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Study on the Planning of Public Bus Transport at Luang Prabang City

[1] Chansavath Bounyong, [2] Vinath Mekthanavanh, [3] Somsanook Bounxayyavong
[1] Public Works and Transport Office, LuangPrabang City, Lao
[2, 3] Faculty of Engineering, Souphanouvong University, Luang Prabang City, Lao

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Corresponding Author: **Chansavath Bounyong**

Abstract
This study aims to examine the current state of transportation and planning approaches for developing the public transport system within the urban area of Luang Prabang. The study area is defined along the city's main routes and surrounding zones. The research methodology involved interviewing experts from the urban development project, the Department of Transport in Luang Prabang, and planning specialists from the private sector, alongside the use of Geographic Information Systems (GIS) and SWOT analysis for data evaluation.
The study found that the main city routes extending from the Royal Road to the Pak Khan intersection have three designated pick-up and drop-off points with a high level of suitability. Meanwhile, the peripheral roads along the Mekong River and Nam Khan River, which are one-way streets, have six designated pick-up and drop-off points, also rated highly suitable. However, the provision of public transport services in Luang Prabang remains limited because the population still primarily uses private vehicles, and tourists tend to rely on transportation provided by guesthouses or hotels. Therefore, future development of public transport should consider using smaller vehicles that are appropriate for the city's urban layout, clearly organizing routes and pick-up/drop-off points, and expanding the network to provide access to communities and key tourist destinations. This approach should be integrated with support from multiple sectors to ensure that public transport services are sustainable, environmentally friendly, and contribute to a future system of efficient urban mobility.

Keywords: Transport Planning, Public Bus System, Urban Transportation, Luang Prabang

1. Introduction

Overall, the government is the central and unified manager of land transport throughout the country, with the Ministry of Public Works and Transport directly responsible for coordinating with the Ministry of Public Security, other ministries, agencies and local authorities (National Assembly, 2013) [15]. The capital city of Luang Prabang is a famous cultural and natural heritage city in Laos and the world. With the growth of tourism and its transformation into a sustainable development goal (United Nation, 2023), traffic in the city has increased rapidly, especially public buses (tuk-tuks and minibuses) which are the main means of transport for locals and tourists. However, the current bus system does not have a clear plan, causing many problems such as traffic congestion due to competition between different types of vehicles. Inefficient energy use because roads are not designed to suit the needs of service users. Environmental impacts such as emissions and noise. Land transportation within Luang Prabang may have been convenient in the past with shuttle services, but there are no public buses, causing difficulties for users of public transport services. The current reality is that there are no public buses on each route within Luang Prabang. There are also problems of disorder within Luang Prabang, such as: traffic problems, dilapidated public structures, encroachment on public areas, garbage and wastewater problems, the placement of barriers, and billboards. In general, the main traffic problems that are often encountered are as follows: 1) The problem of lack of police officers and skilled personnel to solve the problem, 2) Management and budget problems, 3) The problem of urban expansion and community growth, 4) The problem of disorderly people in using the road, 5) Problems related to law enforcement. In addition, traffic congestion in Luang Prabang is also caused by: due to the increase in vehicles, there is no public transport, there are no measures to limit the use of private cars in heritage areas, there is limited space to expand the width of the road to accommodate traffic, service providers and people in the area do not have their own parking spaces, people use public areas as private parking spaces, causing insufficient public parking spaces, parking on the roadside, law enforcement is not yet strict,

and driving etiquette is lacking (Luang Prabang Public Works and Transport Office, 2024) [18].

Research has shown that solving the problem of land transportation can be done in many ways, such as using public buses to focus on the importance and necessity of using public buses (Economic Research Institute for ASEAN and East Asia: ERIA, 2019). Buses can meet the travel needs of users across the country, and therefore the road transport system must have a comprehensive service system and service quality of buses. The use of public transport can solve other problems such as traffic congestion, pollution and environmental problems, energy conservation problems, and road accidents (Hayeesa, 2011). Therefore, the researcher is interested in studying the planning of public buses in the capital city of Luang Prabang to study the current transportation situation of public buses in Luang Prabang. Finding a route plan that is more efficient and in line with the needs of the community. Proposing a practical organizational method in coordination with relevant stakeholders. On the other hand, it is to respond to and support the achievement of the Sustainable Development Goal 11: Sustainable Cities and Communities (SDG 11). It is also a connection between bus systems and bus systems, management of bus route networks and bus route systems or network convenience to summarize as a guideline for planning bus. Improving urban transportation will be beneficial for the study and planning of public transportation systems, including the future urban management of the capital city of Luang Prabang.

2. Research objectives

1) To study the transportation situation in the heritage area in Luang Prabang.

2) To analyze the planning guidelines for the development of local buses in Luang Prabang.

3. Research methods

This research is a qualitative study. The data used in the research came from interviews with experts, academics, and entrepreneurs. The experts have more than 10 years of experience in planning the development of public transport networks. However, the Lao academics have a lot of experience in planning the development of public transport systems. They selected a sample group of 2 routes in the World Heritage Area as a case study. The research included the steps of creating interview tools, collecting data, and using GIS to analyze geographic data by analyzing map elements (Map Elements) such as routes, analyzing pick-up and drop-off points, distances from pick-up and drop-off points on routes within the World Heritage Area, pick-up and drop-off points for passengers, transit areas within the WHS, land use, heritage buildings, and public spaces. Map descriptions.

3.1 Data collection tools

This research uses qualitative research methods and uses instruments to assist in the interview and data collection, such as cameras and voice recorders. The interview and questionnaire design uses theories related to planning and organizing the public bus network, regulations for heritage protection, and geographical changes and legislation on the protection of heritage areas in Luang Prabang province.

3.2 Population and sample size

3.2.1 Population

The population used in this study was professionals/academics working in planning and developing public transit bus networks.

3.2.2 Sample size

For experts/scholars, there were a total of 6 people, which was considered a small number, so all of them were interviewed.

3.3 Data collection

In this study, the researchers used two sources: Primary data (first-level data) and secondary data (second-level data), which are detailed as follows:

1) Primary Data

Primary data is data obtained from actual collection by interviewing experts/technical experts on public bus service planning, with 6 interviews conducted in Prabang Capital and Luang Prabang Province, with face-to-face interviews with experts.

2) Secondary Data

The data source is obtained from reviewing relevant documents such as: textbooks, planning theories, reports, theses and research articles. Researching relevant information on various Internet websites such as: research articles, dissertations, relevant laws, regulations and information from relevant departments. Requesting information directly from the Public Works and Transport Office of Luang Prabang Capital and analyzing geographic information from GIS to determine the route.

3.4 Data analysis

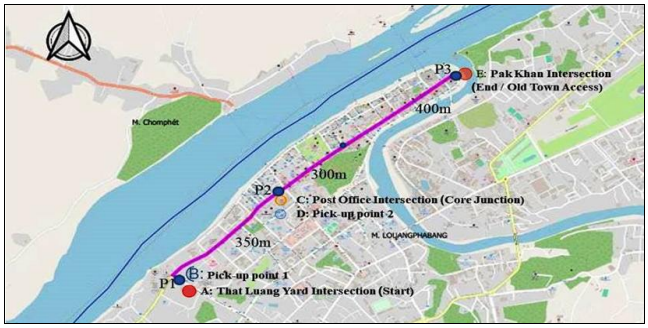
The data analysis from the interview method uses a summary analysis of the data from the target group and then analyzes the results according to the actual situation regarding general information and the transportation situation in Luang Prabang and the planning guidelines for the public transport system in Luang Prabang, which are detailed as follows:

Analysis of the opinions of the expert/academic group uses a SWOT analysis: to find strengths, highlights, weaknesses or what may be important problems with the current public transport system and including guidelines for planning the development of the network in the future. This analysis analyzes Strengths - strengths or advantages of using public transport, analyzes Weaknesses - weaknesses or disadvantages in setting up a public transport system in the past (internal factors) and analyzes Opportunities - opportunities to develop such a public transport system network and Threats - obstacles/constraints in developing a public transport system network (external factors).

The route of the regular bus is determined using a Geographic Information System (GIS) tool. The study has determined 2 routes: Route 1 runs along the central route of Luang Prabang from That Luang Square to Si Pak Sini to Sam Pak Khan (the middle route of the World Heritage City), Route 2 (the heritage surrounding route) runs along the That Luang route from Si Pak Sini to Si Pak Khan Market to Sam Pak Khan (on the banks of the Khan River) to Tha Heuaw Me (on the banks of the Mekong River) to Sam Sang Phet (in front of That Luang), a one-way road. The time for each stop to pick up and drop off passengers is about 1 minute.

4. Results

Planning of public transport routes using GIS. The results of route analysis with GIS include a study route map. Map title: Analysis map of public transport routes on the central route of the heritage city, Route 1: (Route from the That Luang intersection - the Post Office intersection - 3 Pak Khan Intersection)



Define 3 "Pick-up/Drop-off" points (GIS Point Layer) Point 1: That Luang Yard, Type: Pickup/Drop-off, Role: Pick-up/Drop-off of passengers and tourists, Traffic condition: Heavy (Peak Hour). Point 2: Post Intersection, Type: Transit Stop, Role: Change direction/Stop, Importance: Network center. Point 3: Pak Khan Intersection, Type: Drop-off, Role: Entering the tourist area/community, Constraints: Narrow road, limited vehicles. Map Elements: The route from That Luang Intersection-Pasni Intersection-3 Pak Khan Intersection, pick-up and drop-off points, WHS boundary, Land Use, Heritage Buildings, and Public Spaces. Map Description: "Map showing the route of a regular bus study using Network Analysis in GIS to determine the appropriate route considering the compatibility with the conservation of World Heritage Sites" as follows:

Table 1: Pick-up and drop-off points Route from That Luang Intersection-Pasni Intersection-***3*** Pak Khan Intersection (Centerline of the Heritage Site)

NO	Point type	Point name	Travel role	Suitability
1	Origin	That Luang Expressway Color	Entry gate	Suitable
2	Intermediate	Postal Expressway Color	Service and commercial center	Suitable
3	Destination	3 Pak Khan Expressway	Tourist area – waterfront	Suitable

From Table 1, it was found that the study of transportation conditions in the heritage area in Luang Prabang Capital, 293 people living in the residential area of the World Heritage Area, the results of determining the pick-up and drop-off points (Origin–Destination) from the GIS analysis text: It is determined that there are 3 pick-up and drop-off points from "the determination of pick-up and drop-off points is based on the importance of the main intersection and the density of activities within the city area" is appropriate.

Table 2: The results of determining the distance of pick-up and drop-off points on the route from the That Luang intersection-the Post intersection-the Pak Khan intersection (the middle line of the heritage area)

NO	Point name	Distance (m)	Land use	Suitability
1	Point A	350	Commercial	Suitable
2	Point B	300	Public space	Suitable
3	Point C	400	Tourism	Suitable
	Total	300-400	Heritage land	Suitability

From Table 2, it is found that the study of transportation conditions in the heritage area in Luang Prabang Capital can read the GIS distance value: Buffer 300–400 m, Overlay with Land Use, Accessibility Analysis

The results of the analysis of the route with buildings, shops and public areas, and the distance to the tourist area are appropriate.

Table 3: Transit area Transportation in the heritage area in Luang Prabang Capital

S. No	Area type	Distance (m)	Passage level	Impact
1	Commercial	High	Commercial	Enhance access
2	Tourism	High	Public area	Enhance public transport usage
3	Heritage building	Low	Tourism	Avoid impact

From Table 3, it is found that the transportation areas in the heritage area in the capital Luang Prabang have a high transit distance, which has been improved, the tourist area is at a high distance of public areas, public transportation should be improved, and the heritage buildings are at a low distance for tourism, which should avoid affecting the heritage buildings.

Summary for Chapter "The results of the route analysis using GIS indicate that the route from Si Pak Sini to Si Pak Khan is suitable for the development of regular buses, while maintaining a balance between urban development and the conservation of the World Heritage City".

Route ***2:*** That Luang to Si Pak Sini to Si Pak Sari Dara to Sam Khima to Sam Pak Khan (on the banks of the Mekong River) to Tha Heu Me (on the banks of the Mekong River) to Sam Sang Phet (on the banks of the That Luang).

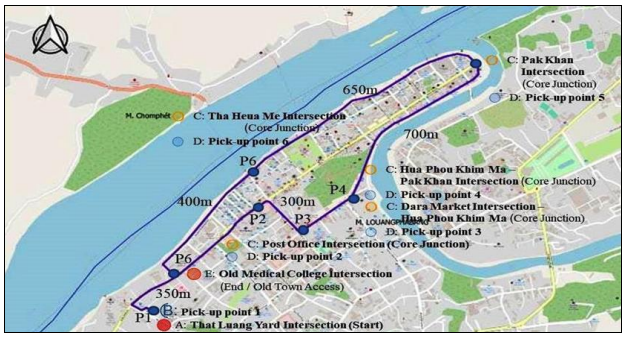


Table 4: Analysis of pick-up and drop-off points, WHS boundaries, land use, heritage buildings, and GIS areas to determine appropriate road access levels

S. No	Route waypoint name	period (m)	Land Usc	Pick-up point	Buffer (m)	Accessibility	Trip Generator	suitability
1	That Luang Yard Intersection - Post Office Intersection	450	Commercial +Government	That Luang Yard Intersection	200	High	High	High
2	Post Office Intersection - Dara Market Intersection	600	Markets+ Commercial	Dara Market Intersection	200	Very high	Very high	Very high
3	Dara Market Intersection - Hua Phou Khim Ma	550	Tourism +Community	Hua Phou Khim Ma	150	Moderate	Moderate	Moderate
4	Hua Phou Khim Ma - Pak Khan Intersection	700	Riverside	Pak Khan Intersection	150	Moderate	Moderate	Moderate
5	Pak Khan Intersection - Tha Heua Me Intersection	650	Tourism + Riverside	Tha Heua Me Intersection	200	High	High	High
6	Tha Heua Me Intersection - Old Medical College Intersection	400	Old Town	Old Medical College Intersection	200	High	High	High

From Table 4, it is found that the transportation area in the heritage area, That Luang-Postal Crossroads, the distance through commercial buildings and government buildings is 450 m, the pick-up and drop-off point is in front of That Luang, the distance is 200 m, the accessibility is at a high level, with a high level of suitability. The Postal Crossroads-Dara Market area, through the market + commercial buildings, the distance is 600 m, the pick-up and drop-off point is in front of Dara Market, the distance is 200 m, the accessibility is at a very high level, with a very high level of suitability. The Dara Market area-Phou Khima, through the tourist area + community, the distance is 550 m, the pick-up and drop-off point is the road up to Phou Khima, the distance is 150 m, the accessibility is at a moderate level, with a moderate level of suitability. The Khima-Phou Khima area, through the riverside area, the distance is 700 m, the pick-up and drop-off point is in Pak Khan, the distance is 150 m, the accessibility is at a moderate level, with a moderate level of suitability. Pak Khan-Thaheua Me area passes through the tourist area + riverside for 650 m. The pick-up and drop-off point is Pak Khan, 200 m away. The accessibility is high with a high pass distance and a high level of suitability. The Me area-Three-way intersection passes through the old city area for 400 m. The pick-up and drop-off point is Three-way intersection, 200 m away. The accessibility is high with a high pass distance and a high level of suitability.

From the GIS analysis table, it was found that most of the routes pass through commercial and tourist areas, which are high trip generators, reflecting that this route is suitable for the development of public transport systems within the city

4.1 Internal factor assessment

Strengths/Advantages of Public Bus Service (S-Strengths)

S1: It is the main means of transportation for people and tourists, which allows them to travel to and from their destinations conveniently.

S2: It can reduce travel costs because it is a low-cost option, saving on fuel and other service costs compared to using private cars/rental cars.

S3: It reduces traffic congestion by reducing the number of private cars on the road, making traffic smoother, especially during major festivals.

S4: It promotes social equality so that all groups of people, such as students, the elderly, and low-income earners can access travel.

S5: It promotes economic development by helping workers, tourists, and businesses move continuously.

S6: It reduces environmental impact by transporting many passengers in one vehicle, which helps reduce greenhouse gas emissions and energy consumption. In conclusion, public buses are an important foundation of the transportation system, helping to create convenience, equality, and sustainable development, and can develop into smart transportation.

Weaknesses/Disadvantages of the previous public bus network (W-Weaknesses)

W1: It is not yet accepted by the general public because it is not yet accessible as customers want because the public bus will run at a designated point, such as: running in a circular pattern around the city, starting from That Luang Prabang Square and going along the Kam Khan Road to Wat Xieng Thong and going along the Kam Khan Road.

W2: The behavior of the Luang Prabang people like to use private cars because they find it very convenient and can go to the destination they want and do not like to go in large groups.

W3: Some tourists prefer to use cars provided by guesthouses and hotels.

W4: The determination of routes to reach the public is limited, especially in heritage areas, where some areas cannot be determined as it would violate heritage regulations.

W5: Public relations are still limited, as many parties do not know the details of the service provided by each route.

4.2 External Factor Assessment

Opportunities to Develop a Public Transport Network (O-Opportunities)

O1: The use of public buses will help reduce congestion and reduce costs for low-income people, especially along the heritage route, as there are many types of vehicles available.

O2: It can reduce costs for students and the general public, tourists, because they have to drive on important routes to access communities and tourist attractions.

O3: It will also reduce congestion in the heritage area and create a more orderly arrangement for the beautiful scenery in the heritage area. In addition, passengers can see the beautiful scenery of Luang Prabang because the public buses run along the Khan River - Wat Xieng Thong and return to That Luang. This route will allow you to see beautiful scenery, especially along the river on the right

bank. You can see Phu Thao - Phu Nang, which are the pride of the people of Luang Prabang.
O4: Many relevant parties are making efforts to promote the use of public buses on this route because it will reduce congestion in the city, maintain order, and promote environmentally friendly tourism, including sustainable tourism, as well as smart transportation in the future.

Obstacles/Limitations in the Development of the Public Transport Network (Threats)
T1: The regulations for the management of heritage areas in the capital city of Luang Prabang, especially the determination of routes, still have many limitations.
T2: The installation of passenger pick-up and drop-off signs, which are limited in construction because some places cannot be built because they will conflict with the scenic conservation area of the heritage city.
T3: The determination of routes is still limited and cannot be determined according to the needs of passengers.
T4: Instability of the budget in managing various aspects to support.
T5: The behavior of the people of Luang Prabang/tourists in using cars is still popular with private cars/rental cars provided by guesthouses and hotels.
T6: The number of various types of buses is increasing, including private cars**.**

4.3 Guidelines for planning public transport
From the interviews, it can be summarized as follows:
1) The transportation route planning should provide more access to community resources, activity sources or important tourist attractions to accommodate the increase in tourists and most importantly, the company must have a stable financial system and adjust prices appropriately.
2) Improve the insufficient bus network in each area, and increase the connection in the area to the Lao-China Railway Station, Tad Kuangsi and Sok Prasat Bus Station.
3) Consideration should be given to the "duplication of routes" in each line. There is no duplication of services because they have a detailed systematic management of buses. Regular buses will run on designated routes, which will be different from other types of vehicles.
4) Add more passenger pick-up and drop-off points because currently there is no plan for construction due to space constraints, orderliness, including the Mulak Khat area, which still needs to be considered in many conditions for construction. But now there are 5 installed in 500 meters apart. Previous studies have shown that nearly 90% of passengers are satisfied with the value for money.
5) There should be plans to connect the public bus system with other transportation systems such as airports, high-speed rail stations, tricycles, and ports**.**

5. Analyze the results
5.1 Transportation Conditions in Luang Prabang Capital
The most popular mode of transportation in Luang Prabang Capital is the general van type. The public bus is not yet accepted by the general public because it is not accessible as customers want and some tourists prefer to use the cars provided by guesthouses and hotels. However, in reality, public buses play an important role because they are a transportation system that helps create convenience, equality and sustainable development. Currently, there are not many designated routes for public buses to reach various points as users want, so "public bus transportation is not yet the main option in Luang Prabang Capital" but is an experimental step in the development of the city to adapt to an incomplete system because it has limited routes for passenger service. However, improvements are being made in service, especially on routes that reach the limited population. In line with the study by Ceder (2016) [2], it was found that the design of routes must take into account operating costs, the number of vehicles and passenger revenue. This is also consistent with Saengphayap's (1979) [21] research, which found that passengers' access decisions include accessibility, efficiency, reliability, comfort, safety, and fares In line with the European Commission (1998) which assessed public transport systems with the following elements to consider: usability, accessibility, connectivity, time, user-friendliness, comfort, safety and environmental impact. In line with the European Commission (1998) which said that roads should connect residential areas, educational institutions, workplaces, markets and service centres. This is in contrast to the theory of Banister (2008) [1] which said that rail transport is the preferred mode for medium and long-distance travel due to its safety and energy efficiency and in contrast to the theory of Rodrigue *et al*. (2017) [19] which said that air transport is the preferred mode for long-distance international travel due to its speed and time savings.

5.2 Public Bus Planning Guidelines in Prabang Capital
Current transportation route planning includes key factors that are used in consideration, such as access to community resources, activity sources or tourist attractions, including the old city area. The company must have a stable financial system, adjust the price of services to be able to provide access and satisfaction to the public, and the project will try to improve the transportation system to access important community resources and tourist attractions. The current public bus route network has "connecting community resources and activity sources" which is not enough to connect each area, more connections in the area should be added, which is in line with the research of Budsuwan (2021) in a study to study the concept and theory of public bus planning in the city center. It was found that the public bus planning guidelines for the city center on Phayothin Road found four aspects: 1) improving the network to control 2) organizing the bus schedule 3) improving the connection to the timetable and 4) improving the quality of service, which will be useful in studying and developing the public network in the city center, determining government policies and city development**.**
There is no duplication of services on each route because they have a detailed system of bus operations, and the regular buses will run on specific routes that will be different from other types of vehicles. Currently, there is no sufficient planning for the construction of passenger pick-up and drop-off points due to space constraints, including UNESCO (2011) [25]; ICOMOS (1993 a, b, c, d) [10, 11, 12, 13] heritage sites that still need to consider many conditions for construction, but there are still 5 places installed, which are 500 meters apart. In line with UITP (2019) [23], passenger pick-up and drop-off points should be within walkable distance and take into account the disabled and elderly. There is a plan for the regular bus system to "connect with other transport systems" such as airports, high-speed train stations, tricycles, ports. In line with Vuchic's (2005) [26]

theory, the determination of routes, stops, service frequencies and connections with other transport modes to maximize convenience and efficiency. In line with Ortúzar & Willumsen (2011) [16], surveying the number of service users, travel directions, and peak hours is the basis for determining routes. As Dong (2024) [5] states that public transport route planning needs to be based on travel demand analysis and origin-destination relationships to ensure that routes are aligned with passenger usage, Wang *et al*. (2021) [27] states that currently, transport route planning has evolved into a real-time adaptive model such as Demand-Responsive Transit to increase service flexibility and efficiency, Public Bus Transport Planning Using Modified and colony optimization (2025) states that many scholars have applied optimization models and heuristic algorithms to bus route design to reduce costs and increase service usage, Journal of Public Transportation (2012) studies found that public transport network design principles should consider space management, accessibility, service frequency, and route clarity to make service users understand and use them easily, and Marra & Corman (2025) [14] studies found that the use of Big Data and Artificial Intelligence (AI) in route planning can help predict passenger behavior more accurately.

6. Summary

The general situation of transportation in Prabang Capital. Currently, the most popular mode of transportation is the general van type, while public buses are not yet accepted by the general public. However, this public bus transportation helps to create convenience, equality and sustainable development and can develop into intelligent transportation in the future.

The provision of public bus services in heritage areas within Luang Prabang Capital is not yet acceptable because most Luang Prabang residents prefer to use private cars and tourists use the general van type provided by guesthouses and hotels. In addition, the car usage behavior of Luang Prabang residents still prefers private cars over public buses because they find using private cars convenient and can go to the destination they want, so "public bus transportation is not yet the main choice of most people in Luang Prabang Capital."

Regarding the planning direction for the development of public buses in heritage areas, there are still many factors that are still facing difficulties. In particular, the size of public buses is not yet suitable for operating in such areas. It should be changed from public buses to general small buses. It should select a type of electric bus that is suitable for the World Heritage City by allocating service routes, clearly defining the duration and scope of each type of bus. It also needs to consider the regulations for determining the route for running such buses, especially the determination of passenger pick-up and drop-off points. Regarding the direction for the development of public buses in the future to be acceptable, it should consider many factors such as: expanding the route network to reach more community resources, activity sources or important tourist attractions. Most importantly, public bus companies must have a stable financial system. Therefore, the development direction in the future should involve many parties to provide assistance and support to make it a sustainable and environmentally friendly service, moving into the next stage of intelligent transportation.

7. References

1. Banister D. The sustainable mobility paradigm. Transport Policy. 2008; 15(2):73-80.
2. Ceder A. Public transit planning and operation: Modeling, practice and behavior. CRC Press, 2016.
3. Daniels R, Mulley C. Planning public transport networks. The Neglected Influence of Topography. Journal of Public Transportation. 2012; 15(4):23-41.
4. Department of Public Works and Transport, Luang Prabang Province. Annual performance report for 2022-2023 and work plan for 2023-2024. Luang Prabang, Laos: Department of Public Works and Transport, 2024.
5. Dong C. Layout planning of a basic public transit network considering expected travel times and transportation efficiency. Systems. 2024; 12(12):550. https://doi.org/10.3390/systems12120550
6. European Commission. Research and technological development in Europe. Directorate-General for Research and Innovation, 1998.
7. European Commission. Sustainable urban transport planning. European Communities, 1998.
8. Historic Towns. Historic Towns. Sri Lanka: The State Printing Corporation. 92.
9. Historic Towns. Sri Lanka: The State Printing Corporation.
10. ICOMOS. The resolutions of Bruges: Principles governing the rehabilitation of historic, 1993a.
11. ICOMOS. Resolutions of the international symposium on the conservation of smaller, 1993b.
12. ICOMOS. Resolutions on the regeneration of historic urban sites, 1993c.
13. ICOMOS. UNESCO-Recommendation concerning the safeguarding and contemporary, 1993d.
14. Marra AD, Corman F. Modelling route choice in public transport with deep learning. Transportation, 2025.
15. National Assembly. Presidential decree on the promulgation of the law on land traffic (Revised), No. 029/PR, January 17, 2013. Vientiane Capital, Laos: Office of the President, 2013.
16. Ortúzar J, De D, Willumsen LG. Modelling transport (4th ed.). Wiley, 2011.
17. Public transport planning using modified ant colony optimization. Sustainability. 2025; 17(6):2468.
18. Public Works and Transport Office, Luang Prabang City. Annual performance report for 2022-2023 and work plan for 2023-2024. Luang Prabang, Laos: Public Works and Transport Office, 2024.
19. Rodrigue JP, Comtois C, Slack B. The geography of transport systems (4th ed.). Routledge, 2017.
20. Role of historic areas. Historic Towns. Sri Lanka: The State Printing Corporation, 2017, 110-118.
21. Saengphayap W. A study of public transport services along Songkhla-Hat Yai corridor, 2554. [On-line]. Available: http://www.sri.cmu.ac.th/~transportation/.
22. Towns. Historic Towns. Sri Lanka: The State Printing Corporation. 89.
23. UITP. Public transport planning and design. International Association of Public Transport, 2019.
24. UITP. Bus network design and route planning. UITP Academy, 2025.
25. UNESCO. Recommendation on the Historic Urban Landscape, 2011, p3.
26. Vuchic VR. Urban transit: Operations, planning, and economics. Wiley, 2005.

27. Wang Z, Lan F, Lin Z, Lian L. A heuristic method for bus rapid transit planning based on the maximum trip service. Sustainability. 2021; 13(11):6325. Doi: https://doi.org/10.3390/su13116325