

Understanding Inland Water Transportation and Its Potential for Tourism: The Case of Navotas - Malabon River Boats in Metro Manila, Philippines

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Abstract: This study examines the Inland Water Transportation (IWT) system and its tourism potential using the case of the boats operating across the Navotas and Malabon Rivers in Metro Manila, Philippines as urban congestion and environmental issues grow, water-based transport can offer a fast and sustainable mobility solution. Using a qualitative case study approach, the research tries to understand the operations of manually operated “de-bugsay” boats and to explore their tourism potential. Data was gathered through document reviews, interviews, and field observations. Findings reveal that the IWT system offers affordable, zero-emission transport but faces challenges in safety, infrastructure, and governance. Only the Navotas City Government has incorporated the system into development plans but its role in tourism remains underexplored. The study emphasizes the need for improved safety standards, infrastructure, and policies, along with leveraging tourism to enhance the IWT system as a sustainable mobility option in the Philippines.

Keywords: Inland water transportation (IWT); transport system, Navotas-Malabon River; Boat; Sustainable local tourism; Urban Mobility

1. INTRODUCTION

Urban areas worldwide face persistent transportation challenges, including congestion, environmental pollution, and inadequate accessibility, particularly in developing countries such as the Philippines. Transport development efforts have traditionally prioritized land-based modes, often overlooking the potential of inland water transportation (IWT) as a sustainable and cost-effective mobility alternative. Yet many coastal and riverine cities possess waterways that remain largely underutilized despite their capacity to support urban mobility and contribute to local development. In the Philippines, historical underinvestment has constrained the development of IWT systems (Francisco & Lim, 2021). While Metro Manila’s Pasig River Ferry Service, which traverses eight cities, has received increasing attention and investment aimed at improving its operations (DENR, 2020), other localized water transport systems continue to function with limited recognition. Among these are the river transport services operating between Navotas and Malabon, where manually operated de-bugsay boats provide essential connectivity between Barangay Flores, Malabon City and Barangay San Roque, Navotas City, as well as between Barangay San Jose, Navotas City and Barangay Concepcion, Malabon City.

This study focuses on the Navotas–Malabon river boat system to examine its characteristics and explore its potential role in tourism development. Despite its historical and

socio-cultural significance, this localized IWT system remains largely overlooked as a tourism resource. Employing a qualitative case study approach, the research draws on key informant interviews, field observations, and document analysis to investigate the operations, functions, and opportunities associated with the de-bugsay boats. By examining this case, the study aims to demonstrate how inland water transportation can contribute not only to addressing urban mobility challenges but also to promoting environmental sustainability, preserving cultural heritage, and stimulating local economic development. In doing so, it draws insights from internationally recognized water-based transport and tourism systems, such as those found in Venice, Amsterdam, and Bangkok, to highlight the broader potential of integrating urban waterways into sustainable tourism and transport planning.

1.1 Background of Study

Globally, rapid urbanization and the surge in land-based transit demand have exposed significant sustainability challenges, with cities grappling with congested road networks, escalating pollution, and diminishing urban quality of life due to an over-reliance on fossil fuel-based vehicles (Korawat et al., 2023). This has spurred a reevaluation of traditional transport infrastructures and inspired the integration of cleaner, alternative solutions such as water-based transportation. At the national level, the National Capital Region (NCR) of the Philippines faces similar challenges, underscoring the need for sustainable and innovative mobility solutions.

With this context, the exploration of IWT in Navotas-Malabon River boats becomes particularly relevant, as these cities are uniquely positioned to leverage water-based transport solutions for both urban mobility and tourism appeal. Drawing inspiration from global examples like Venice, where water taxis and vaporetti form the backbone of the urban transport system, this study recognizes that stringent regulations and well-integrated multi-modal networks can transform water transportation into an efficient, sustainable, and community-focused development. This study aims to fill a critical gap in the literature by understanding water transportation systems in the case of boats crossing the Navotas-Malabon River and exploring the possible role of tourism in IWT development. Inland waterways can play a crucial role as transport routes, especially given the heavy traffic congestion often experienced in these cities. Utilizing inland waterways for transportation reduces the burden on road networks, offering efficient and direct routes free from land traffic delays (Boquet, 2017). Integrating water transport not only alleviates congestion but also brings notable environmental benefits, such as lower per-passenger emissions, particularly when modern mitigation strategies like hybrid or electric propulsion systems are applied. Using IWT promotes sustainable transport by reducing the carbon footprint and minimizing air pollution in densely populated areas (Calderón-Rivera, Bartusevičienė, and Ballini, 2024). By integrating IWT into urban transport systems, cities can create a more resilient and diversified transportation network that supports economic growth, enhances mobility, and improves the quality of life for passengers and tourists (Choi, Oh, & Chon, 2021).

1.2 Statement of the Problem

In the Philippines, water transportation, such as boats, also plays a significant role in the movement of people and goods, particularly in coastal and riverine areas (National Economic and Development Authority, 2017). However, the study of inland water transportation (IWT),

like boats in general, and from a tourism perspective, remains largely underexplored (Kalahe and Mudunkotuwa, 2020). Despite its importance, the body of knowledge on the potential of IWT in the tourism sector remains limited (Calderón-Rivera, Bartusevičienė, and Ballini, 2024), particularly in the context of urban destinations.

Using the case of the boats crossing the Navotas-Malabon river, this study aims to understand the IWT in the Philippines and explore its possible role in tourism. It seeks to recognize the role of IWT, its challenges and opportunities, and explore its potential contribution to the tourism sector. To achieve this, the study focuses on specific areas of inquiry:

- Understanding the different types of boats and their roles, including their tourism purposes.
- Assessment of related infrastructure as well as governance and management structure in the study area.
- A review of the related policies governing the system of operation and exploring the role of tourism in the process, how passengers' views were incorporated into operations, and the opportunities and challenges faced in the study area.

1.3 Objectives of the Study

The primary aim of this study is to understand the IWT system in the Philippines using the Navotas-Malabon River boats and explore its role in tourism.

The specific objectives of this study include the following:

- To identify and understand the water mode used in the study area, the related infrastructure and systems of operation, including the governance and management system.
- To investigate the IWT system in urban areas using the case of Navotas-Malabon River boats, and explore tourism opportunities and challenges.

1.4 Significance of the Study

This study is significant as it serves as an initial study of the IWT system in the Philippines, its tourism role in the context of sustainability. It can serve as a baseline for integrating IWT into sustainable local tourism development and urban planning, providing valuable insights into current operations, infrastructure, and governance. By shedding light on the opportunities and challenges of IWT, the study encourages the appreciation of inland waters and their potential role in sustainable local tourism development. Additionally, its findings can inform local government units in policy formulation, collaborations, and infrastructure planning, contributing to improved water transport services and enhanced socio-economic benefits for communities.

1.5 Scope and Limitations

This study focuses on the operations of inland water transport (IWT) such as the boats operating along the Navotas-Malabon River, specifically examining the routes from Badeo Quatro Ferry Terminal, Brgy. Flores, Malabon City to Badeo Quatro Ferry Terminal, Brgy. San Roque, Navotas City, and from Badeo Tres Ferry Terminal, Brgy. San Jose, Navotas City to Badeo Tres Ferry Terminal, Brgy. Conception, Malabon City. It is important to note that these terminals at Navotas-Malabon River are officially named "Badeo Tres Ferry Terminal" and "Badeo Quatro

Ferry Terminal" in maps and local permits; the terminal primarily serves boats. Also, the operator does not distinguish between boats and ferries and thus uses the term "ferry terminal" to refer to these boat terminals. It aims to understand the IWT system, specifically regarding boats found in the Navotas-Malabon River, and explores its role in tourism. As an exploratory study, its scope is limited to providing a general understanding of the transport system in the study area.

2. REVIEW OF RELATED LITERATURE

2.1 Introduction

The Inland Water Transportation (IWT) is a practical mode of fast and sustainable mobility in riverine and coastal cities, driven by the urgency of urban traffic congestion, escalating pollution, and the demand for cleaner transport options. IWT is defined as the movement of people and goods on navigable waterways such as rivers, canals, and lakes, offering an essential alternative for urban mobility and enhancing connectivity (Maersk, 2024). It is recognized as an environmentally friendly and cost-effective transport mode for both commuters and tourists, with well-integrated ferry networks globally connecting with land-based transport systems for seamless passenger movement.

Historically, IWT in the Philippines, including the use of boats, dates back to the 1800s, serving as a vital means of transporting people and goods across numerous rivers and inland waterways (Andoon, 2019). Areas like Navotas and Malabon specifically utilized their extensive river networks for transport during this period, and IWT also played a role in promoting cultural heritage and enhancing travel experiences. Despite being an archipelagic nation, the Philippines has historically underinvested in its water transport sector. While Metro Manila has notably focused on the Pasig River for urban mobility and environmental rejuvenation, other cities like Malabon and Navotas can be seen operating water transportation modes for mobility purposes..

2.2 Global models of IWT systems

Globally, a number of IWT systems can be observed. European examples include Venice, Italy, where the Vaporetto system serves as the public transport backbone, seamlessly integrated with land transport and major attractions (Lilliquist, 2025). Amsterdam's canal transport system (water buses and taxis) facilitates commuting and tourism with a commitment to sustainability, including solar-powered boats (Duin and Kortmann, 2014). Stockholm, Sweden, features a well-integrated water transport system connecting islands with the mainland, smoothly linked with bus and train networks (Tanko, Burke, and Cheemakurthy, 2018). Common themes among these European models are their high degree of integration with land systems, commitment to sustainability, efficient environmental regulations, and dual function for commuters and tourists.

In Latin America, Buenos Aires, Argentina's Rio de la Plata system, provides vital connectivity for commuters and tourists (Balgun, Maiztegui, Colautti, 2016), while in the Amazon Basin of Brazil, IWT is the primary mode linking remote communities with significant social and economic benefits (Santos de Lima et al., 2024). These Latin American models emphasize regional connectivity, social inclusion, and dual use for commuting and tourism.

Within ASEAN, Bangkok, Thailand's Chao Phraya Express Boat is a large public transportation network well-connected with other transit systems, effectively decongesting traffic

and improving accessibility (Chao Phraya Express Boat, 2025). It also has boats for tourism purposes, such as those near canal markets. Singapore's river cruise and water bus services provide efficient transit options connecting commuters to key tourist destinations (Qing, 2022).

2.2.1 IWT System Components

Moving to the IWT system components, the detailed modes of transport note that international examples utilize diverse vessels. Thailand and Brazil primarily use motorized boats of various sizes for passengers and cargo (Da Silva et al., 2022; Reuters, 2023). Venice, Italy, uses motorized water taxis, larger passenger boats, and gondolas, with efforts towards electric drives (Encyclopaedia Britannica, n.d.; The Times, 2023). Amsterdam also has a highly motorized scene, aiming for emission-free passenger boats by 2025 (Amsterdam.nl, n.d.; Port of Amsterdam, n.d.).

Regarding related infrastructure, nations like Brazil, Argentina, Italy, and Thailand provide essential infrastructure such as ports, berths, access roads, and safety gear (ECLAC, 2016; OECD, 2024; World Bank, 2021). Basic amenities like waiting areas, ticketing services, and repair facilities are often present (ECLAC, 2016), though some areas may lack sanitation facilities or clean water (WHO, 2022).

The system of operation, governance, and management in these countries is known to be robust, including route planning, frequent maintenance, operator training, and emergency equipment deployment (IMO, n.d.; World Bank, 2020). Italy particularly excels in providing precise processes for passenger complaints, safety exercises, and communication with rescue authorities (European Commission, 2023; ACTV, 2022). Government roles often include regulation, licensing, infrastructure investment, personnel assistance, finance, training, safety inspection, and environmental sustainability, alongside marketing and social media presence.

The concept of sustainability in IWT systems integrates environmental, social, and economic factors. From an environmental standpoint, despite many IWT systems being motorized and thus having emissions, governments are actively working to reduce negative effects by incorporating pollution control, enforcing regulations, and encouraging cleaner fuels. Examples include Venice converting to electric boats (Venice Municipality, 2023) and Thailand monitoring water quality (ITF-OECD, 2024). Economically, IWT often provides cheap fares, making it an affordable means of movement for regular commuters (e.g., Bangkok, Brazil) (Chao Phraya Express Boat Company, n.d.; IFC, 2022), though some systems like Venice's water taxis are more costly and primarily serve tourists (Encyclopaedia Britannica, n.d.; The Times, 2023). Socially, community involvement is crucial, with water transportation being an essential aspect of urban life that residents depend on for commerce, commuting, and cultural events (e.g., Thailand, Venice, Brazil) (IFC, 2022; Venice Tourism Board, 2021).

2.3 Summary of the related literature

This study notes that globally, effective IWT systems are built on effective modes, well-established infrastructure, effective governance, and environmentally friendly practices, integrating IWT into daily urban activities with government and community support to offer economic, social, and environmental benefits. In stark contrast, the Philippines, despite its waterway potential, lags behind in harnessing IWT for tourism or city development. Its current application is often utilitarian and functional, hindered by poor policy support, insufficient

infrastructure, and the absence of government support and proper management. The literature suggests that realizing IWT's potential in the local setting necessitates investment in infrastructure, policy reform, and increased research.

2.4 Conceptual framework

The conceptual framework of this study is guided by Tavanti's model and emphasizes the environmental, social, and economic dimensions of sustainability in relation to IWT components (mode, infrastructure, operations, governance) and the role of tourism. This framework highlights that a sustainable IWT system involves its modes, related infrastructure, and systems of operation and governance, all influencing and contributing to these three pillars. Environmentally, IWT offers a zero-emission alternative, reduces reliance on land-based infrastructure, and promotes sustainable infrastructure development. Socially, it emphasizes community engagement and poverty alleviation through livelihood opportunities. Economically, it enhances profit generation, improves urban mobility, and unlocks tourism potential. The framework stresses the holistic integration of these factors for a sustainable IWT system that supports tourism, transforming underutilized urban waterways into vibrant transport and tourism corridors.

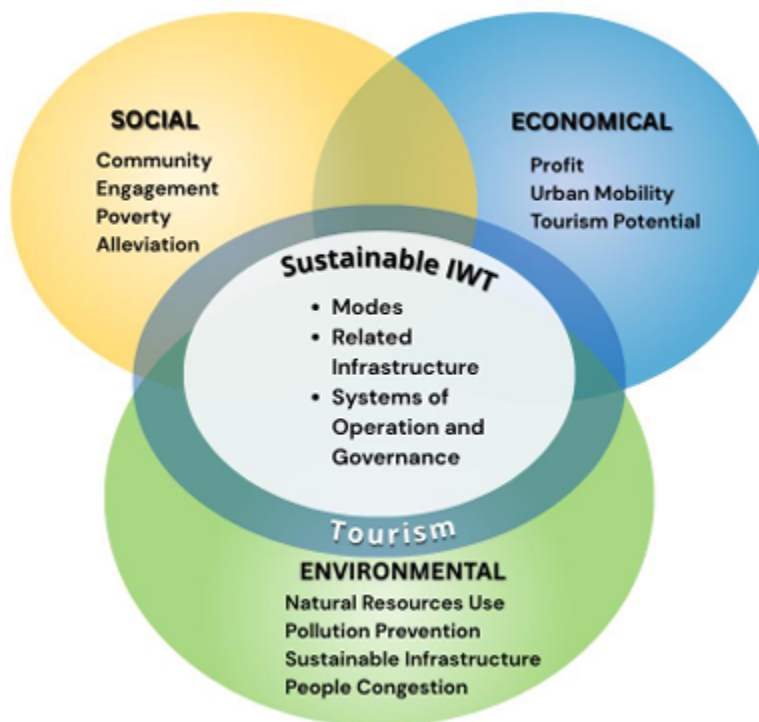


Figure 1: Conceptual Framework on IWT Sustainability

3. METHODOLOGY

The study employs a qualitative case study approach to understand the Inland Water Transportation (IWT) system and explore its potential role in tourism development.

3.1 Case Study Area

The research focuses on the Navotas-Malabon River in Metro Manila, specifically at two boat terminals: Badeo Quatro Ferry Terminal (connecting Brgy. Flores, Malabon City, and Brgy. San Roque, Navotas City) and Badeo Tres Ferry Terminal (connecting Brgy. Concepcion, Malabon City, and Brgy. San Jose, Navotas City). These areas were chosen due to their extensive waterways and rivers, positioning them to leverage water-based transport solutions for both urban mobility and tourism. The study highlights that the water transport route between these barangays is significantly shorter and faster by water (2 to 5 minutes for 137.29 meters), whereas land travel over the same origin and destination can take 17 to 30 minutes, covering a much longer distance of 4.9 to 6.4 kilometers due to indirect road networks, traffic congestion, and limited route connectivity.

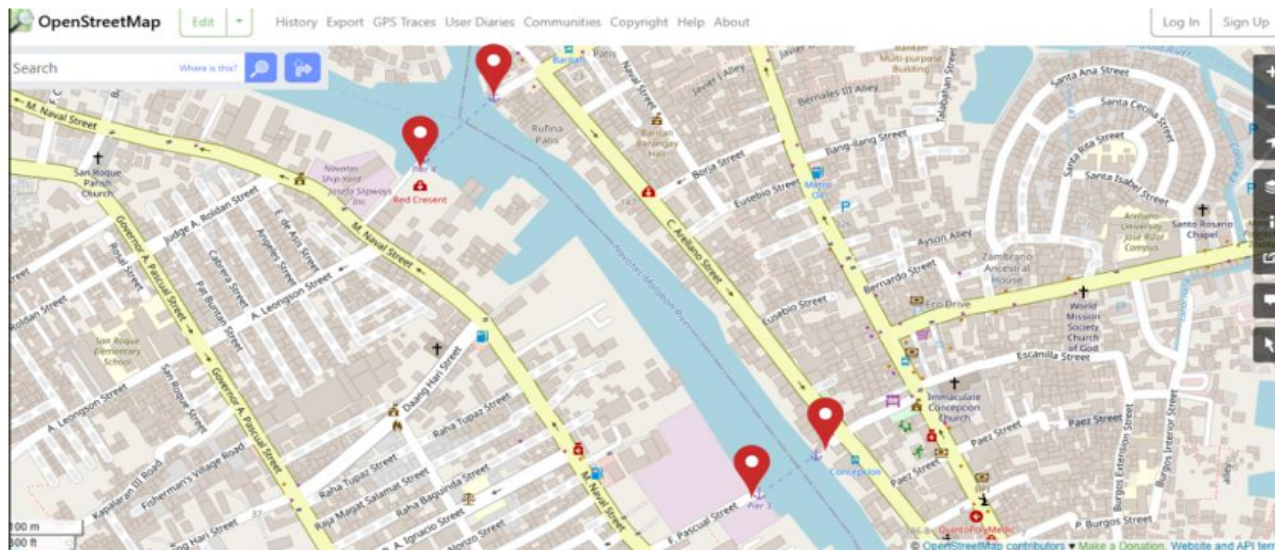


Figure 2: Map of Navotas-Malabon River showing the Badeo Tres and Badeo Quatro Ferry Terminals (Pier 3 and Pier 4)

3.2 Data Collection Methods

Data for this study were gathered through both primary and secondary sources. A total of 20 key informant interviews were conducted, comprising three main stakeholder groups: eight government officials, four boat operators, and eight boat passengers. Among the passengers, four were regular users while four were occasional visitors, ensuring a balanced perspective of usage patterns. Additionally, secondary data were sourced from official government documents such as Comprehensive Land Use Plans (CLUP), water transport ordinances, and reports issued by relevant local and national agencies.

Data was gathered using three primary methods:

- Semi-structured Interviews: Conducted with key stakeholders including boat passengers, boat operators (known as *bangkero*), and local government representatives (e.g., City

Planning and Development Officers, City Tourism officers, City Treasury officers, Barangay Captains). These interviews aimed to gather qualitative insights into operational challenges, management practices, and the integration of tourism considerations.

- **Field Observations:** Researchers directly observed operations at the boat terminals, assessing the condition of boats, infrastructure, safety measures, boarding procedures, and overall passenger handling, including the behaviors of commuters and tourists.
- **Document Reviews:** Relevant local government policies, operational manuals, regulatory frameworks, Comprehensive Land-Use Plans (CLUPs) of Malabon and Navotas, and official tourism brochures were analyzed to understand governance and regulatory aspects, as well as to identify quantitative data on boat operations.

This mixed-method approach provided a robust foundation for analyzing both operational and policy dimensions of the local water transport system.

3.3 Sampling and Ethics

A purposive sampling approach was used to select key informants with in-depth expertise in the water transportation system, while a convenience or random sampling approach was applied for boat passengers. Strict ethical standards were maintained, including obtaining informed consent, preserving confidentiality, and informing participants of their right to withdraw.

3.4 Data Analysis

The collected qualitative data underwent thematic analysis. This involved transcribing all data, developing an initial coding scheme based on literature and research questions, segmenting the data into meaningful units, and then grouping them into broader themes. The findings were cross-verified across multiple data sources to ensure consistency and reliability.

4. PRESENTATION, ANALYSIS, AND DISCUSSION

4.1 IWT System of Navotas-Malabon River

The IWT system in Navotas-Malabon River operates primarily through manually paddled boats, locally known as 'de-bugsay'. These boats are legally registered under various services, such as Ferry 3 Water Transport Service, Crossing Inland Passenger Water Transport, and Meriel Ferry Transport Service, and operate with permits from the Navotas and Malabon City governments. The operation of these boats along the river predates living memory, with some informants suggesting its existence since the "Kalakalang Galyon" (Galleon Trade) period (Encyclopaedia Britannica, n.d.), indicating its long-standing presence and sustainability.

The Navotas-Malabon River system provides a significantly faster and shorter travel alternative compared to land routes. For instance, a water route between Brgy. Flores to Brgy. San Roque, or Brgy. San Jose to Brgy. Concepcion is only 137.29 meters and takes 2 to 5 minutes by water, vastly quicker than the 4.9 to 6.4 kilometers and 17 to 30 minutes by land, especially considering traffic congestion.

4.2 Transportation Mode: Basic, Utilitarian, and Safety Concerns

The sole mode of IWT identified in the study area is the 'de-bugsay' boat, which is manually operated using fiberglass paddles. These boats vary in size, with Malabon's boats generally larger (carrying 5 to 18 people) than Navotas' (5 to 15 people). Fares are affordable, ranging from PHP 5 to PHP 10 per head (approximately USD 0.09 to USD 0.18), with an additional PHP 10 (around USD 0.18) charged for "special" trips where passengers request immediate departure. This affordability makes it a crucial, cheap water transportation option for daily commuters.

Despite their cultural significance and affordability, the design and amenities of the de-bugsay boats remain rudimentary and raise considerable safety concerns. Passenger comfort and protection are limited, as the boats are fully open and lack canopies or covers, leaving riders exposed to harsh weather conditions such as direct sunlight or rain. This absence of protective features compromises the overall usability and safety of the transport system, particularly during inclement weather.

Furthermore, the boats do not have designated seating arrangements. Passengers are typically instructed that they "can sit on the side of the boat," a practice that the researchers observed as a significant safety hazard. The lack of structured seating not only affects stability but also increases the risk of accidents, particularly during boarding, disembarkation, or when the boat is in motion.

Safety equipment on board is also notably insufficient. Most boats are equipped with only two to three life buoys, which are inadequate given the number of passengers typically transported. This deficiency is a recurring theme in passenger feedback, with many of whom expressed concerns and called for the provision of additional safety measures, particularly life jackets. The combination of minimal comfort, poor seating arrangements, and insufficient emergency equipment underscores the urgent need for design improvements and regulatory oversight to ensure passenger safety.



Figure 3: Badeo Quatro Boats at Malabon (Left Picture) and Navotas (Right picture)

4.3 Related Infrastructure: Critical Gaps and Maintenance Issues

The infrastructure at the Badeo Tres and Badeo Quatro ferry terminals is characterized as basic and largely inadequate, falling short of the standards expected for safe and accessible public transportation. Although both terminals are equipped with essential physical components such as docks, piers, stairs, and access roads, they lack critical accessibility features. Notably, there are no designated berths or gangways/ramps, compelling passengers to wade through the water when

boarding or disembarking—an issue that becomes particularly hazardous during rainy weather. The stairs are also often described as "mossy" and slippery, further increasing the risk of accidents.

In terms of safety and monitoring, the terminals are poorly equipped. There are no closed-circuit television (CCTV) cameras for surveillance, and lighting is insufficient, especially at night. While Navotas relies on conventional electric lighting, Malabon has made modest improvements through the use of solar-powered lights at Badeo Tres. The lack of visibility and surveillance contributes to a general sense of insecurity among passengers.

Basic commuter amenities are also absent. The terminals do not provide proper waiting areas, ticketing systems, restrooms, refreshment kiosks, or facilities for minor repairs. This absence of services not only affects the comfort of passengers but also undermines the potential of the ferry system as a viable and user-friendly mode of transportation.

Responsibility for maintenance and infrastructure improvements falls largely on private operators. City government involvement tends to be reactive rather than proactive—often limited to addressing safety concerns, responding to passenger complaints, or reviewing improvement proposals submitted by boat owners. This fragmented governance structure has contributed to the stagnation of infrastructure development, despite the ferry system's potential to serve as a sustainable and community-based transport alternative.

These infrastructural deficiencies "hamper the effectiveness of the terminals in handling commuters and tourists".

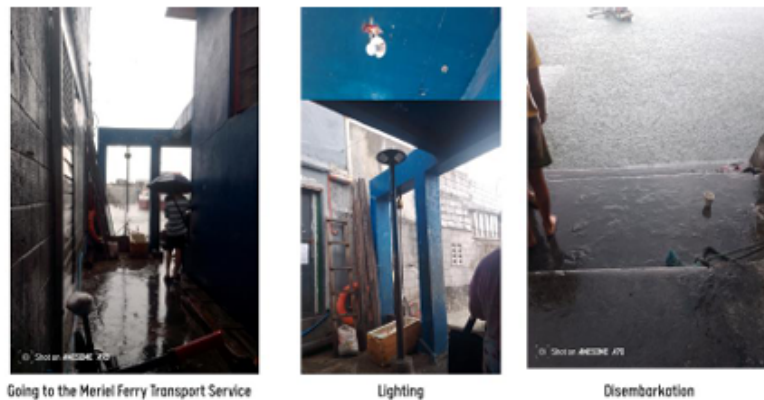


Figure 4: Photos of Meriel Ferry Transport service at Badeo Quatro Terminal Brgy. Flores, Malabon City



Figure 5: Photo Annotation of Meriel Ferry Transport Service at Badeo Quatro Terminal Brgy. Flores, Malabon City

4.4 System of Operation, Governance, and Management: Informality and Limited Support

The IWT system operates largely within an informal economy. While boat services are licensed and registered, the Business Permits and Licensing Office (BPLO) primarily handles administrative purposes (payment verification, submitted forms) and does not validate boat operator qualifications or require training certificates.

4.4.1 Boat Operators' Conditions:

Ferry boat operators (*bangkero*) in the Navotas-Malabon informal inland water transport (IWT) system work under challenging and precarious conditions. They typically endure extended working hours, ranging from 11 to 13 hours daily, with some reporting shifts lasting up to 19 hours. Operations run on a 24/7 basis, yet operators are subject to a strict “no work, no pay” policy. They do not receive any formal employment benefits, including health insurance, social protection, performance incentives, bonuses, or access to formal training or certification programs.

Training for operators is informal and largely experiential. Most *bangkero* grew up along the riverbanks and acquired their skills from a young age through observation and hands-on practice. While this method reflects a deep cultural connection to the waterways, it also highlights a glaring institutional absence in the form of government-supported training and certification. The lack of standardized instruction poses significant concerns regarding safety, service quality, and long-term operator welfare.

Compensation structures among operators vary. Some receive a fixed daily wage of PHP 400 (approximately USD 7), while others earn based on the volume of passengers transported, after a portion known as the *tarya*—the boat owner’s share, typically ranging from PHP 1,000 to PHP 2,300 (USD 18 to USD 42)—is deducted. This system creates inconsistencies in income stability and contributes to economic insecurity for many operators, particularly during lean hours or off-peak seasons.

4.4.2 Operational Deficiencies:

The operations of the Navotas-Malabon informal inland water transport (IWT) system are largely characterized by the absence of formal procedures. There are no standardized systems for route planning, routine maintenance schedules, organized loading and unloading processes, passenger tracking mechanisms, regulated seating arrangements, or weather-responsive operational adjustments. This lack of structure undermines both service efficiency and passenger safety.

Safety protocols within the system remain informal and rudimentary. For instance, red and white lights are used during nighttime operations as makeshift signaling devices, while emergency communication often relies on shouting or clapping to alert nearby operators. Although life buoys are present on some boats, their number and accessibility are generally inadequate, limiting their effectiveness in actual emergencies.

While no major accidents have been officially recorded, minor incidents have occurred. These include passengers slipping on slippery stairs and intoxicated individuals falling into the water. The absence of proper incident documentation or reporting mechanisms further contributes to the system's informality and hampers efforts to improve safety standards.

Despite these challenges, the system does exhibit a degree of intermodal connectivity. All ferry terminals are linked to local land transport modes such as pedicabs, jeepneys, and tricycles, thereby enabling last-mile connectivity and extending the reach of the IWT system within the urban fabric. This linkage highlights the potential for better integration if formal planning and regulation were introduced.



Figure 6: Boat operator holding the rope to support de-bugsay boat

4.4.3 Government Support and Policies:

Local government unit (LGU) involvement in the Navotas-Malabon inland water transport (IWT) system is minimal and largely limited to basic administrative functions. Barangay and city-level offices generally lack engagement in critical areas such as regulatory enforcement beyond basic licensing, infrastructure development, provision of equipment, deployment of support personnel, and operational financing. This limited involvement has contributed to the persistence of informality and stagnation in the system's development.

A comparison between Navotas and Malabon reveals nuanced differences in institutional response. The Navotas City Planning and Development Office (CPDO) acknowledges the existence of the badeo ferry system but does not prioritize it, citing the absence of reported accidents as a reason to assume that operations are proceeding smoothly. As a result, the office focuses its efforts on other urban development projects. In contrast, Malabon's CPDO appears to have no active role in the planning, support, or regulation of the IWT system, indicating a deeper level of institutional disengagement.

Among city offices, only the City Treasury Office of Navotas demonstrates active involvement by collecting annual taxes or franchise fees from boat operators. This fiscal

engagement suggests that the city recognizes boat operations as part of its local transport system. However, this recognition is not matched by the provision of comprehensive regulatory, financial, or infrastructural support.

Moreover, the system suffers from a complete lack of promotion and digital presence. There is no social media outreach or marketing initiated by LGUs, rendering the IWT system underutilized and largely invisible within broader city-level mobility and tourism strategies. This invisibility limits both user awareness and the potential for policy integration.

Environmental management efforts are also viewed with skepticism. While barangays conduct periodic clean-up drives, these are often perceived as *pakitang-tao* or performative actions, lacking consistency and long-term impact. The continued presence of garbage along the waterways suggests irregular maintenance and the absence of effective environmental management strategies. The Department of Environment and Natural Resources (DENR) is similarly perceived to be neglectful in its responsibility to ensure river cleanliness, further highlighting the systemic lack of coordinated governance and environmental accountability.

4.5 Tourism Potential: Untapped despite Strategic Location

The study highlights that the Navotas-Malabon IWT system holds significant untapped potential for local tourism.

The boat terminals are strategically situated near a variety of cultural, culinary, and historical attractions in both cities, such as Navotas Centennial Park, San Jose Church, Navotaste FoodPark, the ancestral houses of Malabon, San Bartolome Church, and well-known local food destinations, including establishments serving *Pancit Malabon*. Traveling via the traditional *de-bugsay* boats provides a distinctive experience that evokes a sense of historical continuity, offering passengers a journey through the heritage and evolution of these water-based communities.

Moreover, the cities of Navotas and Malabon celebrate their rich aquatic culture through prominent river-related events, including Navotas' Pangisdaan Festival, which features boat races, and Malabon's Immaculate Concepcion Fluvial Procession and the Pagoda-Caracol Fluvial Parade. These festivals present opportunities for deeper cultural integration into the tourism landscape.

The water transport system is likewise utilized by a wide range of passengers—among them cyclists, culinary tourists, business professionals, and festival-goers—demonstrating its versatility and appeal across various interest groups.

4.6 Comparison with International Models:

The study compares the informal water transport system of Navotas-Malabon with successful international models in cities such as Venice, Amsterdam, Stockholm, Bangkok, Singapore, Brazil, and Argentina. These international systems share several key features: strong integration with land transport networks, investments in sustainable technologies like solar-powered boats (as seen in Amsterdam), and dual functionality for both commuters and tourists. They also benefit from robust governance through clear regulations, licensing systems, infrastructure investment, and environmental policies. Active promotion through marketing campaigns and social media further boosts their visibility and usage.

Among these, the Chao Phraya Express Boat in Bangkok stands out as a formalized and tourist-oriented system. It features strict safety measures, multiple route options, and full integration with land-based transport. This contrasts sharply with the more basic, informal, and community-centered operations in Navotas-Malabon.

4.7 IWT System Sustainability Concept

The study situates the informal inland water transport (IWT) system of Navotas and Malabon within a sustainability-oriented framework, adapted from Tavanti (2010), to evaluate its environmental, social, and economic dimensions. Tourism is considered a cross-cutting element influencing all three pillars.

Environmental Sustainability

The IWT system demonstrates several environmentally sustainable practices. The use of manually paddled de-bugsay boats ensures zero carbon emissions and contributes to reduced noise and water pollution, making them an inherently eco-friendly mode of transport. In terms of resource use, the construction of these boats relies primarily on locally sourced wood and fiberglass for paddles, reflecting a low-impact and resource-efficient approach. Additionally, all barangays involved in the system organize regular clean-up drives—conducted twice a month—as part of environmental maintenance. However, these efforts are widely perceived as inadequate, with persistent garbage accumulation and a noted lack of visible, long-term commitment from both local government units (LGUs) and the Department of Environment and Natural Resources (DENR). In terms of infrastructure, Malabon has taken initial steps toward sustainability by installing solar-powered lighting at its boat terminals. In contrast, Navotas continues to rely on conventional electricity sources.

Social Sustainability

Socially, the IWT system enhances mobility for various sectors of the population by offering an affordable and convenient transport option, particularly beneficial in flood-prone and traffic-congested areas. It improves accessibility for students, elderly residents, and workers. Beyond mobility, the system also contributes to community well-being by fostering social cohesion and cooperation among boat owners. Initiatives such as clean-up drives are indicative of civic engagement and community solidarity. Furthermore, the system supports poverty alleviation by generating daily income for boat owners, ranging from PHP 1,000 to PHP 2,300 (approximately USD 18 to USD 42), and operators, who earn around PHP 400 per day (roughly USD 7) or a share in daily profits. It also stimulates local economies through micro-enterprises, including food vendors operating near boat terminals.

Economic Sustainability

From an economic standpoint, the IWT system is considered cost-effective, relying on low-cost infrastructure and relatively inexpensive operations. However, its potential to contribute to the local tourism economy remains largely unrealized. While the system already offers cultural and

experiential value, it has yet to be formally integrated into tourism development plans. Realizing this potential will require stronger government commitment, strategic planning, and targeted investment to position the IWT system as a viable component of sustainable urban tourism.

4.8 Integration with City Planning

Navotas City explicitly integrates IWT into its Comprehensive Land-Use Plan (CLUP 2016–2025), aiming to enhance mobility and connectivity using sustainable transport modes, alleviate road congestion, and promote local livelihoods and disaster resilience through waterways. Navotas envisions itself as a "premier fishing capital with empowered citizens, resilient infrastructure, and a sustainable economy rooted in maritime excellence".

In contrast, while Malabon City acknowledges the historical importance of its waterways for transportation, its CLUP (2014–2020) does not explicitly prioritize or strongly integrate IWT as a central component of its urban development or mobility plans. Malabon's goals focus more broadly on nurturing its citizens, cultural preservation, and becoming a strategic growth hub. This highlights a "city-level governance gap" and a disparity in strategic planning between the two cities regarding their shared waterways.

To sum it up, the study found that the Navotas-Malabon IWT system is a vital, affordable, and environmentally friendly mode of transport for daily urban mobility and social connection. However, its potential is significantly constrained by inadequate infrastructure, limited government support, a lack of formal operational and safety standards, and an absence of proactive promotion. Realizing its full potential as a sustainable local tourism asset and a more efficient urban mobility solution would require substantial improvements in infrastructure, governance, safety, and active promotion, learning from more developed international examples.

5. CONCLUSION

This study aimed to understand the inland water transportation (IWT) system, specifically its boat services operating on the Navotas-Malabon River, specifically at the Badeo Tres and Badeo Quatro terminals, through the lens of tourism and to explore its potential role in sustainable local tourism development. Drawing upon a qualitative case study approach involving semi-structured interviews with key stakeholders, document analysis, and field observations, this research has provided valuable insights into the system's current state, its contributions, inherent challenges, and untapped potential.

The study found that the IWT system in the Navotas-Malabon River is fundamentally a vital, affordable, and grassroots mode of daily urban mobility for residents and occasional visitors. Primarily utilizing environmentally friendly and manually operated boats propelled by paddles (de-bugsay boats), these boats traverse the historically significant Navotas-Malabon River, serving as an essential transport link between neighboring barangays. The low fares underscore its affordability, particularly for the working-class and students. The system's manual operation inherently promotes environmental sustainability, producing zero carbon emissions and minimizing noise and water pollution. The use of locally sourced materials and community-led clean-up drives further enhances its environmental benefits. Economically, it supports urban mobility by alleviating road congestion, provides a dependable income for boat operators and owners, and sustains local micro enterprises around the terminals. Socially, it fosters community

interaction and enhances mobility for diverse groups, contributing to social cohesion.

However, the study concurrently brought to light significant limitations and challenges that hinder the system's efficiency, safety, and broader potential. The infrastructure, such as the terminals, is notably basic and inadequate; operational aspects are largely informal, and passenger feedback consistently highlights safety concerns, comfort issues, and the need for improved terminal management. In terms of governance, government support appears limited, primarily focused on basic safety/environmental standards and tax collection. There is a notable absence of comprehensive support for staff, infrastructure development, formal regulations, or systematic monitoring. Crucially, the complete lack of promotion and social media outreach represents a significant missed opportunity for increasing ridership and awareness, including for tourism purposes.

Despite these challenges, the IWT system holds untapped potential, particularly as a tourism asset. Its proximity to various cultural, food, and historical sites in both Navotas and Malabon offers a unique opportunity for integration into tourism experiences. However, this potential remains largely unrealized.

6. RECOMMENDATIONS AND IMPLICATIONS

The result of this study can be helpful to future research on transportation systems, urban planners, developers, and local governments of Navotas and Malabon City, or other cities that have inland water transportation like boats. In essence, this study's findings underscore that the Navotas-Malabon River IWT system, while currently basic and facing significant challenges, can be a valuable asset for sustainable urban mobility and holds considerable potential for tourism. Implementing the recommendations for improvements in infrastructure, safety, governance, and promotion, guided by the lessons learned from both local observation and international comparisons, is essential for its evolution into a more efficient, safe, and formally recognized component of the cities' transport and tourism landscape.

More specifically, this study recommends the following:

1. Improve Infrastructure Facilities

Investment is needed to upgrade the terminal, and this can include installing sufficient and reliable lighting systems (potentially solar-powered, similar to Malabon's Badeo Tres terminal), constructing safe and non-slip gangways or ramps to replace stairs, establishing adequate covered waiting areas with sufficient seating, providing basic sanitation facilities (restrooms), and installing surveillance systems (CCTV) at terminals for safety and monitoring. Waste management systems at terminals should also be improved.

2. Formalize Operations and Strengthen Safety

Operational procedures, currently largely informal, must be standardized and formalized. Mandatory provision and enforcement of life jackets for all passengers is critical, as passenger feedback highlights a lack of sufficient safety equipment. Boat operators should receive formal safety training covering emergency procedures and passenger assistance. Regular inspections of boats and terminals should be implemented to ensure seaworthiness and safety compliance.

Standardizing working hours and considering basic welfare for operators should also be explored.

3. Establish a Comprehensive Governance Framework on IWT Systems

LGUs need to move beyond limited oversight and tax collection to implement a more integrated governance structure. This involves developing clear regulations for IWT operations, including potentially standardized fares, capacity limits, and operational guidelines. A dedicated LGU unit or mechanism for regular and systematic monitoring of boats, terminals, and service quality is essential. Government support should include exploring training programs and welfare initiatives for operators. Enhanced coordination between City Planning, City Treasury, and especially City Tourism offices is necessary to align development efforts. Additionally, coordination with national-level agencies such as the Department of Transportation and the Department of Tourism is crucial to ensure a unified approach to regulations, safety standards, and sustainable local tourism development.

4. Integrate IWT into Tourism Promotion and Development

The significant potential of the IWT system as a tourism asset, given its proximity to cultural, food, and historical sites in Navotas and Malabon, is currently unrealized due to a lack of formal commitment and promotion. Additionally, there is a need to develop tourism products that go beyond just fiestas or fluvial parades, and consider factors such as weather, particularly during the summer months, to offer year-round attractions. This would help diversify the tourism experience and make better use of the system's potential. City Tourism offices should actively promote boat travel as a unique mode of access to nearby attractions. Developing simple route maps linking boat terminals to tourist spots and leveraging social media and traditional tourism channels for promotion are crucial steps. Collaboration with local businesses to create tourism packages could enhance IWT's appeal.

The findings of this study show several key implications for the stakeholders involved and for future considerations:

For Local Government Units (LGUs):

The study highlights the necessity for LGUs to formally recognize and integrate IWT as a crucial element of urban mobility and sustainable development. The identified deficiencies in infrastructure, safety, and governance imply that significant policy shifts and strategic investments are required to professionalize the system. Integrating IWT into broader urban planning efforts can contribute to alleviating road congestion and building a more resilient transport network.

For IWT Operators and Owners

The study implies that while providing a livelihood, the current informal operational model may need to evolve. Formalization, adherence to new regulations, potential participation in training programs, and possibly investing in safety or infrastructure upgrades (ideally with LGU support)

are potential changes. These adjustments, however, could lead to increased ridership, improved public trust, and potentially more stable or enhanced income through improved service quality and tourism integration.

For Commuters and Tourists

Implementing the recommendations, particularly those related to safety and infrastructure, would significantly improve the daily commuting experience, making it safer, more comfortable, and more reliable. For tourists, realizing IWT's potential creates a unique, environmentally friendly, and cost-effective way to access local attractions. This enhanced accessibility benefits both residents' quality of life and visitors' experiences.

For Urban Planning and Sustainable Development

The study demonstrates that even small-scale, grassroots IWT systems using simple modes like manually paddled boats (de-bugsay boats) can serve as vital components of urban mobility and contribute to environmental sustainability. Its low-cost and environmentally friendly nature makes it relevant for other water-rich urban areas facing congestion. Acknowledging and supporting such systems, potentially integrating them into broader urban transport networks as seen in international examples like Bangkok's Chao Phraya Express Boat (albeit on a much larger, more regulated scale), is crucial for achieving sustainable urban development goals.

For Future Research

This exploratory study opens several avenues for deeper investigation. Future research could conduct detailed economic analyses of proposed infrastructure upgrades and their potential return on investment, perform comprehensive market research on the tourism potential including specific target markets, analyze the social and economic impacts of formalizing operations on operators and the local community, and conduct quantitative environmental assessments comparing the IWT system to land-based alternatives. Comparative studies examining governance models and operational structures of similar small-scale IWT systems in other urban areas could also provide valuable insights.

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