ENVIRONMENT OR TRANSPORT; WHAT DO WE NEED IN DEVELOPING COUNTRIES?

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Abstract

Revealing people needs with respect to transport and the environment helps decision-makers and donor agencies to direct future projects. From an attitude survey the reaction of a representative sample of Greater Cairo travellers is recorded. Thus, we try to know how people think? what are their needs? are they aware of the effects of transport on the environment? do they believe that improving transport should come first? or can they live with current traffic problems but with improved environment? are there differences between attitudes of the respondents by socio-economic group and travel mode? The paper tends towards general conclusions that can be generalised and/or transferred to other developing countries.

INTRODUCTION

In this research we address a very important topic that is high on the urban policy agenda in developing countries. Over the last decade many voices started to echo the industrialised world move that emerged much earlier for reducing the adverse impact of transport on the environment. Traffic congestion and the dependence on public transport buses and informal transit are certainly having serious effects on the urban environment. Not only city image is affected but also, and certainly of more concern, other impacts such as noise, delays, pedestrian/vehicle conflict, increased energy consumption and above all air pollution are persisting especially in large metropolises. However, at the same time public transport, formal and informal, cannot cope with the heavy and continuously increasing demand. Many cities cannot afford metros and even LR systems; either new or expansion of existing ones. Both can achieve a balance; they are environment friendly and provide high level of service. Bus levels of service are deteriorated and paratransit vehicles are not healthily functioning. With the limited budget city managers find themselves strangled between the need to improve transit and the pressures for reducing traffic impacts on the environment. Or simply they are puzzled whether to go for the environment? or for transport? So are donor agencies/countries that are ready to address project financing.

In many situations in developing countries projects are decided taking little notice of the opinion of the end users, the urban travellers. This research aims at investigating travellers preferences. May be if we reveal the requirements of the people, we can help decision-makers as well as donor agencies to direct and justify future projects. Based on attitude survey the reaction of a sample of the people living in Greater Cairo (GC) is recorded. This can serve as an example that may be followed in other large urban agglomerations of the developing countries. The survey is carried out with travellers of different socio-economic levels. Each interviewee is asked to state his/her preference for transport performance or environment quality improvements. This type of survey makes the researcher more close to people needs and thoughts. The outcome, therefore, helps so much in knowing how the people think? what do they really need? are they aware of the serious effects of transport on the environment? do they believe that improving transport should come first? or can they live with current traffic problems but with increased improvement to the quality of the urban environment? how does the various socio-economic groups react to these matters? also are there differences between attitudes of the respondents by sex or age group? The paper tends towards the general type of conclusions that can be generalised and/or transferred to other developing countries as well as pointing out areas that prove to require further investigation.

In second section, environment quality problems related to city transport in developing countries are highlighted. This is followed by further details about GC situation. The growing concern of national and international bodies about the effect of transport on the environment are then discussed in the third section with particular reference to Egypt. In the fourth section the basic philosophy of the current paper is addressed. The designed interview survey is described in the fifth section together with analysis of its results. The paper ends with conclusions and recommendations in the last section.

ENVIRONMENTAL PROBLEMS RELATED TO URBAN TRANSPORT

Problems in developing countries

Major cities in developing countries are facing sever traffic congestion problems due to the rapid increase in population, urban sprawl, and limited capacity of the transport network. In absence of proper measures, such an acute situation brings severe damage to the urban environment in these

cities with direct implications on public health. While similar congestion problems can be observed in some cities in the developed world, developing countries cities also have problems of their own (Grubler, 1993). Some environmental problems which were tackled successfully in many developed countries remain to be resolved in the developing countries cities. For example, lead poisoning still persists and specific emissions per vehicle are larger due to absence of control technologies, greater age of vehicles, and poor maintenance. Moreover, capital shortages heavily constrain the investment-intensive upgrading of infrastructures and the construction of efficient mass transit systems. With the current trends, the situation is expected to worsen as the demand on mobility is expected to double or even triple in the near future.

Environmental problems due to transport in developing countries cities can be observed in different forms and severity. Air pollution, noise, vehicle/pedestrian conflicts, visual intrusion and degradation of city image, accidents, and even soil pollution are most common examples. Local geographic, topographic and meteorological conditions can even aggravate the situation in some cases. Absence of continuous and accurate monitoring systems in most of these cities hinders the formulation and evaluation of suitable measures to tackle these problems.

Such severe environmental problems are best observed and documented for the megacities of the developing countries particularly for air pollution. Bangkok (Pendakur, 1996 and Wibulswas et al, 1996) with its limited road space has one of the worst traffic congestion in the world. Air pollution is a major concern in Bangkok with levels of suspended particulate mater along roadside are on the average three to ten times the World Health Organisation (WHO) standard. Also carbon monoxide levels are 50% above the WHO standard. Air pollution in Mexico City, the world's largest metropolis, is described to transform the city into a virtual "gas chamber" (Faiz, 1990). Residents of Mexico City were exposed to 1,400 hours of high ozone levels while the WHO standard is only one hour! Also of concern are emissions of lead, carbon monoxide, sulphur oxides, hydrocarbons, and particulate, for all of which levels above (often well above) WHO guidelines are experienced (Pendakur, 1996). These can also contaminate fresh food, which is subject to street vending in many cities of the developing countries. Other examples of severe urban environmental damages and health consequences can be also observed in Bombay, Jakarta, Manila, etc. (Faiz, 1990).

Situation in GC

GC is no exception of the situation described above. Few research work and statistics are available on the effect of urban traffic on the environment in GC. For instance, no comprehensive inventories and measurements of SO_2, CO and NO_X exist (Nasssralla, 1994). Limited short-term measurements in the early 1990s (Earthwatch, 1992) indicate that air pollution levels by several types of pollutants were away beyond the acceptable standards set by WHO. Concentration of lead, for example, reached more than five times the acceptable hazardous threshold in some locations in the city center. Measured concentration levels of total suspended particulate were found to be about ten times the WHO guidelines (natural sources are major contributor, however). Carbon monoxides, sulfur oxides, and nitrogen oxides had also high concentration levels. The major contributors to this high level of pollution were the industrial activities and transport. Probably this picture has not changed much except for few of these gases, which either dramatically decreased like in the case of lead or unfortunately increased as in some other cases.

The above mentioned estimates of airborne lead would either fall directly on fresh food items that are sometimes sold on the roadside, or contaminate dust that would later affect these items. Congestion brings about other forms of environment quality threats. For instance, pedestrian/vehicle conflicts are quite common on busy streets with many incidents of random crossing of the road. This creates many problems such as pedestrians and vehicles delay and the obligation for many drivers to use the horn. Hence, noise levels in some instances exceed tolerable limits. Although some of GC residents may have been accustomed to such levels, yet many others show unhappiness about traffic noise.

With many flyovers and long elevated roads that cross many squares and districts of the city and pass very close to residential buildings, it is clear that adverse visual intrusion takes place. Unfortunate residents of nearby apartments cannot but to look at these huge structures all the time. Similarly the faraway residents are obliged to see such infrastructure projects that damage the landscape view. In general city image is certainly affected by such unavoidable transport infrastructure projects, which is also the case in many major cities in other developing and developed countries alike.

THE GROWING CONCERN ABOUT THE EFFECT OF TRANSPORT ON THE ENVIRONMENT

Concerns in the developing countries

Drastic increase of population and car ownership in the main urban centers of many developing countries has become an unfortunate trend over the last two decades. Coupled with the difficulties to improve public transport, to provide new (or expanded) rail mass transit and to increase the existing street capacity, the urban environment has become under threat. In an attempt to follow the earlier concerns and efforts made by many of the developed world countries since the early 1970s, many voices started to express serious concerns about the quality of the urban environment in the developing countries (Huzayyin, 1995). National governments as well as international agencies shared the same views. The pioneer work by the World Bank carried out for Mexico City about a decade ago was one of the very first serious efforts for caring about air quality in a major metropolis of a developing country. Later, when the concept of sustainable development started to evolve for developing countries, its environmental aspect was emphasized again (Gakenhiemer, 1990). Furthermore, it is emphasized (UNCHS, 1991) that urban transport contributes to sustainable urban development if the movement of people and goods is performed in such a way that the least damage to the natural (or built) environment is incurred, and non-renewable resources are saved, while transportation is affordable and social equity is ensured in the distribution of transport costs and benefits. Camagni et al (1997) mentioned that Hay and Trinder (1991) stress that the notion of urban sustainability in terms of economic efficiency, social equity and environmental quality is to be taken as an explicit part for urban policy. Camagni et al (1997), then, warned that developing countries cities without a mobility policy driven by market principles will turn into pollution havens. They advocated the need for traffic restraint and road pricing and other policies for control of the situation.

Other examples of practical policies for transport and the environment are given by Camagni et al (1997) for the short and long terms. These include restraints on private car use and goods vehicles movement in the short term and investment in public transport services and infrastructure on the long term.

Addressing environmentally sustainable urban transport in African cities, Banjo (1997) listed key objectives of relevant global strategies given earlier by Serageldin (1993). These included for example restricting emissions from fossil fuels, and increasing efficiency of energy use. To achieve such objectives, the latter author has identified some tools for governments to show concern. These include, for example, fuel pricing, cleaner fuels and technologies, non-motorized transport, and demand and traffic management. Concerns about urban environment and air quality in Asian cities has also been shown (Rahmatullah, 1997). For instance, the same author indicated that air pollution has become a significant health problem in the region with people, in some cities, travel for three hours daily in a polluted road environment. The author, then, argued for a need to put strong emphasis in land use planning among other options in order to achieve a balance in traffic flows. In Latin America also concerns about the urban environment has been shown as mentioned by Camagni et al (1997) giving two examples. Again in Mexico City they emphasis that Goddard (1995) proposes demand side management polices for making urban areas sustainability viable by managing vehicle

use as a part of car efficiency programme for controlling emissions and congestion. The second example is relevant to long term integrated policies between transport and land use with good impact on the environment as in the case of Curitiba, Brazil.

Concerns in Egypt; and particularly in GC

The initial formal signs of concerns about the urban environment in Egypt appeared more than a decade ago. Before then it was often said that Cairo air, a typical representative of the urban environment, had no one to take care of! There were neither legislation nor government bodies in charge of monitoring and enforcing suitable practice to ensure acceptable urban environmental conditions. Moreover, the general public were not much aware about environmental problems and their consequences. As a result, there was no commitment to protect the urban environment. The main concerns at that period were devoted to economic development and probably the only environment-related concerns were those related to protecting the River Nile, branching canals and agriculture land. Consequently, severe environmental problems prevailed in big urban areas, and particularly in GC.

The turning point came with a formal national conference organized mainly by the government back in 1986 in which wide range of environmental issues were discussed and strong recommendations to mobilize efforts to protect the national environment were given. As a result, some signs of awareness among government officials and the educated people emerged. This was also followed by small-scale efforts to solve some problems that needed immediate actions. The major steps to tackle environmental problems, however, came to effective reality some three years later in the 1990s. In 1992, the Egyptian government published a national environment action plan, which was followed by the first, consolidated act on environmental protection in 1994 known as Environmental Protection Law no. 4. This law sets standards and regulations and defines responsibilities and penalties to matters related to all aspects of the environment such as air, water, soil, noise, etc. Several new government bodies have been also established and additional responsibilities have been added to existing bodies aiming at improved environment quality for Egypt in general and GC in particular. The most important of these bodies is the Egyptian Environmental Affairs Agency (EEAA) established within the Prime Minister's cabinet. EEAA was given extensive power in 1994 in its capacity as the coordinating authority for environmental protection in Egypt. The decrees necessary for the implementation of the Environmental Protection Law were then adopted in 1995 and it is planned to be fully enforced soon in 1998. Another major institutional step was the formation of the Ministry of the Environment in 1994.

Having set out suitable legislative and institutional conditions, major projects for environmental protection have been launched. For example, unleaded gasoline was introduced in 1995. A recent survey on lead concentration in air at some major road intersections indicated that massive reduction in lead concentration of as high as 80% occurred as a result of this measure. Now all gasoline sold in GC is unleaded. Also taxi and shared taxi vehicles are encouraged to convert their gasoline/diesel engines into Compressed Natural Gas (CNG) engines under a major project run by the government with several incentives such as cheaper prices for CNG and attractive scheme to ease payment of the cost of converting engines. The government is also giving full support to the construction of metro, the environment friendly system, to encourage modal shift to clean mass transit systems. A further encouragement to modal shift is the recent introduction of air-conditioned buses to attract private car users to public transport. Also several programmes to raise awareness level among the public to get their support are undergoing.

International agencies and donors are also playing important role in deepening and supporting the concerns about the environment in Egypt and GC. Several projects are now financed with some examples given below.

- Cairo Clean Air Project (CCAP) by USAID with some of its components directed to introducing vehicle inspection and tune-up stations, equipping transit buses with CNG engines, and establishing air monitoring stations.
- DANIDA (Danish International Development Assistance) Environmental Programme including institutional strengthening, training and education, as well as the establishment of an environmental monitoring system. Other activities also comprise assistance to the introduction of environmental taxes.
- ECOTRA by JTCA (Japan Transport Cooperation Association) aiming at examining environmental problems related to transport in GC and prescribing solutions and measures to tackle these problems.
- Public Awareness Campaign on Environmental Protection Law by USAID.

In order to strengthen the above-mentioned efforts of the government and donor countries, it is very useful to get to know what really do the people require. Are they mainly for transport improvements? Or do they seek more concern about environment quality improvements? It is really essential for policy makers and financing bodies to listen to the people.

Advocating the need to listen to the public

As mentioned earlier, the current paper is focused on investigating the attitudes of GC travelers towards transport performance and environment quality improvements. This is emphasized in more detail in the fourth section. Before doing so, it is felt necessary, however, to stress that other voices also support the idea of integrating public reactions to decision making on environment quality and transport performance improvements. For instance, it is mentioned by Camagni et al (1997) that the implications of diverse patterns of urban transport and urban morphology for urban sustainable development are faced in each city by site specific factors. These include, among others, the behavior-specific response of citizens which makes it uneasy to clarify the consequences of improvements. Hence, investigating citizens' opinions and attitudes is, in other words, necessary for the researcher and the policy maker. The authors also mentioned that a World Bank Report (1994) gives among guidelines for policies of infrastructure provision the need to give users (and other stakeholders) strong voice. They argued that governments, therefore, must give special care to safe guarding the interest of economically deprived people and the interest of the environment when developing initiatives for provision of infrastructure that induce private investment.

Furthermore, the same paper (Camagni et al, 1997) reported that Houghton and Hunter (1994) included the need to encourage wide spread of public participation in strategy formulation, policy implementation and project management. This is listed among other guiding ecological principles for sustainable urban development. In his report, Banjo (1997) mentioned that Serageldin (1993) stressed that community participation is essential for approving the various policies he identified for achieving the objectives of global strategy for environmentally sustainable urban transport.

BASIC PHILOSOPHY OF THE PAPER

Urban environment in many large congested cities in developing countries suffers from threats of deteriorated quality caused by their complex transport demand and supply problems. Signs of such deterioration are clear and have started to find a place on the urban policy agenda. In parallel, concern is still concentrated on how to improve daily transport within the urban area domain in order to satisfy travel needs of the population. In other words, improvement of the existing transport system and provision of new facilities have been on top of the urban area requirements over the last three decades in the developing countries. Whereas, urban environment improvement have started to be of a growing importance over the last decade or so. Combating adverse effects of transport on the environment started to attract attention.

City transport engineers and policy makers are puzzled on the priorities they should be giving; are they to go for transport? Or should they go for the environment? What are the desires of the community? Do they prefer to have better transport? Or they rather look for better environment? Many voices in the developing countries say that the urban residents only seek easy travel irrespective of the effects of transport on the environment. Contrarily, some others think that the urban travelers of developing countries are concerned about environment quality no less than those living in cities of the developed world.

This research work tries to reveal views of urban travelers of GC, one of the megacities of the developing countries, about transport and the environment. The idea is simply to put forward some questions to a sample of GC travelers about their preferences; is it for transport or the environment? The sample distinguishes between four categories of respondents: sex, age, socio-economic level, and travel mode. It is hoped that the results can shed light on peoples requirements with respect to the above mentioned questions. This can certainly help policy makers and city managers and engineers as well as donor agencies in taking appropriate decisions with respect to future projects and policies for transport, the environment, or both. In addition, it can point out the group(s) of travelers who are not totally aware of the impact of transport on the environment and those who are fully aware of this issue. Hence, appropriate programmes can be designed for creating such awareness among those who seem to care less about the environment.

DESIGN AND RESULTS OF THE INTERVIEW

Design of the interview

The interview form included two parts, the first concerns general information about the trip maker. This helped in grouping interviewees into four distinct groups as follows:

- Sex
- Age (<20, 20-40, 40-60, and > 60 years)
- Socio-economic level (Very Low, Low, Medium, and High)
- Travel Mode
    - Formal transit (bus, minibus, light rail and metro)
    - Informal transit (shared taxi)
    - Private transport (car and taxi)

The second part of the form was dedicated to inquiring about the attitude of the travelers towards provision of transport and environment quality improvements. This was not a straightforward task. First, we had to decide upon indicators to reflect transport performance and others to denote the effect of transport on the environment. Second it was important to design questions that can reflect travelers attitude concerning transport and the environment. At the same time the questions had to be simple, clear, short and easy to understand by all groups of the interviewed sample irrespective of their education and socio-economic background.

For the factors that can reflect the traveler attitude against transport system performance it was decided to select "Speed" and "Comfort". While "Speed" is easy to understand, it reflects delay, journey time, traffic regulations and street capacity. "Comfort", on the other hand reflects vehicle condition, street surface conditions as well as the general travelling conditions on the city transport system whether the respondent is a passenger or a driver. For the factors that reflect the traveler attitude towards the environment it was decided to take the two profound factors, "air pollution" and "noise". Certainly, these are very much felt (and hence can be asked about) by the urban travelers in a congested city. Other factors, such as city image, visual intrusion and pedestrian/vehicle conflict though important, yet they can neither be easily nor directly explained to the interviewees.

Having selected the above four factors: speed, comfort, air pollution and noise, it was decided to ask each respondent to rank them according to the priority he/she gives to each. To illustrate, suppose that a respondent thinks that his/her priorities for transport and environment quality are as follows:

to reduce air pollution,
to increase comfort during travelling,
to increase journey speed (i.e., reduce travel time), and then
to reduce traffic noise.

Then, air pollution will be given the rank "1", comfort will be given the rank "2", and speed and noise are to be given ranks "3" and "4", respectively.

The registered ranks of the above mentioned factors can give good idea about travelers preference. For instance if a traveler indicates that reduction of air pollution and noise levels are number 1 and 2 on his/her priorities, then he/she would be considered to call for environment quality more than for transport system improvements. Contrary, if speed and comfort appear as the first two choices, then the respondent would be considered to give priority to improving transportation than having better environment conditions. Nevertheless, two more questions were included in the interview forms in order to see how far the respondents are ready to go for transport/environment improvements. These are:

- Are you ready to pay more fares/fuel prices for sake of transport improvements (e.g. to build more roads, resurface existing roads, and improve the public transport fleet)?
- Are you ready to pay more fares/fuel prices for sake of improved environment quality (e.g. to equip vehicles with gas filters and supply cleaner fuels)?

The authors themselves carried out the interviews so as to ensure consistency and accuracy. The survey started with pilot interviews with ten persons to make sure that questions are adequate and clear as well as that responds are consistent. After finalizing the interview form, the sample reached 250 travelers and the results are given hereafter.

Interview results

Table 1 gives the weighed average percentage scores by travelers groups for each of the four factors: speed and comfort (to reflect transport performance requirements) and air pollution and noise (to reflect environment quality requirements). The main comments are given below.

General comments

- It is clear that in general comfort is the factor with the highest weight (69%) among all travelers irrespective of the group they belong to. This may reflect that GC travelers feel unhappy about daily travel on a congested network and hence they call for comfortable transport more than any other thing.
- However, speed comes marginally lower than comfort with an overall score of 66%, which again reflects the need for reduced journey time.
- Reduction of air pollution is still a basic requirement scoring 63%, which is very close to those for comfort and speed.
- Traffic noise reduction seems not to be on top of the GC requirements compared to comfort, speed and reduction of air pollution. However, it is still a reasonably favored factor as its average score reached 52%.

Table 1: Weighed average scores by travelers groups for each of the selected transport and environment factors

Group / Factor	Sex		Age*				Socio-economic level				Mode**			Over-all
	M	F	1	2	3	4	VL	L	M	H	FT	IT	PT	
Speed	69	59	84	68	56	61	65	69	67	48	71	70	59	66
Comfort	71	65	74	70	65	68	69	58	64	58	74	73	64	69
Air Pollution	59	69	46	62	69	68	56	59	66	79	54	59	71	63
Noise	50	55	46	50	59	54	56	47	53	58	50	47	56	52

* 1 =< 20 ys., 2= 20-40 ys., 3 = 40-60 ys., and 4 >= 60 ys.

** FT = Formal Transit (bus, minibus, and metro), IT = Informal Transit (shared taxi), and PT = private transport (car and taxi).

Comments on the preference of travelers by sex

- Its is very interesting to note that for male travelers comfort and speed come with higher priorities than the environment quality factors scoring 71% and 69%, respectively. Whereas for female travelers air quality and comfort come first with average scores of 69% and 65% respectively.
- This is a logical result as while comfort is a common requirement between the two sexes bearing in mind the problems of urban travel in a congested metropolis like GC, speed is more attractive for male and air quality is a major requirement by the female. It is believed that this goes very well with the nature of both sexes.
- Along with the interpretation of the above result, it is also logical to note that noise reduction looks more important for female than male travelers.

Comments on the preference of travelers by age groups

- Speed is by far the most important requirement for young travelers with the highest percentage score of 84% in the entire table. Whereas, such travelers seam not to bother much by environment improvements with the least score of 46% in the entire table.
- For the middle age groups comfort and reduction of air pollution start to be one of considerable concern. For group 2 (20-40 ys.) comfort is first with 70% average score, while for group 3 (40-60 ys.) reduction of air pollution has the highest score of 69%.
- For group 3 (40-60 ys.) speed is the least important factor. Its 56% score is the least score for speed compared to other travelers groups in the table. It may be argued therefore, that in this age group persons reach highest maturity and hence do not care much about travel speed compared to other factors of transport and environment improvements. Of equal logic it is clear that the score for traffic noise concern of 59% for age group 3 is the highest among all other travelers groups in the table.

Comments on the preference of travelers by socio-economic groups

- For the very low socio-economic level travelers comfort followed by speed are more important than improving environment quality.
- Speed comes first for both the low and medium level travelers. However for the medium level travelers air pollution reduction is also important scoring 66% compared with a 67% score for speed.
- For the high level group, speed is the factor of least importance scoring only 48% which is the lowest score for speed among all groups of GC travelers in the surveyed sample. However, quite logically the high-level travelers rank air quality on top of the list scoring 79%.

Comments on the preference of travelers by travel mode

- For transit users (formal and informal) it is clear that comfort followed by speed are of much more concern than environment improvement. With the crowded transit modes comfort is logically coming on top of the requirements list.
- As for private car or taxi users reduction of air pollution comes first followed by comfort, with speed and noise coming in the end of priorities.
- If one considers the score for speed by mode it is interesting to note that transit users give scores of 71% and 70% for formal and informal modes, respectively, compared with 59% for private transport modes. For formal transit since the bus is the dominating mode this result reflects the travelers requirements of improved service. Increased speed means less delay and hence less waiting time. As for informal transit increased speed is of course a priori knowing that most of the users of this mode are those who care much for speed the same as for its drivers who speed to maximize profit (Huzayyin and Godard, 1992).
- Also if one looks at the score for air pollution by mode we note that they increase when the vehicle size decreases (NB, the informal shared taxis in GC are 11 seaters compared with buses and private cars at both ends of the scale). So it may be argued that air pollution caused by traffic is much felt when you travel in a small size vehicle than a large one.
- It is also interesting to note that air quality improvement comes first for both private transport users and the high socio-economic level travelers. This is quite reasonable as usually the latter group uses private transport.

Table 2 gives the generalized results of travelers' attitude towards transport performance improvements on one hand, to environment quality improvements on the other. This is demonstrated by two elements.

Table 2: Generalized results of travelers' attitude

a) % of replies for absolute favoring of transport, the environment and undecided by travelers groups

Group	Sex		Age*				Socio-economic level				Mode**			Over-
Preference	M	F	1	2	3	4	VL	L	M	H	FT	IT	PT	all
Transport	46	22	58	40	30	43	36	49	37	13	51	46	30	40
Environment	19	31	5	13	36	29	20	15	36	50	14	10	37	23
Undecided	35	47	37	47	44	28	44	46	27	37	35	44	43	37

b) % of replies indicating willingness to pay for sake of transport performance improvements or for environment quality improvements by travelers groups

Group	Sex		Age*				Socio-economic level				Mode**			Over-
Preference	M	F	1	2	3	4	VL	L	M	H	FT	IT	PT	all
Transport	58	62	36	66	60	67	68	59	57	71	62	63	57	60
Environment	45	68	22	54	61	71	32	45	45	43	38	54	64	53

* 1 =< 20 ys., 2= 20-40 ys., 3 = 40-60 ys., and 4 >= 60 ys.

** FT = Formal Transit (bus, minibus, and metro), IT = Informal Transit (shared taxi), and PT = private transport (car and taxi).

a) - The % of replies which ranked speed and/or comfort as the 1st or 2nd choices among the four factors, thus, indicating that the traveler is in favor of transport.
- The % of replies which ranked air pollution and noise as the 1st or 2nd choices among the four factors, thus, indicating that the traveler is in favor of the environment.

b) - The % of replies which indicate travelers who are willing to pay higher fares/fuel prices for sake of achieving transport improvements.

- The % of replies which indicate travelers who are willing to pay higher fares/fuel prices for sake of achieving environment quality improvements.

Main comments on Table 2 are given below.

Comments on the attitude of travelers by sex

- Male travelers are clearly for transport (46%) and ready to pay for its improvements. Note that only 19% of the male travelers indicates that they care for environment quality improvements.
- Female travelers are for the environment (31%) and ready to pay for improving its quality slightly more than for transport improvement (68% agree to pay for environment compared with 62% for transport). However, the undecided females who did not go absolutely for the environment or for transport reach 47% compared with 35% for male travelers.

Comments on the attitude of travelers by age

- The young (=<20 ys.) travelers go absolutely for transport (58%) with only 5% for the environment and 37% undecided. These travelers are also ready to pay more for transport (36%) than for the environment (22%). However, 64% and 78% of them confirmed that they are not willing to pay more for transport and environment improvements, respectively.
- For other age groups, only those between 40–60 ys. are for the environment (36%) more than transport (30%). However, when it comes to payment, the upper two groups 40-60 ys. and 60+ ys. are willing to pay for the environment more than for transport. But the differences are marginal with most of the percentages range between 60% and nearly 70%. This shows that those who are not willing to pay either for transport or environment improvements generally range between about 30% and 40%.

Comments on the attitude of travelers by socio-economic levels

- Apart from the high level travelers, those belonging to all other levels go more for transport than for the environment. But it is clear that for the high socio-economic level travelers environment quality improvements look much more important (50%) than transport improvements.
- There is a consistency on the willingness to pay for transport improvements more than for environment improvements among all socio-economic groups. However, it is surprising that the very low and the high level travelers score nearly the same acceptance to pay; with relevant percentages are 69% and 71%, respectively. For the high level travelers this is quite logical. The only explanation for those from the very low socio-economic level to show willingness to pay for transport improvements, is either because they suffer from travelling daily on a congested system or because they were just giving a reply to a hypothetical question. When it comes to reality maybe these travelers will change such attitude.

Comments of the attitude of travelers by mode

- Transit users go much more for transport improvements than their care about the environment. They are also more willing to pay for sake of transport improvements.
- The contrary is observed for the care of private transport travelers where they care more for environment improvements and are more willing to pay for sake of environment improvements.

CONCLUSIONS AND RECOMMENDATIONS

Bearing in mind the results given in Tables 1 and 2 and related comments the following general conclusions can be made.

- GC travelers' attitude seams to be for transport improvements (40%) more than for environment improvements (23%). However, the undecided travelers reached 37% of the interviewed travelers, which means that still many people are in between the two choices.
- Effort to increase awareness of the importance of environment quality improvements should concentrate on the low socio-economic groups, the public transport users and the young travelers.
- While 60% of the interviewees indicated they are ready to pay higher fare/fuel prices for transport improvements, 53% showed the same willingness but for environment quality improvements. With this close result, it seems that in general people are nonetheless ready for improving both transport and the environment in GC, with little more bias towards transport.
- This result is quite impressive as still with the difficult travel conditions considerable number of travelers show positive attitude towards improving environment quality.
- On average 69% score was attached to comfort as the main factor of interest to the interviewed travelers, compared to 66% for speed, 63% for air quality or 52% for reduction of traffic noise. This indicates that GC travelers put a lot of hope on improving comfort level offered by the existing congested and overloaded transport system.
- With speed in the second rank this confirms the need to release traffic congestion problems in GC.
- Improving air quality although comes in third place, yet it is still a very important requirement of GC travelers. Its score of 63% is just 9% and 3% lower than those of comfort (69%) and speed (66%), respectively.
- Although traffic noise reduction ranked fourth among the four tested factors, yet in general 52% score for this factor is observed. This confirms that still considerable importance is placed on reducing traffic noise levels in GC.

It is clear, therefore, that the following main recommendation can be put forward. First of all, policy makers should be confident when setting policies for environment quality improvements as this seems not to be a luxury. Even the urban poor have expressed considerable understanding of the need for such improvements. Second, it is necessary to balance projects, and hence budgets, between those projects focusing on transport performance improvements and those aiming at environment quality improvements. Both types of projects are nearly equally needed by the travelers in GC. Furthermore, it is important within the transport system improvement projects to give more emphases to comfort than to speed, or at least to deal with them on equal basis. This is contrary to what is usually preferred by engineers and decision-makers who usually focus mainly on increasing travel speed taking less concern for comfort. In addition, reduction of air pollution from the traffic stream comes in the first place for environment quality improvements as usually the case. However, some care should also be given to reduce noise level resulting from urban traffic.

Finally, the authors strongly recommend carrying out the same interview with various groups of travelers in major urban centers in other developing countries. This is essential if some kind of generalization of the above results and recommendation should be attempted. This will not only be useful to researchers, planners and policy makers in these countries but also it will help international donor agencies in allocating their aid projects making sure they will address real needs of the travelers. Increasing the sample than that dictated by budget constraints in the current work, is another recommendation. This can allow more understanding of the attitude of the various traveler groups. It can also make it possible for the analyst to examine attitudes in a "two way classification" of various pairs of traveler groups.

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