

# MANAGEMENT OF WATER RESERVOIR TOURISM IN UPPER NORTHERN THAILAND FOR SUSTAINABLE TOURISM

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## ARTICLE HISTORY

**Received:** 21 September 2025    **Revised:** 25 September 2025    **Accepted:** 26 September 2025

## ABSTRACT

The research focuses on tourism management at water reservoirs in upper Northern Thailand, aiming for sustainable tourism. It examines management models from theoretical and practical perspectives. The study explores the relationships between tourism image, tourism innovation, information technology, community participation, and integrated collaboration to support sustainable tourism. The findings are intended to guide the Royal Irrigation Department in maintaining market share, attracting tourists, and developing integrated marketing strategies for efficient and competitive operations.

**Keywords:** Tourism management, water reservoir, sustainable tourism

**CITATION INFORMATION:** Thima, S., Wongyos, N., & Sakkatat, P. (2025). Management of water reservoir tourism in upper Northern Thailand for sustainable tourism. *Procedia of Multidisciplinary Research*, 3(9), 9.

## INTRODUCTION

The tourism industry has long been a significant contributor to Thailand's economy, driving over a third of its economic growth in recent years. In 2023, Thailand welcomed 28.15 million international tourists, generating approximately 223,972 million baht in revenue, a 31.79% increase from 2022 (Ministry of Tourism and Sports, 2024). Reservoirs under the Royal Irrigation Department offer a unique ecotourism opportunity, allowing visitors to experience and understand nature. Accommodation options range from floating rafts to designated camping areas. Beyond electricity generation, irrigation, flood control, and fisheries, reservoirs provide recreational value through their scenic beauty and tranquility, attracting tourists and stimulating tourism-related businesses in surrounding communities (Vejchatanakul, 2016).

However, several challenges impact tourism, including an insufficient number of tourist attractions, resulting in overcrowding and degradation, particularly at conservation sites. Inadequate transportation infrastructure limits accessibility. Furthermore, basic amenities like clean restrooms, multilingual signage, tourist information, and essential infrastructure are lacking. The absence of dedicated personnel, specialized knowledge, proactive public relations, and medium-term budgeting for reservoir tourism hinders consistent management and resource allocation. Insufficient oversight of tourists during peak periods leads to waste accumulation, unsanitary facilities, and disruptive behavior. Despite ongoing efforts by the government and private sectors, these issues persist. Effective management of water reservoir tourism in upper Northern Thailand requires addressing factors influencing tourism image, innovation, information technology, and community participation to achieve sustainable tourism goals. Therefore, research into management models for water reservoir tourism in upper Northern Thailand is crucial and can inform policy decisions.

## TOURISM IMAGE

The concept of tourism image is a widely accepted theoretical framework that focuses on understanding tourists' perceptions, beliefs, and attitudes towards destinations (Echtner & Ritchie, 1991; Pike & Ryan, 2004). While valuable for explaining tourist behavior, it has limitations in explaining the quality of tourism management, a key factor in building confidence, safety, and sustainability. Tasci & Gartner (2007) state that tourism image encompasses tourists' perceptions, beliefs, and attitudes towards a destination, emphasizing the management of infrastructure, safety, services, and community collaboration by relevant organizations and stakeholders. In other words, the image of tourism management reflects not only the physical beauty of the location but also confidence in management systems, including safety, cleanliness, environmental sustainability, and operational efficiency. In summary, this study utilizes the variables of tourism management image from academics, categorized into three components: Atmosphere and Scenery, Activities and Facilities, and Management and Access, as shown in Table 1.

**Table 1** Observation variables of tourism management image

<b>Tourism Management Image</b>	<b>Atmosphere and scenery</b>	<b>Activities and Facilities</b>	<b>Management and access</b>
Echtner & Ritchie (1991)	X	X	X
Pike & Ryan (2004)	-	X	X
Tasci & Gartner (2007)	X	X	X

## TOURISM INNOVATION

Innovation originates from Schumpeter's (1934) classic work, which describes innovation as the primary driver of economic development through the creation of new products, processes, and business models. Despite its age, this work remains foundational for innovation studies across various sectors, including tourism. More recently, scholars have developed more

contemporary and specific frameworks for the service and tourism industries. Pinhal (2025), through a systematic review using the PRISMA framework on open innovation in the tourism industry, synthesized 35 studies from Scopus and identified prominent forms of open innovation, such as collaboration with startups, open data platforms, and co-creation mechanisms with tourists/communities. The review emphasizes that opening knowledge boundaries accelerates the service innovation cycle, reduces the risk of closed development, and better aligns experience design with local contexts, which is highly suitable for reservoir areas with diverse stakeholders and extensive environmental data. Hjalager (2020) reviewed and confirmed that tourism innovation can be divided into four main areas: product innovation, process innovation, service innovation, communication innovation, marketing innovation, organizational innovation, and safety/environmental innovation. This remains a widely accepted conceptual framework. Contemporary work also reflects that innovation is not only a business tool but also a mechanism for creating sustainability, helping destinations adapt to changes in society, the environment, and crises. In summary, this study employs three components of tourism innovation: service innovation, Communication and information innovation, and Safety and environmental innovation, as outlined in Table 2.

**Table 2** Observation variables of tourism innovation

<b>Tourism Innovation</b>	<b>Service innovation</b>	<b>Communication and information innovation</b>	<b>Safety and environmental innovation</b>
Schumpeter (1934)	X	X	X
Hjalager (2020)	X	X	X
Pinhal (2025)	X	X	-

## INFORMATION TECHNOLOGY

The use of information technology in tourism can be explained in stages, starting with its application in the 1990s to support reservation systems and tourist databases. This evolved into eTourism, integrating websites, the Internet, and information systems for destination management, and eventually into Smart Tourism, which emphasizes the use of advanced technologies such as Big Data, Cloud Computing, IoT, and AI to create real-time management and multi-dimensional connections. Current research has expanded to Digital Transformation (Verhoef et al., 2021), which views information technology not merely as a tool but as a driver of structural change, innovation, and business models in the tourism industry. In terms of management, information technology is utilized to develop Destination Management Systems (DMS) that enable tourism organizations to efficiently collect, manage, and utilize spatial data, resources, and tourist information (Xiang et al., 2015). Contemporary research also confirms that DMS driven by Big Data and AI can analyze market demands, predict behavior, and support accurate policy decisions (Dwivedi et al., 2021). Furthermore, Mariani and Borghi (2021) demonstrate that the use of digital technology has a direct impact on consumer satisfaction and destination competitiveness. In summary, this study employs two components of innovation: the Use of information technology in tourism planning and the Use of information technology during tourism, as shown in Table 3.

**Table 3** Observation variables of Information Technology

<b>Information Technology</b>	<b>Using information technology in tourism planning</b>	<b>Use of information technology during tourism</b>
Mariani & Borghi (2021)	X	X
Xiang et al. (2015).	X	X
Verhoef et al. (2021)	X	X

## COMMUNITY PARTICIPATION

Community participation is widely recognized as a fundamental element of sustainable tourism development. The work serves as a cornerstone, emphasizing that participation is not merely symbolic involvement but a process where communities possess the authority and rights to determine the direction of resource management. He explains that genuine participation leads to a sense of ownership and the equitable distribution of benefits, which are the foundation of community-based tourism (CBT). However, this concept remains a theoretical framework and does not delve into the structural mechanisms that facilitate practical participation. Community participation in the context of Thai tourism has evolved continuously, starting with the work of Gronroos (1984). Various scholars have defined community participation differently based on their conceptual frameworks and disciplines. For example, Oakley (1991) explains that participation refers to "the process by which individuals or groups influence decisions that affect their lives." Cohen and Uphoff (1980) expand this, stating that participation encompasses policy formulation, decision-making, implementation, and evaluation. Meanwhile, Tosun (2000) states that participation in the context of tourism is the opportunity for local people to play a role and exercise their rights in the planning and development of tourist attractions. Furthermore, Scheyvens (1999) suggests that community participation should not be limited to economic aspects, but should encompass other dimensions, including social, spiritual, and political participation, to achieve genuine empowerment at the community level. Aref's (2011) work confirms that participation is a factor that strengthens social capital, leading to community empowerment and sustainable resource management. In summary, this study employs two components of tourism innovation: participation in conservation and development, and Participation in activities and experiences, as illustrated in Table 4.

**Table 4** Observation variables of Community participation

<b>Community participation</b>	<b>Participation in conservation and development</b>	<b>Participation in activities and experiences</b>
Gronroos (1984)	X	X
Oakley (1991)	X	X
Scheyvens (1999)	X	X
Aref (2011)	X	X

## SUSTAINABLE TOURISM GOALS

Key theories used to study the goals of sustainable tourism include:

- 1) Sustainable Development Theory (Brundtland Report, 1987): This emphasizes meeting the needs of the present without compromising the ability of future generations to meet their own needs. This theory leads to analysis in economic, social, and environmental dimensions and is used to determine indicators of tourism sustainability.
- 2) Tourism Area Life Cycle (TALC: Butler, 1980): TALC describes that tourist destinations go through a life cycle from exploration, growth, maturity, and potentially decline.
- 3) Stakeholder Theory (Freeman, 1984): This emphasizes that management must consider the needs and interests of all stakeholders, including government agencies, private companies, communities, and tourists. Applying this to STGs involves creating a balance between economic benefits, social justice, and environmental conservation, with stakeholder participation seen as a key factor in making tourism sustainable.
- 4) Triple Bottom Line (Elkington, 1997): The TBL framework suggests that evaluating the success of development should not be based solely on economic profits (profit) but also include society (people) and the environment (planet). This aligns with the core of STGs, which attempts to define indices covering all three dimensions.

5) Community Participation Theory (Tosun, 1999): Tosun suggests that community participation has many levels, from limited participation to interactive participation and real decision-making power. In STGs research, this theory is used to analyze whether local communities benefit and have the power to determine the direction of tourism. Genuine participation is, therefore, a key condition for achieving STGs.

6) Collaborative Governance (Ansell & Gash, 2008): Collaborative Governance emphasizes cooperation among multiple sectors through negotiation, trust, and the creation of shared goals. This theory is used in STGs research to explain that achieving goals requires "network governance" rather than a top-down management approach, particularly when multiple agencies are involved, such as in the management of natural areas, parks, or reservoirs.

7) Systems Thinking / Sustainable Destination System: Systems thinking views tourism as a "complex system" linking many components (natural resources, tourists, communities, policies, and the global market). Doctoral-level studies often use this concept to develop integrated tourism management models, such as designing STGs indicator systems that reflect both internal and external factors.

In summary, this study employs three components of sustainable tourism goals: economic, Social, and Environmental, as outlined in Table 5.

**Table 5** Observation variables of Sustainable Tourism Goals

<b>Sustainable Tourism Goals</b>	<b>Economic</b>	<b>Social</b>	<b>Environmental</b>
Brundtland Report (1987)	X	X	X
Butler (1980)	X	X	X
Freeman (1984)	X	X	X
Elkington (1997)	X	X	X
Tosun (1999)	X	X	X
Ansell & Gash (2008)	X	X	X

## CONCLUSION AND DISCUSSION

The key to managing water reservoir tourism in upper Northern Thailand is the image of tourism. Wang (2024) proposes a visual analysis framework for understanding destination image, focusing on how photographs and online media shared by tourists and DMOs reflect perception. Using image-based analytics and a semiotic interpretation framework, the research found that visual elements, such as cleanliness, safety, signage, amenities, and environmental conservation, all convey management-related meanings that affect tourist perception. This emphasizes that the image of management is not only presented through descriptions but also conveyed through visual media reflecting actual management in the area, providing a foundation for studying the image of reservoir tourism management that aims to communicate safety and the systematic use of resources. Dwivedi et al. (2021) present the integration of Big Data and AI in tourism using cross-disciplinary literature analysis. The study indicates that IT not only functions in data collection but can also be used to predict tourist behavior trends, manage resources, and create service innovation. This reflects that the future of tourism management will increasingly rely on analytics-driven IT. Su and Wall (2014) delve into a case study of community-based tourism in developing countries in Asia, focusing on "power relations" or power dynamics between the state, private sector, and community. This expands on Zapata's findings by highlighting that genuine participation cannot occur if the power structure remains centralized in the hands of the state or large corporations. Research results indicate that participation designed to be symbolic (tokenistic participation) does not foster sustainability, but rather causes communities to lose trust in tourism projects and may lead to long-term conflict. This helps fill the gap identified by Zapata by providing a more detailed explanation of the power structure and reflecting the concrete institutional obstacles.

In conclusion, water reservoir tourism is gaining popularity as a source of natural and health-oriented tourism. However, achieving sustainability requires effective management. Based on several academic articles, sustainable development of water reservoir tourism can be summarized into five key areas: the image of tourism management, tourism innovation, information technology, community participation, and sustainable tourism goals. These lead to the future development of tourism and are key to success in developing better management models for water reservoir tourism. Therefore, service providers in the tourism industry must continually adapt and develop new forms of tourism and services to keep pace with evolving tourist demands. Governments and government agencies, which play a regulatory role, should be aware of the changes taking place and develop appropriate regulatory guidelines to support the stable growth of the Thai tourism business. Strengthening the capacity of communities to link benefits from tourism is also key. Suppose communities can manage and link the various benefits from tourism. In that case, this will lead to additional income for the community, a pleasant living environment, and the conservation and value-added of local lifestyles and culture. In addition, each sector can contribute to supporting tourism that benefits local communities, including the government, tourism companies, tourists, the media, and educational institutions. These sectors will help make local development balanced and sustainable, leading to the ultimate well-being of local communities.

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**Data Availability Statement:** The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

**Conflicts of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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