# WHY ARE YOU NOT CYCLING? – A CASE STUDY FOR TRINIDAD AND TOBAGO

*Angela Francke*

*Technische Universität Dresden, Dresden, 01062, Germany*

*Email for correspondence: angela.francke@tu-dresden.de*

## ABSTRACT

Public and non-motorized transport has the potential to achieve a sustainable urban structure in developing and transition countries. Trinidad and Tobago, which just recently became a transition country, has several obstacles in using non-motorized and public transport modes. The development of the last decades concentrated strongly on motorized individual traffic and infrastructure projects. Subsidies for petrol further supported this development. The paper identifies the obstacles using literature and expert interviews. The literature review especially looked at grey literature like transportation plans, road planning analyses and reports as well as news paper articles as there is a lack of up to date scientific articles in that topic. Finally, based on this research recommendation to improve the non-motorized and the public transport sector were derived. This package of measures should consist of policy changes which include pricing policies, funding allocation and also infrastructural improvements. An interdisciplinary and holistic approach is required.

*Keywords: cycling, transport system, non-motorized transport, public transport, Trinidad and Tobago*

## 1. INTRODUCTION AND BACKGROUND

Trinidad and Tobago is a twin island state and belongs to the West Indies. The country has circa 1.3 million inhabitants and the second highest per capita income in the Caribbean and Latin America. The majority of this income comes from the exploitation of oil and natural gas resources as Trinidad and Tobago's economy is heavily dependent on the exploitation of natural resources (INDUFOR, 2010).

Being the most industrialized country in the Caribbean (EDC, 2012) it was only in November 2011 that the status of the Trinidad and Tobago was changed by the OECD from a developing

into a recently industrialized country (OECD, 2013). During its transition from a developing to a developed country it is still having problems regarding transport, but has also achieved a certain state of development. Figure 1 shows a comparison of the development of population, vehicle registration and gross domestic product (GDP) in Trinidad and Tobago. GDP and vehicle registration contribute to the travel demand whereas the population only contributes marginally to the total travel demand. It is expected that over time the number of vehicles will reach saturation point (MOWT, 2006b).

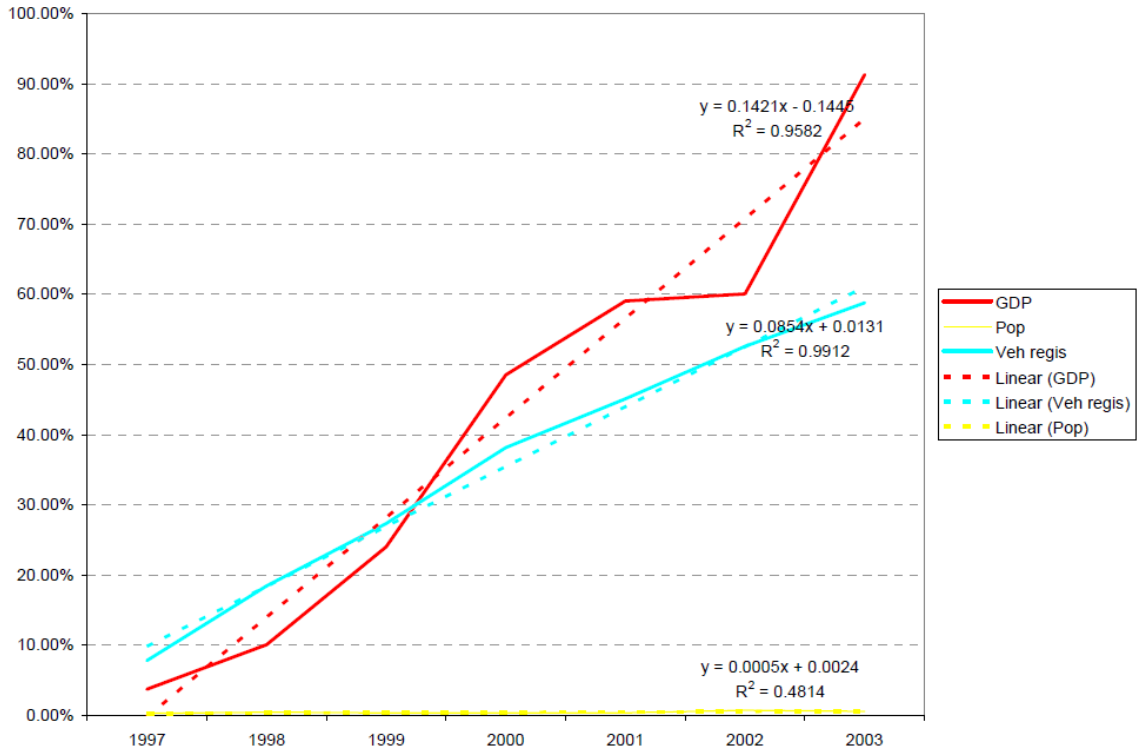


Figure 1 – Development of GDP, growth in number of registered vehicles and in population (MOWT, 2006b)

The capital and main urban centre, Port of Spain, is located in Trinidad at one end of a high-density area which is called the East-West Corridor. This area is home to approximately one-half of the population, which results in high numbers of daily commuters and traffic jams. The infrastructure constructed in the last few decades was mostly designed for motorized individual traffic to provide relief from congestion and focussed on enlarging the already existing high ways (Paul, 2012). As the country is a producer of oil the fuel is cheap in comparison to other countries (Mutabazi & Ackbarali, 2010). Private transport and car ownership increased rapidly which was further stimulated by governmental subsidies for petrol. This increase leads again to further infrastructure investments although these investments have not kept up pace with the exponential rise in the country's economy. There is also a lack of organized planning of the expansion (MOWT, 2006). But nevertheless as an extension of infrastructure requires space, this solution is limited in such a small country.

Public transport mainly focuses on bus services, so called maxi taxis (privately owned minibuses) and private/route taxis ("H" taxis). Maxi taxis are supposed to be the backbone of

public transit in Trinidad (MOWT, 2006b). These taxis operate on certain routes where they stop ever so often to pick up or drop off passengers. "H" taxis operate as route taxi or as exclusive ride taxis. There is also an illegal taxi phenomenon called "PH" taxi with free negotiable rates and often service in areas where "H" taxis are not operating (MOWT, 2006b). There is no reliable inner city public transport in the capital and the level of safety, efficiency and comfort is low. For longer distance travelling the Public Transport Service Cooperation (PTSC) provides bus services through the country on a regular and comfortable basis.

Compared to other developing countries, the modal share of non-motorized transport appears to be low and there is a high dependency on motorized individual transport. Especially in the East-West Corridor many homes are in close proximity to busy roads, resulting in the negative externalities of noise and air pollution (Rajkumar & Chang, 2000). In general as a result of traffic and heavy industry, Trinidad and Tobago is ranked within the global top 10 on carbon emissions per capita (United Nations, 2011). Increasing the use of non-motorized transport and public transport would also address that problem.

Besides traffic problems the country focuses also safety and security problems which will again influence the mobility behavior. The sense of security is weakest in Trinidad and Tobago (25 percent) compared to the other Caribbean countries, with the strongest sense in Barbados (79 percent) (Caribbean Human Development Report, 2012). The Global Competitiveness Report lists crime as the major obstacle to start a business in Trinidad and Tobago (World Economic Forum, 2010). It is not only crime with a high number of murder victims but also a high road fatality number (St. Bernard & Matthews, 2003; CSO, 2009) that has an influence on everyday's life and the transport mode choice of the inhabitants.

Further, the country and therefore its infrastructure is highly susceptible to natural disasters like floods or earthquakes. Especially in the rainy season major streets become flooded and are regularly impassable. Finally, climate change and possible sea level rise also play a role being a small island state (United Nations, 2011).

Facing these problems from different areas which are linked together makes it obvious that the country needs a holistic approach. Transportation is characterized as a complex, large, open and integrated system. This characterization implies that it includes social, political and economic aspects (Sussmann et al., 2005). The Vision 2020, a development plan for Trinidad and Tobago that aims to become a developed country by 2020, stated that "the challenges are complex, cutting across many interrelated issues, and require coordinated inter-agency responses. The priority will be to improve the quality of the road infrastructure; air, land and sea transport; drainage and flood management systems; and building construction and maintenance, in accordance with international standards of safety, aesthetics and functionality" (GORTT, 2005).

The analysis was carried out in Trinidad and Tobago and was kindly supported by the University of the West Indies during two in total three months stays in 2012 and 2013. The project was independent from any local stakeholder because it was funded by a European

academic exchange program. This independency facilitated to gather information from different stakeholders and to obtain insight of structures and procedures as well as data.

# 2. METHODS

As seen in the background section there is not much scientific research done in the transportation sector of Trinidad and Tobago. This is the reason that this explanatory study was conducted to give a status quo report about the transportation situation and to understand the mobility behaviour as well as the obstacles to use non-motorized and public transport modes.

The methodology for the project began with the collection of basic information on the transport system, such as transportation modes, transportation plans and modal split. In the literature review especially grey literature like transportation plans, road planning analysis and reports as well as news paper articles were considered. The collection of existing data and relevant information and their analysis was more challenging than expected as some of them are unavailable or inaccessible. Through personal contact unpublished material and draft reports could be acquired.

Further, there seems to be a lack of up-to-date scientific articles in that topic. The secondary analysis therefore had to focus on governmental reports, project plans and newspaper articles dated back as far as 1950 about the transportation situation in Trinidad and Tobago.

In a second step, based on this literature research, 15 in-depth interviews with stakeholders from the government (Ministry of Transport), transport companies (Maxi Taxi Association, Port Authority). NGOs (Arrive Alive) and researchers (from the University of the West Indies, St. Augustine Campus) were conducted. Table 1 states the institution types where interviews were conducted.

Table I – Interview partner per type of institution.

| Type of institution | Number of interviewees |
|---|---|
| Ministries | 1 |
| Road administration | 3 |
| Police department | 1 |
| Universities and research institutions | 5 |
| International organizations | 2 |
| Planning consultancies | 1 |
| NGO and special interest groups | 2 |

The interviews were conducted as semi-structured interviews giving the interviewee enough space to comment on observations and developments in the country as well as for personal impression. The structure of the interview consisted of questions to the actual position of the

interviewee and her or his responsibilities. The second part focussed on the transport sector, its strengthens and weaknesses. The last part had a wider focus and dealt with the challenges and opportunities of the country itself.
The interviews lasted between 15 minutes and two hours and they took place in February and March 2012 as well as in January, February and March 2013 in Trinidad and Tobago. Although the country consists of two islands the research focused only on Trinidad as it is the economic center and the majority of the population lives there.

The goal of the interviews was to detect the daily problems of practitioners and systemic shortcomings. As the interview partners had various backgrounds the interview parts were completely different fulfilled and therefore difficult to compare. Therefore the outcome of the interviews is summarized in the paper, not intending to emphasize the opinion of one certain interview partner. This also assures the interviewees anonymity and encouraged them to speak freely about problems in the country.

Finally, taking in consideration the literature review and the interviewees' information measures for improvements in public and non-motorized transport were derived.

# 3. RESULTS

## 3.1 General transportation situation

Over the past four decades there have been numerous transportation studies in Trinidad and Tobago (see Table II). The studies have in common, that each of them has called for upgrading of public transport services (MOWT, 2006c).

Table II – List of transport plans or national plans including transportation analysis and objectives (compilation with information from GORTT, 2005; MOWT, 2006c; MEP 2011)

| Year | Name of the plan |
|---|---|
| 1967 | National Transportation Plan |
| 1974 | Priority Route Transit Study |
| 1981 | National Physical Development Plan |
| 1996 | National Internal Transportation Policy |
| 1997 | East-West Corridor Study |
| 2000 | Local Area Plan for Port of Spain |
| 2005 | East-West Corridor Study |
| 2005 | Vision 2020 - National Strategic Plan |
| 2006 | Comprehensive National Transportation Study |
| 2011 | Innovation for Lasting Prosperity - Medium-Term Policy Framework 2011-2014 |

Most of the reports as well as the press state problems in the transportation sector (see i.e. Baboolal, 2008; Genivar, 2008; Arima Borough Corporation, 2010; Furlonge, 2010 and 2013; Paul, 2012). As noted in the Comprehensive National Transportation Study (2006a) the Government of Trinidad and Tobago is fully aware of the shortcomings in the transportation system and "the apparent inadequacy of the existing system to serve the growing economy and the larger movements of people and goods" and "is conscious that expenditures in transport infrastructure will play a key role". This Comprehensive National Transportation Study is still the base for the decisions taken at present. There is therefore a high level of awareness toward the need for reform in the area of transportation.

The country had a high increase in private vehicle ownership within the last decades (see Figure 2). In 2007, the number of registered vehicles increased to a total of 490 987 (WHO, 2009). The 2013 road safety reports states a number of 321 191 registered vehicles in 2010 (WHO, 2013). Although the number in 2010 has decreased (possibly a change in the statistics or the already mentioned point of saturation) it is obvious that private vehicle ownership has almost tripled over the past 15 years. At the same time the use of public transport has mainly stayed at the same level for maxi taxis and route taxis and has experienced a decline for PTSC buses (MOWT, 2006b). In addition, in Trinidad and Tobago, the private vehicle use goes beyond its role as mode of transport to one of image and social status (Mutabazi & Ackbarali, 2010).

Figure 2 – Number of registered vehicles (1996 - 2005) in Trinidad and Tobago (GORTT, 2005)

A large percentage of the population (53% or 690 000 persons) commute daily between their work and home, especially along the East-West-Corridor. Many persons leave their homes at an extremely early hour in order to beat traffic and get to work on time (Baboolal, 2008). Figure 3 shows a master plan for the traffic situation in and out Port of Spain which depicts the commuting flows around the capital.

Even though several transportation plans were commissioned many of their objectives were never achieved. In 2006, the ministry of works and transport still stated that there is a "lack of integrated transportation and land use planning in major cities, particularly the capital city of Port of Spain" (MOWT, 2006b).

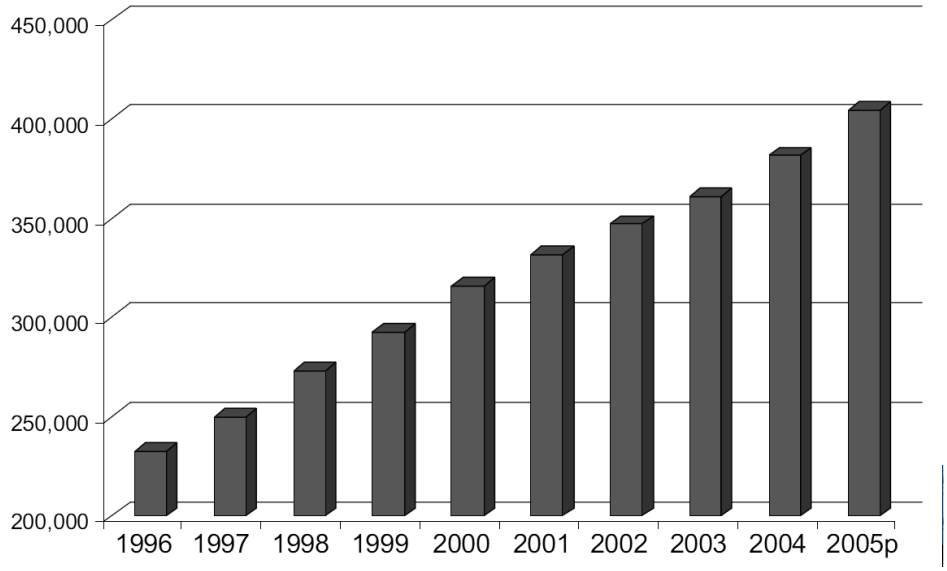


Figure 3 – Port of Spain - Traffic and Transportation Master Plan (Genvia, 2008)

Despite these apparent problems the World Economic Forum (2010) rated the country for the overall infrastructure quality, the port infrastructure quality, and the air transport infrastructure quality with 7 out of 10. This means the overall infrastructure quality is ranked among the best in the world. This is in contrast to the perception of the daily commuters and the transport experts as well as the interviewees. The air and the port infrastructure is modern and works at a professional level and therefore these evaluations might have boosted the overall ranking.

### 3.2 Pedestrian situation

In general, walking seems not a suitable alternative to other transport modes. In many interviews people stated that they would walk or already walked a lot in other countries but not in Trinidad and Tobago. When asked for the reason, three main "excuses" were stated:

First, the climate plays an important role as the weather is perceived to be too hot in the dry season and too unpredictable with the possibility to get wet in the rainy season.

This is also linked to the second reason, convenience. People are not used to walking or to doing other physical exercises outside and even very short distances are apparently driven by car instead of walking outside and being exposed to the weather. It feels inconvenient to even walk short distances from a station of the public transport and one interviewee said that he "would only use the public transport if it would stop right in front of his office". There are poor facilities for pedestrians with often broken or non-existing pavements and nearly every destination is accessible with private vehicles, therefore there is no incentive to change the mobility behavior.

The third reason often stated by the interview partners, was crime. As already described in the background section, crime is an obstacle that influences every part of the country and the high crime rate makes it especially impossible meaning unsafe to walk during night or dusk and dawn. Safety reasons are influencing the mobility behavior, which also plays a role linked to the relatively high road fatality rate in Trinidad and Tobago. Pedestrians account for 21% of the fatal road accidents (WHO, 2013).

### 3.3 Cycling

Apparently, a bicycle is a piece of sports equipment that is used as a child and then later again by only a small ratio of the population for sporting activities. Groups of cyclists can be observed at some Sunday mornings at the highways accompanied by an escort vehicle.

The Comprehensive National Transportation Study (2006d) undertook a survey with representatives of various national and local governmental agencies and asked them to judge each element of the transportation system (on a scale from 1 the lowest quality to 5 the highest quality) in terms of operation and effectiveness of the element in meeting the nation's transport needs. Bicycle facilities achieved the lowest rank with 1.4, pedestrian facilities were ranked at 1.9, the PTSC 2.0 und Maxi Taxis achieved the highest rank among the public transport elements with a 3.0 score. Overall, most of the transportation elements were rated as less than acceptable in term of operation and effectiveness.

The reasons for not using the bicycle as a daily mode of transport or just for short distances are similar to the obstacles for pedestrians. This mode of transport is exposed a lot to the weather and because of the physical exhaustion again more unattractive to use to commute daily. Further, the non-existence of bicycle lanes makes it more dangerous to cycle at the street as many streets are narrow and bordered by drainage systems. As the drivers of private cars, maxi taxis and taxis are not used to bicycles as equal road user conflicts and safety problems are present. Because of the high car occupancy rate the 'fight' for room at the street is even worse. This can possibly result in road accidents. As bicycles are apparently hardly used at all as a transport mode the ratio of 3% of death by road user category (WHO, 2013) seems quite high (to compare: drivers of 4-wheeled cards and light vehicles: 37%, Passengers: 34%).

The Comprehensive National Transportation Study recommended to "include bicycle accommodations and sidewalks in all applicable new construction, widening and resurfacing projects" and to encourage the bicycle route development (MOWT, 2006b).

### 3.4 Public transport

As explained in the introduction section the public transport consist of the PTCS buses and the private organized taxi services, especially maxi taxis. There used to be a nationwide transport system consisting of train, trams and trolley buses which got abolished in the 1950s and 1960s due to maintenance and financial problems (McNish, 1963; Anthony, 1997). However, there seem to be problems since decades with the then installed public transport system and its service quality as news paper articles revealed. Further, all of the already mentioned studies recommend upgrading public transport vehicles and its facilities to make this mode of transport more attractive. One recommendation was e.g. to introduce larger vehicles and to schedule information. As an outcome of all studies it was stated that the government should stronger promote the use of public transport over the use of private cars (MOWT, 2006d).

As Furlonge (2013) mentioned, although the car ownership is high in Trinidad and Tobago, the majority of the population has no access to a private vehicle. In particular, women and children use some form of public transport like maxi taxi or private taxis. Access to transportation for non-car owners is mostly difficult and made even more handicapped though the congestion of the car owners. Supporting this, some interview partners stated that public transport is mostly used by the vulnerable groups of the society like children or women. Mostly, as soon as a car is accessible at the household the mobility behavior changes.

Trinidad and Tobago faces serious environmental problems due to heavy industry and high motorized automobile use. Within the new Policy Framework from 2011, which replaced the Vision 2020, the government wants to create a greener transportation system. The emphasize is not only at the reduction of the congestion and the transportation costs of moving people, goods and services thus enhancing productivity but also at the sustainability of the transport system. The transportation sector seems also to be a suitable area for future development of renewable energy technology. Further, the operation of the PTSC is planned to be improved significantly with the acquisition of 100 new buses and the implementation of a strong in-house maintenance capacity. The PTSC is also the basis to create a modern land transportation system (GORTT, 2005; MPE, 2011).

## 4. SUMMARY AND RECOMMENDATIONS

It turned out that many of the current urban transport problems in Trinidad and Tobago, such as congestion and very high accident and road fatality rates, could be improved by enhancing non-motorized transport and by establishing a reliable public transport network.

### 4.1 Main reasons for poor non-motorized transport use

Based on the analysis and the interviews, the following main reasons for poor non-motorized transport use and public transport conditions were discovered:

- Subsidies for petrol to enable mobility for everyone,
- Car ownership as a status symbol,
- Convenience and distance,
- Crime and therefore safety problems,
- Abolishment of trolleybus, train and tram networks in the 1950s and 1960s,
- Focus of planning activities on vehicle-oriented road construction,
- Hardly any infrastructure to facilitate cycling,
- Poor condition or absence of many sidewalks,
- High road fatality rate,
- Low obedience to traffic rules.

### 4.2 Recommendations

To round up the analysis a few recommendations to improve the situation for the non-motorized transport sector as well as for the public transport sector were derived. As formulated in the new policy framework of the country these transport policies should "take into consideration the highest environmental standards" (MPE, 2011). Certainly, it will be difficult to change habits and to not use the private vehicle for every trip. This can be addressed by a bunch of both pull and push measures.

Pedestrians and cyclists need safe and adequate pedestrian facilities. Pedestrianization in downtown areas is again a step further to improve the quality of living in those areas and to actually enable people to walk. This requires careful planning as the needs of commercial activities such as deliveries should be catered too. Further, the design and the location of parking lots with an easy and pleasant walking access to downtown areas can stimulate walking again (Arima, 2010). In combination with the implementation of parking fees the mobility behavior can be influenced towards non-motorised and public transport modes (Hilton, 1999; Litman, 2012). In general, to achieve an effective transportation system, political criteria also need to be considered. This includes measures like adapting legal regulations or imposing appropriate fines.

Literally since the closure of the railway system it is planned to install a new reliable mass transportation system. The recently promoted and finally rejected Trinidad rapid rail project is just one from many other alternatives that were discussed (e.g. Monorail in 1974). The objective of such a train system is to provide a modern, alternative mode of transport to the travelling public (Arima, 2010; Furlonge, 2013). Especially commuters living within the East-West and North-South urban corridors need a mass transportation system with high frequency, ridership number and reliability. They would benefit most from the implementation of an e.g. light railway system. But not only the people in those corridors but

the entire country could benefit as e.g. wasted time in congestion and travel costs decrease and people get to work on time.

The maxi taxi can still play an important role in a modern transportation system as they could serve the rural, sparsely populated areas where no train and bus service is provided. In these areas flexible schedules and lines are useful. Additionally, a flexible maxi taxi service is still very convenient for the riders. For example in Turkey exists a mini bus system (called Dolmus) comparable to the maxi taxis with a proper service in the rural areas which could be a best practice for the modification of the maxi taxis in Trinidad and Tobago (Eder, 2012).

An important issue that needs to be addressed in the entire country is crime and safety. This was the main point stated by the interviewees as a challenge for Trinidad and Tobago. A lower perception of safety in public influences immensely the mobility behavior. The use of the private vehicle increases the own security and is therefore often chosen as best option only because of that reason. The intensified effort of the government together with other organizations like police and educational institutions will hopefully contribute to a safer country. That is a long term objective the country is aiming for and it is a basis for further development in numerous sectors. As explained already, the road safety is at a low level too. Again, both push and pull measures as e.g. higher traffic law enforcement and better driver education can improve that situation. Financial resources need to be provided to implement and to maintain these structures. Additionally, an increase in public transport ridership would also has a positive effect on road safety.

Finally, it is important to put in place comprehensive traffic management measures and to constantly monitor them. The requirement is, that “these measures should be based on up-to-date traffic data, thorough analysis and the application of all of the elements of traffic management i.e. including proper signage, education and information as well as regulation and enforcement and the application of low cost engineering solutions, for example channelization and barriers” (Arima, 2010). Implemented measures and policies should be evaluated regularly if they achieved improvement and constantly refined.

### 4.3 Challenges in data collection

There have been considerable challenges to obtain data and information. This was due to the problem to get in contact with the proper persons in charge, bureaucratic procedures as well as to inaccessible or inexistent data material. The results of the study are limited by the small sample size of the interviews but gave a good first insight in the transportation system and its challenges in Trinidad and Tobago. Further, when secondary data is used, details of the data collection process remain unknown which could have skewed results. On some specific topics only limited information was available or available only in insufficient quantities. Some of the data presented was therefore already several years old and may therefore not reflect totally the current situation.

Further research is needed to analyze in more detail the variables on understanding the mobility behavior and the influence of certain policies. It is further important to focus on

several subgroups as for example the elderly or school children to make sure that they will not be disadvantaged when the transportation system is changed or less subsidised.

## ACKNOWLEDGMENT

The author wants to thank all the persons, organizations, institutions and companies who spent a considerable amount of time on the meetings and provided valuable information and material. The analysis is based on interviews and the whole study would have been impossible without the support from all the helpful individuals. Further, all the scientific staff at the University of the West Indies, especially Prof. Surendra Arjoon, Prof. Gerard Hutchinson, Dr. Kristy Lascelles, Dr. Godfrey St. Bernard, Blaine Marcano and the programme coordinator Sharan Singh supported the work by giving valuable suggestions and providing contact ideas. Basic funding is provided by the Heinrich-Böll-Stiftung. The two research trips to Trinidad and Tobago were enabled and supported by the Erasmus Mundus ACP Programme and my family.

## REFERENCES

Anthony, M. (1997). Historical Dictionary of Trinidad and Tobago, Lanham.

Arima Borough Corporation (2010). Final Draft Spatial Development Plan of the Arima Borough (2010 - 2020), Arima.

Baboolal, Y. (2008). Transport horror still prevails, in: The Trinidad Guardian Newspaper, Dez. 14th, 2008.

Central Statistical Office (CSO) (2009). Traffic Statistics, Road Traffic Accidents Bulletin. Port of Spain.

Eder, C. (2012). Ein Bus ist ein hochtechnologisches Gerät, in: VCÖ-Magazin, Vol. 04/2012.

Furlonge, R. (2010). Public transport for all, in: Trinidad and Tobago Newsday, Sept. 16th, 2010.

Furlonge, R. (2013). Our transportation system is in crisis, Caribbean Counsel on Sensible Transport, press series, URL: http://www.ccost.org/our_transportation_system_is_in_crisis (03.03.13)

GENIVAR (2008). Transportation Seminar, McGill University Port of Spain: Traffic and Transportation Master Plan, Montreal.

Government of the Republic of Trinidad and Tobago (GORTT) (2005).Vision 2020 Draft National Strategic Plan, Port of Spain.

Hilton, A. (1999). The parking problem, in: Trinidad and Tobago Newsday, Nov. 25th 1999.

INDUFOR (2010). Financing for Sustainable Forest Management. Case Study: Trinidad and Tobago.

Litman, T. (2012). Understanding Transport Demands and Elasticities - How Prices and Other Factors Affect Travel Behavior, Victoria Transport Policy Institute.

McNish, H. A. (1963). Enforced Zoning Would Solve The Railway Problem, in: The Trinidad Guardian Newspaper, 22th March 1963.

Ministry of Planning and the Economy (MPE) (2011). Innovation for Lasting Prosperity - Medium-Term Policy Framework 2011-2014, Port of Spain.

Ministry of Works and Transport of Trinidad and Tobago (2006a). Comprehensive National Transportation Study, Port of Spain.

Ministry of Works and Transport of Trinidad and Tobago (2006b). Comprehensive National Transportation Study, Draft Final Report, Land Sector, Port of Spain.

Ministry of Works and Transport of Trinidad and Tobago (2006c). Public Transport: Diagnostic, Port of Spain.

Ministry of Works and Transport of Trinidad and Tobago (2006d). Project Inception Report, Port of Spain.

Mutabazi, M.I.; Ackbarali, A. (2010). School Travel Characteristics and Attitude Towards Ride Sharing: A Case Study of St. George East School District, Trinidad, The West Indian Journal of Engineering, Vol.32, Nos.1&2, 60-68.

Organisation for Economic Co-operation and Development (OECD) (2013). URL: http://www.oecd.org (10.02.13)

Paul, A.-L. (2010). Transportation Experts offer Solutions, 2012 Trinidad & Tobago Chamber of Industry and Commerce, http://www.contact-tt.com/index.cfm?Content=391

Rajkumar, W. S.; Chang, A. S. (2000). Suspended particulate matter concentrations along the East}West Corridor, Trinidad, West Indies, Atmospheric Environment 34, 1181-1187.

St. Bernard, G.; Matthews, W. (2003). A contemporary analysis of road traffic crashes, fatalities and injuries in Trinidad and Tobago, Injury Control and Safety Promotion, 10:1-2, 21-27.

Sussmann, J.; Sgourdis, S. P.; Ward, J. L. (2005). New Approach to Transportation Planning for the 21st Century: Regional Strategic Transportation Planning as a Complex Large-Scale Integrated Open System, Transportation Research Record: Journal of the Transportation Research Board, Vol. 1931, 89-98.

United Nations Development Programme (2011). Human Development Report 2011 Explanatory note on 2011 HDR composite indices - Trinidad and Tobago.

United Nations Development Programme (2012). Caribbean Human Development Report 2012.

United Nations Executive Board of the United Nations Development Programme, the United Nations Population Fund and the United Nations Office for Project Services (2011). Draft country programme document for Trinidad and Tobago (2012-2015).

World Economic Forum (2010). The Global Competitiveness Report 2010–2011, Geneva.

World Health Organization (WHO) (2009). Global status report on road safety: time for action. Geneva.

World Health Organization (WHO) (20013). Global status report on road safety: time for action. Geneva.