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Towards a 15-Minute City: Redevelopment of Victoria Urban Terminal, Mauritius

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Abstract

The "15-minute city" concept aims to create cities where all essential services and amenities are within a 15-minute walk, bike ride, or transit from residents' homes. It has gained popularity worldwide among urban planners and policymakers. The Victoria Urban Terminal in Port-Louis is a major transit hub connecting various neighborhoods and destinations. Its current design hinders accessibility by foot or bike from many parts of the city, making it incompatible with a 15-minute city concept. To address this issue, a gondola lift system is proposed as a fast, efficient, and sustainable transit option that can link the terminal to surrounding urban neighborhoods and amenities. This dissertation aims to explore the potential of implementing a gondola lift system at the Victoria Urban Terminal to support its redevelopment while aligning with the 15-minute city concept. It will analyze case studies, review relevant literature, and conduct interviews to gather information about the redevelopment of the existing terminal to adapt to a 15-minute city concept. The findings will contribute to the development of design guidelines for urban terminals in Mauritius, facilitating their integration into the 15-minute city framework.

Keywords: 15-minute city, Victoria Urban Terminal, Gondola Lift System

Introduction

The Victoria Urban Terminal, located in the heart of Port-Louis, Mauritius, is a modern transit hub that serves both commuters and visitors. Positioned strategically, this terminal acts as a central point for bus and taxi services, along with various retail and commercial establishments. As the largest and inaugural urban terminal in Mauritius, it accommodates a daily influx of 50,000 to 80,000 commuters. The facility's contemporary and efficient design ensures a smooth transportation experience for its users. Equipped with 36 bus bays, 24 taxi stands, a designated area for intercity coaches, and a newly constructed tram station, the terminal facilitates seamless travel both within and outside of Port-Louis. Furthermore, it offers a range of amenities, including shops, restaurants, and a food court, providing convenience for commuters and visitors alike. Since its inauguration in 2016, the Queen

Victoria Urban Terminal stands as a significant infrastructure project in Mauritius, contributing to the country's efforts to enhance public transportation and modernise its urban centres.

Port-Louis, similar to numerous urban centres, grapples with the task of providing sufficient public infrastructure to meet the needs of its residents and visitors. Certain parts of the city face notable deficiencies in public infrastructure, particularly concerning transportation and sanitation. A prominent challenge in Port-Louis lies in traffic congestion, impeding efficient movement within the city. Moreover, contributing factors include the city's narrow streets and limited public transportation options, resulting in overcrowding of buses and taxis. Furthermore, the availability of parking facilities is limited, posing challenges for drivers in finding suitable parking spaces (World Bank, 2017).

The city's outdated urban planning exemplifies its inefficiency on multiple fronts. It promotes urban sprawl, fosters a car-centric environment for inter-zone commuting, incentivises the use of motorised vehicles, and exacerbates severe traffic congestion, resulting in an annual loss of approximately four billion rupees. As evidence, in 1990, the number of registered cars on Mauritian roads stood at 123,500 (National Transport Authority, 1991). The first instance of traffic congestion occurred in the city centre of Port-Louis. To address this issue, Mauritian authorities invested in the construction of a ring road in 2005 to divert traffic away from the city centre during peak hours. Presently, the island has seen a significant increase in registered vehicles, reaching 622,988 by the end of 2021 (Road Transport and Road Traffic Accident Statistics, 2022).

The lack of sufficient public infrastructure is one of the reasons why commuters rely on private vehicles as their primary mode of transportation daily. Despite the increased price of gasoline resulting from the Ukraine war and the challenges posed by COVID-19-related freight shipping, the use of private cars persists without significant deterrence (Statistic Mauritius, 2019). An overview of the situation in Mauritius reveals a surge in newly registered vehicles, contributing to issues such as congestion, heavy traffic, and polluted roads. These concerns have been extensively addressed and discussed at various levels (Alladin, 2022).

Mauritius' Prime Minister acknowledges that traffic congestion incurs an annual cost of four billion rupees for the country. To address this issue and reduce business costs, Mauritian authorities initiated a $560 million project in September 2017 for a new light rail system. The rail system aims to alleviate traffic congestion by connecting Curepipe, a central town in Mauritius, to the capital city of Port Louis. The initial stage of the project commenced at Victoria Urban Terminal in Port Louis, the heart of Mauritius, where it connects to Rose-Hill, situated on the central plateau. The focus on enhancing public infrastructure is pivotal in mitigating recurring traffic congestion issues. In addition to reducing energy expenses and traffic jams, the country's economy will benefit from these improvements. By initiating more projects, Mauritius can further advance its infrastructure and facilitate its ongoing restructuring process (Tanwar, 2018).

The "15-minute city" represents a contemporary urban planning concept that has garnered significant interest among policymakers, urban planners, and researchers in recent times. The concept advocates for a city design where vital services and amenities, including schools,

workplaces, healthcare facilities, and recreational areas, are all conveniently accessible within a 15-minute walk or bike ride from residents' homes. The overarching objective of the 15-minute city is to foster sustainable and vibrant urban environments by diminishing reliance on automobiles and encouraging active modes of transportation. This approach offers several potential advantages, such as enhanced air quality, reduced traffic congestion, and increased physical activity levels (Moreno, 2020).

In the realm of transportation, mobility refers to the distance one can travel within a given timeframe, whereas accessibility pertains to the extent of destinations that can be reached in that timeframe. According to Dan Luscher (2020), optimal accessibility is achieved when a diverse range of services is integrated within one's neighbourhood, eliminating the need to travel long distances or outside the city to access essential amenities. Other studies have focused on the frequency and purpose of short walking trips and the urban environments that facilitate such behaviour. These studies also examine the unequal distribution of proximity trips across a city and how factors like income and population density can influence these travel patterns (Garcia-Ramon, 2015).

However, most research on sustainable urban mobility has centred around contemporary cities with mixed-use development. Limited studies have been conducted on historical and outdated cities like Port-Louis, exploring how the 15-minute city concept can be applied to meet people's needs while reducing reliance on private vehicles. Therefore, the aim of this study is to identify strategies for implementing the 15-minute City concept and incorporating an aerial tramway as a means of transit within the redevelopment of Victoria Urban Terminal. These strategies are intended to align with the principles of transit-oriented development (TOD).

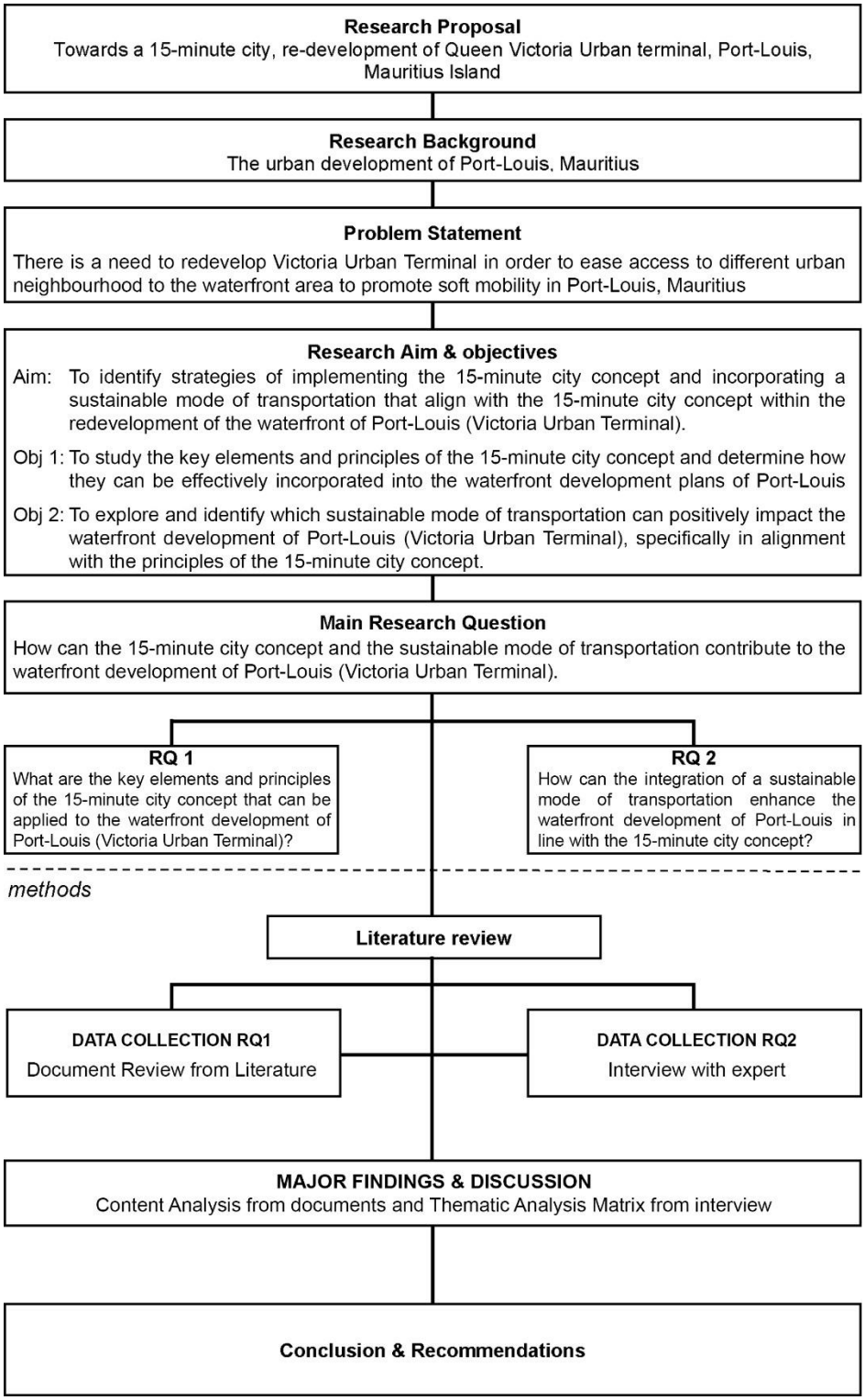


Figure 1: Research Framework (Source: Author, 2023)

Literature Review

A literature review plays a crucial role in establishing knowledge and insights regarding a specific topic. This literature review focuses on several key areas. Firstly, it examines the concept of 15-minute cities and explores how it is applied in urban planning and development. Secondly, it delves into the principles of urban design and architecture that contribute to the

successful integration of gondola lifts within urban areas. By analysing existing research and debates in these areas, a comprehensive understanding can be gained, providing a solid foundation for the subsequent discussions and analysis in this study.

15-Minute City and Its Application in Urban Planning and Development

The idea of the "15-minute city" has become a game-changing vision to develop lively, inclusive, and liveable urban settings in the field of urban planning and sustainable development. The term "15-minute city" was developed by Carlos Moreno, a professor at the Sorbonne University in Paris, and it suggests a drastic break from conventional urban planning paradigms. It promotes city reorganisation to allow urban residents to have access to necessary amenities, services, and recreational possibilities within a 15-minute commuting radius.

The main goal of the 15-minute city is to raise the standard of living by lowering reliance on personal automobiles and promoting a more sustainable, human-scale urban fabric (Dan Luscher, 2020). The idea encourages people to walk, cycle and utilise public transport by designing compact, mixed-use neighbourhoods that include residential, commercial, educational, and recreational uses. It imagines a time when people would be able to live close to where they work, socialise, and fulfil their daily requirements, getting rid of long commutes and enhancing general well-being.

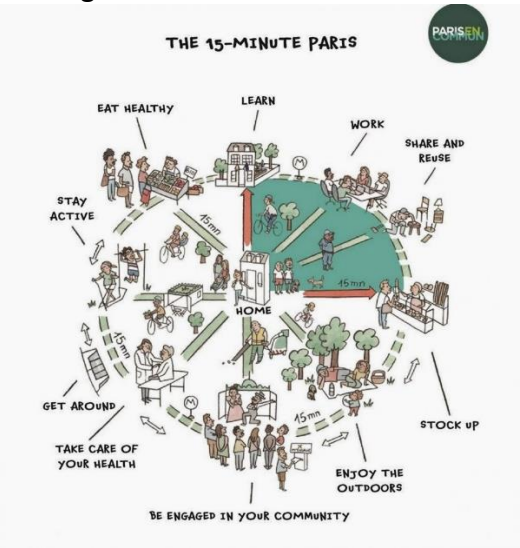


Figure 2: Paris 15-minute city concept. *Source: Paris en Commun.*

15-minute City Key Attributes

Proximity and Mixed-Use Development

The idea of putting necessary services, amenities, and workplaces closer to residential areas is the basis of the 15-minute city. The concept reduces the need for lengthy journeys and minimizes congestion by emphasizing mixed-use construction, where residential, business, and recreational spaces coexist. Since inhabitants can easily access amenities like grocery stores, schools, hospitals, and green areas close to their houses, this strategy promotes a sense of place and community.

Enhanced Mobility

For the 15-minute city to succeed, creating a walkable and bikeable urban environment is essential. Prioritizing bike lanes, public transit, and pedestrian-friendly streets promotes active modes of transportation, lowering dependency on automobiles and reducing pollution. Transport systems that are well-connected ensure that locals may move between neighbourhoods with ease, promoting social cohesion and facilitating the smooth integration of various communities (Maria Dolors Garcia-Ramon, 2015).

Urban Resilience

The 15-minute city idea emphasizes the importance of improving urban resilience. Cities become more resilient to disturbances like natural disasters, pandemics, or infrastructure failures by decentralising resources and services. It is possible to build localised systems to produce food, water, waste management, and energy, which will lessen communities' vulnerability and ensure their independence (Moreno, 2020). Additionally, the incorporation of change and infrastructure, such as parks and gardens, encourages biodiversity, lessens the effects of climate change, and enhances citizens' general well-being.

Application of 15-Minute City to Traditional Cities

Applying the 15-minute city concept to traditional cities, which often have a long history and existing infrastructure, can be challenging yet offer unique opportunities (Davies, 2020). Notably, traditional cities frequently possess a rich cultural and historical past. It is crucial to strike a balance between the demand for modern functionality and the preservation of historical aspects. Adaptive reuse tactics should be used, whereby old buildings and structures are converted to house various residential, commercial, and cultural pursuits, enhancing the dynamism of the 15-minute city.

The infrastructure in many traditional cities might not have been created with the idea of a 15-minute metropolis in mind. Retrofitting infrastructure can improve accessibility and lessen car dependency by adding bike lanes, enlarging walkways, and enhancing public transportation systems. This approach necessitates meticulous planning and may entail rearranging existing roadways or coming up with creative solutions while keeping in mind the limitations of the urban fabric.

Find locations that can be converted into mixed-use complexes within the traditional city. Residential, business, cultural, and recreational venues can all be discovered in these locations. Unoccupied or underutilised buildings can be revitalised and turned into mixed-use developments to create thriving neighbourhoods where people can live, work, and access services conveniently.

Traditional cities frequently have winding roadways that were not planned with the needs of contemporary transportation in mind. Put pedestrians first by implementing pedestrianization techniques in strategic locations and designating pedestrian-only zones. Reduce vehicle speeds and improve safety for cyclists and pedestrians by implementing traffic management strategies, such as traffic calming techniques. Adapt urban agricultural and green space programmes into conventional cities. In addition, a vacant lot, a roof, or a courtyard that could be transformed into a park, a garden, or an urban farm should be noted. These areas support the 15-minute city idea by promoting sustainable practices, enhancing air quality, and offering recreational possibilities.

Include members of the neighborhood, such as locals, proprietors of businesses, and other stakeholders, in the planning and execution process. Strong community links are common in

traditional cities, and incorporating the community encourages a sense of ownership and guarantees that the idea is in line with their needs and aspirations. Increased neighborhood and district connectedness inside the traditional city. To make city travel more efficient, enhance public transit choices, such as bus, tram, or metro systems. Create secure, well-maintained networks for bicycling and walking that connect different locations, facilitating inhabitants' access to amenities and services within a 15-minute drive.

By encouraging mixed-use developments, maintaining the city's architectural history, and developing vibrant public spaces, put your attention on revitalising historic districts. By making historic neighbourhoods more appealing and useful, more people will want to live, work, and spend their free time there, reducing the need to travel far for everyday needs. Recognise that each traditional city is unique, and solutions should be tailored to the specific context and constraints of the urban fabric. Embrace adaptive strategies that acknowledge the city's history, cultural identity, and existing built environment while still working towards the principles of the 15-minute city concept.

Implementing the 15-minute city concept in traditional cities requires a balance between preservation and modernisation. By leveraging the unique characteristics of these cities, such as their historic charm and existing community networks, it is possible to create vibrant, accessible, and sustainable urban environments.

Aerial Tram in Urban Areas

Aerial cable cars, commonly referred to as gondolas or ropeways, have drawn attention as a practical transit option in cities with complex topographies or traffic problems. To shed light on the possibilities of aerial cable car systems as a sustainable and effective form of public transportation, this paper examines the benefits, difficulties, and case studies related to their implementation. An overview of the growing popularity of aerial cable cars as a form of public transportation is provided in the introduction. It draws attention to the distinctive qualities of cable car systems and their potential advantages, including fewer traffic jams, environmental sustainability, and increased accessibility in congested urban areas (Gattuso, 2016).

The historical context of aerial cable cars is explored in this section, along with the development of these vehicles. It analyses the development of early cable car systems into urban public transportation networks and looks at how they were utilised for transportation in industries like mining and tourism.

The use of aerial cable cars as a form of public transit has a long history. In the beginning, cable car systems were created for activities like mining, quarrying, and forestry as they offered a way to move supplies through difficult terrain (Davila, 2011). However, as time went on, these systems were modified for use in passenger transport, which marked the start of their use in cities.

The Marstrand cable car in Sweden, built in 1893, is one of the earliest documented instances of a cable car being used for public transportation. The main use of this cable car system was for tourism, offering guests a practical means of transit to the top of a hill where they could take in expansive views of the area (Postorino, 2020).

The introduction of cable car systems for urban public transportation gained momentum in the mid-20th century. In particular, the city of San Francisco, USA, is well-known for its iconic cable car network. The San Francisco cable cars, introduced in the late 19th century, played a vital role in the city's transportation system, providing a solution for the city's hilly terrain.

Internationally, cable cars have been utilised as public transportation in various cities with challenging topography or limited space for traditional modes of transportation. For instance, in Latin America, the Medellín Metrocable system in Colombia revolutionised urban transportation by providing aerial cable car connections to the city's hilly and underserved neighbourhoods (Panfilov, 2019). The La Paz-El Alto Cable Car System in Bolivia is another notable example, connecting the two cities and improving mobility for residents.

In recent years, aerial cable cars have gained attention as a sustainable and efficient transportation option. This has led to innovative projects and proposals in cities worldwide, including London's Emirates Air Line and the Roosevelt Island Tramway in New York City. The historical context of aerial cable cars as public transportation demonstrates their evolution from industrial applications to urban mobility solutions. The lessons learnt from early implementations have informed the design, safety measures, and operational considerations of modern cable car systems. The success and integration of cable cars into transportation networks in various cities worldwide have showcased their potential as a viable mode of public transportation in challenging urban environments (Miranda, 2012).

Advantages of Aerial Cable Cars as Public Transportation:

This section discusses the benefits of using aerial cable cars as a form of public transportation. Their ability to cross steep slopes, low land needs, low environmental impact, cost-effectiveness, and ability to integrate with current transportation networks are only a few of their key advantages. Also considered are the possible social and economic advantages, such as increased mobility and tourism prospects.

Challenges and Considerations:

The difficulties and factors to be considered when implementing aerial cable car systems are covered in this section. It covers topics such as system design, security precautions, capacity restrictions, climatic circumstances, maintenance needs, and public acceptance. The importance of thorough feasibility studies, regulatory and legal considerations, and other related issues are also emphasized.

Principles of Urban Terminal Design

Urban terminals are crucial elements of transportation networks as they serve as significant hubs for numerous modes of transportation and facilitate the movement of people and goods within urban areas. Designing an efficient urban terminal requires carefully considering several factors. In this literature review, the ideas and elements that ought to be considered when creating an urban terminal are addressed. Magda Pitsiava-Latinopoulou (2021) states that Intermodality is an integral part of sustainable mobility, and its enhancement is of vital importance, particularly in highly congested urban areas.

Accessibility and Connectivity:

Ensuring a terminal is accessible and connected is one of the guiding concepts in urban terminal design. Terminals should be easily accessible by various transportation options (including buses, trains, trams, and bicycles) and connected to nearby communities and metropolitan centers (Oviedo, 2014). There are several important factors to consider when designing urban terminals for accessibility and connectivity to ensure that the terminal is simple to use and has good connections to nearby neighborhoods and various forms of transportation.

Location and Proximity

It is essential to choose the best location for the urban terminal. It should be placed in a way that will meet the demands of a variety of users, including locals, commuters, visitors, and companies. The terminal should be conveniently positioned, ideally within or close to areas with a significant demand for transit. Connectivity can be improved by being close to main thoroughfares, mass transit routes, and other transportation centers. Urban terminal design must focus on facilitating intermodal connectivity (Abdelfattah, 2022). An intermodal terminal makes it possible to switch between several means of transportation with ease. Bus stops, train stations, tram lines, bike-sharing stations, and pedestrian paths inside or close to the terminal can all be integrated in this fashion. Hence, by offering easy links between modes, passengers can quickly change between various types of transportation.

Building a sustainable and user-friendly urban terminal requires promoting accessibility for people on foot and by bicycle. Active transport is promoted by creating well-marked, secure pedestrian and bicycle lanes that connect to and from the terminal. Accessibility is improved by including features like bike parking areas, crosswalks that are welcoming to pedestrians, and sidewalks with plenty of room for foot traffic. Furthermore, for effective transportation systems, the urban terminal must be integrated with the current or future public transit systems. Coordinating bus routes, train schedules, and other public transit services with the terminal's operations guarantees smooth transfers and convenient connections. Dedicated platforms or stops for various transit modes can improve connection and user-friendliness in the terminal area. Moreover, clear wayfinding systems and signs are essential for assuring ease of navigation within the urban terminal. Different modes of transportation, ticketing locations, platforms, exits, and amenities should all be well-marked with signs. This makes it simpler and faster for users to move around the terminal, which improves accessibility.

Universal Design and Accessibility:

By incorporating universal design principles, it is made possible for people of all ages and abilities to access the urban terminal. Individuals with disabilities are accommodated through amenities, including ramps, lifts, escalators, tactile paving for the blind, and accessible seating places. Additionally, having enough room for mobility aid movement, clear sightlines, and loud announcements also helps create an inclusive and accessible terminal atmosphere (Decker, 2017). Urban terminals can be constructed to accommodate a variety of user needs, encourage sustainable transportation options, and successfully integrate with the larger transportation network of a city by taking these accessibility and connectivity factors into account.

Multimodality

Multimodality refers to the ability of an urban terminal to accommodate and facilitate the seamless integration of multiple modes of transportation. Designing a multimodal urban terminal involves creating an environment where different transportation options can coexist and provide convenient transfer opportunities for passengers. A multimodal urban terminal aims to bring together various transportation modes, such as buses, trains, trams, bicycles, and even ride-sharing services, within a single facility or in proximity. This integration allows passengers to transition smoothly between different modes of transportation, reducing travel times and enhancing overall convenience.

Intermodal Transfer Facilities

Urban terminals frequently have dedicated intermodal transfer facilities to accommodate multimodality. Well-designed bus stops, train platforms, tram stops, bike-sharing stations, and parking lots for various means of transportation may be included in these facilities (Anagnostopoulou, 2016). Thus, easy access and smooth transitions between modes should be prioritised in the design and organisation of these facilities, reducing walking distances and enhancing the user experience.

Conceptual Framework

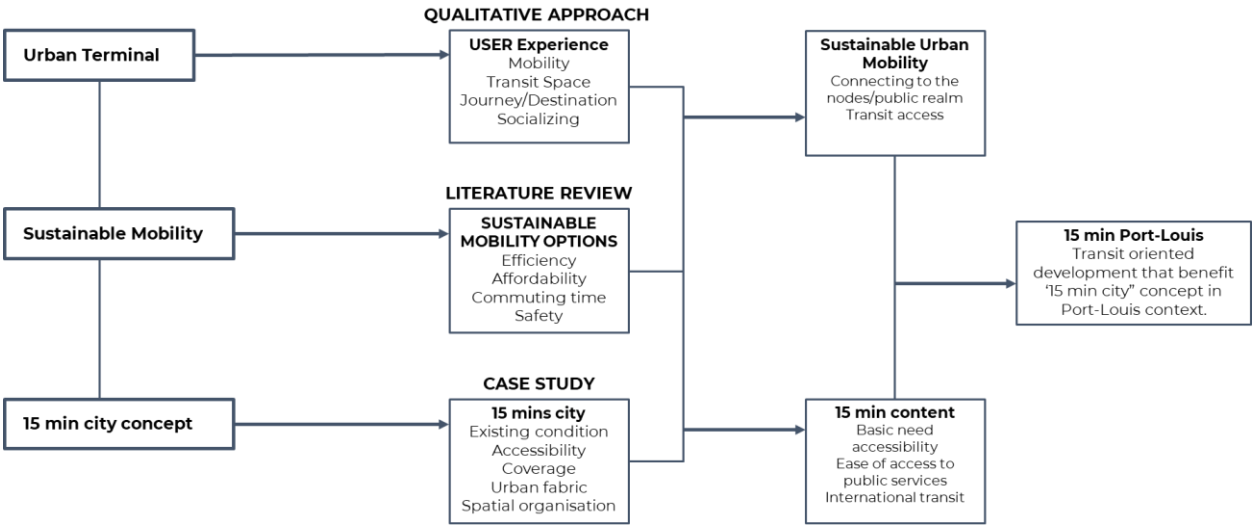


Figure 3: Conceptual Framework (Source: Author, 2023)

Method

The research method entails the analysis and interpretation of data through the adoption of specific strategies, procedures, and techniques. It is essential to recognise the significance of research methodology, as it encompasses philosophical assumptions and serves as a guide for selecting appropriate research methods (Babbie, 2012; Long, 2014). Three distinct research methodologies have been identified: qualitative, quantitative, and mixed methods, each embodying a unique set of ontological and epistemological assumptions (Babbie, 2012). A research methodology encompasses a systematic plan and approach for conducting research, encompassing data collection and analysis decisions that range from broad assumptions to detailed methods (Creswell, 2014). According to Creswell (2014), the selection of research design is typically influenced by the nature of the research problem, the researcher's expertise, and the intended audience. Additionally, Creswell (2014) recommends presenting the research methods consecutively, enabling readers to comprehend the logical progression from one step to another and ensuring a comprehensive discussion of data collection and analysis.

This study employed a qualitative approach for data collection, analysis, and interpretation (Creswell, 2014). To ensure comprehensive data gathering, multiple sources were utilised, including interviews with experts and document reviews from literature, thus avoiding reliance on a single data source. The researchers thoroughly examined and synthesised all the collected data, identifying overarching themes that emerged across various sources. The literature review served as a supplementary source, validating the primary data obtained from expert interviews, as displayed in Figure 3.1. The selection of data collection methods

was guided by the sub-research questions, ensuring the acquisition of optimal results, as outlined below:

Sub RQ1: What are the key elements and principles of the 15-minute city concept that can be applied to the waterfront development of Port-Louis (Victoria Urban Terminal)?

Objective 1: To study the key elements and principles of the 15-minute city concept and determine how they can be effectively incorporated into the waterfront development plans of Port-Louis (Victoria Urban Terminal).

Data collection method 1: Document Review from literature

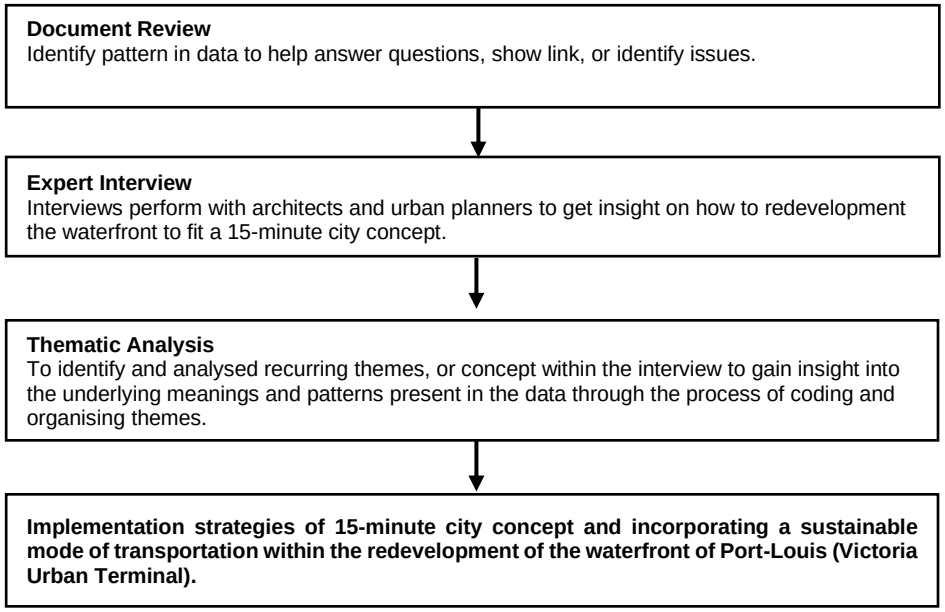
Sub RQ2: How can the integration of a sustainable mode of transportation enhance the waterfront development of Port-Louis (Victoria Urban Terminal) in line with the 15-minute city concept?

Objective 2: To explore and identify which sustainable mode of transportation can positively impact the waterfront development of Port-Louis (Victoria Urban Terminal), specifically in alignment with the principles of the 15-minute city concept.

Data Collection Method 2 Interview From Expert

Table 4

Research Methodology Process.



(Source: Author, 2023)

Result And Discussion

The results and discussions section holds immense significance in every study as it plays a critical role in presenting and interpreting the study's outcomes. It follows the research methodologies and data collection strategies discussed in the previous chapter. This crucial section's primary purpose is to effectively communicate the key findings, conduct thorough data analysis, and engage in a comprehensive discussion of the research results, thereby establishing their relevance to the research objectives and the existing literature on the 15-minute city concept and incorporating sustainable modes of mobility in the redevelopment of the waterfront (Victoria Urban Terminal).

Document Review

The document review involves an in-depth analysis of relevant literature, academic publications, and credible sources to comprehensively understand the key elements and the principle of the 15-minute city concept. By utilising this deductive approach, the research aims to draw meaningful conclusions and establish connections between existing knowledge and the specific sub-research question at hand.

Comparison of Paris 15-Minute City to Port-Louis City

Table 1

15-Minute Principle

15-minute principle	Description
Land use	mix of residential, commercial, and recreational spaces within proximity.
Walkability & cyclist lane	Assess the presence and quality of pedestrian infrastructure, including sidewalks, crosswalks, pedestrian-friendly streets, and safe pathways.
Public Transport	Evaluate the availability and efficiency of public transportation systems, such as buses, trains, trams, or subways.
Local Services and Amenities	proximity of essential services, such as healthcare facilities, schools, grocery stores, pharmacies, libraries, and community centres.
Green Spaces	Consider the presence of parks, gardens, and other green spaces within the city.
Neighbourhood Connectivity	Evaluate the connectivity between different neighbourhoods within the city. Assess the ease of movement and transportation options between residential areas and the various amenities and services.

(Source: Author, 2023)

The following concepts are important in urban planning and design: geometrical patterns, mixed-use development, utilising the public realm as the centre core, coarse grain development, and incorporating organic open spaces within blocks. On the other hand, Por-Louis uses fine grain courses in the trading zone to make it more accessible to pedestrians, but the zoning is rather set compared to mixed-use.

In line with the urban structure and fabric of Port-Louis, a comprehensive desk study was conducted to assess the applicability of the 15-minute city concept to the urban neighborhood. This analysis thoroughly examined the existing urban layout, amenities, and transportation infrastructure to evaluate the neighbourhood's potential to provide residents with easy access to essential services and facilities within a 15-minute radius. The desk study aimed to shed light on how well the principles of the 15-minute city align with the existing urban fabric of Port-Louis, providing valuable insights into the neighborhood's capacity to foster sustainable mobility, enhance residents' quality of life, and contribute to a more vibrant and accessible urban environment.

Interview Results (Focus Group)

The experts provided several ideas for the implementation of a sustainable mode of mobility in the waterfront development of Port-Louis while aligning with the 15-minute city concept. Taking into account the city's population and the goal of promoting the tourism industry, the most efficient proposal was determined to be the tramway system. However, due to the city's urban structure and historical background, it was suggested that an aerial tramway would be more suitable than an on-ground tramway.

Subsequent discussions focused on redeveloping the existing urban terminal to accommodate the aerial tramway and, more importantly, how to incorporate the principles of the 15-minute city concept. The successful outcome was based on people's daily necessities, considering the six key principles of the 15-minute city concept: Living, Working, Entertainment, Healthcare, Education, and Commercial. The responses emphasised the need to integrate these six principles within the Urban terminal, ensuring that residents can reach each key principle within a 15-minute walk from the terminal.

In designing the urban terminal, the prominent responses highlighted the importance of prioritising pedestrian accessibility and circulation. Additionally, other elements that could be added to the urban terminal include the adaptation of electric buses, scooters, and park-and-ride facilities.

Conclusion

In conclusion, this research study has effectively addressed its primary objectives and research question, shedding light on the implementation strategies of the 15-minute city concept and the integration of a sustainable mode of transportation within the redevelopment of the waterfront of Port-Louis (Victoria Urban Terminal).

Through an in-depth exploration of urban planning principles, sustainable transportation models, and the 15-minute city concept, the study has provided valuable insights into how these interconnected elements can positively impact the waterfront development of Port-Louis. By identifying strategies for implementing the 15-minute city concept, the research has laid the foundation for creating a well-connected, accessible, and vibrant urban space that fosters social, economic, and environmental sustainability.

The research findings highlight the potential benefits of adopting a sustainable mode of transportation, such as walking, cycling, and aerial tramway, in promoting accessibility and reducing carbon emissions as well as traffic congestion. These transportation options contribute to a more inclusive and resilient urban environment, fostering a sense of community and encouraging the use of public spaces in the waterfront development.

Furthermore, the study has emphasised the importance of considering the specific context and characteristics of Port-Louis to tailor the implementation of the 15-minute city concept effectively. Factors such as existing infrastructure, land use patterns, and the preferences of residents and visitors play crucial roles in determining the success of the proposed strategies.

Overall, the research has demonstrated the significance of integrating the 15-minute city concept and sustainable transportation within the waterfront development of Port-Louis. By doing so, the city can aspire to achieve a holistic and balanced approach to urban planning, promoting efficient land use, reducing congestion, enhancing accessibility, and ultimately improving the quality of life for its residents.

Research Implications

Expanding the implications for similar small island cities globally can enhance the relevance of the research by demonstrating the broader applicability and benefits of the 15-minute city concept and the proposed transportation solutions. This approach can inform urban planning and policy-making in various contexts.

First, the 15-minute city concept promotes urban density and compact development, which is crucial for small island cities facing land scarcity. Efficient land use reduces the need for extensive infrastructure, preserving natural landscapes and mitigating urban sprawl (Moreno et al., 2021). Second, prioritizing pedestrian, bicycle, and public transit options can significantly reduce reliance on private vehicles, thereby decreasing traffic congestion, lowering emissions, and improving air quality. This shift also enhances energy security by reducing dependency on imported fuels (Pozoukidou & Chatziyiannaki, 2021).

Furthermore, implementing a 15-minute city framework can enhance tourism by providing easily accessible amenities and reducing travel time. This can boost the local economy through increased tourist stays and spending (Graells-Garrido et al., 2021). Additionally, the 15-minute city promotes climate resilience by developing localized, sustainable infrastructure that mitigates risks associated with climate change, such as sea-level rise and extreme weather events (Abdelfattah et al., 2022).

The health and well-being of residents can also improve through this approach. Active transportation options and accessible amenities encourage physical activity and reduce pollution, fostering stronger community ties and enhancing overall well-being (Marquet & Miralles-Guasch, 2015). Economically, reducing the need for extensive road networks and parking spaces frees up valuable land for other uses, such as affordable housing, green spaces, and commercial developments, stimulating economic growth and providing more equitable access to resources (Marshall, 2000).

Preservation of cultural and natural heritage is another significant benefit. Small island cities often possess rich cultural histories and unique natural environments. Sustainable development practices promoted by the 15-minute city concept support the preservation of these assets, minimizing urban sprawl (Brand & Dávila, 2011). The proposed gondola lift system and other scalable, adaptable solutions can address similar challenges in other small island cities, facilitating knowledge transfer and inspiring innovation (Panfilov, 2019).

Lastly, the successful implementation of the 15-minute city concept requires robust policy frameworks and governance structures. Highlighting effective policies and case studies within this research can guide other small island cities in developing sustainable urban planning initiatives (Kiba-Janiak & Witkowski, 2019).

By addressing these implications, the research provides valuable insights and practical solutions for urban planners, policymakers, and stakeholders in small island cities globally, fostering sustainable and resilient urban development.

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