# Public Transport as a tool towards Sustainable Mobility for the Elderly Population

## By Deborah Mifsud (dmif0017@um.edu.mt)
### Master of Science (Sustainable Development)
### Institute for Sustainable Development, University of Malta

University of Malta
L-Università ta' Malta

## Introduction

One main goal of sustainable mobility is to meet the needs and travel demands of the population. Sustainable mobility requires the need to promote travelling by an accessible and reliable public transport (Gutierrez et al., 2011). The elderly population and public transport are highly correlated and indispensable to one another. Actually, the elderly people are the patrons that mostly use public transport. The elderly population is amongst the transport disadvantaged groups in society. Consequently, accessible public transport can provide them the necessary mobility, reduces depressive symptoms associated with the decline in out-of home activities and improves their quality of life.

## Objectives of the Study

The study targeted an important social pillar in sustainable mobility. The three research questions were:

1. Is proximity to bus stops a determinant of public transport use for the elderly people?

2. What are the main barriers that elderly people encounter when using public transport? Do these lead to social exclusion?

3. Can the elderly people access Mater Dei Hospital within their desired time budget using public transport?

## Case Study of the Research

The case study chosen for the research was Luqa. It is amongst the five top localities in Malta with the highest elderly population which amounts to 31.35 per cent of the entire population (NSO, 2007).

Mater Dei Hospital was chosen as the target destination for travel time surveys as medical trips are the highest amongst the elderly population. The average distance from Luqa to Mater Dei Hospital is eight kilometers.
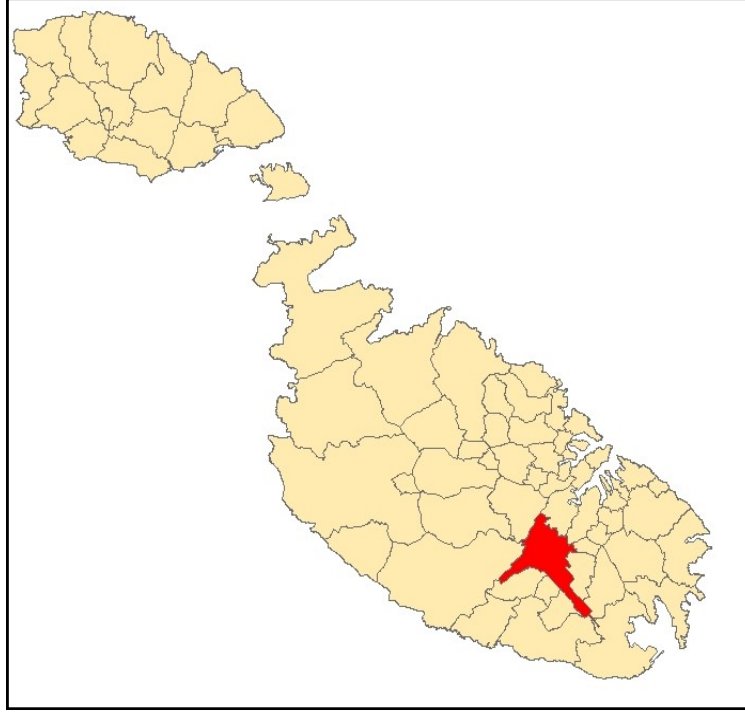

Figure 1: Case Study Selection—Luqa (Source: Drawn by author)

## Data Collection and Analytical Methods

The main data collection methods and analyses techniques used in the study were:

- Two hundred telephone surveys to the elderly population in Luqa
- Travel Time Surveys
- Bus Frequency Surveys

- Geographic Positioning System (GPS)
- ArcGIS 10 Software – Network Analyst Extension
- IBM SPSS 20 Statistics Software

## First objective: Proximity to Bus Stop versus Public Transport Use

In the Maltese Context the service area distance around a bus stop is of 150 metres (MEPA, 2003).

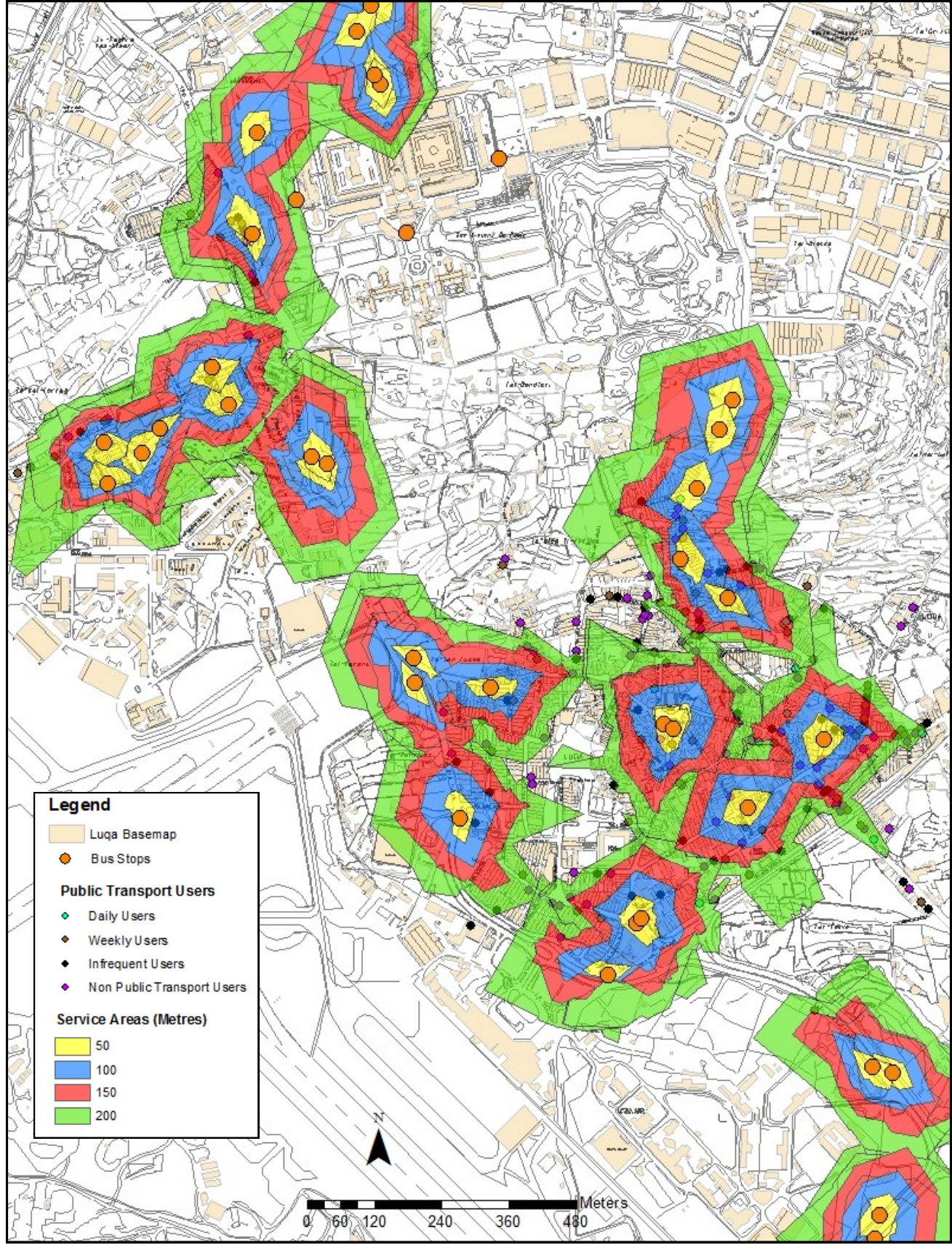Service Areas of 50, 100, 150 and 200 metres were created around each bus stop in Luqa (Figure 2).


Figure 2: Service areas (50 ,100, 150, 200 metres) around the bus stops in Luqa (Source: Drawn by author)

The absolute majority of the elderly people in Luqa fell within the 200 metres service area. This means that the 150 metres national threshold was exceeded.

The majority of the frequent bus users (daily and weekly users) laid within the outer buffers.

Supported by the Kruskal Wallis Statistical test, the main conclusion was that proximity did not affect public transport use amongst the elderly population in Luqa.

## Second objective: Barriers encountered by elderly people when using public transport

Unfortunately, 72 per cent of the frequent bus users claimed that they encounter several barriers when using public transport.

The principal barriers encountered were:

- Long waiting times on bus stops and at interchanges;
- Difficulty to access the bus stop due to lot of traffic passing by;
- No bus shelters or seating;
- Very low frequency of buses;
- Bus stop too far away from home;
- Inappropriate coverage of routes; and
- Inaccessible, non-updated and difficult travel information.



Very long waiting times and subsequently over-crowded buses

None of the bus stops in Luqa has appropriate seating or shelter

Difficult and non-updated travel information on bus stops

Difficulty to access Tumas Bus Stop due to traffic and no pedestrian crossings/traffic lights
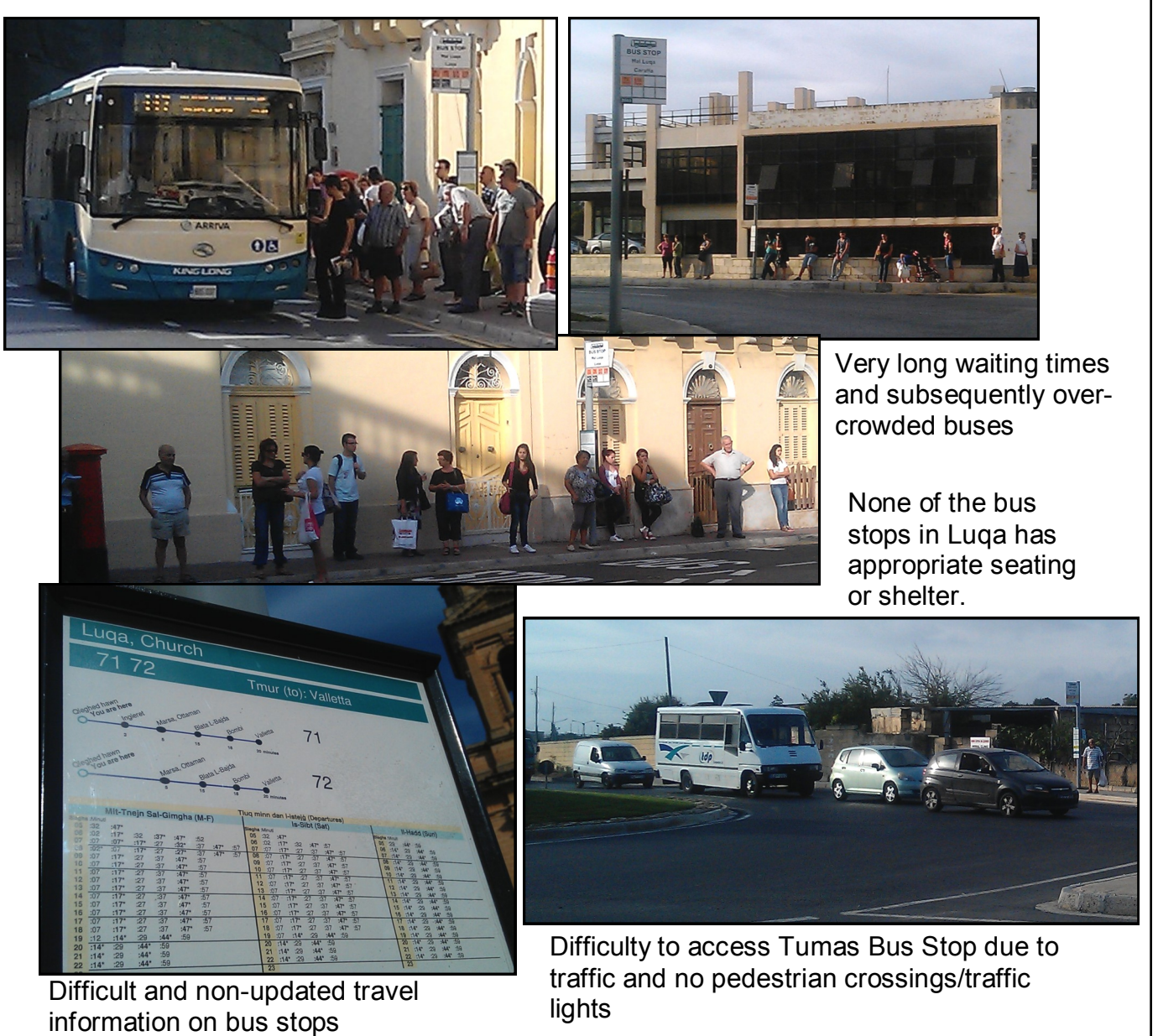
Figure 3: Some of the barriers encountered in Luqa when using public transport (Photos taken by author, 11th October 2012)

Despite the obstacles encountered by elderly people when using public transport, the study showed that the main reasons that can lead them to social exclusion were not related to transport matters, but mainly to their age and health status.

## Third objective: Travel time Analyses to access Mater Dei Hospital using public transport

The desired time budget of 64 per cent of the elderly to access Mater Dei Hospital by bus was of 30 minutes.

All the routes going from Luqa to Mater Dei Hospital exceeded this time budget.

The shortest and longest routes were Route 117 and the Route X4/ 210 respectively (Figure 4).



Average travel time in peak hours: 36.7 minutes.
Average travel time in off-peak hours: 35.3 minutes.

Average travel time in peak hours: 105.7 minutes (1 hour 45 minutes).
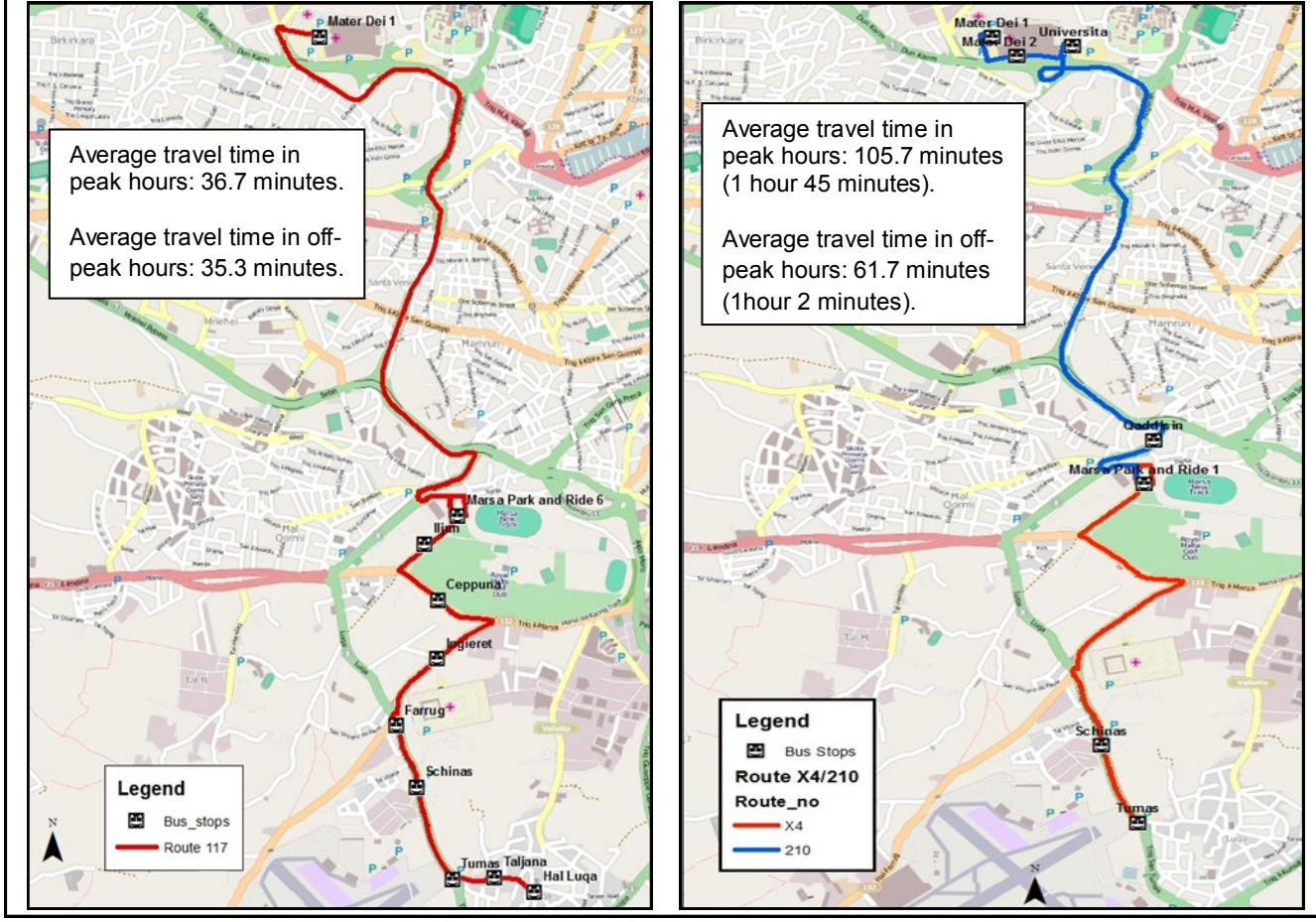Average travel time in off-peak hours: 61.7 minutes (1hour 2 minutes).

Figure 4: Route 117 with the shortest travel time and Route X4/210 with the longest travel time from Luqa to Mater Dei Hospital (Source: Drawn by author. Diagram not to scale).

From all the journey time, the longest time was spent waiting on bus stops particularly at the Marsa Park and Ride Interchange.
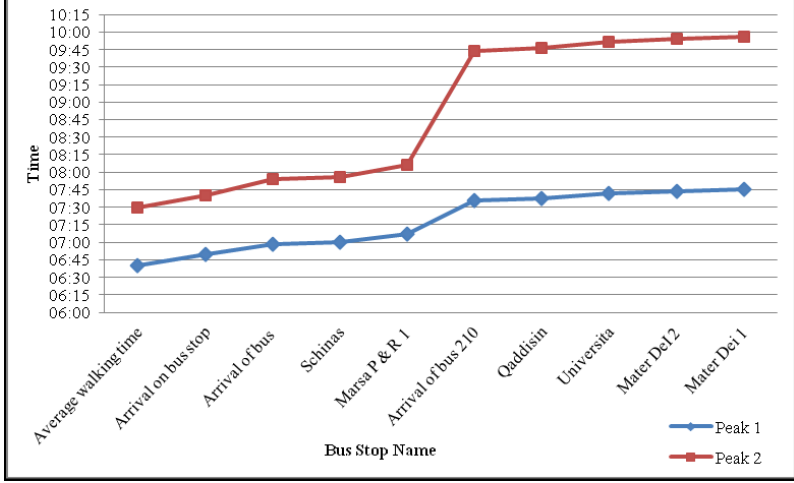

Figure 5: Cumulative travel time graphs showing the very long waiting time spent at Marsa Park and Ride Interchange (in two different peak times)

The bus frequency survey confirmed that delays were one major reason for long waiting times, particularly for Route X4 (Figure 6).


Figure 6: Expected vs. Actual time for Routes 117 and X4

References:
- Gutiérrez, J., Cardozo, D.C. and García-Palomares, J.C., 2011. Transit ridership forecasting at station level: an approach based on distance-decay weighted regression. *Journal of Transport Geography*, 19, 1081-1092.
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- MEPA (Malta Environment and Planning Authority), 2003. *Transport Topic Paper*. MEPA, Floriana, Malta.