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**Assessment Cover Page**

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**Declaration**

By submitting this assessment, I confirm that I have read the CCT policy on academic misconduct and understand the implications of submitting work that is not my own or does not appropriately reference material taken from a third party or other source.

I declare it to be my own work and that all material from third parties has been appropriately referenced.

I further confirm that this work has not previously been submitted for assessment by myself or someone else in CCT College Dublin or any other higher education institution.

# Assessment Task: Capstone Project Proposal

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# Fast and Luas: Charting the flow of Luas passengers to inform future service planning

## Introduction

The Luas is a [tram](https://en.wikipedia.org/wiki/Tram) system in [Dublin](https://en.wikipedia.org/wiki/Dublin) that connects the south and southwest of Dublin with the city center. The word Luas is the [Irish](https://en.wikipedia.org/wiki/Irish_language) word for “speed”. There currently exist two main lines, the [Green Line](https://en.wikipedia.org/wiki/Green_Line_(Luas)), which began operating on 30 June 2004, and the [Red Line](https://en.wikipedia.org/wiki/Red_Line_(Luas)) which opened on 26 September 2004. According to the Transport of Ireland website the Luas carried 48.2 million passengers across the city in 2023 (Transport of Ireland 2024).

However, people in Dublin currently use their own vehicles, taxis, or rideshare services to access the airport, contributing to traffic congestion, pollution, and environmental degradation. Improving public transportation options such as a Luas line can help to alleviate congestion and reduce some of the carbon footprint associated with airport travel.

## Objectives

**Some of the objectives of this proposal to extend to Luas service in a main route are:**

**Data Analysis:** Analysing the data from the Central Statistics Office and the Transport of Ireland website to examine user trends and predict need and usage of a new Luas line.

**Efficiency and Reliability:** Ensure that the new Luas line provides an efficient and reliable mode of transportation for passengers traveling between the city center and the airport and vice versa. This includes minimizing travel time, maintaining a consistent schedule, and providing sufficient capacity to accommodate passenger demand.

**Accessibility:** Ensure that the new Luas line is accessible to all passengers. This involves designing stations with features such as ramps, elevators, and tactile paving, as well as ensuring step-free access to tram cars.

**Safety and Security:** Prioritize the safety and security of passengers and staff along the Luas line. This includes implementing safety features such as, emergency communication systems and surveillance cameras, as well as ensuring proper training for staff members.

**Integration with Existing Transport Networks:** Ensure seamless integration of the Luas line with existing public transport networks, such as bus routes, train stations and taxis. This involves coordinating schedules, providing convenient interchange facilities, and implementing integrated ticketing systems to facilitate transfers between different modes of transport.

## Problem Definition:

Currently, there are a limited public transportation options connecting the city center to the airport. This lack of connectivity can inconvenience commuters, tourists and other travellers, impacting overall accessibility to and from the airport.

The necessity to establish a new Luas line connecting the city center to the airport and the context of this problem stems from some factors:

* Building a new Luas line involves significant infrastructure costs, including land acquisition, construction, and ongoing maintenance. Securing funding for such a project can be challenging, especially if public budgets are limited or if there is opposition to allocating resources to public transportation projects.
* Determining the optimal route for the Luas line involves considerations such as minimizing travel time, serving densely populated areas, and providing convenient access to major destinations like the airport. Route planning must also account for potential obstacles such as existing infrastructure, geographical features, and traffic congestion.
* Environmental and Social Impact: Building a tram line may have environmental impacts, such as changes to local ecosystems, increased noise and air pollution, and disruption to communities along the route. Social factors, such as displacement of residents or businesses, must also be considered and mitigated where is possible. It may be beyond the scope of the current data to analyse these factors but it is important to acknowledge this limitation.

The challenge of establishing a new Luas line from the city center to the airport and vice versa is essential for enhancing overall transportation infrastructure, promoting sustainable urban development, and supporting the socio-economic well-being of the community. By improving accessibility, reducing congestion, and fostering economic growth, the project can have a significant positive impact on the city and its residents. Therefore, it is imperative to carefully plan and execute the development of this tram line to ensure its success and maximize its benefits for all stakeholders involved.

## Scope

The available data on the CSO website comprise the breakdown of Luas passenger flow by day of the week, per month and per annum from 2018-2022. Combining these data with overall public transportation data from the Transport for Ireland website, the project endeavours to analyse the viability of creating a new Luas line. The data will be analysed to predict potential uptake of this proposed service and estimate costs and benefits. The steps taken will be to first prepare the data for analysis as outlined in the Data Preparation Module. Machine learning will be considered and this will be applied in the next semester.

**Proposed timeline:**

|  |  |  |
| --- | --- | --- |
| Task | Semester 1 | Semester 2 |
| Project planning & proposal | ✓ |  |
| Data preparation | ✓ |  |
| Exploratory analyses | ✓ |  |
| Statistical analyses |  | ✓ |
| Machine learning model building |  | ✓ |
| Interpretation |  | ✓ |
| Report writing |  | ✓ |

## Data Sources:

* <https://www.transportforireland.ie/news/record-highs-for-public-transport-passenger-numbers-in-2023/>
* <https://data.cso.ie/> [Transport Infrastructure Ireland datasets]

## Ethical Considerations:

The ethical implications of the proposed capstone project are considered to be minimal. As the project proposes the analysis of secondary data there will be no interaction with human participants. Whilst there can be ethical concerns with analysing secondary data, the datasets do not contain any personal data. According to the Data Protection Commission in Ireland, "the term personal data means any information concerning or relating to a living person who is either identified or identifiable". No such data (e.g., names, IP addresses, location) are included in the datasets, which are fully anonymised. Therefore, the General Data Protection Regulation (GDPR) does not apply and factors such as consent for data processing and data retention periods do not have to be established to carry out the project.

## References

Central Statistics Office (2024) Transport Infrastructure Ireland, TII Statistics, TII03 - Passenger Journeys by Luas, retrieved from <https://data.cso.ie/> [accessed on 28th March 2024].

Transport of Ireland (2024) Record highs for public transport passenger numbers in 2023, retrieved from <https://www.transportforireland.ie/news/record-highs-for-public-transport-passenger-numbers-in-2023/#:~:text=Dublin%20Bus%20carried%20over%20145,its%20services%20the%20previous%20year> [accessed on 28th March 2024].