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# Understanding the urban travel attitudes and behavior of Tbilisi residents

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ABSTRACT

In recent decades the public transport network in Tbilisi, Georgia has decayed, while the number of private automobiles has increased dramatically. This study seeks to expand our understanding of the Tbilisi population's urban transport attitudes and behavior. It elaborates on the perceived strengths, weaknesses, and potentials of the public transport system, and seeks to understand the reasons for the increased use of private automobiles. A questionnaire survey was conducted among Tbilisi car drivers (n=159) and public transport users (n=163). The results show that most of the survey respondents preferred to use a private car and avoid using public transport. Particularly important factors include time issues such as schedules and frequency, plus comfort and safety issues. Tbilisi residents value their time and want to use it efficiently. Changing residents' travel behavior will require making the public transport options competitive with the perceived advantages of the car. The study offers recommendations for more effective urban transport policy, including incentives to encourage greater use of public transport in Tbilisi.

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# 1. Introduction

### 1.1. Background

The bulk of research in urban transport has focused mainly on economic calculations and engineering analyses. This has given a clear picture of certain aspects of transport systems, but has failed to resolve many transport-related problems. There have been fewer efforts to understand the social basis of transport behavior, though it is increasingly recognized that considering phenomena such as social norms and habitual behavior is at least as important as issues of economic and engineering optimization (Lyons, 2004). Effective public policy must consider transport as a part of everyday life and behavior, and an integral part of modern culture (Jensen, 1999).

Differences in people's attitude and personality traits lead to their attributing varying importance to environmental considerations, safety, comfort, and convenience, and could be a key to improving the urban transport situation. Gärling et al. (1998) found that attitudes towards flexibility, comfort, and environmental issues all influence one's choice of transport. Ibrahim (2003) examined the attitude of car owners and non-car owners towards transport modes in Singapore, and found that car owners and non-car owners portray different attitudes towards various

\* Corresponding author. *E-mail address*: roger.sathre@cgf-georgia.org (R. Sathre). transport modes. This suggests that different strategies may be needed to change transport behavior of various social groups.

Beirão and Cabral (2007) conducted a qualitative study of public-transport users and car users in order to understand travelers' attitudes towards transport and to explore perceptions of public transport service quality. They found that in order to increase public transport usage, the service should be designed in a way that accommodates the levels of service required by customers and by doing so, attract potential users. Furthermore, the choice of transport is influenced by factors such as individual characteristics and lifestyle, the type of journey, the perceived service performance of each transport mode, and situational variables. Paulley et al. (2006) described a range of factors affecting the demand for public transport, concentrating on the influence of fares, quality of service, income, and car ownership.

Hiscock et al. (2002) conducted interviews with car owners and non-car owners in Scotland, to investigate the psycho-social benefits people seem to derive from their cars. They found that cars were seen to provide protection from undesirable people and events, and provided autonomy because car use was seen as being more convenient, reliable, and providing access to more destinations than public transport. Cars were also seen to give prestige and other socially desirable attributes such as competence, skill, and masculinity. To make public transport more attractive, the authors suggested that policy makers consider how to make it provide similar sorts of benefits, targeting the different needs of various population groups.

Several authors have analyzed the transport transition that accompanies post-socialist economic and political transition



(see e.g. Grime and Duke, 1996). Many urban residents in transition countries now have greater affluence and have a wider choice of private transport options, while the public-sector transport options become less significant. Specific to the former Soviet republic of Georgia, located in the south Caucasus region, few studies to date have examined the sociological aspects of transport issues in the capital city of Tbilisi. Karanadze (2006) reviewed transport-related issues in Georgia, discussing key barriers to sustainable transport development including the legislation system, fuel quality, traffic management, vehicle condition, health effects, public transport, and public participation. Khuchua (2002) investigated car sharing in Tbilisi during the previous decade, revealing several possible barriers to implementation including the inflexibility of the existing travel behavior of potential participants and low public and political accessibility. Vardosanidze (2006) offered insight into sociological aspects of transport system functioning in Tbilisi. He reported that the population of Tbilisi feels discomfort from transport chaos, but they also see ways to overcome it. These studies hint at the importance of sociological aspects of urban transport, yet no study to date has specifically focused on the attitudes and behavior of Tbilisi residents to public versus private transport options. Such a study could potentially contribute to a more effective public policy towards urban transport in Tbilisi.

#### 1.2. Study objectives

Tbilisi, with a population of about 1.2 million, is experiencing rapid growth in levels of mobility. During the last decades, traffic volume in Tbilisi has rapidly increased, in particular the number of private automobiles. In late Soviet times there were 15 cars per 1000 inhabitants. By 2000 this had risen to about 70 vehicles per 1000 inhabitants, and by July 2005 there were about 100 vehicles per 1000 inhabitants in Tbilisi. The situation is dramatically different in the public transport sector. Tbilisi used to have a very well developed public transport system including metro, city buses, trolley-buses, trams, mini-buses, and taxis. The Soviet Union traditionally gave overriding priority to mass public transport (White, 1979). During the 1990s the municipal bus service virtually collapsed, and is now slowly improving after the Tbilisi municipality purchased additional buses in 2004. Tram and trolley-bus service has been eliminated from Tbilisi. The metro network remains in operation and attracts a significant number of riders, but metro transport is limited to certain areas of the city. The gap in urban transport service, for those residents who do not own a car, has been filled by the numerous, flexible, though less comfortable "marshrutka" mini-buses. The metro and bus systems are owned and operated by public authorities, while mini-buses are privately owned and operated but are licensed and regulated by public authorities.

No integrated, long-term transport planning has been done for Tbilisi. The increased use of private cars has created problems for the city and its inhabitants, though the ongoing transition in urban transport has occurred largely without debate or study of urban transport demand and how it might best be satisfied. Urban transport is a complex issue with multiple factors to consider, including sociological aspects such as the travel-related attitudes and behavior of the urban residents. The present study investigates the relationship between car driving and public transport use, and seeks appropriate policy incentives that encourage people to use public transport rather than drive cars.

The study is based primarily on a survey of urban travel attitudes and behavior of Tbilisi residents. Acknowledging the complexities of understanding attitudes and behavior (Ariely, 2008), including the potential gaps between stated and revealed preferences, a specific focus of the survey is on policy incentives that could encourage people to use more public transport. The rationale for this study is that people's attitudes could form obstacles, but also solutions, to effective urban transport, by finding practical incentives that encourage the use of public transport. Knowledge of these factors could generate ideas for effective policy measures that Tbilisi authorities could implement in terms of public and private transport management for the benefit of city residents.

#### 2. Methods

A questionnaire survey was conducted among Tbilisi car drivers (n=159) and public transport users (n=163). The aim of the survey was to understand how people think about and use private and public transport, and their anticipated reaction to potential transport policy measures. A number of questions were asked for basic demographic variables like age, gender, income, occupation, place of residence, etc. These demographic data served as independent variables for analysis of most of the subsequent questions. Another key series of questions were asked for information on usage habits of public and private forms of transport. Additional questions were tailored for public transport users and car drivers, and went into further detail on frequency, mode, distance, and other factors related to their urban travel habits.

Further questions were specific to the perceived relative advantages and disadvantages of private cars and public transport options. Questions regarding costs, comfort, safety, routes, and other factors explored the advantages and disadvantages of different transport options including cars, buses, metro, trolleybuses, mini-buses, etc. The general aim of the survey questions was to determine the factors that would increase the desirability of using the public transport system, and what incentives would encourage public transport use and discourage private car use. Some questions were formulated in a way to find out specific government policy measures that could encourage a change in transport behavior, including residents' opinions about appropriate transport management.

A pre-test survey exercise was conducted among 20 respondents to discover unclear questions, ambiguities, sensitive issues, and other potential weaknesses of the survey questionnaire. These issues were then corrected in the final version of the survey that was given to the general population. The survey was conducted in the Georgian language.

The full survey was then conducted using the intercept survey method. Convenience sampling was used, whereby people who at the time of the sampling were either using a car or were using a form of public transport were approached and asked to complete the survey questionnaire. Car drivers were approached in parking areas as they entered or left their vehicles. Effort was made to vary the sampling to include various parts of the city, as well as various times of day and days of the week. Professional drivers such as bus or taxi drivers were excluded from the survey. A total of 159 car drivers and 163 public transport users completed the survey. The refusal rate was higher among car drivers than among public transport users, and generally was motivated by "lack of time" by the potential respondent, though this difference among the groups was not quantified or controlled for. Data from the completed questionnaires were manually entered into a computer database and analyzed using statistical software.

The quantitative survey activity was complemented by a review of the existing literature and by dialogue with Tbilisi municipal authorities. Government documents, academic articles, books, and internet sources were accessed to increase the theoretical knowledge of the transport situation in Tbilisi as well as the experiences of other cities experiencing a transport transition. The Georgian governmental statistics department was contacted to find information on previous studies on Tbilisi transport problems or resident's travel behavior. Interviews were conducted with municipal transport management staff to find out their plans, priorities, and needs, and to engage in cooperative dialogue to allow this research to be more useful to Tbilisi public policy makers.

### 3. Survey results

#### 3.1. Demographic comparison

The survey included demographic information in order to identify the results with different groups of people. Survey questions included age of the population, gender, occupation, and income. The demographic results of the survey sample are shown in Table 1, together with relevant data on the total Georgian population.

The public-transport users had a wider range of ages (  $\leq 23$  to  $\geq 65$  years old), while more car drivers were in the 24–49-year old range. No car driver was older than 65 years of age. Significant gender differences were observed, with 78% of the public transport users being female, while 72% of the car drivers were male. The majority of both car drivers and public transport users worked in the private sector. Most of the public transport users were in the lowest income category, while car drivers were more commonly in the middle to high income categories.

#### 3.2. Public transport users

Public transport (PT) users were asked which type of public transport they use more often: metro, bus, or mini-bus. Most of them use mini-buses, with an average of 5.1 trips per week (Fig. 1). A likely reason for the greater use of mini-buses is that they have a greater geographic coverage than other forms of public transport, going to places without metro coverage and where bus route frequency is irregular.

Public transport users' main concern is related to the price of transport fares. 77% of PT users are not satisfied with the price.

In July 2007 the PT fare in Tbilisi was doubled to 0.40 Lari per trip (1US\$=1.6 Lari). In general, PT users have lower incomes than car drivers (Table 1) and increases in the cost of transport will more sharply affect their budget. Most of the PT respondents work for the private sector (54%) and only 16% work for governmental sector. 48% of the sample has a monthly income of below 200 Lari. Fig. 2 shows the income breakdown of the 23% of PT users who are satisfied with PT fares, and the 77% who are unsatisfied. A majority of the respondents who are unsatisfied with the price of transport are in the low income group.

PT users were asked to suggest improvements to PT service. The results are shown in Fig. 3. The most frequent response was to reduce fares (see also discussion above). The next most frequent concerns were for greater comfort, and for more reliable and frequent service. Other concerns include environmental issues and vehicle safety.

PT respondents prefer more comfortable journeys, including soft, clean seats, a pleasant temperature, preferably having air conditioning. This appears to be an important issue in Tbilisi because of its hot summers. Most of the recently-obtained city



Fig. 1. Frequency of using different modes of public transport, as stated by public transport users.

Table 1

Summary of demographic characteristics of survey respondents and the total Georgian population (Geostat, 2009). Some percentages do not sum to 100% due to rounding.

Characteristic		Car drivers (%)	Public transport users (%)	Georgian population (%)
Age	≤23	12	19	32
-	24-35	39	31	18
	36-49	37	26	20
	50-64	12	16	16
	$\geq$ 65	0	8	14
Gender	Female	28	78	53
	Male	72	22	47
Occupation	Private sector work	62	52	a
	Public sector work	28	15	a
	Student	3	14	17
	Pensioner	1	9	19
	Unemployed	7	11	7
Monthly personal income	≤200 Lari	11	48	b
	200–500 Lari	41	41	b
	500–1000 Lari	36	10	b
	$\geq$ 1000 Lari	12	1	b

<sup>a</sup> Information not available.

<sup>b</sup> Average monthly per capita income in urban areas is 141 Lari. Average monthly household income in urban areas is 514 Lari.

buses are designed for using air conditioning and do not have opening windows. To save fuel the air conditioning systems are not used in Tbilisi, which caused concern for the passengers. Opening windows were later installed in the buses, but still air conditioning remains an issue. Complaints were made about very crowded transport, especially on mini-buses that are frequently uncomfortable with broken seats, extra seats installed, unpleasant smells, and poor ventilation. Passengers are unsatisfied with the lack of technical safety of many mini-buses, for example, worn tires and non-functioning lights. The main reason people use mini-buses is that their routes are very flexible and they can be stopped anywhere. Based on the survey results, there is a desire for more comfortable, flexible, convenient transport that will be able to deliver the passengers to remote areas of the town.

Travel time and reliability are key factors in the choice of transport and are more important for travel to work or school activity. There is a demand for more frequent direct public transport links. Respondents want brief waiting time, fast journey, and reliability. 62% of the PT respondents complained about frequency, waiting time, schedule delay, and lack of travel information. Passengers preferred that buses should stop at designated bus-stops, rather than at anywhere along the street.

43% of PT users preferred more environmentally friendly public transport. These survey results were compared with the age of the respondents. There was no major difference in response based on age: about 40% of respondents in each age category desired more environmentally friendly transport (Fig. 4). The survey instrument did not go into detail regarding what an "environmentally friendly" form of transport might entail, and





instead sought to capture the general attitudes of the population vis-à-vis environmental concern and transport choice. Assuming that more people will use a public transport option that has preferred attributes, this significant response rate indicates a potential avenue towards increasing the usage of public transport in the future. A campaign could focus on the environmental benefits of using public transport, although there are additional



Fig. 4. Percentage of public transport survey respondents in various age categories who prefer to have more "environmentally friendly" public transport vehicles.



Fig. 5. Preferred transport type, as stated by public transport users.



Fig. 3. Suggestions by public transport users for improvements to public transport service.



Fig. 6. Primary obstacles to driving, as described by car drivers.



**Fig. 7.** Percentage of car drivers in each age category who listed "other drivers' low qualification or skills" as an obstacle to driving.

complexities regarding people's attitudes and behavior in terms of environmental issues (Thaler and Sunstein, 2008).

PT users were asked to choose among different possible transport options, including getting a ride in the car of a family member or friend. Most chose to share a car because it is more comfortable and convenient (Fig. 5). Metro and bus service were considered less desirable. There are no organized car-share institutions in Tbilisi, thus, car sharing is embedded in the family or social setup. There is potential to improve the experiences of both car owners and car-sharing riders, for example, by allowing cars with two or more occupants to use priority lanes in congested corridors.

PT users were questioned whether they would continue to use PT if they obtained a car. Here the results were divided, with 45% reporting that they would still use PT. The main reasons for continuing to use PT are that some places are adequately accessible by PT and the cost is lower. The 55% of the respondents who stated that they would not continue to use PT were asked the reason(s) for that decision. The main reason stated is more efficient use of time when traveling by car. This suggests that scheduling, frequency, and reliability issues are critical to effective public transport systems (Tyrinopoulos and Antoniou, 2008; Paulley et al., 2006).

## 3.3. Car drivers

Private car users were asked the main obstacles to driving their cars in Tbilisi. Their main concerns were traffic congestion,

difficulty in finding parking, and problems caused by other drivers and pedestrians (Fig. 6). Traffic congestion was the main concern for car drivers. This is likely due to the rapidly growing traffic volume in Tbilisi exceeding the designed capacity, and the lack of an efficient traffic management system.

64% of private car drivers complained about other driver's low qualification or skill. These respondents were compared in terms of age, showing that older drivers are more likely to complain about other drivers (Fig. 7). This is unsurprising, as traffic regulations were more rigorously organized and enforced during the Soviet era than in more recent years. During the post-Soviet transition, driving licenses became easier to get and traffic regulations were less strictly enforced. Although this situation has improved in recent years, there is still an evident difference between drivers with Soviet-era experience and those without.

Car drivers were asked what would make them reduce driving. It is clear that some of the car users have very low intentions to use alternative modes of travel: 37% replied that there would be no reason to reduce their driving (Fig. 8). The same respondents were asked if they ever used public transport and why. 56% replied that they would only use PT if their car was broken or if they had no other option.

Car drivers were asked a question focusing on financial issues that could encourage them to switch to PT. They were asked, "If public transport were cheaper and had better service compared to maintaining and using your car, would you reduce driving and use more public transport?" 20% said they would, 38% said they would not, and the remainder was undecided.

26% of drivers said that difficulty in finding a parking place could affect their decision to drive. This may change due to new parking rules that came into effect in Tbilisi in 2008 and are currently being phased in (Tbilielebi, 2007). Tbilisi is to be divided into three parking zones with varying parking fees. Parking meters will be established in parking places. Monthly parking cards will be available for people who use the same parking place often. Fines of 20 Lari per hour will be charged for illegal parking. The effect of these parking rules on driver satisfaction is still unclear.

Respondents were asked if they obey traffic rules while driving, and why or why not. Most of the respondents (69%) reported that they follow the rules. Of those who do not follow the rules, 61% gave the main reason that they are "in a hurry". 37% said that "nobody follows the rules so neither do I". This suggests that traffic regulations should be better organized and that rules should be enforced. Another question about seatbelts came up with interesting results. At present seatbelts are required only



Fig. 8. Responses by car drivers to the question "What would make you reduce driving?"



Fig. 9. Responses by car drivers to question "What do you like about driving your own car?"

while driving on highways, but not in towns. When asked whether seatbelts should also be used in town, 91% of the respondents replied positively, and said they would use seatbelts if it is required by law.

In response to the question "what do you like about driving your own car," 53% replied that it saves time and 59% said that it is convenient (Fig. 9). Thus it is clear that travel time and convenience play a key role in determining transport mode decisions. This suggests that progressive improvements to the public transport system, such as improving convenience and reliability, may contribute to changing people's attitude towards using public transport in Tbilisi. Respondents want to feel in control when traveling and this means brief waiting times and certainty about scheduling. This information indicates that public transport with reliable time tables, efficient routes, and real-time arrival information at bus-stops could be attractive to car drivers by giving the traveler more control over travel time.

### 4. Discussion

Society in Tbilisi appears to be divided into two groups: one population group that uses public transport and another that uses private cars. They are different in terms of not only their actual transport usage patterns but also with thinking and attitudes towards transport needs and demand. The results from the survey show that 64% of PT users use public transport every day and 87% of PT users do not own a car. Of the car drivers, 72% drive their car every day. While 94% of car drivers have used public transport at some time in their lives, most of them use PT only a few times per month or year. 6% report that they have never used PT; this group mostly works in the private sector and has monthly incomes of 500–1000 Lari.

In addition to the predetermined questions in the survey questionnaire, the respondents were given the opportunity to write additional information expressing their concerns, opinions, and recommendations. The main concerns expressed by public transport users were transport ticket price, convenient buses with comfortable seats and air conditioner, technical safety of vehicles; drivers' qualification, well organized routes and short time intervals, overcrowded buses, additional vehicles needed at rush hours, reduced prices for students, drivers' rude behavior, reduced car traffic, and separate lanes for buses. Car drivers' comments include that police do not have high qualification and do not follow the traffic rules, women as drivers, bad driving habits of public transport drivers, damaged roads, and low qualification of other drivers.

Tbilisi, especially the city centre, was not designed to accommodate the current number of vehicles. The river valley, which gives the city a linear structure, hinders dispersion of air pollutants. Prior to the collapse of the Soviet Union, Tbilisi had a wide variety of public transport options including electric trolleybuses and trolleys. However, instead of improving the electric transport options the city government removed them completely. Their role has been filled by conventional buses, mini-buses, and private cars. The resulting increased fuel consumption causes increased pollution in the city and contributes to global climate change. Urban congestion and an unhealthy environment result from the increased traffic flow. Despite recently resurfaced roadways, some redesigned intersections, a renovated traffic light system, and some aborted steps taken towards restricting vehicle movement in the central part of the city, traffic jams are a common sight on Tbilisi's streets.

A key to sustainable urban transport is demand management combined with strong policies to promote public transport and the concentration of development (Banister, 2005). There are numerous examples worldwide of cities that have successfully incorporated public transport as an integral part of urban and regional development (Cervero, 1998). Improvements have been made to public transport management in Tbilisi in recent years. New programs for bus networks are currently under development (Nacvlishvili, 2007). The city government has purchased 510 new buses including 360 small buses and 150 large buses. Tbilisi has many narrow streets so smaller buses are more appropriate for some areas.

A new ticket system is also being developed. Passengers will buy tickets from a ticket office or automated machine, thus freeing the bus drivers from taking money and allowing them to focus on driving. There will be a control system for passengers. A card making it possible to ride both buses and metros is also being developed, which will make public transport use more convenient. There are some social programs on the agenda, especially after the doubling of ticket prices in 2007. After increasing the price to 0.40 Lari per ride, a bus card allowing reduced ticket prices was developed for the more vulnerable part of the population. Cards can be purchased at metro stations. Children under 6 years old are free. There are no reduced prices for students or senior citizens. Vulnerable and disabled citizens, refugees, and parents with more than three children pay a lower price of 0.10 Lari per ride.

Nevertheless, the Tbilisi culture has clearly become more caroriented over the last decades. While there is still a working public transport system that the city government endeavors to maintain and improve, other official actions were taken that work against improving the public transport system. Examples include the complete elimination of electric trolley-buses and trams, restrictions against mini-bus travel in the central city, and facilitation of private car parking. The public transport system has struggled to compete with private cars at every stage.

Tbilisi has the potential to develop a people-friendly and environmentally-adapted transport system to facilitate sustainable development. A long-term future vision for Tbilisi could involve an urban development approach where individuals choose to live in car-free zones within the city. Voluntary travel behavior change requires an understanding of people's motivations for change (Ampt, 2003). Different people have different motivations, and interventions must target realistic behavioral change in specific population groups. Public transport in Tbilisi should be of a sufficiently high standard to make car ownership unattractive among increasingly larger groups, particularly as the costs of ownership are made higher. Car-free zones established in increasingly wider areas can gradually phase in more sustainable transport forms. Travel within these zones would be by walking, bicycle, or electric vehicles such as the discontinued trolleys or modern electric cars. This would become increasingly attractive as Georgia further develops its vast potential for hydroelectric energy. Infrastructure development and costs could be spread over an extended time period as the city transitions to a sustainable, integrated urban transport system.

Implementation of specific policies by city government could eventually lead to the realization of this vision. These include strategies to limit private vehicle traffic at particular times and places, increasing fuel taxes to internalize the external costs of private car traffic, strategies to reduce traffic speeds, design and management practices that favor more efficient transport modes, variable road pricing used to reduce peak-period vehicle trips, increasing parking fees, giving priority to public transport in downtown, and encouraging non-motorized transport. A sustained, committed effort towards fundamental changes will be required to implement an urban transport transition in Tbilisi. Capacity building measures may be required for institutions that currently lack the technical capacity to design, implement, or monitor such policies.

### 5. Conclusion

The urban transport problem in Tbilisi is complex. A questionnaire survey of 322 Tbilisi transport users reveals that Tbilisi residents are increasingly adopting a car-oriented culture. Most of the survey respondents preferred to own a private car and avoid using public transport. To change this attitude, as well as the resulting travel behavior, will require making the public transport options competitive with the perceived advantages of the car. Particularly important factors include time issues such as schedules and frequency, and comfort and safety issues. Tbilisi residents value their time and want to use it efficiently. Public transport quality has degraded in recent decades, which has led most residents to prefer car ownership. Nevertheless, a sustained and committed effort by municipal transport authorities could result in improved public transport service, leading to increased use of public transport, and improved social and environmental conditions in Tbilisi.

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