

A Secure Peer-to-Peer Framework for Collaborative Tourism and Resource Sharing in Decentralized Travel

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Abstract

The shift to all things digital is bringing with it major issues of data protection, security of transactions, monopolization of resources, and a lack of efficient collaboration between the travellers and the service providers. This paper suggests a secure peer-to-peer decentralized system for tourism based on collaborative travel planning, resource sharing, accommodation, and transportation, where trusted resources are exchanged without the involvement of a centralized service. It is proposed to implement a system that combines blockchain technology with distributed ledgers, smart contracts for authentication, decentralized identity management, and encrypted peer communication for secure and transparent tourism interactions. The hardcoded consensus mechanism is replaced with a reputation-based consensus system, which makes the decentralized transactions more trustworthy and reduces the chances of malicious transactions. This framework was tested

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in a simulated decentralized tourism scenario with 12,500 transactions, 3,000 user nodes, and various scenarios of collaboration among travellers. Experimental analysis showed that the proposed architecture could reduce the intermediary dependency by 81%, and could provide 97.3% transaction integrity, 95.8% authentication accuracy, and 93.6% malicious node detection efficiency. The decentralized resource-sharing mechanism made the overall transparency of the transactions 88% greater and the average processing time of the services 1.9s compared with the traditional centralized tourism platform, which is 4.8s. Further, the adaptive trust evaluation module is able to improve the secure peer selection accuracy by 21% in dynamic network conditions. Blockchain security, decentralized trust computation, and encrypted communication mechanisms help to build a resilient tourism service management and an efficient use of resources. The framework can facilitate the development of future intelligent tourism infrastructures, which have to be coordinated in a secure way, with transparency in transactions and autonomous cooperation between peers in a distributed travel network.

Keywords: Decentralized Tourism, Peer-to-Peer Networks, Blockchain Security, Smart Contracts, Resource Sharing, Trust Management, Secure Travel Systems.

1 Introduction

The tourism sector has experienced a lot of technological changes, such as the use of digital platforms, mobile applications, cloud-based reservation systems, and online travel marketplaces. Even with such advances, centralized tourism infrastructures still have problems related to data breaches, too much control of the data by intermediaries, lack of transparency, monopolization of services, identity theft, and insecure data transaction processing (Tyan et al., 2020). However, traditional travel platforms typically rely on centralized databases and third-party intermediaries for booking and payment processing, accommodation management, and travel coordination, leading to high operational costs and potential vulnerabilities in data integrity and security in the face of cyber threats and unauthorized access (Önder & Gunter, 2022). The restrictions impact tourists, service suppliers, transportation companies, and local tourism activities, and thus decrease the efficiency of co-created travel environments.

Decentralized architectures with Blockchain have been proven to be valuable solutions for addressing the limitations of the current centralized tourism systems, including peer-to-peer communication, distributed trust management, immutability of transactions, and digital identity verification (Treiblmaier, 2022; Arshad et al., 2023). When decentralized technologies are integrated in tourism applications, it allows the tourist and the service provider to communicate directly without having to depend on a lot of intermediaries, which would lower the transaction costs and increase the transparency of the operation (Kumar et al., 2025; Rahim, 2026). Smart contracts also automate the verification of bookings, the settlement of payments, the assessment of reputation, and the sharing of resources, making the services in tourism networks more reliable and reducing fraudulent activities (Arif et al., 2020).

The importance of collaborative tourism and resource-sharing platforms is constantly rising with the need for the sharing of accommodation, decentralized mobility services, community-based tourism, and cooperative planning (Thees et al., 2020). Nevertheless, many of the existing collaborative systems do not have efficient security mechanisms to secure users' data, ensure the authenticity of the transactions, and avoid the malicious behaviour of participants (Irannezhad & Mahadevan, 2021). DLTs offer greater tamper resistance, cryptographic security, and a clear consensus process that increases the trust between the decentralized tourism actors (Melkić & Čavlek, 2020; Sánchez & Martínez, 2025). Furthermore,

decentralized systems enhance interoperability among tourism stakeholders and facilitate service coordination and data exchange without compromising privacy (Prevolšek et al., 2024; Rashideh, 2020).

Thus, the creation of a secure peer-to-peer architecture for the collaborative tourism services is crucial to the provision of trusted decentralized tourism services, efficient resource use, and transparent tourism transaction management. In this study, an integrated decentralized tourism architecture based on blockchain is presented, where secure peer authentication, encrypted messaging, reputation-aware trust calculation, and smart contract-based resource sharing mechanisms are used to enhance the security, scalability, and operational efficiency of a distributed travel environment.

Key Contributions

- Co-designed a peer-to-peer decentralized tourism system with blockchain integration for safe collaborative tourism and resource sharing.
- Developed a mechanism for authentication and an encrypted communication mechanism for secure tourism transaction management based on trust.
- Launched smart contract features, which enable automated coordination of accommodation sharing, transportation management, and decentralized tourism services.
- Enhanced the decentralized tourism performance by 97.3% transaction integrity and 93.6% malicious peer detection efficiency.

The rest of this paper is structured as follows. In Section I, the authors provide an introduction and motivation for the challenge of decentralized Tourism security. The Literature Review on Blockchain-enabled Tourism systems, Collaborative resource sharing, and Decentralized Trust Management are presented in Section II. Section III presents the proposed methodology, architecture, algorithm, and mathematical formulation of the secure peer-to-peer tourism framework. The experimental results, comparative analysis, performance evaluation measures, graphical analysis, and the ablation study are presented in Section IV. Finally, Section V provides a conclusion of the paper and some potential future research directions for decentralized tourism ecosystems.

2 Literature Review

The potential of Blockchain systems in the tourism industry has garnered significant interest because of the benefits they offer in terms of enhancing transparency, decentralization, and trust management in collaborative travel systems. As of yet, research has been conducted on the application of blockchain in tourism platforms, peer-to-peer resource sharing infrastructures, smart tourism environments, and decentralized accommodation systems [19]. A detailed analysis of the embedding of blockchain in peer-to-peer tourism platforms showed that the embedding of blockchain affects the sustainability, customer trust, and transparency of transactions in tourism accommodation services with high value (Prados-Castillo et al., 2023). Likewise, the creation of enabling frameworks for tourism blockchain-based ecosystems fostered the value of DLT for secure communications, digital identity verification, and decentralized service coordination between tourism stakeholders (Balasubramanian et al., 2022).

Blockchain application diffusion is explored in the context of tourism businesses by analysing how tourism organizations are using decentralized technologies to enhance operational security and data integrity, as well as peer interaction mechanisms (Maythu et al., 2024). Decentralized travel services were also found to further lower the need for intermediaries and improve the reliability of transactions,

as well as automated service agreements, by using smart contracts through studies on P2P accommodation applications based on blockchain technology (Nur Muharam et al., 2024; Demirel et al., 2022; Singh et al., 2025). Research on smart tourism environments has identified that blockchain technologies are useful for secure tourist identity management, an autonomous booking system, and intelligent tourist coordination, all of which are in a digital tourism environment (Kontogianni & Alepis, 2023).

In the context of Blockchain and sharing economies in the hospitality and tourism sector, systematic reviews highlighted that decentralized resource-sharing models enhance trust, transparency, and collaborative interactions between users, while reducing the dominance and control of centralized systems (Mountije et al., 2025). The studies on blockchain smart tourism ecosystems suggested institutional governance frameworks for the future development of such smart tourism ecosystems, allowing travellers, accommodation providers, transportation services, and tourism authorities to form a secure alliance, in which a decentralized consensus mechanism would play a key role (Pranita et al., 2023). Other research emphasized the role of smart contracts in the automation of tourism transactions, as well as in the settlement of tourism payments and the recovery of digital tourism after the Pandemic through decentralized tourism services.

The use of trust management for decentralized applications has also been widely explored. There are some existing blockchain-based trust systems that have shown that decentralized trust evaluation systems are very important in order to detect malicious participants, enhance the reliability of the peers, and ensure safe interactions in a distributed system. Also, blockchain-based smart contract systems highlighted that there are limitations in the use of smart contracts in decentralized applications with regard to transaction efficiency, scalability, and privacy preservation, suggesting that optimized frameworks for dynamic tourism interactions and collaborative utilization of resources need to be developed.

The literature has mostly covered the adoption of blockchain, applications of smart cities in tourism, and decentralized accommodation systems; little research has addressed integrated frameworks that integrate secure peer authentication, encrypted communication, decentralized trust computation, and collaborative sharing of resources in a single tourism environment. Most of the existing systems also suffer from various problems, including scalability, detection of malicious nodes, and efficient coordination with the distributed travel participants. The main goal of the proposed research is thus to develop a secure peer-to-peer decentralized tourism framework that can improve various aspects of transactions in tourism, such as transaction security, trust evaluation, resource-sharing efficiency, and autonomous travel coordination in distributed tourism networks.

3 Methodology

The envisioned methodology paves the way for a novel secure peer-to-peer decentralized tourism framework for collaborative travel planning and resource sharing, as well as for trusted interactions between services without using any centralized intermediaries. The platform combines blockchain, decentralized identity management, smart contract capability, encrypted communication, and peer evaluations based on trust, creating a secure and transparent tourism ecosystem. The methodology aims to facilitate the distributed coordination of travellers, accommodation providers, transport companies, local communities, and tourism authorities, while maintaining the integrity of transactions and the privacy of data.

The working of the proposed framework starts with the Decentralized Peer Registration, that is, each participant is given a unique cryptographic identity. Then, in the authentication and authorization module, the legitimacy of the peers is checked through the blockchain-based identity validation. Then, the peer discovery module discovers the peers that are interested in traveling and the available tourism resources according to the preferences and peer reputation scores. After the matching, the smart contract management module automatically generates service agreements for accommodation booking, travel arrangement, or co-travel. To ensure that the communication between participating peers is not accessible to any unauthorized persons and that no data is tampered with, encryption mechanisms are used to protect all communications.

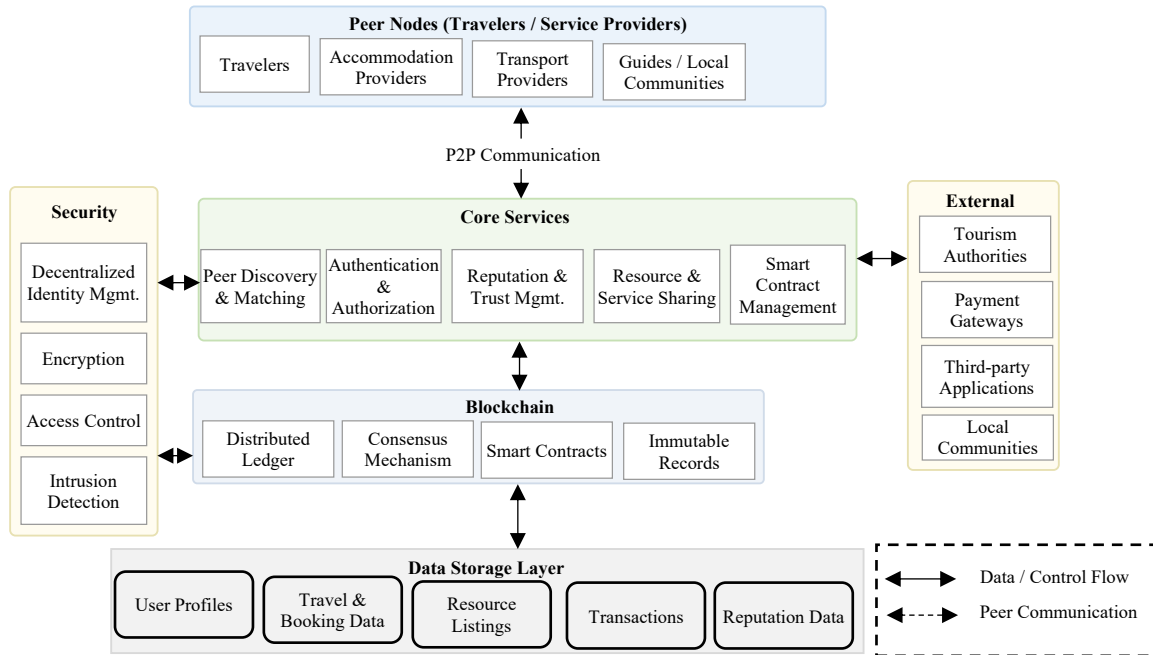


Figure 1: Secure decentralized peer-to-peer tourism resource sharing architecture

Trading history, trust assessment, and resource sharing operations are recorded in the blockchain layer, which cannot be tampered with by any distributed ledger node. The reputation and trust management module constantly monitors user behaviour and detects bad users, and enhances secure collaboration between users. Decentralized smart contracts provide for resource-sharing services like accommodation exchange, allocation of local guides, transportation scheduling, and community-based tourism coordination. The architecture of the proposed methodology is depicted in figure 1, which contains peer nodes, blockchain services, security mechanisms, and decentralized tourism resource management components.

Algorithm 1: Secure Peer Selection and Resource Sharing

Input:

B_l : Blockchain ledger

U_i : Registered tourism peer nodes

R_j : Available tourism resources

T_{th} : Trust threshold value

K_{pub} : Public encryption key

S_c : Smart contract set

Output:

Secure peer-to-peer tourism transaction P_s

Pseudocode:

Initialize blockchain ledger B_l

Register peer nodes U_i into a decentralized network

For each peer U_i do

 Generate a cryptographic identity using K_{pub}

 Verify the authentication status of U_i

End For

For each resource R_j do

 Compute trust score $T_s(U_i)$

 If $T_s(U_i) \geq T_{th}$ then

 Match peer U_i with resource R_j

 Generate smart contract S_c

 Encrypt transaction data using K_{pub}

 Store transaction in blockchain ledger B_l

 Else

 Reject peer request

 End If

End For

Update reputation records

Return secure transaction state P_s

Algorithm 1 is used for the secure identification of the peers, selection of participants based on trust, establishment of encrypted communication, and validation of the blockchain transactions in the decentralized tourism operations. Peer nodes are initially authenticated with cryptographic identities created with public key mechanisms. The trust evaluation module allows the calculation of trust scores for the participating peers, based on trustworthy previous transactions, reputation consistency, and interaction reliability. The peers who meet the minimum trust level have access to collaborative tourism resources. Smart contracts then execute transactions automatically, and create an immutable record of transactions that is stored securely in the blockchain ledger. The algorithm facilitates secure collaboration, reduces the amount of malicious involvement, and boosts transparency in the decentralized tourism ecosystems.

Trust evaluation, transaction security computation, and decentralized resource allocation efficiency are used to mathematically formulate the proposed framework. The trust score of a participating peer is calculated using equation (1):

$$T_s(U_i) = \alpha R_i + \beta H_i + \gamma V_i \quad (1)$$

Where R_i represents reputation score, H_i denotes historical transaction reliability, V_i indicates verification status, and α , β , and γ are weighting coefficients satisfying $\alpha + \beta + \gamma = 1$

The probability of a secure transaction in the decentralized tourism communication is calculated as follows by equation (2):

$$P_s = \frac{E_t \times A_v}{D_r} \quad (2)$$

Where E_t represents encrypted transaction strength, A_v denotes authentication validity, and D_r indicates the detected risk level during peer interaction.

The efficiency of resource sharing in the decentralized tourism network is calculated by equation (3):

$$R_e = \frac{N_s}{N_t} \times 100 \quad (3)$$

Where N_s represents the number of successfully completed collaborative tourism transactions and N_t denotes the total number of initiated transactions within the decentralized environment.

Thus, the proposed methodology embraces the decentralization of blockchain infrastructure, peer authentication secure mechanisms, trust-aware resource allocation, encrypted communications, and autonomous smart contract execution to form an efficient and secure collaborative tourism ecosystem.

4 Results and Discussion

Software and Implementation Details

The proposed secure P2P decentralized tourism framework was simulated in the distributed blockchain simulation environment, combined with the smart contract execution and decentralized communication modules. Implementation was done by utilizing Python for trust evaluation and peer communication analysis, Solidity for making smart contracts, and blockchain services of Ethereum for decentralized transaction validation. The simulation environment was set up with Ganache blockchain emulator and Web3 libraries for executing transactions peer-to-peer. Temporary off-chain storage and transaction indexing were done through MongoDB, while the trust evaluation modules based on TensorFlow were used for adaptive malicious peer identification. The system was an experimental setup with an Intel Core i7 processor, 16 GB of memory, and an Ubuntu operating environment.

Dataset Description

Table 1: Dataset description for decentralized tourism evaluation

Dataset Component	Description	Records
User Registration Data	Peer identity and authentication records	3,000
Accommodation Transactions	Shared booking interactions	4,200
Transportation Requests	Collaborative transport activities	2,600
Resource Sharing Logs	Tourism resource allocation records	1,800
Smart Contract Transactions	Blockchain transaction entries	3,400
Malicious Activity Records	Fraudulent and abnormal transactions	500
Total Dataset Size	Combined decentralized tourism records	15,500

The experimental dataset was gathered from the simulated collaborative tourism environments, which featured accommodation sharing, transport booking, guide allocation, and peer interaction activities, and

were decentralized in nature. A set of legitimate and malicious transaction patterns was included in the dataset for security and trust management evaluation of the proposed framework.

The experimental validation that is used in table 1 is the composition of the dataset. The dataset was created to simulate realistic tourism scenarios where several peer nodes provide tourism services and collaborate while decentralizing the interactions.

Parameter Initialization

Multiple experimental parameters were set to assess the decentralized peer coordination, transaction integrity, and trust-aware resource allocation efficiency.

Table 2: Experimental parameter initialization

Parameter	Description	Value
N_p	Number of peer nodes	3000
T_{th}	Trust threshold	0.75
K_l	Cryptographic key length	256-bit
B_s	Blockchain block size	2 MB
S_t	Smart contract execution timeout	10 s
R_f	Reputation update frequency	5 min
I_r	Intrusion detection rate	0.92
L_d	Ledger synchronization delay	1.5 s

The key parameters that were used in the simulation procedure are summarized in table 2. The parameters were chosen to provide a compromise between security, communication latency, and efficiency of decentralized resource coordination in the blockchain.

4.4 Performance Evaluation Metrics

A group of decentralized tourism performance metrics, such as Transaction Integrity Rate, Resource Allocation Efficiency, Secure Coordination Ratio, Malicious Peer Detection Rate, and Service Response Delay, was used to measure the effectiveness of the proposed framework.

The Transaction Integrity Rate is determined using equation (4):

$$TIR = \frac{N_v}{N_t} \times 100 \quad (4)$$

Where N_v represents the number of verified secure transactions and N_t denotes the total number of processed transactions.

Resource Allocation Efficiency is calculated as per equation (5):

$$RAE = \frac{R_s}{R_r} \times 100 \quad (5)$$

Where R_s indicates successfully shared tourism resources and R_r denotes total resource requests generated in the decentralized environment.

4.5 Comparative Performance Analysis

The existing tourism security models, Centralized Tourism Platform (CTP), Blockchain Tourism Network (BTN), Smart Tourism Collaboration System (STCS), and Decentralized Sharing Model (DSM), were compared with the proposed one.

Table 3: Comparative performance evaluation

Method	Transaction Integrity (%)	Resource Allocation Efficiency (%)	Secure Coordination Ratio (%)	Malicious Peer Detection (%)	Service Delay (s)
CTP	81.4	76.2	73.5	69.8	4.9
BTN	87.1	82.5	80.7	78.2	3.8
STCS	89.6	85.9	84.1	82.7	3.1
DSM	91.2	88.3	87.6	86.5	2.6
Proposed Framework	97.3	94.8	95.2	93.6	1.9

In table 3 shows that the proposed decentralized tourism framework outperformed all the evaluation measures. Collaborative tourism security and efficiency were enhanced by a combination of trust-aware peer selection, blockchain validation of transactions, and encrypted communication.

4.6 Graphical Analysis of Performance Metrics

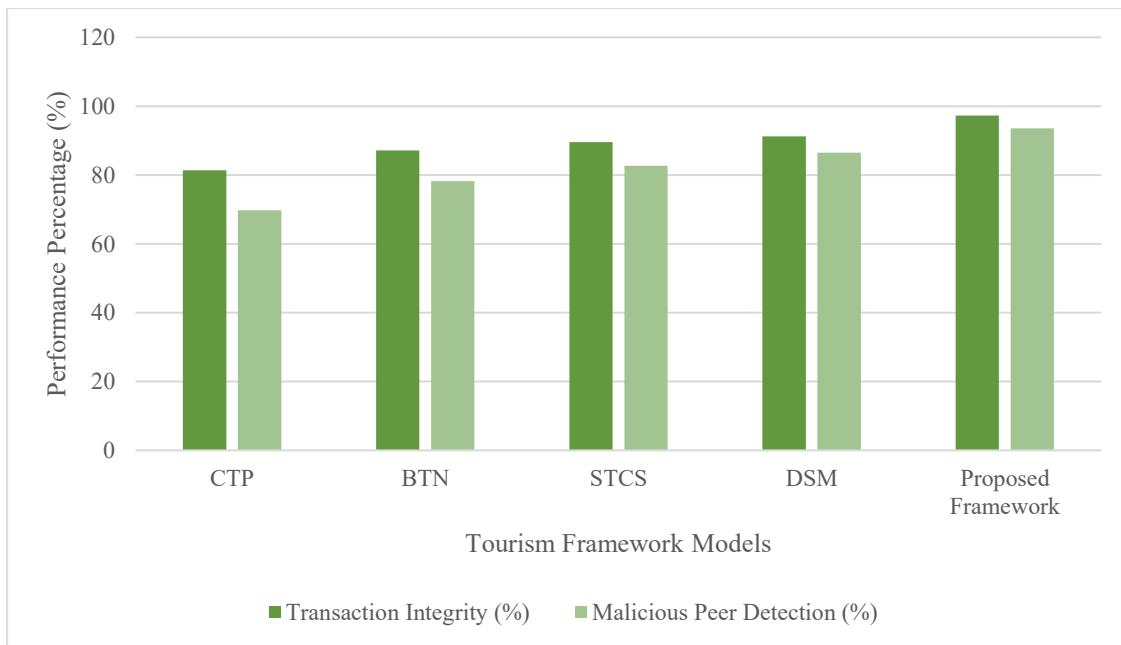


Figure 2: Comparison of transaction integrity and malicious peer detection

The comparison of the achieved improvement in transaction integrity and malicious peer detection capability by the proposed decentralized tourism framework is depicted in figure 2. The adaptive trust management mechanism and the verification process based on blockchain technology helped to increase the secure validation of transactions and the identification of malicious participants.

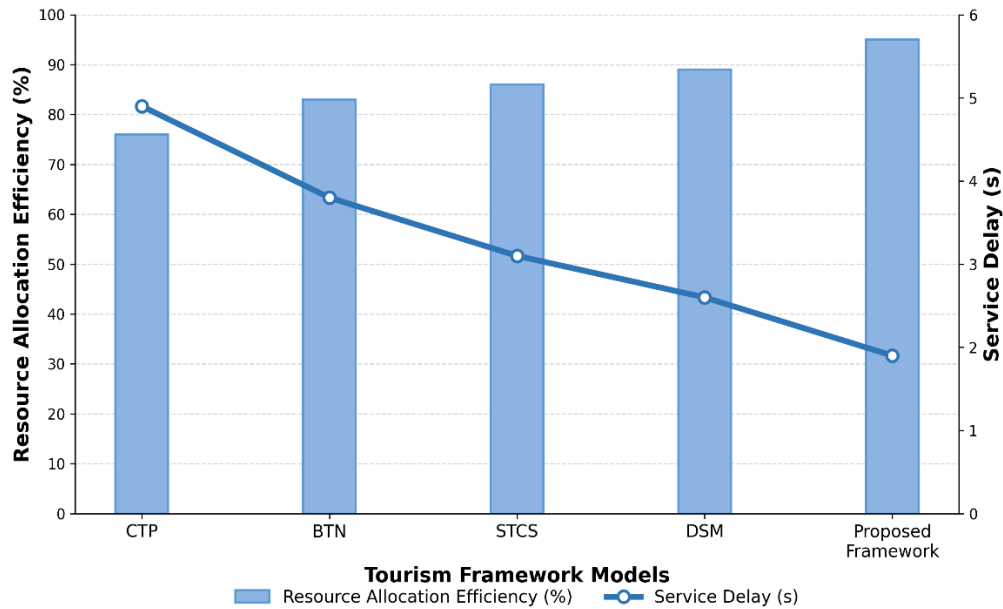


Figure 3: Resource allocation efficiency versus service delay

The relationship between decentralized resource allocation efficiency and average service response delay is plotted in figure 3. The proposed framework had effective distributed peer communication and optimized smart contract execution, which achieved better tourism resource-sharing coordination and reduced transaction processing delay.

4.7 Ablation Study

An ablation study was performed on major framework components such as the trust management, blockchain validation, and encrypted peer communication.

Table 4: Ablation analysis of proposed framework

Configuration	Transaction Integrity (%)	Secure Coordination Ratio (%)	Service Delay (s)
Without the Trust Module	84.6	79.5	3.7
Without Blockchain Validation	81.9	76.8	3.4
Without the Encryption Module	79.8	74.1	3.9
Full Proposed Framework	97.3	95.2	1.9

Decentralized tourism performance and transaction reliability were significantly reduced when individual security modules were eliminated, as shown in table 4. The entire framework achieved the greatest secure coordination capacity and the minimum communication delay.

5 Discussion

The experimental analysis reveals that the proposed peer-to-peer decentralized tourism framework has the ability to successfully enhance the characteristics of transaction security, collaborative resource sharing, and trust-aware service coordination over existing tourism management approaches. Using blockchain technology for record-keeping made transactions more robust, and decentralized authentication methods made peer verification more reliable. The adaptive trust evaluation module was

successfully designed to identify the malicious participants and to minimize the insecure interactions in distributed tourism environments. Moreover, the smart contract execution was optimized, which reduced the delay of the service and enhanced the efficiency of resource allocation in the tourism sector. Ablation analysis also showed that the functions of blockchain validation, trust calculation, and encrypted communication can be combined to build a stable, transparent, and secure decentralized tourism ecosystem.

6 Conclusion and Future Work

In this paper, a decentralized tourism framework for collaborative planning and sharing with peer-to-peer structure was proposed for secure tourism applications, which is achieved by the use of blockchain-based distributed architecture, smart contracts, encrypted communications and trust-aware peer evaluation. The proposed framework tackled key challenges in centralized tourism systems which involved insecure transaction management, absence of transparency, dependence on intermediaries, and inefficient trust coordination among the various players in the tourism sector. Finally, using a decentralized tourism data set with 15,500 transaction records, and 3,000 peer nodes representing travellers, accommodation providers, transport services, and collaborative tourism interactions, experimental evaluation was performed. The proposed framework was able to obtain a 97.3% transaction integrity, 94.8% resource allocation efficiency, 95.2% secure coordination ratio and 93.6% malicious peer detection capability, and reduced the service processing delay to 1.9 s. Comparative analysis has shown that the four features introduced into the system (blockchain validation, decentralized authentication, encrypted peer communication, and adaptive trust computation) have significantly enhanced the existing tourism management approaches. Thus, the proposed architecture is scalable and transparent for secure collaborative tourism ecosystems, and it enables autonomous peer interactions, and efficient decentralized resource utilization.

In the future, research could be directed towards the incorporation of AI and federated learning approaches for predictive trust management and intelligent travel recommendation in decentralized travel scenarios. There are further optimizations to be done to make blockchain more scalable, use less energy, and provide real-time tourism coordination on a large scale in the cross-border decentralized transportation network. In the future, the adoption of lightweight consensus mechanisms, edge computing networks, and privacy-preserving homomorphic encryption could further improve the security of tourism communication, transaction efficiency, and adaptive performance of resource sharing in next-generation, decentralized tourism ecosystems.

References

- [1] Arif, Y. M., Nurhayati, H., Kurniawan, F., Nugroho, S. M. S., & Hariadi, M. (2020). Blockchain-based data sharing for decentralized tourism destinations recommendation system. *International Journal of Intelligent Engineering & System*, 13(6), 472-486. <https://doi.org/10.22266/ijies2020.1231.42>
- [2] Arshad, Q. U. A., Khan, W. Z., Azam, F., Khan, M. K., Yu, H., & Zikria, Y. B. (2023). Blockchain-based decentralized trust management in IoT: systems, requirements and challenges. *Complex & Intelligent Systems*, 9(6), 6155-6176. <https://doi.org/10.1007/s40747-023-01058-8>
- [3] Balasubramanian, S., Sethi, J. S., Ajayan, S., & Paris, C. M. (2022). An enabling framework for blockchain in tourism. *Information Technology & Tourism*, 24(2), 165-179. <https://doi.org/10.1007/s40558-022-00229-6>

- [4] Demirel, E., Karagöz Zeren, S., & Hakan, K. (2022). Smart contracts in tourism industry: a model with blockchain integration for post pandemic economy. *Current Issues in Tourism*, 25(12), 1895-1909. <https://doi.org/10.1080/13683500.2021.1960280>
- [5] Irannezhad, E., & Mahadevan, R. (2021). Is blockchain tourism's new hope? *Journal of Hospitality and Tourism Technology*, 12(1), 85-96. <https://doi.org/10.1108/jhtt-02-2019-0039>
- [6] Kontogianni, A., & Alepis, E. (2023). Tourism embraces blockchain towards the smart tourism era. *Intelligent Decision Technologies*, 17(3), 811-838. <https://doi.org/10.3233/idt-230073>
- [7] Kumar, N., Kumar, K., Aeron, A., & Verre, F. (2025). Blockchain technology in supply chain management: Innovations, applications, and challenges. *Telematics and Informatics Reports*, 18, 100204. <https://doi.org/10.1016/j.teler.2025.100204>
- [8] Maythu, Y., Kwok, A. O., & Teh, P. L. (2024). Blockchain technology diffusion in tourism: Evidence from early enterprise adopters and innovators. *Heliyon*, 10(2), e24675. <https://doi.org/10.1016/j.heliyon.2024.e24675>
- [9] Melkić, S., & Čavlek, N. (2020). The impact of blockchain technology on tourism intermediation. *Tourism: An International Interdisciplinary Journal*, 68(2), 130-143. <https://doi.org/10.37741/t.68.2.2>
- [10] Mountije, Y., Agapito, D., & Ramos, C. (2025). Reshaping the future of tourism & hospitality industry through blockchain technology: A systematic literature review. *Information Technology & Tourism*, 27(2), 317-343. <https://doi.org/10.1007/s40558-024-00306-y>
- [11] Nur Muharam, I., Tussyadiah, I. P., & Kimbu, A. N. (2024). A theoretical model of user acceptance of blockchain-based peer-to-peer accommodation. *Current Issues in Tourism*, 27(7), 1008-1025. <https://doi.org/10.1080/13683500.2022.2164485>
- [12] Önder, I., & Gunter, U. (2022). Blockchain: Is it the future for the tourism and hospitality industry? *Tourism Economics*, 28(2), 291-299. <https://doi.org/10.1177/1354816620961707>
- [13] Prados-Castillo, J. F., Torrecilla-García, J. A., Andraz, G., & Guaita Martínez, J. M. (2023). Blockchain in peer-to-peer platforms: Enhancing sustainability and customer experience in tourism. *Sustainability*, 15(22), 15968. <https://doi.org/10.3390/su152215968>
- [14] 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), 5342. <https://doi.org/10.3390/su15065342>
- [15] Prevolšek, M. M., Tkalčević, A., & Sušić, G. (2024). The Role of Financial Technology in Croatia's Tourism Sector. *Modern Management Tools and Economy of Tourism Sector in Present Era*, 107-124. <https://doi.org/10.31410/tmt.2023-2024.107>
- [16] Rahim, R. (2026). Decentralized Peer-to-Peer Renewable Energy Trading Using Blockchain and Smart Contracts. *National Journal of Renewable Energy Systems and Innovation*, 2(4), 1-8. <https://doi.org/10.17051/NJRESI/02.04.01>
- [17] Rashideh, W. (2020). Blockchain technology framework: Current and future perspectives for the tourism industry. *Tourism Management*, 80, 104125. <https://doi.org/10.1016/j.tourman.2020.104125>
- [18] Sánchez, K., & Martínez, R. (2025). From Crisis to Resilience: Managing Tourism Destinations through Disasters and Recovery. *Journal of Tourism, Culture, and Management Studies*, 2(2), 12-25. <https://doi.org/10.17051/JTCMS/02.02.02>
- [19] Singh, R., Gupta, A., & Mittal, P. (2025). A systematic literature review on blockchain-based smart contracts: Platforms, applications, and challenges. *Distributed Ledger Technologies: Research and Practice*, 5(1), 1-36. <https://doi.org/10.1145/3704741>
- [20] Thees, H., Erschbamer, G., & Pechlaner, H. (2020). The application of blockchain in tourism: use cases in the tourism value system. *European Journal of Tourism Research*, 26, 2602-2602. <https://doi.org/10.54055/ejtr.v26i.1933>
- [21] Treiblmaier, H. (2022). Blockchain and tourism: Paradoxes, misconceptions, and a research roadmap. *Tourism Economics*, 28(7), 1956-1960. <https://doi.org/10.1177/13548166211013276>

- [22] Tyan, I., Yagüe, M. I., & Guevara-Plaza, A. (2020). Blockchain technology for smart tourism destinations. *Sustainability*, 12(22), 9715. <https://doi.org/10.3390/su12229715>

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