain applications). Methodologically, the dissertation consisted of two stages, a systematic review and analysis of the literature on disruptive technologies and sequential mixed-method research, consisting of qualitative and quantitative empirical parts.

The first stage consisted of a systematic literature review and meta-analysis employing the PRISMA methodology, to map the characteristics of blockchain and the metaverse and their adoption factors. Scholarly literature, along with grey literature and web search, were used as sources of information. The use of grey literature and web search was deemed appropriate for this subject, given the scarcity of case studies in the academic literature related to the metaverse and blockchain in tourism. Indeed, the use of other sources than academic databases tremendously enriched the collected data. In addition, the evolution of the metaverse was examined in detail and its trajectory was categorized into 4 distinct eras, named "The 4 Epochs of the Metaverse". In the second stage, the concept of marketing mix was examined within the metaverse and proposals for its optimal use were collected from 14 experts on disruptive technologies. For this qualitative part experts were selected through purposive sampling, and a wide range of professions was represented, which allowed the concept of marketing mix to be tested from many different angles, adding to the richness of the collected data. Qualitative research with pluralism in experts' professions was a stated limitation in previous studies. All the interviews were conducted online with open cameras, so that the researcher could maintain visual contact with the interviewees and their environment during the entire process. The average interview lasted 44.3 minutes, with the shortest and the longest interviews lasting 28 and 84 minutes respectively. The panel of experts was international, and all the interviews were recorded upon participants' written consent, and transcribed and coded using the NVivo software.

For the quantitative part, a closed-ended questionnaire with statements in a 1-5 Likert scale was distributed to a global sample of 412 metaverse and blockchain app users. Stratified sampling was applied with 6 continents as strata, according to the U.N. classification for internet use. The lack of official and reliable data on metaverse/blockchain users led to the use of internet users per stratum as a proxy for geographic stratification. The data were analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM), chosen for the model's complexity (inclusion of reflective, formative and composite constructs together with mediation and moderation effects). The analysis was conducted with the SmartPLS software (v.4.1.1.4).

Results

Addressing RQ₁ and RQ₂, the analysis of early adopters' cases shows that within tourism management blockchain contributes mainly through smart contracts and Non-Fungible Tokens (NFTs). These applications reinforce trust and transparency in bookings, loyalty schemes, tourist identification and B2B partnerships. The main reason for this contribution is the bridge that those applications build between the virtual and the real world. Other blockchain applications, such as Decentralised Autonomous Organisations (DAOs) or cryptocurrencies remain almost absent from the tourism industry, owing to high integration costs, scarce specialized expertise, lack of legal framework and negative image that most providers and tourists have about crypto-economy, considering it as a highly risk-inclined environment. On the other hand, the metaverse can potentially enrich every stage of the travel cycle, from pre-trip destination selection through digital twins, to on-site augmentation of experiences and post-trip capability of sharing experiences. For RQ₃, the systematic review identified 33 early-adoption cases with 21 distinct adoption drivers on the supply side. Promotion (78.7%), enhancement of the customer experience (66.6%), creation of new revenue streams (57.6%), community building (51.5%) and brand engagement (51.5%) scored as the most important ones.

Responding to RQ₄, the qualitative findings confirmed that the 8 elements of the marketing mix (Product, Price, Place, Promotion, People, Programming, Packaging and Partnerships) remain functionally adequate for metaverse destinations, provided that each one is conceptually redefined for the virtual environment. The experts further proposed two additional factors (without these being components of it) that influence the effectiveness of marketing mix within metaverse and blockchain users: the level of realism and the sense of safety. The measurement model was assessed for reliability and validity following established guidelines (Hair et al., 2019). The structural model was examined in terms of hypotheses testing, effect sizes and explanatory power. Finally, predictive power and relevance tests confirmed the model's generalizability. Immersion and Involvement exerted a positive and statistically significant effect on Destination Image formation and physical Visit Intention. Destination Image significantly predicted Visit Intention and proved to be a significant mediator of Immersion and Involvement in their effects on Visit Intention (partial mediation). The value of $R^2 = 0.746$ for Visit Intention indicates that Immersion, Involvement and Destination Image within a virtual world explain tourist behavioral intention to a high degree (RQ₆). Contrary, the same coefficient for Destination Image was 0.275, which is an acceptable for social science research (Cohen, 1992), yet, weak explanation for its formation (RQ₅).

Marketing Mix was treated as a composite variable in the proposed model consisting of 8 items based on its theoretical concept. The variable did not exert a significant effect on either Destination Image formation or physical Visit Intention (RQ₆). The two variables drawn from the experts' views (Realism and Safety) were treated as moderators on the effect of Marketing Mix on Destination Image and Visit Intention, though without significant effects. Nonetheless, the analysis of the regression slopes for the moderation effects revealed two motives: users who prefer i) realistic or hybrid representations in the metaverse, and ii) a strong link between blockchain applications and the real-world, appear to be more receptive to marketing mix actions. Conversely, users who feel less secure and safe while using disruptive technologies displayed reactance toward marketing mix stimuli (RQ₅). In essence, this means that users who feel anxious or unsafe while using such applications may take a defensive stance toward marketing messages.

Theoretical conclusions

On a theoretical basis, the dissertation enriches the scholarly literature on tourism marketing and disruptive technologies by describing the connection between five concepts that had not previously been examined together: blockchain, the metaverse, immersion, marketing mix and tourist behaviour. Through the development of an original conceptual model the research provides a starting point for future empirical research on samples with different demographic and behavioral characteristics, as well as a basis for theoretical extensions to further explore the relationship between disruptive technologies and tourism marketing. The theoretical examination and empirical validation of 8Ps model through the mixed-methods approach provides a solid foundation for tourism marketing literature in virtual worlds, beyond the physical world. Finally, the non-significant effect of Marketing Mix on Destination Image and Visit Intention, in contrast with existing literature for physical destinations, highlights the distinctive nature of digital destinations and the need for re-examination of other well-established theories and models in tourism marketing.

Practical, managerial and policy implications

The findings provide significant guidance for Destination Marketing and Management Organisations (DMMOs) and tourism businesses seeking to incorporate disruptive technologies into their operations. The proposed framework can serve as a tool for strategic planning to bridge physical and digital tourism. The dissertation shows that marketing cannot be applied uniformly to all users, same as in the real-world: it calls for a targeted segmentation strategy that takes into account different preferences of realism. Marketing actions exert a different effect on users who favor realistic representations and real-world connection for the applications they use than users who prefer a hybrid approach or a fully imaginary one. Destinations that adapt their marketing mix to these characteristics can improve their image and, in turn, strengthen visit intention.

The results also highlight the value of a safe navigation or browsing environment as a precondition for the effective implementation of marketing mix. Strengthening user safety includes mechanisms for monitoring and reporting abusive behaviors, a clear regulatory framework and tools that protect users against different types of fraud. Furthermore, the research reveals that promotion, enhancement of guest experience and possibility of new revenue streams, among other factors, are driving the tourism industry toward the adoption of disruptive technologies as a new value proposition.

Finally, the dissertation made it obvious that users tend to engage with these technologies, especially with metaverse platforms, primarily as a means of entertainment or escapism rather than as a tool for practical connection with the real-world, which was the original purpose for their creation. Strengthening the links between virtual and physical environments for the metaverse, and tokens and NFTs usage with real-world benefits, could evolve disruptive technologies into valuable tools for travel-related decisions.

Content of the dissertation

Abstract of Chapter 1: Introduction

The chapter introduces the object of the research, the goal and objectives, the six research questions, the necessity and timeliness of the study, and the researcher's approach. The overall structure of the dissertation is described analytically.

Abstract of Chapter 2: Literature Review, Technologies

The chapter presents the literature review of blockchain, the metaverse, and their supporting technologies. It defines blockchain and the metaverse along with their underlying technologies (virtual, augmented, mixed reality, digital twins, mirror worlds, avatars, smart contracts, DAOs, NFTs and artificial intelligence). It traces the historical evolution of the metaverse and proposes the framework of the "4 Epochs of the Metaverse".

Through the systematic review and meta-analysis, the first metaverse tourism cases and their adoption motives are presented and analysed. The characteristics of blockchain applications in tourism, funding opportunities through blockchain networks and adoption barriers are also discussed in this chapter. Through the PRISMA systematic review and meta-analysis, Chapter 2 successfully addresses the research questions RQ₁–RQ₃.

Abstract of Chapter 3: Literature Review, The Conceptual Model

The chapter reviews the literature related to the variables of the conceptual model. It analyses the concept and evolution of the marketing mix and the eight elements of the 8Ps model. The presentation of the tourism “Product”, the “Pricing” Policy, the “Distribution” channels, the “Promotion” strategy, the “People” who interact with tourists, the “Packaging” and “Programming” strategy, and, finally, the “Partnerships” of a destination justify the selection of this variable through which the dissertation examines the marketing and management environment. In Chapter 3 other concepts that play a role in user navigation are also presented, such as Involvement and Immersion. In parallel, the roles of Destination Image formation and Visit Intention are also analysed and justified for their inclusion in the proposed conceptual model. The relationships among these variables were documented and transformed into research hypotheses, building the original conceptual model that forms the core object of the study. By synthesizing between the systematic literature review and the findings of the qualitative research, the conceptual model was finalized with the inclusion of two additional variables, “Mirror of Realism” and “Sense of Safety”, while Marketing Mix was included as a composite variable with 8 items, without any modifications.

Abstract of Chapter 4: Methodology

The chapter explains the research philosophy and the five principal research paradigms. It states the choice of critical realism as the selected paradigm for the doctoral research. Chapter 4 describes the sequential mixed-methods approach, the sampling techniques for both the qualitative interviews and the quantitative survey, and explains the statistical techniques employed to test the hypotheses, including PLS-SEM and the treatment of mediation and moderation effects. Finally, it explains the use of Immersion, Involvement and Visit Intention as reflective variables, Destination Image as a formative variable (consisting of 13 items), Marketing Mix as a composite variable, Realism as a categorical moderator (realism/hybrid/imaginary) and Safety as a dichotomous moderator (feel Safe/Unsafe).

Abstract of Chapter 5: Findings

The chapter reports the findings of the qualitative and the quantitative parts. It presents the profile of the expert panel and the content analysis of the collected data, the resulting reformulation of the eight marketing-mix elements and the emergence of the two new variables. Regarding the quantitative part, Chapter 5 describes the profile of the survey sample, and the full results of the measurement and structural models, the predictive-ability tests, the testing of the developed hypotheses and the analysis of mediation and moderation effects.

Abstract of Chapter 6: Conclusion & Discussion

The chapter summarises all the parts of the dissertation content. It synthesizes the literature review with the qualitative findings to answer RQ₁ to RQ₄. It also draws the quantitative conclusions to answer RQ₅ and RQ₆. The theoretical and practical contribution of the dissertation are also discussed in this chapter. Following, it points out the limitations of the doctoral research and directions for future research on the integration of disruptive technologies into tourism.

References

- Buhalis, D., Leung, D., & Lin, M. (2023). Metaverse as a disruptive technology revolutionizing tourism management and marketing. *Tourism Management*, 97, 104724. <https://doi.org/10.1016/j.tourman.2023.104724>
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>
- Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., Dennehy, D., Metri, B., Buhalis, D., Cheung, C. M. K., Conboy, K., Doyle, R., Dubey, R., Dutot, V., Felix, R., Goyal, D. P., Gustafsson, A., Hinsch, C., Jebabli, I., ...

- Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 66, 102542. <https://doi.org/10.1016/j.ijinfomgt.2022.102542>
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Rana, N. P., Baabdullah, A. M., Kar, A. K., ... & Yan, M. (2023). Exploring the darkverse: A multi-perspective analysis of the negative societal impacts of the metaverse. *Information Systems Frontiers*, 25(5), 2071-2114. <https://doi.org/10.1007/s10796-023-10400-x>
- Hair, J.F., Risher, J.J., Sarstedt, M. & Ringle, C.M. (2019) When to Use and How to Report the Results of PLS-SEM. *European Business Review*, 31, 2-24. <https://doi.org/10.1108/EBR-11-2018-0203>