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Shifting towards mass rapid transit in the Maltese islands

Malcolm Cachia[a]*

[a]*University of Malta, Msida, MSD 2080, Malta*

Abstract

Over the past 50 years, Malta's transportation planning has been geared towards the private vehicle. This approach, coupled with a lack of investment in public transportation has permitted a population of just over 400,000 to go from 150,000 vehicles in 1990 to over 335,000 today (NSO, 2014). This has resulted in the detriment of urban spaces, congestion, noise, and high costs being incurred due to the dominance of vehicles, despite a highly dense population. Extensive research was therefore carried out in order to assess the possibility of introducing a mass rapid transit system for such a small catchment, and to determine whether the cost of implementing such a system is economically, socially and environmentally favourable. The research focused on studying the dynamics of the islands' urban development through a comparative analysis of the urban development of other cities which were planned according to principles of transit-oriented development. In particular, the study analysed the development of the urban fabric, understanding demographic shifts, mapping origin-destination matrices and studying the properties of various transportation modes with the aim of creating a modal shift away from the private vehicle. The results of the research propose a network for a mass rapid transit system in Malta, which would form part of a multi-modal system designed to reduce the use of private modes of travel, mitigating social, economic and environmental costs through improved mobility and air quality. This paper will present a network together with the identification of strategic locations for stations within the Maltese urban fabric considering environmental implications while still allowing for further economic growth.

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Keywords: Mass Rapid Transit; Transit Ridership; Transit-Oriented Development; Urban Form
*Corresponding author. E-mail address. malcolm.cachia.10@um.edu.mt

1. Introduction

Throughout all member states within the EU, 24.30% of all greenhouse gas (GHG) emissions originate from the transportation sector. From this percentage value, as illustrated by the figure below, road transport is responsible for 71.90% (Eurostat, 2012). A simple calculation can therefore conclude that road transport is responsible for 17.47% of total GHG Emissions.

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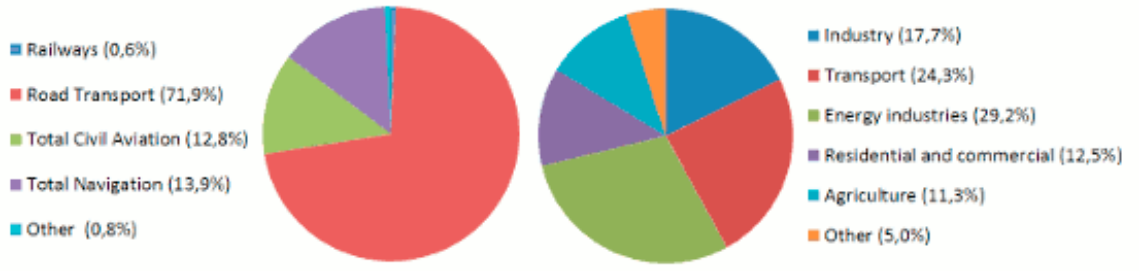

Figure 1: EU GHG Statistics by Sector / by Transport Mode

The half-century, 2050, is being considered a benchmark year by most. In 2011, the EU White Paper on Transport listed a series of targets for cities to reach and surpass by 2050. The aim of these targets is to create a Europe which is no longer dependent on imported foreign oil supplies, instead exploring new methods for the transition of energy "while increasing competitiveness and security of supply" (2050 Energy Strategy; EU White Paper on Transport, 2011). In the case for transport in Malta, the Institute for Climate Change & Sustainable Development (ICCSD) at the University of Malta (UoM) has carried out a study on "the external costs of traffic and congestion in Malta." In general, the study found that the main contributors to high levels of motorisation and car dependence were "changes to the socio-demographic fabric of the population, a lack of integration between land use and transport planning, a lack of investment in the public transport service, continued provision for road infrastructure and a relative dearth of policies aimed at promoting modal shift" (ICCSD, 2014). Through this study, the ICCSD has estimated an annual cost of €274M for accidents, air pollution, climate change, noise and congestion, rising to €317M by 2020 and €322M by 2030 in the event that no significant change is seen (ICCSD, 2014). This cost is no doubt directly affiliated with the level of car ownership, rising year-on-year. In fact, as of the fourth quarter of 2015, car ownership stands at 820 (Total Number of Vehicles /1000 inhabitants) and 650 (Number of Passenger Vehicles /1000 inhabitants) for the Maltese Islands (NSO, 2016). This research is therefore being compiled in order to investigate the potential of introducing a mass rapid transit (MRT) network, so as to reverse the negative effects being experienced and allow the islands to be developed more sustainably.

This report is an extract from a dissertation presented to the UoM which has analysed and discussed a number of parameters dealing with urban transportation and its interaction with the population as well as phenomena of urban sprawl, principles of transit-oriented development (TOD) and studies of particular cities in which this approach has proved successful, investigating forms of MRT, and relating this information in application to the Maltese Islands.

2. Literature Review

The concept of TOD, "first proposed by the American architect Calthorpe (1993), is to develop compact, mixed-use neighbourhoods around existing or new public transit stops offering frequent and high quality public transportation" as a means to "reduce car use" (De Vos, J. *et al.*, 2014), "particularly [by] creating sustainable urban transport systems [which] are not car-dependant" (Bayramoglu Barman G., 2013). TOD works when "a percent of the total urban area lives within a 5-minute (400m) and 10-minute (800m) walking distance of transit stations", referred to as acceptable access distances (Bandi *et al.*, 1974; Vuchic VR, Newell GF., 1968; Vuchic, 2005; Laporte *et al.*, 2011; Gutierrez, J. *et al.*, 2011; Guiterrez-Jarpa, G. *et al.*, 2013). The attractiveness for passengers to opt for rapid transit systems changes depending on the systems performance (Vuchic, 2005). An example of such is achieving a higher right of way (ROW) category, implying less obstacles for the system to navigate, resulting in an increased speed of operation and therefore also an increased likelihood that people will use the network. Land use is an important factor when planning for a MRT network to function through TOD. The Institute for Transportation and Development Policy (ITDP) "addresses development that maximises the benefits of public transit" in order to shift the focus of urban development's back to the users (ITDP, 2015). It does this through the introduction of a series of objectives designed specifically to create a more liveable environment.