Available online at: https://journal.poltekpar-nhi.ac.id/index.php/jk
**Jurnal Kepariwisataan: Destinasi, Hospitalitas dan Perjalanan**
Volume 9 Nomor 1, 2025: 108-127
DOI: 10.34013/jk.v9i1.1922

# A Comparative Analysis of *Kali* Pepe-Tirtonadi Weir and Japan's Nagara River for Water-Based Tourism Development

**Purwoko Ajie[1], Octaviano Dwiyan Putra[2], Satrya Paramanandana[3], Dannis Ni'matussyahara[4], Srimaryani[5], Raden Roro Ratnasari Dwi Riyanti[6], Desi Fitri Yani[7]**

Cultural Studies, Faculty of Cultural Sciences, Universitas Sebelas Maret, Indonesia[1,2,3]
Geography Education, Universitas Sebelas Maret, Indonesia[4]
Economic Education, Universitas Sebelas Maret, Indonesia[5]
Economics and Development Studies, Universitas Sebelas Maret, Indonesia[6]
Accounting Department, Universitas Sebelas Maret, Indonesia[7]

## Abstract

The COVID-19 pandemic has receded from Indonesia, yet it has left enduring historical impacts, particularly on the economic sector, with tourism being one of the affected areas. Post-pandemic recovery has witnessed the emergence of numerous new locations and destinations, particularly water tourism sites, as part of tourism development initiatives. Through researcher observations via surveys and field observations in the Tirtonadi Weir area and *Kali* Pepe flow, several issues have been identified, including inadequate supporting facilities, suboptimal water flow circulation, less-than-optimal vegetation along the riverbanks, and pollution from inorganic waste in the river. This study adopts a qualitative comparative approach and employs SWOT analysis to compare the *Kali* Pepe-Tirtonadi Weir in Surakarta with the Nagara River in Japan. Data collection techniques include observation, literature review (books, journals, articles, YouTube videos, magazines, and newspapers), and documentation. Following data collection, a systematic qualitative and SWOT analysis is conducted. The findings reveal differences in management approaches between the *Kali* Pepe-Tirtonadi Weir and the Nagara River in Japan, attributed to long-term tourism planning, revitalization processes, and river management carried out by policymakers. It is anticipated that the Tirtonadi Weir and the *Kali* Pepe Stream can evolve into water tourism destinations, serving as new tourism icons in Surakarta City.

**Keywords**: Comparative Studies, Tirta Tourism, *Kali* Pepe, Tirtonadi Weir, Nagara River.

## A. INTRODUCTION

The COVID-19 pandemic, first reported in Wuhan, China in December 2019, fundamentally altered the trajectory of the global tourism industry. As governments responded with border closures and mobility restrictions based on WHO directives, the tourism sector experienced a historic collapse (Gunaisah et al., 2022; WHO, 2024). The Indonesian tourism industry, which heavily relies on natural and cultural resources, was no exception. However, this disruption also served as a turning point that catalysed innovation in the form of spatially dispersed, environmentally conscious, and locally anchored tourism models. Among these emerging trends is river-based tourism an ecotourism approach that repositions rivers not merely as ecological infrastructure but as experiential and interpretive landscapes (Mahendru et al., 2024).

In both hydrological and anthropological dimensions, rivers (*Kali*) represent more than watercourses. They are dynamic systems that integrate ecological, economic, and cultural functions, especially within archipelagic countries like Indonesia. The Government of Indonesia, through Peraturan Pemerintah Republik Indonesia Nomor 38 Tahun 2011 tentang Sungai, defines a river is a natural and/or artificial water channel or container in the form of a water flow network and the water in it, starting from the upstream to the estuary, limited on the right and left by a boundary line. This legal definition foregrounds the dual nature of rivers as physical entities and as

* Corresponding author: Purwoko Ajie; E-mail: purwokoajie@student.uns.ac.id
Received: February 20, 2025; Revised: May 15, 2025; Accepted: May 20, 2025

institutionalised environmental resources. Rivers like the Musi, Kapuas, and Mahakam have long been integrated into national and regional economic strategies through transport and irrigation schemes, while simultaneously serving as symbols of local identity and pride (Faisal, 2024).

Recent efforts to revitalise rivers as tourism spaces can be seen in projects such as the Cheonggyecheon Stream in Seoul, the Seine River in Paris, and the Melaka River in Malaysia, each demonstrating the transformative potential of rivers through environmental rehabilitation, cultural preservation, and inclusive tourism (Huang et al., 2024; Lee & Jung, 2016; Lestel et al., 2023). In Indonesia, although smaller in scale, similar initiatives have emerged in urban settings such as Kali Code in Yogyakarta and Wangen River in Gresik, showcasing the growing relevance of river tourism as a post-pandemic resilience strategy (Afif, 2022; Brontowiyono et al., 2010).

Within this broader narrative, *Kali* Pepe, a tributary of the Bengawan Solo River in Surakarta, presents a rich yet underutilised site of cultural memory, hydrological utility, and tourism potential. As a cultural artefact, *Kali* Pepe holds deep mytho-historical significance. The strategic selection of the Surakarta Palace's location at the *tempuran*, the confluence of *Kali* Pepe and Bengawan Semanggi reflects the Javanese cosmological belief in the spiritual potency of water junctions, where such sites are perceived to channel natural and metaphysical power (Geertz, 1976; Purwani, 2014; Ricklefs, 2012). Furthermore, *Serat* Sri Radya Laksana provides an anecdotal yet enduring oral narrative linking *Kali* Pepe to the Pajang Kingdom

This story dates back to the era of the Pajang Kingdom. Prince Pabelan, the son of a tumenggung, was known as a *Don Juan* or playboy due to his mystical powers and handsomeness. The Princess of Pajang, or the Princess of Kedhaton, fell in love with this prince, who was of much lower status than herself. Unfortunately, their love was opposed by the King because of their differing social ranks. However, they defied the King's orders and continued their relationship, leading to Prince Pabelan being sentenced to death, and his body was thrown into the river. The prince's body became entangled in one of the rivers in the village of Solo, named *Lepen* (*Kali* or a small river) Pepe. The local ruler, Ki Gede Sala, buried the unfortunate prince at a site now known as *Bathangan*. The name originated from the word *'bathang*', which in Indonesian means 'corpse'. The prince's body became entangled in *Kali* Pepe due to his mystical powers. His spirit requested to be buried in the Solo village, promising that, because of his power, the area around his grave would eventually become a great city (Fitrianto, 2014). Such symbolic narratives not only contextualise the river within Javanese spiritual geography but also anchor it within local identity and memory.

Beyond its mythic aura, Kali Pepe functions as a critical drainage channel in urban Surakarta. Infrastructural improvements since the early 1990s such as the river conservation system initiated by Paku Buwono X and the construction of *Kali Anyar* as an overflow channel—demonstrate the river's continued relevance in flood mitigation and urban planning (Cahyani, 2018; Pranata, 2022). Despite these efforts, significant environmental challenges persist. Several studies confirm that domestic waste, sedimentation, and invasive vegetation have impaired water quality, undermining its potential as a tourism resource (Miladan et al., 2018; Setyowati et al., 2020).

A number of recent proposals suggest transforming *Kali* Pepe and Tirtonadi Weir into recreational and educational spaces through *praon* (boat) tours, river festivals, and environmental education initiatives (Darmastuti et al., 2018). However, in the absence of integrated planning and community participation, these remain fragmented efforts. It is in this context that a comparative study with more developed models becomes not only relevant but necessary.

Japan's Nagara River (長良川, Nagaragawa), located in Gifu Prefecture, is widely regarded as one of the cleanest and most sustainably managed rivers in the world. The secret to its success lies

in strong cultural attachments to the river, rigorous environmental policy, and active civil participation. In a key study on Japanese river governance, Sato et al. (2018) noted that the Nagara River basin has a population of 860,000 people and the river flows through urban areas, the waters of the river remain clear and clean amidst the daily lives of the people. In order to preserve, inherit, and develop the Nagara River System, the Gifu Prefecture certifies its products as 'Products of Excellence' blessed by the clear waters of the Nagara River. The waters of the river are kept clean due to the cooperation of the people and their sense of responsibility in preserving the environment, which has been instilled in their minds.

Complementary programs such as the River School, community foresting, and upstream-downstream collaboration not only support environmental stewardship but also position the river as an engine of cultural tourism (Watanabe, 2021; Wiyatasari, 2023). The integration of river ecology, local knowledge, and tourism infrastructure along the Nagara River offers valuable insights for Indonesian cities seeking to revitalise their own water-based assets.

While previous studies of Kali Pepe largely focus on physical and spatial analyses (Andriyani, 2022; Romadhoni et al., 2017), few have systematically examined the structural and cultural differentials between its management and internationally renowned river tourism systems. Thus, this study seeks to fill that gap by employing a comparative qualitative methodology and SWOT analysis to investigate both the potentials and constraints of *Kali* Pepe–Tirtonadi Weir in comparison to the Nagara River in Japan.

The central objective of this study is to examine how governance structures, environmental ethics, cultural heritage, and public participation interact in the cases of *Kali* Pepe–Tirtonadi Weir and Japan's Nagara River and how these insights can inform the sustainable development of *Kali* Pepe as a viable water-based tourism icon in Surakarta. To systematically analyse both the internal conditions of *Kali* Pepe and the external forces surrounding its development, this study adopts the TOWS Matrix framework introduced by Weihrich (1982). Unlike the traditional SWOT model, which merely identifies variables, the TOWS Matrix facilitates the formulation of targeted strategies by aligning internal strengths and weaknesses with external opportunities and threats (Weihrich, 1982). In this comparative approach, the Nagara River serves not only as a reference point but also as a reflective model through which strategic directions for river-based tourism development in Surakarta can be envisioned, localised, and adapted.

## B. LITERATURE REVIEW

This study draws upon a theoretical foundation grounded in Sustainable Tourism Theory and Destination Development Theory, both of which provide the conceptual scaffolding for analysing the development potential of *Kali* Pepe–Tirtonadi Weir in Surakarta. These frameworks are applied in tandem with SWOT analysis to explore the comparative dynamics between the Indonesian case and the Nagara River in Japan. This literature review synthesises key debates and findings relevant to environmental, cultural, and governance-based approaches to river tourism, while also identifying context-specific challenges that hinder development.

Sustainable tourism theory, as elaborated by Telfer and Sharpley (2007), is based on the premise that tourism must fulfil three interconnected objectives: (1) Environmental conservation, (2) Socio-cultural respect, and (3) Long-term economic viability. This framework critiques conventional mass tourism that prioritises short-term profits at the expense of ecological degradation and social disruption (Telfer & Sharpley, 2007). Instead, it advocates for models that minimise ecological footprints, empower local communities, and sustain destination appeal over time. In the context of river-based tourism, sustainability implies maintaining water quality,

fostering public participation in environmental stewardship, and ensuring equitable economic benefits for residents in adjacent areas.

Applying this theory to *Kali* Pepe–Tirtonadi Weir reveals several critical gaps. While the river holds spatial and cultural potential, it suffers from recurring problems such as solid waste accumulation, limited waste management infrastructure, and seasonal flooding (Miladan et al., 2018; Setyowati et al., 2020). These issues reflect a broader lack of environmental awareness and systemic planning. Furthermore, tourism utilisation remains minimal due to low accessibility and weak community involvement (Rencana Induk Pembangunan Kepariwisataan Daerah Tahun 2016-2026 Kota Surakarta, 2016; Wibawa & Qomarun, 2020), signalling a disconnect between spatial potential and operational readiness. Previous studies (e.g., Wibawa & Qomarun, 2020; Pranata, 2022) point to fragmented institutional governance and limited inter-agency coordination as primary obstacles. Despite regulatory backing such as RIPPARDA, implementation remains weak due to overlapping jurisdictions, lack of community incentives, and absence of long-term investment strategies. These issues reinforce the necessity of integrating planning with participatory governance mechanisms, as demonstrated in successful international cases.

To complement the sustainability lens, this study also adopts Destination Development Theory, as defined by Fletcher et al. (2018). This theory delineates the stages of tourism development from exploration to involvement, development, consolidation, and potential stagnation or rejuvenation. Key to this framework are the variables of stakeholder collaboration, infrastructure readiness, and branding identity (Fletcher et al., 2018). In this regard, *Kali* Pepe remains in the "involvement" phase, where there is emergent interest but a lack of coordinated investment and governance strategy. On the other hand, Japan's Nagara River exemplifies a consolidated tourism destination, underpinned by cultural practices such as *ukai* (cormorant fishing), educational initiatives (*River School*), and environmental certification programmes (*Products of Excellence*) (Sato et al., 2018; Wiyatasari, 2023). Applying Destination Development Theory to *Kali* Pepe-Tirtonadi reveals a disjunction between regulatory intention and development practice. While the site aligns with the "involvement" phase, characterised by initial interest and stakeholder identification, it lacks the strategic coordination and branding necessary to move towards consolidation. This theoretical mismatch suggests that traditional linear models of tourism development may require adaptation in complex urban-river systems like Surakarta, where socio-cultural, ecological, and governance variables intersect unpredictably.

To operationalise these theoretical frameworks, this study employs SWOT analysis (Houben et al., 1999) as an analytical tool for assessing internal strengths and weaknesses, as well as external opportunities and threats. Within this framework, the *strengths* of *Kali* Pepe include its central location in Surakarta, cultural-historical resonance, and recent infrastructure (such as the Tirtonadi Weir Park and pedestrian areas). However, *weaknesses* involve water pollution, weak inter-agency coordination, and low public awareness. *Opportunities* include the integration of *Kali* Pepe into broader tourism circuits (e.g., Pasar Gede, Keraton Kasunanan), while *threats* stem from environmental neglect and public apathy.

The success of the Nagara River offers a compelling contrast. Despite flowing through a dense urban setting with over 860,000 residents, the Nagara River has achieved high water clarity and sustainable use through community-driven environmental ethics. As Sato et al. (2018) state that The waters of the river are kept clean due to the cooperation of the people and their sense of responsibility in preserving the environment, which has been instilled in their minds. Furthermore,

institutional consistency and civic engagement have allowed Gifu Prefecture to maintain river health while promoting tourism that is both cultural and ecological (Watanabe, 2021). These characteristics contrast sharply with the fragmented, top-down development patterns at *Kali* Pepe.

Beyond the Nagara River, international precedents reinforce the theoretical frameworks employed in this study. The Seine River in France has been revitalised through a multi-stakeholder approach involving pedestrian redesigns, commercial nodes, and public art initiatives (Lestel et al., 2023). The Cheonggyecheon Stream in South Korea demonstrates how polluted infrastructure can be transformed into a central public space and ecological corridor through state-led engineering and public participation (Lee & Jung, 2016). Similarly, the Melaka River in Malaysia exemplifies integrated management combining culinary tourism, heritage trails, and urban aesthetics to create a river-based tourism economy (Huang et al., 2024). These examples collectively support the premise that sustainable river tourism requires long-term planning, participatory governance, and adaptive infrastructure. However, as the RIPPARDA (2016–2026) document for Surakarta acknowledges, the current approach to *Kali* Pepe's tourism potential remains fragmented, lacking in community integration and ecological vision.

Therefore, the present study positions itself at the intersection of theory and practice. It not only synthesises comparative case studies, but also provides a theory-informed diagnostic of *Kali* Pepe–Tirtonadi Weir using SWOT analysis. The goal is to generate strategic insights that align with sustainability principles while responding to the specific ecological, social, and institutional challenges found at the site.

In order to formulate context-specific strategies that address the internal limitations and external constraints of *Kali* Pepe–Tirtonadi Weir, this study employs the TOWS Matrix framework developed by Weihrich (1982). As an extension of SWOT analysis, the TOWS Matrix facilitates the generation of actionable strategies by systematically cross-referencing strengths, weaknesses, opportunities, and threats (Weihrich, 1982). This theoretical integration allows for not only the diagnosis of development challenges but also the formulation of adaptive strategies tailored to Surakarta's ecological, cultural, and governance context.

## C. RESEARCH METHOD

This study adopts a qualitative comparative approach that draws upon secondary data to explore the potential of *Kali* Pepe–Tirtonadi Weir in Surakarta as a sustainable water-based tourism destination, using the Nagara River in Japan as a model for strategic learning. The comparative method is utilised to identify key similarities and contrasts between the two cases, with particular attention to environmental governance, community participation, and destination development dynamics (Arikunto, 2010).

Since *Kali* Pepe–Tirtonadi Weir is still in the planning and pre-operational stage, the research is conducted entirely through documentary and literature analysis. Data sources include regional planning documents most notably the *Rencana Induk Pembangunan Kepariwisataan Daerah* (RIPPARDA) Kota Surakarta 2016–2026 alongside academic publications, journal articles, undergraduate and postgraduate theses, and official reports concerning sustainable river tourism. Supplementary data, such as news articles, social media, and YouTube videos, are used to enrich the contextual understanding of both sites.

The analysis is grounded in two main theoretical frameworks which are sustainable tourism theory (Telfer & Sharpley, 2007), which highlights the need for a balance between ecological protection, socio-cultural preservation, and economic benefit; and destination development theory (Fletcher et al., 2018), which explains the sequential stages and strategic elements in tourism growth. These theories provide the evaluative lens through which the development trajectories of both rivers are examined.

To translate theoretical insight into practical recommendations, the study operationalises its comparative findings using the TOWS Matrix developed by Weihrich (1982). Building upon SWOT analysis (Houben et al., 1999), the TOWS Matrix enables a more dynamic synthesis of internal (strengths and weaknesses) and external (opportunities and threats) factors. The matrix is used not only to categorise each factor but also to formulate development strategies, namely SO (Strength–Opportunity), ST (Strength–Threat), WO (Weakness–Opportunity), and WT (Weakness–Threat). This allows for a structured diagnosis and strategic formulation tailored to the specific challenges and potentials of *Kali* Pepe–Tirtonadi Weir.

All analytical procedures are conducted conceptually and interpretively, without the use of field surveys or interviews. Instead, the analysis relies on qualitative synthesis to construct a strategy-oriented understanding of how Surakarta might adapt and apply the successful practices of the Nagara River in building a sustainable, competitive, and community-driven river tourism destination.

## D. RESULTS AND DISCUSSIONS

### Comparison of the Tourism Potential of *Kali* Pepe-Tirtonadi Weir with the Nagara River

The Nagara River exemplifies an integrated model of sustainable river tourism in Japan, underpinned by strong civic engagement, cultural continuity, and institutional support. Historically, the river became a focal point of environmental consciousness when local communities protested against dam construction in 1982 due to fears of ecological disruption (Chakraborty, 2013). The successful resistance highlights how community participation serves as a strength (S) that safeguards environmental integrity while nurturing tourism.

Environmental awareness among residents along the Nagara River is cultivated from a young age and embedded in cultural expressions, including *Ukai* (cormorant fishing), *Seki* knife craftsmanship, *Mino Washi* paper, and *Gujo-Honzome* dyeing (Watanabe, 2021). These enduring traditions function as opportunities (O) that have been transformed into tourism assets, effectively combining ecological stewardship with economic viability an ideal SO strategy (Strength–Opportunity) in the TOWS Matrix (Houben et al., 1999; Weihrich, 1982).

In contrast, *Kali* Pepe has long held historical and spiritual significance in Surakarta's development, serving as both a trade artery and cultural symbol (Geertz, 1976; Purwani, 2014; Ricklefs, 2012).. However, the transformation of this river system into a viable tourism destination remains constrained. Unlike Nagara, *Kali* Pepe faces serious internal weaknesses (W) notably the lack of waste management, sedimentation, and minimal public involvement. Damayanti et al. (2015) and Harvianto & Utami (2022) report that 65–70% of residents along the riverbanks still dispose of domestic waste directly into the river, contributing to environmental degradation (Damayanti et al., 2015; Harvianto & Utami, 2022). In the TOWS framework, these issues necessitate a WO strategy leveraging existing opportunities such as regional development plans and cultural heritage, while addressing environmental and institutional deficiencies through education and community engagement.

The spatial advantage of *Kali* Pepe–Tirtonadi Weir is evident in its central location, illustrated in Figure 1. The area is adjacent to key transport nodes Tirtonadi Terminal, Balapan Train Station, and is supported by varied tourism attractions and accommodations. This geographical strength (S) can be used to counter external threats (T), such as competition from established river destinations like *Kali* Code in Yogyakarta (Brontowiyono et al., 2010) or Maron River in Pacitan (Andika, 2022; Noviani & Utomowati, 2024). Applying an ST strategy, this accessibility and cultural identity could serve as a branding advantage to differentiate *Kali* Pepe's tourism model within Central Java.

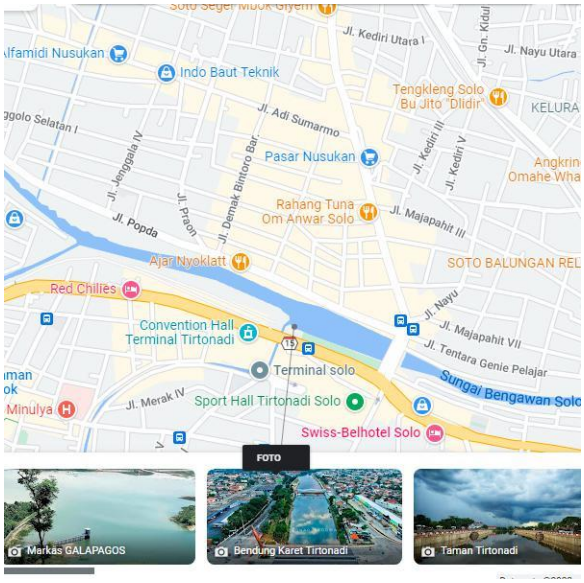


**Figure 1. Map of the *Kali* Pepe-Tirtonadi Weir Location, Surakarta**
Source: Google Maps Imagery, 2023-2024.

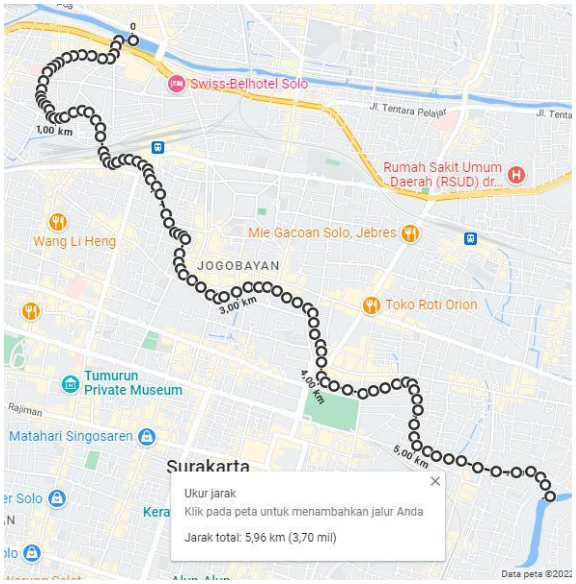


**Figure 2. Length of *Kali* Pepe: 5.96 Km**
Source: Google Maps Measurement Imagery, 2023-2024.

As seen in Figure 2, the 5.96 km length of *Kali* Pepe, stretching from Tirtonadi Weir Gate to Demangan Weir Gate, is suitable for *praon* (boat) tours. Along the route, visitors may access significant landmarks such as *Kali* Pepe Park, *Pasar* Gedhe, and the *Keraton Kasunanan* Hadiningrat Surakarta. Nevertheless, optimal utilisation of this potential requires long-term planning, cross-sectoral integration, and infrastructure readiness, echoing the key factors in Destination Development Theory (Fletcher et al., 2018). Such planning is already reflected in Surakarta City Regulation No. 13 of 2016 (RIPPARDA 2016–2026), which identifies *Kali* Pepe–Tirtonadi–Sangkrah as a priority tourism development zone (Rencana Induk Pembangunan Kepariwisataan Daerah Tahun 2016-2026 Kota Surakarta, 2016). However, without adequate implementation, these regulatory supports risk becoming latent.

In this context, WT strategies (minimising Weaknesses and countering Threats) must be considered. The threat of competition and community apathy coupled with weaknesses in sanitation and design could be mitigated through participatory programs, such as adopt a river, environmental education, and regular tourism festivals. These programs reflect the success of Nagara River's "River Adoption" scheme and reinforce the principles of Sustainable Tourism Theory, which prioritises environmental conservation, cultural respect, and long-term economic sustainability (Telfer & Sharpley, 2007).

Thus, when viewed through the TOWS lens, the comparative analysis suggests that the key to *Kali* Pepe's transformation lies not only in physical revitalisation but in strategic alignment between internal assets and external dynamics. Surakarta must adopt a comprehensive planning model that combines spatial capital, regulatory backing, and active public involvement elements that have made the Nagara River a world-class example of sustainable water-based tourism (Sato et al., 2018; Watanabe, 2021).

**Strengths of *Kali* Pepe-Tirtonadi Weir (S)**

According to Gürel and Tat (2017), strength is an internal capability or resource that offers a significant advantage in achieving strategic goals. In the context of tourism, strengths include spatial, cultural, and infrastructural assets that increase a destination's appeal and competitiveness (Gürel & Tat, 2017). In the case of *Kali* Pepe–Tirtonadi Weir, several internal strengths can be identified and strategically harnessed to support sustainable river-based tourism development. These strengths align with broader

opportunities identified in the Surakarta City Regulation No. 13 of 2016 on the Regional Tourism Development Master Plan (Rencana Induk Pembangunan Kepariwisataan Daerah Tahun 2016-2026 Kota Surakarta, 2016), creating possibilities for the formulation of SO (Strength–Opportunity) strategies as outlined by Weihrich (1982) and further elaborated by Houben et al. (1999).

**Table 1. Analysis of Strengths (S) of *Kali* Pepe-Tirtonadi Weir**

| | Figures | Object Description | Development Potential |
|---|---|---|---|
| **Figure 3** |  | Location of *Kali* Pepe–Tirtonadi Weir | Construction of a connecting bridge between Tirtonadi Weir and Tirtonadi Terminal to facilitate easier access for visitors from outside the area. |
| **Figure 4** |  | Papan Kawruh Tirta | Opening a dedicated public access (with specific conditions) and providing educational resources on sustainable water resource management. |
| **Figure 5** |  | Photo Spot on the Northern Side of Tirtonadi Weir | Enhancing photo spots on the southern side by adding more attractions, along with the installation of roofed gazebos to serve as resting areas during the daytime. |

Sources: Researcher Documentations, 2023–2024

As shown in Table 1, the location of *Kali* Pepe–Tirtonadi Weir is highly strategic, positioned at the core of Surakarta. Its immediate proximity to Tirtonadi Terminal (Class A intercity terminal) and Balapan Station Figure 3, both of which are connected to the Adi Sumarmo Airport Train, places the site in a strong logistical position. This accessibility serves as a core strength in attracting domestic and regional tourists. To enhance connectivity, the proposal to construct a pedestrian bridge between the terminal and the weir park represents a relevant SO strategy. This would not only facilitate mobility and visitor flow but also exemplify integrated tourism-transport infrastructure similar to successful models like Cheonggyecheon Stream in South Korea. Leveraging this spatial advantage reflects a conscious effort to align local strengths with external opportunities related to transportation and urban revitalisation.

In addition to its geographical value, Figure 4 highlights the presence of *Papan Kawruh Tirta*, an existing educational facility focused on water resource management. This infrastructure has collaborated with local river communities, river school programmes, SAR teams, the Regional Disaster Management Agency (BPBD), and Universitas Sebelas Maret (UNS) Surakarta (Jatengprov, 2019). As a strength, this facility holds significant potential to become a focal point for educational tourism. Through appropriate SO strategies, *Papan Kawruh Tirta* could be expanded and adapted to engage a broader public audience, particularly school groups and environmentally conscious tourists, offering experiential learning related to sustainable drainage, ecosystem services, and disaster mitigation. As demonstrated by the Nagara River,

instilling environmental awareness from an early age contributes greatly to the long-term resilience and attractiveness of river tourism destinations (Sato et al., 2018; Watanabe, 2021).

Beyond educational and infrastructural assets, Figure 5 depicts the recreational and aesthetic elements of Tirtonadi Weir, especially the large-scale photo frames and park installations on the northern bank. These visual icons currently serve as appealing attractions, especially for young visitors and families seeking accessible outdoor recreation. However, the southern side of the weir remains underutilised. To optimise this potential, SO strategies could focus on enhancing the site's visual identity by adding cultural icons, thematic installations, and shaded resting areas such as gazebos. These improvements would not only increase the site's visual coherence but also encourage the growth of culture-based tourism and local creative industries, thus strengthening the community's economic resilience.

The entire revitalisation effort is further reinforced by the legal and political support provided by RIPPARDA 2016–2026. This regulation not only legitimises the development of the *Kali* Pepe–Tirtonadi–Sangkrah river corridor as a tourism area but also opens opportunities for multi-stakeholder collaboration. As observed in Japan, particularly in the Nagara River, successful river tourism depends not only on physical infrastructure but also on civic engagement and shared environmental values (Sippel, 2000; Takahasi, 1997). One relevant model that could be adopted is the implementation of environmental flow (e-flow) management. This approach, proven effective in Nagara River, maintains water quality, supports aquatic biodiversity, and enhances the river's recreational value, particularly for educational ecotourism (Siagian et al., 2023).

In conclusion, the strengths of *Kali* Pepe–Tirtonadi Weir, as illustrated in Figures 3 to 5, form a foundation for the development of integrated, sustainable, and community-driven river tourism. By employing SO strategies that align internal capacities with external opportunities, the site can evolve into a nationally competitive destination that balances tourism growth with environmental stewardship. These SO strategies, when applied coherently and with multi-sectoral coordination, could transform *Kali* Pepe into a flagship model of integrated urban river tourism in Central Java.

**Weaknesses of *Kali* Pepe–Tirtonadi Weir (W)**

According to Valentin (2001), weaknesses refer to internal deficiencies, such as poor infrastructure, limited resources, or ineffective governance that reduce an organisation's ability to achieve strategic objectives or respond to external challenges (Valentin, 2001). These may include insufficient infrastructure, constrained funding, poor management, or a lack of innovation, which can restrict the ability of a destination to compete or sustain growth (Houben et al., 1999; Noviastuti et al., 2023). In the case of tourist destinations, weaknesses often manifest not only through internal limitations but also through inadequate public responses and environmental pressures.

The current condition of *Kali* Pepe–Tirtonadi Weir, as shown in Figure 6, reflects underutilised access infrastructure along the northern and southern banks of the weir. These points could serve as vital nodes for short-distance water transportation, such as small boats or speedboats. However, the absence of proper docking infrastructure and navigable water routes presents a clear internal weakness (W). To address this, a WO strategy (Weakness–Opportunity) could involve the development of eco-friendly water transport in line with the rising demand for alternative tourism experiences (Wibowo, 2016; Widowati et al., 2017). Such facilities could not only enhance the visitor journey but also support the concept of integrated, multi-modal tourism mobility in urban river spaces.

**Table 2. Analysis of the Weaknesses (W) of *Kali* Pepe–Tirtonadi Weir**

| | Figures | Object Description | Development Potential |
|---|---|---|---|
| **Figure 6** |  | Tirtonadi Weir Access Channel | Enhancement of short-distance water transportation facilities (using boats or speedboats) as an alternative mode of transport. |
| **Figure 7** |  | Western Bank of *Kali* Pepe at Tirtonadi Weir | Revitalisation of local settlements and spatial planning of the area, followed by dredging of shallow or vegetation-obstructed river sections. |
| **Figure 8** |  | Tirtonadi Weir Pedestrian Pathway | Construction of a pedestrian pathway along Tirtonadi Weir that is accessible to the general public, along with the installation of guiding blocks and disability-friendly access routes. |
| **Figure 9** |  | Waste Disposal Facilities along the Banks of Tirtonadi Weir | Provision of pavilions, additional trash receptacles, and public toilets to enhance visitor comfort. |

Sources: Researcher Documentations, 2023–2024

Another significant issue is environmental degradation, as illustrated in Figure 7. The western bank of *Kali* Pepe suffers from sediment accumulation, overgrown vegetation, and domestic waste discharge. These conditions disrupt water flow and reduce the river's visual and ecological appeal, mirroring earlier stages of river neglect in sites like *Kali* Code in Yogyakarta (Brontowiyono et al., 2010; Handayani & Miladan, 2020; Kayyisa, 2016). The existing residential settlements along the riverbank are often poorly arranged and lack proper waste management systems. To overcome this, a WT strategy (Weakness–Threat) could be employed: revitalising riverbank housing and implementing community-based sanitation campaigns would not only address infrastructure deficits but also shield the site from growing threats such as pollution, social disinterest, and tourism competition from other revitalised rivers.

The lack of inclusive infrastructure is also evident in Figure 8, which depicts the Tirtonadi Weir pedestrian pathway. While its presence is a positive step, the facility remains incomplete in terms of universal design. The absence of guiding blocks, ramps, and disability-friendly access routes limits its inclusivity and reduces its alignment with global standards for accessible tourism. Addressing these shortcomings requires not only physical enhancements but also institutional

sensitivity to inclusive design, forming part of a broader WO strategy that embraces Surakarta's ambition to become a more visitor-friendly and equitable tourism city.

As shown in Figure 9, essential supporting facilities such as public toilets, trash bins, and resting pavilions remain insufficient along the banks of Tirtonadi Weir. This absence reduces visitor comfort and discourages longer stays, especially during events or evening hours. Enhancing these amenities would be a relatively low-cost but high-impact intervention to improve the visitor experience and overall site usability. Again, these infrastructural weaknesses highlight the gap between existing tourism aspirations and on-the-ground realities.

Additionally, *Kali* Pepe is affected by environmental fragmentation due to embankments that restrict natural water flow and increase sedimentation, ssues similarly observed in the early stages of river restoration in Japan's Nagara River (Sippel, 2000). More critically, the lack of active community participation in environmental conservation poses a deeper systemic weakness. Unlike the Nagara River, which benefits from long-standing traditions of community-based stewardship and environmental monitoring (Siagian et al., 2023), public engagement around *Kali* Pepe remains minimal. To mitigate this, adopting a WT strategy—such as environmental education campaigns, youth participation programmes, or incentives for clean river maintenance—could be instrumental in strengthening civic responsibility and restoring ecological integrity.

In conclusion, the weaknesses of *Kali* Pepe–Tirtonadi Weir, as illustrated in Figures 6 through Figure 9, highlight both infrastructural and participatory deficits that must be addressed to ensure the site's long-term viability. Through the application of targeted WO and WT strategies, these limitations can be gradually transformed into opportunities for inclusive development, environmental resilience, and community empowerment.

**Tourism Development Opportunities (O)**

According to Panagiotou (2003) defines opportunity as an external trend or condition that, if leveraged effectively, can enhance performance and offer strategic expansion avenues for tourism development (Panagiotou, 2003). Advancements in infrastructure, tourism demand, public awareness, and institutional partnerships are among the enabling factors that can significantly improve a destination's competitive advantage (Houben et al., 1999; Noviastuti et al., 2023). In the context of *Kali* Pepe–Tirtonadi Weir, these opportunities exist in various forms ranging from spatial design and cultural integration to water-based recreation requiring strategic actions to maximise their benefits through effective SO and WO strategies, as proposed in the TOWS Matrix model (Weihrich, 1982).

**Table 3. Analysis of Development Opportunities (O) of *Kali* Pepe-Tirtonadi Weir**

| Figures | | Object Description | Development Potential |
|---|---|---|---|
| **Figure 10** |  | Mini Stage on the Northern Side of Tirtonadi Weir | There are two mini stages that can be utilized as performance venues, making them more than just complementary structures on the northern and southern sides of Tirtonadi Weir. |

| | | | |
|---|---|---|---|
| **Figure 11** |  | Whitewater Rafting at Tirtonadi Weir | The provision of adequate water transport infrastructure is necessary. By introducing whitewater rafting, small boats, or speedboats, the appeal of the destination can be enhanced, attracting more visitors. |
| **Figure 12** |  | Riverbanks of *Kali* Pepe (Downstream of Bengawan Solo River) | The riverbank area should be reorganized by constructing houses facing the river. This arrangement aims to enhance the aesthetic appeal of the riverfront while facilitating the implementation of river tourism activities. |

Sources: Researcher Documentations, 2023–2024

Based on the documentation presented in Table 3, field observations as of October 2023 reveal a number of untapped opportunities that can be developed to enhance tourism performance in the area. As depicted in Figure 10, two mini stages are located on the northern and southern banks of Tirtonadi Weir. Rather than serving as passive structures, these stages could be activated through scheduled performing arts events such as live music, traditional dances, or community-based theatre. By programming evening performances on a regular basis, these spaces would support the development of local creative economies and increase night-time tourism. This proposal represents an effective SO strategy, wherein the site's spatial assets (strength) are synergised with the opportunity to create cultural events that enhance visitor engagement and length of stay.

In terms of adventure tourism, Figure 11 documents the existing use of the weir for Search and Rescue (SAR) training, demonstrating that the water volume and flow dynamics are sufficient for water-based activities. Building upon this, the development of recreational infrastructure such as whitewater rafting, *praon* tours, or guided speedboat routes offers a promising opportunity (O) for experiential and exploratory tourism. By addressing the current lack of water transportation facilities (a known weakness (W)), this initiative also represents a WO strategy, transforming infrastructural deficiencies into platforms for new service offerings. This aligns with broader tourism trends that prioritise active, outdoor, and nature-based experiences, particularly among younger and eco-conscious tourists.

Another significant opportunity lies in the reorganisation of residential areas along the banks of *Kali* Pepe, as illustrated in Figure 12, these settlements currently face away from the river and lack aesthetic integration with the tourism environment. Inspired by successful models like *Kali* Code in Yogyakarta, houses can be repositioned to face the river, enhanced with colourful façades or traditional Joglo architectural features (Rosyada, 2018; Rosyada et al., 2021; Safitri, 2018). This approach not only improves visual coherence but also fosters a sense of place, transforming the riverside into an iconic urban-scape that supports photo tourism and cultural appreciation. This opportunity also extends to culinary tourism with the development of a food court or *kuliner malam* centre on the northern bank could serve as a complementary destination to existing culinary hubs such as Galabo and Kota Barat (Maharamah, 2018).

From the perspective of sustainable tourism, *Kali* Pepe–Tirtonadi Weir presents clear potential to adopt best practices from international river tourism models, particularly the Nagara River in Japan. The

Nagara model integrates ecological preservation with tourism accessibility through stakeholder engagement, scientific monitoring, and long-term planning (Japan International Cooperation Agency, 2022; Takahasi, 1997). Similar practices could be implemented in Surakarta through research collaborations with universities and local institutions focused on water management and environmental engineering. These partnerships could drive innovation in hydrological modelling, ecosystem restoration, and climate adaptation all of which strengthen the destination's credibility as a responsible tourism site.

Furthermore, business sector engagement, such as the adopt a river programme, has been successfully implemented in Japan and could be replicated in Surakarta to encourage private sector participation in river maintenance and infrastructure support. This not only diversifies funding sources but also enhances social responsibility across industries. Moreover, the integration of *Kali* Pepe–Tirtonadi Weir into the wider cultural and culinary tourism framework of Surakarta would mirror the holistic tourism model of the Nagara River, where river-based experiences are seamlessly linked to local heritage, crafts, and gastronomy.

In conclusion, the development opportunities of *Kali* Pepe–Tirtonadi Weir, as illustrated in Figures 10 to 12, represent a convergence of cultural, recreational, spatial, and institutional potentials. When strategically aligned with the site's internal strengths and reinforced through solutions to existing weaknesses, these opportunities can drive the transformation of *Kali* Pepe into a vibrant, integrated, and sustainable urban river tourism destination.

**Competitive Threats from Domestic and International Competitors (T)**

According to Helms and Nixon (2010), threats are external forces such as environmental degradation, political shifts, or competing destinations that could negatively impact tourism growth or sustainability (Helms & Nixon, 2010). In the tourism context, threats can emerge from regulatory changes, environmental vulnerabilities, competitive pressures, or socio-political instability. These threats pose serious challenges to the sustainable development and positioning of a destination in the tourism market (Houben et al., 1999; Noviastuti et al., 2023). For *Kali* Pepe–Tirtonadi Weir, these challenges are both environmental and competitive, and require appropriate responses through ST (Strength–Threat) and WT (Weakness–Threat) strategies, as conceptualised by Weihrich (1982) in the TOWS Matrix.

**Table 4. Competitor Threat Analysis (T) of *Kali* Pepe-Tirtonadi Weir**

| | Figures | Object Description | Development Potential |
|---|---|---|---|
| **Figure 13** |  | *Kali* Code Riverbank, Yogyakarta | Water tourism utilizing river flows can be implemented if the Surakarta City Tourism Development Master Plan (RIPPARDA) is well-organized. Code River serves as a strong reference and an ideal location for comparative study. |

| | | | |
|---|---|---|---|
| **Figure 14** |  | Maron River Tourism, Pacitan | Maron River in Pacitan is a rapidly growing competitor. This development is largely driven by the optimization efforts of the local tourism department and active participation of the local community. |
| **Figure 15** |  | Nagara River Tourism, Japan | As one of the three cleanest rivers in Japan, the Nagara River represents an ideal model for sustainable water tourism development, demonstrating excellent management and conservation practices. |

Source: Researcher's Documentation, 2023–2024

Based on the comparative data shown in Table 4, *Kali* Pepe faces mounting threats from well-developed river tourism sites, both domestically and internationally. As seen in Figure 13, the revitalisation of the *Kali* Code Riverbank in Yogyakarta demonstrates how aesthetic urban design and community engagement can transform a neglected river into a prominent tourism destination. Colourful river-facing houses and pedestrian pathways have enhanced the visual identity of the Code River, making it a popular cultural attraction. This directly threatens *Kali* Pepe's competitiveness, especially given the similarities in spatial structure and cultural potential. To counter this, ST strategies must be implemented to leverage *Kali* Pepe's strengths—such as its central location, spiritual heritage, and institutional support (as identified in the RIPPARDA 2016–2026), to differentiate and brand itself uniquely.

Another external threat is presented by the Maron River in Pacitan, as shown in Figure 14. Known for its clear water, lush natural scenery, and immersive river exploration experiences, Maron River has gained popularity through proactive tourism agency involvement and active community participation. It has branded itself as The Amazon of Java, illustrating how effective marketing, supported by ecological management, can rapidly elevate a rural destination. Compared to this, *Kali* Pepe still suffers from image limitations and low visitor engagement. In this case, WT strategies are necessary acknowledging the site's current weaknesses (e.g. limited community involvement, pollution, inadequate infrastructure) while taking steps to minimise the impact of external threats through revitalisation, participation programmes, and environmental rehabilitation.

Additionally, international benchmarks such as the Nagara River in Japan, shown in Figure 15, serve both as inspiration and as competitive pressure. Recognised as one of Japan's cleanest rivers, the Nagara River is supported by strong community stewardship, environmentally focused policies, and extensive tourism infrastructure. It integrates nature conservation, traditional cultural practices (*ukai* fishing), and innovation in water management. The existence of such a global example not only sets a high standard but also raises visitor expectations for environmental quality and tourism services. If left unaddressed, this gap could further marginalise *Kali* Pepe in the domestic tourism map. Therefore, adapting Nagara's model through strategic partnerships with universities, Adopt a River initiatives, and e-flow environmental practices represents a feasible

response that blends local conditions with international best practices (Japan International Cooperation Agency (JICA), 2022; Siagian et al., 2023; Sippel, 2000).

Other non-competitive threats include pollution, sedimentation, and the lack of consistent water quality monitoring. These risks, while often categorised as environmental, are deeply interconnected with institutional challenges such as fragmented governance and low enforcement of regulations, issues that have also affected Japanese rivers before integrated management was adopted (Takahasi, 1997). Therefore, WT strategies focused on strengthening regulatory coordination, environmental monitoring, and climate resilience should become an integral part of tourism planning for *Kali* Pepe.

Importantly, while these domestic and international destinations may seem threatening, they also offer valuable models for reflection and adaptation. As exemplified by the Nagara River's success, the convergence of community involvement, policy commitment, and ecological management can yield lasting transformation. Similarly, the revitalisation of *Kali* Code in Yogyakarta reflects how urban riverfronts can be repurposed into cultural and recreational spaces through relatively low-cost interventions and stakeholder cooperation. Thus, rather than being merely a source of concern, these comparators can act as opportunities to learn and innovate, as long as *Kali* Pepe's development strategies are adapted responsively and inclusively.

In conclusion, the competitive threats faced by *Kali* Pepe–Tirtonadi Weir, as shown in Figures 13 to 15, necessitate a dual approach: leveraging internal strengths through ST strategies to assert its unique value, and simultaneously addressing existing weaknesses through WT strategies to reduce vulnerability. Only through such integrated, adaptive planning can *Kali* Pepe rise as a competitive, resilient, and culturally distinctive river tourism destination in Indonesia's evolving tourism landscape.

**Community Involvement in the Management of *Kali* Pepe-Tirtonadi Weir Tourism**

The success of river-based tourism management is not solely determined by infrastructure and government policies, but also by the level of community involvement. The case of the Nagara River in Japan illustrates how long-term civic participation can support environmental preservation and sustainable tourism development (Sato et al., 2018; Wiyatasari, 2023). In the context of *Kali* Pepe–Tirtonadi Weir, similar strategies can be adapted through locally grounded programs, as described below:

*Environmental Education*

Educational programs involving schools, local communities, and environmental organizations can help raise awareness about the importance of maintaining river cleanliness. According to Takahasi (1997) and Siagian et al. (2023), early environmental education fosters civic responsibility and sustainable behaviour such as

a. Public awareness campaigns on the impact of river pollution and its management strategies, possibly in collaboration with institutions such as *Papan Kawruh Tirta* and Universitas Sebelas Maret (UNS) Surakarta.
b. River School Program (*Sekolah Sungai*), where students are encouraged to learn about river ecosystems and actively participate in clean-up and conservation efforts (Siagian et al., 2023).
c. Training programs for local residents on sustainable water tourism management and ecotourism principles.

*Adopt a River Program*

The "Adopt a River" concept can be implemented by engaging communities or businesses to take responsibility for specific segments of *Kali* Pepe. This strategy is inspired by successful community-based

river governance models in Japan and has been recognized for enhancing environmental quality and social cohesion (Damayanti et al., 2015);

a. Communities or companies adopt and regularly maintain river sections through clean-up activities and basic environmental monitoring.
b. Greening initiatives through tree planting and riverbank landscaping to restore riparian buffers.
c. Routine collaborative clean-up events led by resident groups, student organisations, and city authorities, formalized through local agreements or CSR partnerships.

*Water Tourism Festival*

To foster community pride and boost tourism, an annual Water Tourism Festival could be held, taking inspiration from the success of river festivals in Yogyakarta and Pacitan (Brontowiyono et al., 2010; Maharamah, 2018);

a. Decorated boat parades with traditional themes, involving local artists and youth groups.
b. MSME exhibitions featuring culinary products, crafts, and community enterprises along the northern bank of Tirtonadi Weir.
c. Cultural performances such as *wayang*, *gamelan*, and traditional dance, held on the mini stage at Tirtonadi Park to enhance nighttime tourism appeal.

By implementing these strategies, the local community will not merely act as spectators but become active agents in the preservation and sustainable development of *Kali* Pepe–Tirtonadi Weir tourism. These approaches also align with the city's long-term tourism plan as stated in RIPPARDA 2016–2026 (Rencana Induk Pembangunan Kepariwisataan Daerah Tahun 2016-2026 Kota Surakarta, 2016).

## E. CONCLUSION

Following the COVID-19 pandemic, the impact was not limited to the healthcare sector but also significantly affected the tourism industry. The decline in tourist numbers and the reduction in income for business operators have emerged as major challenges in the recovery of this sector. Comparative analysis, data processing, and research have revealed fundamental differences in management and community participation between the *Kali* Pepe-Tirtonadi Weir in Surakarta and the Nagara River in Japan. These differences are primarily due to long-term tourism planning, revitalisation processes, and the river management policies implemented by the respective stakeholders. For *Kali* Pepe-Tirtonadi Weir to develop into a premier water tourism destination in Surakarta, a sustainable strategy is required, one that encompasses infrastructure enhancement, public education on the importance of maintaining river cleanliness and conservation, and integration with other tourist attractions in Surakarta. The awareness of communities residing along the riverbanks is a key factor in creating a sustainable tourism ecosystem that appeals to visitors.

To establish *Kali* Pepe-Tirtonadi Weir as an icon of water tourism in Surakarta, a comprehensive and sustainable management strategy is necessary. Several measures that could be implemented include the enforcement of strict regulations on domestic waste disposal similar to the system employed at the Nagara River, which utilises incentives for residents participating in river conservation efforts. Additionally, the construction of environmentally friendly pedestrian pathways along Tirtonadi Weir could enhance its tourism appeal while linking this area to other tourist attractions in Surakarta. Community-based educational initiatives, such as the "River School", may also serve as strategic efforts to heighten public awareness about the importance of preserving river ecosystems. Beyond strengthening community involvement, it is crucial to upgrade the supporting facilities and infrastructure to ensure an improved visitor experience. With careful planning and further research on design and master planning for revitalisation, taking into

account environmental, social, and economic aspects, it is hoped that Tirtonadi Weir and the *Kali* Pepe waterway will evolve into an iconic water tourism destination in Surakarta.

While this study provides valuable insights into the comparative development of water-based tourism between *Kali* Pepe-Tirtonadi Weir in Surakarta and the Nagara River in Japan, several limitations must be acknowledged. The research primarily employs qualitative comparative analysis and SWOT methodology, which, while effective in identifying key aspects of tourism development, may not fully capture the complex socio-economic, environmental, and policy-driven factors shaping sustainable river tourism. A more integrated mixed-methods approach, incorporating quantitative impact assessments, geospatial analysis, and stakeholder-driven evaluations, could provide a more comprehensive and empirically grounded perspective. Additionally, the study focuses on two specific river tourism models, limiting the generalizability of its findings to other regions with differing governance structures, ecological conditions, and socio-cultural dynamics. Future research should expand its scope to examine a broader range of river-based tourism destinations, incorporating cross-regional and cross-national comparisons to refine best practices in sustainable tourism management.

Furthermore, while this study highlights the role of community engagement in tourism sustainability, further exploration is needed to understand the behavioral, socio-cultural, and economic drivers influencing public participation in river conservation and tourism initiatives. Longitudinal studies assessing the long-term socio-economic and ecological impacts of water tourism policies would be essential in developing adaptive and resilient tourism strategies. Additionally, integrating perspectives on technological advancements in river conservation, climate adaptation measures, and the role of cultural heritage tourism could provide a more holistic framework for sustainable river tourism development. These future directions will be instrumental in enhancing the viability and competitiveness of river-based tourism as a key component of urban and environmental planning.

## F. CONFLICT OF INTEREST AND ETHICAL STANDARDS

The authors declare that there is no conflict of interest in this research. This study was conducted in accordance with ethical standards, ensuring objectivity, integrity, and adherence to academic and professional guidelines. No external parties influenced the research process, findings, or conclusions.

## G. ACKNOWLEDGEMENT

The author extends gratitude to *Lembaga Pengelola Dana Pendidikan* (LPDP) for their support in funding the research and publication of this article under the scholarship.

## REFERENCES

Afif, M. A. (2022). *Wangen River Tour, Wisata Susur Sungai Sambil Menikmati Keindahan Alam.* Metro TV News. Retrieved from https://www.metrotvnews.com/play/NQAC2Lel-wangen-river-tour-wisata-susur-sungai-sambil-menikmati-keindahan-alam

Andika, I. (2022). *Pengembangan Pariwisata Berbasis Masyarakat (Community Based Tourism) di Sungai Maron Desa Dersono Kecamatan Pringkuku Kabupaten Pacitan*. (Bachelor Thesis, STP AMPTA Yogyakarta).

Andriyani, D. Y. (2022). Analisa Potensi Taman Bendungan (Sebagai Public Space) depan Terminal Tirtonadi Berdasarkan Konsep Waterfront Design. In *Prosiding (SIAR) Seminar Ilmiah Arsitektur* (pp. 419-428).

Arikunto, S. (2010). *Prosedur Penelitian: Suatu Pendekatan Praktik (14th ed.)*. Jakarta: Rineka Cipta.

Brontowiyono, W., Lupiyanto, R., & Wijaya, D. (2010). Pengelolaan Kawasan Sungai Code Berbasis Masyarakat. *Jurnal Sains & Teknologi Lingkungan, 2*(1), 7–20. https://doi.org/10.20885/jstl.vol2.iss1.art2

Cahyani, I. A. (2018). *Perjanjian Konsultan Pengawas (Studi Tentang Perjanjian Antara CV. Harsa Graha Dengan DPU Kota Surakarta dalam Penataan Bantaran Kali Pepe)*. (Bachelor Thesis, Universitas Muhammadiyah Surakarta).

Chakraborty, A. (2013). Developing rivers: How strong state and bureaucracy continue to suffocate environment-oriented river governance in japan. *SAGE Open, 3*(4), 1–13. https://doi.org/10.1177/2158244013501329

Damayanti, R. E. P., Nurhadi, K., & Andini, I. (2015). Pengaruh Revitalisasi Sungai terhadap Kinerja Sistem Drainase Kali Pepe Hilir Kota Surakarta. *Region: Jurnal Pembangunan Wilayah Dan Perencanaan Partisipatif, 6*(2), 51-60. https://doi.org/10.20961/region.v6i2.8486

Darmastuti, A. J., Wardana, A. W., & Nirawati, M. A. (2018). Alternative use of space in slum settlements case study: Kampong Gandekan Kampung Baru in Kali Pepe river Surakarta. In *AIP Conference Proceedings* (Vol. 1931, No. 1, p. 030071). AIP Publishing LLC. https://doi.org/10.1063/1.5024130

Faisal, F. (2024). Policies and Strategies for Green Tourism Development of the Jeneberang River Area in Makassar City. *Jurnal Kepariwisataan: Destinasi, Hospitalitas dan Perjalanan, 8*(2), 285–297. https://doi.org/10.34013/jk.v8i2.1792

Fitrianto, A. D. (2014). *Penataan Waterfront Kali Pepe dengan Studi Kasus Kawasan Pecinan Surakarta*. (Bachelor Thesis, Universitas Muhammadiyah Surakarta).

Fletcher, J., Fyall, A., Gilbert, D., & Wanhill, S. (2018). *Tourism: Principles and Practice (6th ed.)*. London: Pearson Education Limited.

Geertz, C. (1976). *The Religion of Java*. Chicago: University of Chicago Press.

Gunaisah, E., Ismail, & Poltak, H. (2022). Studi Komparatif Penurunan Pendapatan Pada Wisata Pantai Alami dan Amenitas Wisata Pantai Akibat Pandemi Covid-19. *Jurnal Kepariwisataan: Destinasi, Hospitalitas dan Perjalanan, 6*(1), 85–95. https://doi.org/10.34013/jk.v6i1.195

Gürel, E., & Tat, M. (2017). SWOT Analysis: A Theoritical Review. *Journal of International Social Research, 10*(51), 994–1006. https://doi.org/10.17719/jisr.2017.1832

Handayani, K. N., & Miladan, N. (2020). A community-based approach to riverine management of the Kali Pepe in Surakarta. In *IOP Conference Series: Earth and Environmental Science (Vol. 447, No. 1, p. 012024). IOP Publishing*. https://doi.org/10.1088/1755-1315/447/1/012024

Harvianto, M. T., & Utami, T. (2022). Perilaku Sosial Masyarakat dalam Upaya Menciptakan Kebersihan Lingkungan Bantaran Sungai Kali Pepe Kota Surakarta. *Journal of Development and Social Change, 5*(2), 32–46. https://doi.org/10.20961/jodasc.v5i2.62885

Helms, M. M., & Nixon, J. (2010). Exploring SWOT analysis – where are we now*?. Journal of Strategy and Management, 3*(3), 215–251. https://doi.org/10.1108/17554251011064837

Houben, G., Lenie, K., & Vanhoof, K. (1999). A knowledge-based SWOT-analysis system as an instrument for strategic planning in small and medium sized enterprises. *Decision Support Systems, 26*(2), 125–135. https://doi.org/10.1016/S0167-9236(99)00024-X

Huang, L. K., Baig, M. F., & Noor, E. E. M. (2024). Innovative Solutions for Melaka's River Water Treatment. *Journal of Advanced Research in Fluid Mechanics and Thermal Sciences, 117*(2), 28–36. https://doi.org/10.37934/arfmts.117.2.2836

Japan International Cooperation Agency (JICA). (2022). *Japan's Experience on Water Resources Management. Nippon Koei.* Retrieved from https://openjicareport.jica.go.jp/pdf/1000047169_01.pdf

Jatengprov. (2019). *Piknik Pintar di Papan Kawruh Tirta*. Retrieved from https://jatengprov.go.id/beritadaerah/piknik-pintar-di-papan-kawruh-tirta/

Kayyisa, A. R. (2016). *Kali Pepe: Halaman Belakang Kehidupan Kota Solo (Studi Perubahan Tindakan Masyarakat Kampung Bantaran Kali Pepe).* (Bachelor Thesis, Universitas Muhammadiyah Surakarta).

Lee, M., & Jung, I. (2016). Assessment of an urban stream restoration project by cost-benefit analysis: The case of Cheonggyecheon stream in Seoul, South Korea. *KSCE Journal of Civil Engineering, 20*(1), 152–162. https://doi.org/10.1007/s12205-015-0633-4

Lestel, L., Meybeck, M., Carré, C., & Belliard, J. (2023). The Seine, the River dedicated to Paris. In *River culture: life as a dance to the rhythm of the waters* (pp. 673–697). UNESCO Publishing. https://doi.org/10.54677/CGDX8656

Maharamah, I. D. (2018). *Wisata Tepian Air Kali Pepe dengan Konsep Arsitektur Berkelanjutan di Daerah Pasar Gedhe Solo.* (Diploma thesis, Universitas Muhammadiyah Surakarta).

Mahendru, M., Arora, V., Chatterjee, R., Sharma, G. D., & Shahzadi, I. (2024). From Over-Tourism to Under-Tourism via COVID-19: Lessons for Sustainable Tourism Management. *Evaluation Review, 48*(1), 177–210. https://doi.org/10.1177/0193841X231189805

Miladan, N., Handayani, K. N., & Sadana, D. P. A. (2018). Tipologi Kawasan Berisiko Banjir Di Daerah Aliran Sungai (Das) Kali Pepe, Kota Surakarta. *Tataloka, 20*(2), 87-99. https://doi.org/10.14710/tataloka.20.2.87-99

Noviani, R., & Utomowati, R. (2024). Peningkatan Kapasitas Pokdarwis dalam Pengelolaan Ecokarst Tourism Sungai Maron. *SEMAR (Jurnal Ilmu Pengetahuan, Teknologi, dan Seni bagi Masyarakat), 13*(1), 1–8. https://doi.org/10.20961/semar.v13i1.79136

Noviastuti, N., Rachmadiyanti, I. M., & Putro, G. S. (2023). Strategi Pengelolaan Ekowisata Berbasis Masyarakat Di Panorama Pabangbon, Desa Pabangbon, Kecamatan Leuwiliang, Kabupaten Bogor, Provinsi Jawa Barat. *Khasanah Ilmu - Jurnal Pariwisata dan Budaya, 14*(2), 161–169. https://doi.org/10.31294/khi.v14i2.18782

Panagiotou, G. (2003). Bringing SWOT into Focus. *Business Strategy Review, 14*(2), 8–10. https://doi.org/10.1111/1467-8616.00253

Peraturan Pemerintah Republik Indonesia Nomor 38 Tahun 2011 Tentang Sungai (2011). Retrieved from https://bphn.go.id/data/documents/11pp038.pdf

Pranata, G. (2022). *Peran Serta Kali Anyar Mencegah Banjir di Surakarta Abad ke-16. National Geographic Indonesia*. Retrieved from https://nationalgeographic.grid.id/read/133415428/peran-serta-kali-anyar-mencegah-banjir-di-surakarta-abad-ke-16?page=all

Purwani, O. (2014). *Javanese Power: Silent Ideology and Built Environment of Yogyakarta and Surakarta*. (Doctoral Disertation, The University of Edinburgh).

Rencana Induk Pembangunan Kepariwisataan Daerah Tahun 2016-2026 Kota Surakarta, Pemerintah Kota Surakarta 1 (2016). Retrieved from https://jdih.surakarta.go.id/jdihsolo/proses/produkhukum/file/6054_PERDA_NO_13_TAHUN_2016_ver_ttd_GB.pdf

Ricklefs, M. C. (2012). *Islamisation and Its Opponents in Java: A political, social, cultural and religious history, c. 1930 to present*. Singapore: NUS Press Pte Ltd.

Romadhoni, E. G., Qomariyah, S., & Muttaqien, A. Y. (2017). Potensi Kali Pepe (Hilir) sebagai Infrastruktur Transportasi Air di Dalam Kota Solo. *Matriks Teknik Sipil*, *5*(1), 110–117. https://doi.org/10.20961/mateksi.v5i1.36945

Rosyada, N. D. (2018). *Prioritas Faktor dalam Pola Penanganan Permukiman Kumuh Bantaran Kali Pepe Kota Surakarta*. (Bachelor Thesis, Universitas Muhammadiyah Surakarta).

Rosyada, N. D., Hardiana, A., & Rahayu, P. (2021). Faktor prioritas dalam pola penanganan permukiman kumuh di bantaran sungai (Studi kasus: Kali Pepe, Kota Surakarta). *Region: Jurnal Pembangunan Wilayah dan Perencanaan Partisipatif, 16*(1), 45–57. https://doi.org/10.20961/region.v16i1.24904

Safitri, R. (2018). *Efektivitas Program Pembangunan Rumah Deret Kawasan Bantaran Kali Pepe Kota Surakarta*. (Bachelor Thesis, Universitas Muhammadiyah Surakarta).

Sato, A., Silapajarn, K., & Sulit, V. T. (2018). Tale of Two Successful Fisheries Management Schemes Adopted in Japan. *Fish for the People, 16*(3), 41–55.

Setyowati, S., Djunaedi, A., Pramitasari, D., & Sarwadi, A. (2020). The impact of the characteristics of riverbanks settlements on the sustainability of Kali Pepe Surakarta. In *IOP Conference Series: Earth and Environmental Science (Vol. 447, No. 1, p. 012054). IOP Publishing*. https://doi.org/10.1088/1755-1315/447/1/012054

Siagian, K., Sidabutar, I. F., & Koestoer, R. H. (2023). Optimization of integrated watershed recovery: comparison of management systems in Japan and Indonesia. *Journal of Placemaking and Streetscape Design, 1*(1), 12–18. https://doi.org/10.61511/jpstd.v1i1.2023.184

Sippel, P. (2000). Controlling the Nagara: changing approaches to water management in Japan. *Water Policy, 2*(4–5), 283–297. https://doi.org/10.1016/S1366-7017(00)00011-8

Takahasi, Y. (1997). Water Resource Development and the Environment in Japan. *International Journal of Water Resources Development, 13*(2), 181–186. https://doi.org/10.1080/07900629749818

Telfer, D. J., & Sharpley, R. (2007). *Tourism and Development in the Developing World (1st ed.)*. London: Routledge. https://doi.org/10.4324/9780203938041

Valentin, E. K. (2001). SWOT Analysis from a Resource-Based View. *Journal of Marketing Theory and Practice, 9*(2), 54–69. https://doi.org/10.1080/10696679.2001.11501891

Watanabe, T. (2021). Passing on the Culture of the Nagara River Basin. *2021 Top 100 Good Practice Story*. Retrieved from https://greendestinations.org/japan-passing-on-the-culture-of-the-nagara-river-basin/

Weihrich, H. (1982). The TOWS matrix—A tool for situational analysis. *Long Range Planning, 15*(2), 54–66. https://doi.org/10.1016/0024-6301(82)90120-0

WHO. (2024). Coronavirus Disease (COVID-19) Pandemic. *World Health Organization*. Retrieved from https://www.who.int/emergencies/diseases/novel-coronavirus-2019

Wibawa, I. P. U., & Qomarun, Q. (2020). Tingkat Kesesuaian Perda Solo Tentang Sungai di Kali Pepe Solo. In *Prosiding (SIAR) Seminar Ilmiah Arsitektur* (pp. 589-595). https://proceedings.ums.ac.id/siar/article/view/1864

Wibowo, A. R. (2016). *Partisipasi Masyarakat Terhadap Pemanfaatan Kali Pepe Sebagai Transportasi Air*. (Diploma thesis, Universitas Muhammadiyah Surakarta).

Widowati, N., Astuti, W., & Rahayu, M. J. (2017). Tingkat Kesiapan Kali Pepe untuk Dikembangakan sebagai Kawasan Wisata Berbasis Sungai di Kota Surakarta. *Arsitektura, 15*(1), 67–75. https://doi.org/10.20961/arst.v15i1.11394

Wiyatasari, R. (2023). Japanese Clean Culture in Support of Sustainable Tourism. In *Proceedings International Conference of Culture and Sustainable Development, (Vol. 1).* (pp. 587–592). Retrieved from https://proceedings.undip.ac.id/index.php/icocas/article/view/767