

Motorbike Mass Transit

An Exploration into the Potential and Problems of the Rapid Increase in the Use of Motorcycles as a Transport Mode in Karachi, Pakistan

By
**Arif Hasan and
Mansoor Raza**

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Arif Hasan – Architect and Planning Consultant
37-D, Muhammad Ali Society, Karachi – 75350, Pakistan
Tel: (92.21) 3452 2361; Email: arifhasan@cyber.net.pk

Foreword

This study, which has been supported by the International Institute for Environment and Development (IIED), UK, is really an initial exploration into the growing use of motorbikes in Karachi. The potential of motorbikes as an alternative means of commuting to public transport, and its advantages have been studied. However, as the research progressed, it was realised that for a proper understanding of the issue and its many nuances, a number of more detailed studies are required on each of the sections that form a part of the text of this report. It is hoped that the organisations who are involved in working on transport related and social issues will promote further research on this subject.

For this reason, this report is being sent to the individuals and organisations listed below. These include organisations that are involved with social and women issues since the study addresses the desire of women interviewed for riding motorbikes. A presentation of the study is planned at the Urban Resource Centre in Karachi.

A. Government Organisations:

1. Malik Zaheer ul Islam, Former Director of the Karachi Mass Transit Cell of the City District Government Karachi (CDGK)
2. Director of the Karachi Mass Transit Cell of the CDGK
3. Mr. Minoru Shibuya, Team Leader of Japan International Cooperation Agency (JICA) Consultants working on the Karachi Transportation Improvement Project
4. Iftikhar Kaimkhani, Executive District Officer, Master Plan Group of Offices, CDGK
5. Director, Environmental Protection Agency, Sindh
6. Maqbool Ilahi, Secretary Federal Government Task Force on Urban Development, Islamabad

B. NGOs:

7. Sh. Sirajuddin, Chief Operating Officer, IUCN, Karachi
8. Najma Sadque, Director, Shirkatgah, Karachi
9. Mahnaz Rahman, Resident Director, Aurat (Women) Foundation, Karachi
10. Nigar Ahmed, Director, Aurat Foudation, Islamabad
11. Anis Haroon, Chairperson, National Commission on the Status of Women, Islamabad
12. Roland D'Sauza, Member Executive Committee, SHEHRI (Citizens for a Better Environment), Karachi
13. Abdul Shakoor Sandhu, Director, Rural Development Policy Institute, Islamabad
14. Almas Saleem, Shshersaaz, Islamabad
15. Perween Rahman, Director, Orangi Pilot Project-Research and Training Institute (OPP-RTI), Karachi
16. Anwar Rashid, Director, OPP-Orangi Charitable Trust, Karachi
17. Muhammad Younis, Director, Urban Resource Centre (URC), Karachi
18. Pakistan Institute of Labour Education and Research, Karachi
19. Haris Gazdar, Karachi

C. Academia:

20. Durriya Kazi, Head, Department of Visual Studies, Karachi University
21. Dr. Noman Ahmed, Head Department of Architecture and Planning, NED University, Karachi
22. Asiya Sadiq, Assistant Professor, Department of Architecture and Planning, NED University, Karachi
23. Dr. Ali Akbar Hussain, Head, Department of Architecture, Indus Valley School of Art and Architecture, Karachi
24. Samina Raaes Khan, Indus Valley School of Art and Architecture, Karachi
25. Rabia Ezdi, National College of Arts, Lahore
26. Yasira Naeem Pasha, Secretary Board of Studies, Department of Architecture and Planning, Dawood College, Karachi
27. Dr. Nuzhat Ahmed, Director, Applied Economic Research Centre, Karachi University

D: Professional Institutions:

28. Institute of Architects Pakistan
29. Pakistan Council of Architects and Town Planners, Karachi
30. Institute of Engineers, Pakistan

Abbreviations:

CDGK	City District Government Karachi
IIED	International Institute for Environment and Development
JICA	Japan International Cooperation Agency
KTIP	Karachi Transportation Improvement Project
OPP	Orangi Pilot Project
Rs	Pakistani Rupees: US\$ = Rs 84
RTI	Research and Training Institute

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Executive Summary

The number of motorbikes on the road of Karachi increased from 450,000 in 1990 to 500,000 in 2004. In 2010, the number of motorbikes was one million. By 2030, the Karachi Transportation and Improvement Project (KTIP) of the CDGK estimates that there will be 3.6 million motorbikes in Karachi. At present, there are 57 motorbikes for every 1,000 persons and in 2030 it is estimated that this figure will be 115. Today, every 11.8 homes out of 100 own a motorbike, many more than one. This figure in 2030 will increase well beyond that of the KTIP estimates.

The increase in the motorbike numbers is visibly causing congestion on the roads, adding to noise and air pollution and fatal accidents. Initial investigation showed that the reason for increase of motorbikes is that they are a cheaper means of travel than public transport, they provide flexibility, and they save time in commuting. However, there are problems for the lower income groups to purchase them and another important factor is that women, who constitute about 25 percent of public transport commuters at present, do not use them for cultural reasons. The number of women commuting is increasing rapidly.

To understand the potential of motorbikes as an alternative means of commuting to the public transport system, it was decided to interview and serve questionnaires to the following groups:

1. 100 male commuters at bus stops to understand their view on commuting by motorbikes versus public transport and the reasons for those views. They were also asked their views on women riding motorbikes.
2. 68 women commuters were also served questionnaires and asked whether they would like to switch to using motorbike as a means of transport and the reasons for opting for it or opposing it. This issue was also raised at workshops and seminars being held on other subjects.
3. 25 motorbike users were interviewed regarding their problems, advantages and costs of using a motorbike.
4. 25 motorbike dealers were questioned regarding the possibility of introducing "green" motorbikes and of their capital and maintenance costs, as opposed to the ones available in the market today. Web search was also conducted on their availability in the international market.
5. CDGK and JICA literature on their proposed mass transit proposals were also studied along with similar existing rail based mass transit systems in Bangkok and Delhi.

The more important results from the questionnaires, web search and interviews are listed below.

1. There are major incentives for bus commuters to purchase motorbikes as a result of which the number of motorbikes will far exceed the estimates of the CDGK-JICA studies. These incentives are listed below:

- Using a motorbike is cheaper (apart from the initial cost of purchase) than public transport. Its monthly average cost of maintenance and fuel works out to Rs 784 as against a bus commuting average of Rs 1,570. It is important to note that the bus average is for the home to work and back trip only whereas the motorbike average includes social and other business trips as well.
- Commuting by motorbikes reduces travel time by at least 50 percent as compared to by bus.
- The present bus system, which caters to the majority of commuters, is uncomfortable and insufficient.
- The proposed JICA supported CDGK mass transit systems will take at least a decade to be sufficiently extensive to make a difference. In addition, they will be far more expensive than the existing cost of bus based commuting.

2. Findings from 100 Male Respondents:

- The majority of respondents belong to low income settlements.
- The average time spent by them in commuting from home to work and back is two hours.
- 70 percent of the respondents would like to purchase motorbikes but do not have the means. The reasons for wanting to choose a motorbike are its flexibility and cost and time savings in commuting.
- 18 percent of the respondents do not wish to use a motorbike because they considered it to be unsafe.
- 64 percent of respondents do not favour women riding motorbikes.

3. Findings from 68 Women Respondents:

- 49 respondents are between the ages of 20 to 22 years and belong for the most part to lower income settlements.
- Like their male counterparts, the journey from home to work and back takes an average of two hours.

- 36 out of 68 respondents are ready to adopt a motorbike as an alternative to commuting by bus.
- The ones who were not willing to adopt the motorbike, 11 felt they were not suitable for women; 5 felt that it was against religious doctrines; and the rest 20 felt that their parents/guardians would not give them permission.
- This question was put to 20 women in an NGO seminar on disaster by one of the authors. All 20 were willing to opt for the motorbike option.
- Women prefer “women-friendly” scooters rather than motorbikes so that they do not have to straddle the motorbike seat which is culturally considered improper.

4. Findings from 25 Motorbike Users:

- All respondents mentioned high levels of air and noise pollution on the roads as major problems encountered by them.
- 16 respondents did not think that the motorbike is a suitable conveyance for a family.
- All respondents said that the motorbike is economical, saves time, provides manoeuvrability in traffic jams and is spacious enough to accommodate a couple and one child.
- 10 respondents identified the availability of parking space as a major problem.
- 7 respondents were concerned with the absence of proper traffic control systems, 6 about the bad road surfaces, and others about the absence of “good manners” of car and public transport drivers. 6 respondents also pointed to the need for a separate lane for motorbikes.
- The average cost of maintaining a motorbike works out to Rs 784 per month.

5. Findings from 25 Motorbike Dealers and Web Search:

- The cost of a motorbike varies between Rs 40,000 to Rs 120,000. The vast majority of sales are for the Rs 42,000 – Rs 60,000 bracket.
- Motorbikes can be purchased by payments in instalments. Some of the packages are attractive with down payments as low as Rs 10,000 and monthly instalments as low as Rs 1,200. However, such schemes are few and can hardly meet the demand.

- Government duties on motorbikes are 90 percent. If these are reduced, motorbikes can be made affordable to an even larger population.
- The cost of green motorbikes varies between Rs 40,000 to Rs 60,000. The operation costs of a hybrid motorbike (which runs on both fuel and electricity) are Re 1 per kilometre as opposed to the present Rs 3 per kilometres of commuting by bus. This hybrid motorbike is suitable for Pakistan because of extensive electricity outages.
- The fuel cost of electric power for motorbike operation is 25 percent of the cost of gasoline.

On the basis of the surveys, the researchers have arrived at certain recommendations. The important ones are listed below:

1. Given the advantages of motorbike use as opposed to public transport (existing and proposed) the number of motorbikes will increase more than what has been estimated by the CDGK-JICA studies. There is no way in which this process can be curtailed except by increasing the price of motorbikes to an extent that it becomes unaffordable to lower and lower middle income groups. This would be a great injustice. Therefore, it is recommended that:
 - The use of motorbikes should be promoted as an integral part of transport, planning, traffic management and infrastructure design.
 - There should be a reduction on duties on motorbikes and related spare parts to make them affordable to a greater number of people.
 - Micro-credit programmes for the purchase of motorbikes should be introduced.
2. Motorbikes are already causing air and noise pollution, congestion and are involved in fatal accidents. It is recommended that:
 - A physically segregated lane must be provided for motorbikes on all the major arteries of Karachi. Luckily, most of the arteries are wide enough to accommodate such a lane.
 - Building byelaws and zoning regulations of the city should accommodate the needs of motorbike owners and markets in relation to designs of flyovers, under-passes, expressways, housing projects and parking spaces. Architecture, planning and engineering professional and academic institutions can play an important role in this.

- The government and motorbike manufacturers and importers must promote the use of “green” motorbikes. The print and especially the electronic media can be effectively used for it.
 - Battery charging facilities must be incorporated at every petrol pump and at relevant commercial and business centre. In addition, a system for the safe disposal of used batteries should be developed.
 - Options should be available to the motorbike purchaser for the type of seat he/she wishes for their vehicle. The seat size can be increased to accommodate three adults. It has been observed that people are already doing this themselves.
 - Most accidents involving motorbikes take place because of the absence of rear view mirrors. Motorbike riders complain that they get stolen. A product that cannot be stolen needs to be designed and marketed so as to save lives and injuries. Product designers and manufacturers could look into the problem and come up with a solution.
3. Younger women wish to ride motorbikes. All indications in the research show that this will happen. When Lahore police women started using motorbikes (and they are not “women friendly” scooters), it was anticipated that there would be much opposition to it. However, this did not happen. It is felt that this desire should be supported to become a reality since it is unfair that women should be denied this option. To support women in riding a motorbike, a number of steps can be taken.
- Civil society can promote societal values that encourage women to ride motorbikes. NGO activists and students would be the most likely pioneers.
 - Discussion on the subject should be introduced at various seminars and workshops that civil society organisations hold.
 - “Women friendly” motorbikes should be introduced and marketed.

Motorbike Mass Transit

An Exploration into the Potential and Problems of the Rapid Increase in the Use of Motorcycles as a Transport Mode in Karachi

1. BACKGROUND

Motorcycles on the roads of Karachi are visibly increasing. Newspaper reports show that the majority of fatal road accidents are caused or suffered by motorcyclists.¹ Karachi District City Government (CDGK) and Excise Department figures give us some idea of the scale of this increase. In 1990, Karachi had 450,000 registered motorcycles. In 2004, this had increased to 500,000 and in 2010, the figure was just over a million. Every eleventh family in Karachi owns a motorbike (sometime more than one) today. If this trend continues, then by 2030, it is estimated that Karachi will have 3.642 million motorbikes.²

The reasons for an increase in motorcycle usage are easy to understand. Apart from the initial investment of purchasing the bike, they are cheaper to use as compared to buses, they have more flexibility as they give the user a considerable amount of independence of movement options. In addition, public transport in Karachi is uncomfortable and insufficient at peak hours. However, apart from being accident prone, motorcycle users have other visible problems as well. These relate to the absence of parking facilities and police harassment because of target killing of political activists which usually take place from motorbikes. In addition, the motorbikes in use today also cause considerable air and noise pollution.

Given the fact that motorbikes are increasingly being used for commuting, the authors of this report felt that an understanding of their potential as a partial substitute for public transport systems was necessary. For this, a few questions needed to be answered.

1. What percentage of commuters who use public transport today would like to switch over to motorbikes?
2. If they wish to switch over then why is it that they do not do so?
3. The present motorbike users are all male. Do they support the idea of women using motorbikes?
4. What do women feel about using motorbikes given the fact that the present state and society culture prevents them from doing so? What would it require for them to start using motorbikes?

¹. Source: <http://tribune.com.pk/TodaysPrintDetail.aspx?ID=16441&Cat=5&dt=3/9/2011> and

Source: <http://www.pakwheels.com/forums/automobile-news/40863-karachi-likely-have-8m-vehicles-2020-a>

². JICA and CDGK Karachi Mass Transit Cell; *Study for the Karachi Transportation Improvement Project: Progress Report – 2*; Karachi, February 2, 2011

5. What are the problems that motorbike users face today?
6. Why do motorbike manufacturers and dealers not promote / deal in “green” motorbikes?
7. Based on these responses the authors wished to look at the potential of promoting motorbikes as a mass transit option and to identify what it would require to promote such an option.

To answer the above questions, questionnaires were prepared and served to 100 men and 68 women waiting for buses at different locations in Karachi. Questionnaires were also served to 25 motorbike users, 25 motorbike dealers and a web search was conducted to identify green bike manufacturers and identify costs of green bikes. The methodology of the research and its results are given in the sections below.

2. RESEARCH METHODOLOGY

The methodology of the study was based on identifying commuters at various bus stops along the main arteries of Karachi city and serving them with questionnaires. The research also identified motorcycle dealers at Akbar Road and Federal ‘B’ Area (the main motorbike markets) and questionnaires were also served to them. Web search was also conducted to know about the dealers and the specifications of available electronic/green motorbikes and scooters in the international market. Locations where these questionnaires were served are given in the map (**Figure-1**) and are mentioned in Section 3 of this report.

Research Tools:

The method of information gathering comprised of

1. On-site observations, in which the researches systematically recorded their observations.
2. Separate interviews and/or questionnaire surveys with respondents: 100 male commuters, 68 women (in two phases), 25 monocycle dealers and 25 motorcycle users. Each set of interviews has definite and different objectives and will be described briefly in the section of findings of relevant interviews.
3. Secondary data browsing: not much is available on the subject in printed form. However, World Wide Web has provided some clues on the subject.

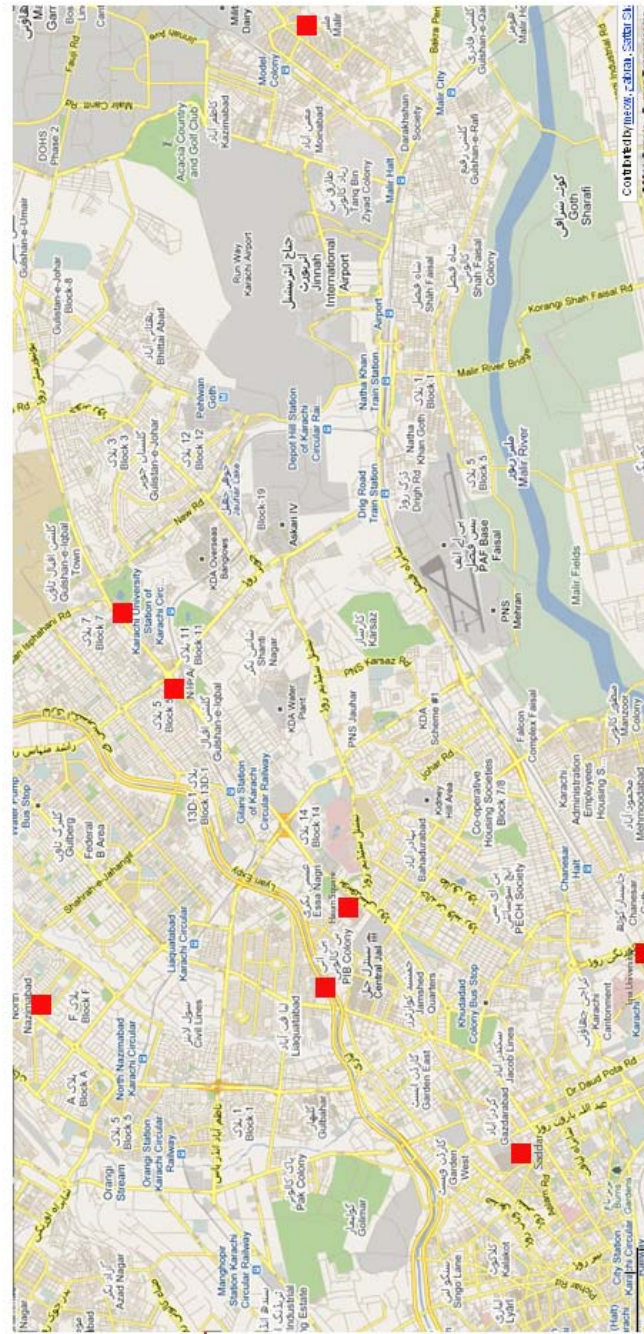


Figure - 1: Location of bus stops where questionnaires for commuters were served.

4. Web surfing for information about e-bike manufacturers and the relevant terms and conditions for ex-Karachi Port delivery and after sales service has yielded little.
5. MS Excel was then deployed to compute percentages accurately from the surveys. The software was also used to perform various combinations by employing data filter techniques.

Questionnaire Design:

Before questionnaires were designed, a discussion was held amongst the researchers to discuss the initial observations on the use of motorcycles and the problems of commuters on bus stops of the city.

After the first round of surveys, the questionnaires were modified for seeking more precise information. The questionnaires are attached as **Annexure 1**.

Initially the questionnaire for women commuters was the same as for men and it was served to 18 women. However, it was soon realised that a separate questionnaire for women was required. This was developed and served to an additional 50 women.

The Survey:

A three member team was established to conduct the interviews. A supervisor was selected among the team for team coordination and management. The team was briefed about the objectives of the research, the ethical issues in conducting such surveys, and the possible problems that could hamper the survey. The Survey was conducted between December 21, 2010 and January 18, 2011.

Methodological Issues:

Though the research team did not face any major obstacles while conducting the survey, they did face some minor issues that are listed below.

Timings for the availability of potential respondents needed to be carefully selected as the availability of younger commuters at the bus stops was subject to their respective school/college timetables. In some cases women were reluctant to provide exact information about their names and their area of residence. Hence, it is possible that the names of some of the women are fake. Similarly, motorcycle dealers were also reluctant to speak to researchers who, despite detailed introduction, were taken as media personnel in disguise trying to probe into their incomes. Later, it was mentioned to the researchers that the motorcycle dealers had bad experiences with media professionals who betrayed their confidence to the Income Tax and Excise Departments.

The rains and the law and order situation in Karachi resulted in some delays of timelines. However, the quality of the surveys remained unaffected by these two factors.

The survey questionnaires have their pros and cons. The questionnaires served as an excellent reminder for what needs to be asked in a systematic manner. They kept the research team on track and saved time as well. However, they proved to be too much of a mechanical tool with little ability to capture the nuances of the entire issue. As the survey progressed, lots of issues not covered by the questionnaires were observed. These are discussed in the next sections.

6. FINDINGS FROM THE SURVEYS

Findings from 100 Male Respondents:

The salient features of the conducted interviews/results from the questionnaires are as follows:

1. 63 percent of the interviews were conducted at Saddar and PIB Colony. Rest were conducted at NIPA, Gulshan, Malir and Nazimabad.
2. 51 percent of the interviewees were between 15 to 24 years of age; 46 percent were between 25 and 49; and the rest 3 percent were 50 and above years of age.
3. 60 percent of the respondents travelled a distance of 16 kilometres or less from home to office and back; 27 percent from 18 to 40 kilometres; and the rest 13 percent travelled between 52 to 120 kilometres. The researchers think that the last figure of 120 kilometres may be an error in judgement on the part of respondents.
4. The commuting time of 32 percent of the respondents from home to work and back is two hours; for 20 percent it is between 90 to 120 minutes; and for 15 percent between 150 and 240 minutes. The largest chunk of the respondents (33 percent) spends anywhere between 20 to 90 minutes commuting. It could be safely concluded that majority of the people spend approximately two hours daily to and from work.
5. The range of daily spending on commuting from home to work and back, varies from Rs. 24 to Rs. 100. The majority (32 percent) spend Rs. 48 per day; another 26 percent spend Rs. 60 per day; and the rest 42 percent spends from Rs 40 to Rs.100 per day. Hence, the average spending per day on commuting from home to work and back is Rs 60.36. It is important to know that this does not include the cost of other business or social trips.
6. 70 percent of the respondents were ready to abandon buses in favour of motorcycles. 52 percent of the respondents thought that motorcycles were a more convenient mode of transport and 11 percent of them also thought that using a motorbike saves time.
7. The 30 percent who wish to continue to use buses have nothing substantial against motorcycles. However, 18 percent consider motorbikes as an unsafe mode of transport and as such do not wish to use it.
8. Researchers probed further with those who wanted to have motorcycles as an alternative means of conveyance. The question asked was why, despite being in favour

- of motorcycles, the respondents were not able to purchase one. 53 percent of the total respondents (37 out of 70 respondents) mentioned financial constraints as the major impediment. As mentioned in point number 1 that majority of the interviewees belonged to youth (a dependent stratum of the society), therefore lack of permission from parents also appears to be a decisive factor. 13 percent said that they are not allowed by their parents to purchase motorcycles since riding them is considered dangerous.
9. 55 percent of the respondents mentioned that they would prefer to buy motorcycles if they fall in a price range of Rs. 30,000 to Rs. 40,000. Only 17 percent showed a willingness to purchase motorcycles of above Rs. 40,000.
 10. 64 percent of the respondents are not in favour of females driving motorcycles on the streets. Rest 34 have no objection. The reason cited by 40 percent of the total respondents is that it is against basic religious teachings for women to ride motorbikes. 10 percent thought that this particular mode of conveyance is not suitable for females.

Findings from 68 Women Respondents:

Given below is the analysis of the two surveys conducted from women respondents. The first was conducted at Malir, Gulshan, PIB Colony, Saddar, Nazimabad and NIPA. In one of the questions of Women Survey – I, it was asked whether women should also drive motorcycles and 11 out of 18 replied with a ‘Yes’. The Women Survey – II, with 50 respondents was administered at Karachi University and Iqra University. Major part of survey was conducted at Karachi University (42 questionnaires) and in Iqra University (8 questionnaires). The purpose was to triangulate the earlier established fact that women are willing to, provided the opportunity, abandon bus service in favour of scooters/motorbikes. The findings of the two surveys are given below.

1. Respondents belonged to the ages of 17 to 47 years. The average age works out to 22, while majority of those (49 respondents) interviewed are between 20 and 22 years of age.
2. The respondents belonged to Clifton, Gulshan, Gulshan-e-Hadeed, M.A. Jinnah Road, Malir, Nazimabad, PECHS, PIB colony, Shah faisal, Sher shah, University road, Water pump, Ayesha Manzil, Bahdurabad, Bufferzone, D.H.A, Gulberg, Gulistan-e-johar, Gulshan, Shaheed-e-Millat Road, Hyderabad Colony, Korangi, Lalo-khait 10 number, Mochi Morr, New Karachi, Orangi, PECHS, Sohrab Goth and Tariq Road. On the basis of their residential locations, it can be said that the majority of the respondents belong to low and lower-middle income localities of the city.
3. The distance travelled by the respondents from home to work place and back per day ranges from 2 to 90 kilometres. 43 of the respondents travel 26 kilometres per day; 35 travel 2 to 20 kilometres per day; 22 travel 22 to 40 kilometres per day; and the rest 11 travel 42 to 90 kilometres per day.



4. The time spent in travelling from home to work and back ranges from 30 minutes to 240 minutes. As such, the average works out to 128 minutes. 47 of the respondents spent from 30 to 135 minutes on the road, while the rest of the 21 spent 140 to 240 minutes. The largest group of 14 respondents mentioned that they spend 120 minutes on the road. The second largest group of 11 respondents mentioned 80 minutes as travelling time. It emerges that women, like their male counterparts, also spend an average of around two hours daily while travelling between home and work place and back.
5. The respondents mentioned that they spend between Rs. 24 to Rs. 110 per day on commuting. This works out to an average of Rs. 54. The largest group (26 respondents) spend Rs. 48 per trip; 45 respondents spend between Rs. 48 and Rs. 60. Accumulated daily spending by the majority is Rs. 48.
6. Out of 68 respondents, 36 were ready to abandon buses and use a motorcycle instead, while the remaining 32 were not willing to do so. However, when the same question was asked to a different set of women respondents in Hyderabad city, all of them replied that they were willing to adopt the motorbike.³ Independence of movement and sense of autonomy was the main reason cited for this answer.
7. 13 respondents out of the 36 who wished to adopt the motorbike mentioned convenience as the main reason. 9 others mentioned that it would save travel time. Another 4 liked the idea of having their own transport.
8. 11 out of 32 respondents who said 'No' considered motorbikes unsuitable for women. Another 5 thought that it is not a safe conveyance, a concern that probably transcends gender boundaries. Only 5 thought that it is prohibited in religious doctrines. However, there have been a number of web discussions on the subject and three probable reasons for women not wishing to use the motorbike have emerged. These are: a) *pardah* or the concept of segregation of women; b) security, given the current conflicts in Pakistan; and c) lack of trust of parents in their girls⁴. In an article⁵ about women-friendly innovation in emerging markets, The Economist unpacks the concept of "wominnovation" by examining how societies can harness the power of innovation to empower women and promote greater gender equality. The Economist points out, these "wominnovations" are comprised of three main elements:
 - (1) **A favorable context**, including political, economic and social conditions that make the time right for its adoption, and an innovation system that excels at finding and testing good ideas and quickly scaling them up;

³. On March 08, 2011, one of the authors (Mansoor Raza) conducted a Focus Group Discussion on disaster related topics with NGO activists, mostly from rural areas of Sindh. In an informal talk, the findings of this research were discussed and all of the twenty participating women expressed their desire to drive motorbikes. It must be noted that these women were NGO and CBO activists and hence role models for others in their community.

⁴ <http://www.paklinks.com/gs/all-views/471994-girls-riding-motorcycle-in-pakistan-why-not.html>

⁵ <http://bigthink.com/ideas/30915>

- (2) An inherent **value proposition** that compels women to embrace the innovation;
 - (3) The **inclusion of women in the design process**, to ensure that the innovation meets the design and technical requirements of women.
9. From those who are ready to adopt the motorbike, the question was asked why they have not bought a motorbike as yet (note that this question was asked of only 18 respondents of Phase-I). 3 respondents mentioned that it is because they do not know how to drive a motorbike; and 2 mentioned that it is because they do not have permission from their parents. One mentioned that it is because of social pressures while the rest could not provide an answer.
 10. The preferred price range for the purchase of a motorbike by the majority of the respondents is between Rs. 30,000 and Rs. 40,000.
 11. In Phase - II (50 interviews) of the survey, the question was asked whether the guardians of the respondents who are willing to buy motorbikes, will allow them to use motorbikes. 35 responded with a 'No'. Out of those 35, 7 thought the guardians will provide religious reasons for not granting permission. Another 6 thought that culture and traditions will force their parents for not granting permission. Another 5 thought that their guardians are far more conservative than them.
 12. Out of those 15 who thought that their parents will allow them to use motorbikes, 6 mentioned that their convenience is more important to their parents than any other factor.

Findings from 25 Motorbike Users:

1. Out of the 25 motorcycles users 7 mentioned that there are no proper traffic control systems in the city and for them this is a major issue and affects their safety. Another 6 complained about bad road surfaces and pointed to the need for a separate lane for motorcycles. The others identified heavy traffic on the roads and lack of "good manners" of vehicle drivers.
2. 15 respondents do not see any problems in availability of parking space, though the other 10 identified this as a major issue that needs to be taken care of.
3. Interviews showed that the per month maintenance cost for a motorbike ranges between Rs. 250 to Rs. 1,000. 8 respondents out of 25, mentioned that they spend Rs. 1,000 per month while another 4 mentioned that they spend between Rs. 900 and Rs. 1,000. The average expenditure as such works out to Rs. 784 per month.
4. 13 of the 25 respondents need to go a mechanic for maintenance purposes once a month while another 3 visited a mechanic once in two months.

5. Conversation with some of the motorcycles users helped to shape the following fuel consumption pattern of selected brands of motorcycles.

Table: Various Brands and Mileage of Motorbikes

	Brand Name	Mileage (new motorbike)	Mileage (old motorbike)
1	Honda 70 CC	60 Km/Liter	40-45 Km/Liter
2	Honda 125 CC	50 Km/Liter	30-32 Km/Liter
3	Unique 70 CC	60 Km/Liter	48-50 Km/Liter
4	Yamaha 100 CC	30 Km/Liter	18-22 Km/Liter

6. 13 respondents said that randomly conducted spot checking by the Police is a serious problem since the Police is corrupt and only wants to extort money from them as bribe.
7. 16 respondents did not think that a motorcycle is a family conveyance, while another 7 thought that it was. However, all respondents felt that a motorbike is economical, saves time, provides manoeuvrability in traffic jams and is spacious enough to accommodate a couple with one child.
8. 11 respondents thought that the in-use design is perfect for 2 persons, while the other 11 thought that it is good for 3 persons.
9. 21 respondents expressed their satisfaction about the capacity of the seat while another 4 thought that it needs some modification to accommodate another person.
10. Interviews also mentioned varying estimates for the three most popular modes of conveyance in Karachi, i) motorcycle; ii) public buses; and iii) QINGQIs. According to media reports 8,000 Qingqis are plying in Karachi, although they are not allowed to operate on the main arteries of the city⁶. For the most part they operate in the lower income settlements and provide links with the main transport modes.

Table: Comparison of Three Modes of Conveyance

Serial No.	Types of Conveyance	Cost Per Kilometre
1	Motorbikes	Rs. 1.5 to Rs. 2/Km
2	Bus	Rs. 2.0 to Rs. 3.5/Km
3	Qingqi	Rs 1.5/Km to Rs. 2/Km

11. In conversations all the respondents mentioned high levels of air and noise pollution from motorbikes and public transport and cargo vehicles as problems encountered by

⁶ 'Qingqis to stay away from main roads', *The Express Tribune* March 21, 2011

them during commuting. However, some were quick to add that the same problems are encountered while travelling by public transport.

Findings from 25 Motorbike Dealers:

The survey was conducted at two places, Akbar Road and Federal 'B' Area. The major portion of the survey was conducted at Akbar Road (19 interviews) which is the main market of motorcycles in Karachi, whereas 6 questionnaires were served in Federal 'B' Area.

Among the 25 dealers with whom the survey was conducted, 18 were authorized dealers of different manufacturers, whereas the remaining 7 dealers were independent of any franchise bonding.

There were total 10 brands in the 25 shops surveyed. These brands are listed below:

- I. Honda
- II. Yamaha
- III. Unique (Pakistani make)
- IV. Super power (Pakistani make)
- V. Habib (Pakistani make)
- VI. Suzuki
- VII. Dhoom (Pakistani make)
- VIII. Metro
- IX. Super star
- X. Hi-speed

Unique and Superstar are the most popular brands. There were 4 types of CCs⁷ (power parameter) available in the 25 shops surveyed.

- I. 70 CC
- II. 100 CC
- III. 125 CC
- IV. 150 CC

According to the dealers 70 CC motorbikes are the most popular, while 100 CC is next in line in terms of popularity⁸. The price range varies between Rs. 40,000 and Rs. 120,000. The prices of various CCs in the market are:

⁷ CC or cubic centimetres refers to engine capacity. Specifically it refers to the amount of air/fuel mixture able to fit into the cylinders (where combustion occurs) at full expansion. 1 cc is equivalent to 1 gram of water aka 1 ml. An example: 250 cc engine means the cylinders with pistons at full expansion can hold a volume of 250 ml of air/fuel mixture prior to the combustion stroke. Read more:

http://wiki.answers.com/Q/What_Does_CC_mean_on_a_motorcycle#ixzz1EJlv6qZ0

⁸ An interesting article on Pakistani market of motorbikes can be read on <http://www.2wheelsindia.com/2007/03/bikesmotorcycles-in-pakistan.html>



- I. 70 CC for Rs. 40,000
- II. 100 CC for Rs. 52,000
- III. 125 CC for Rs. 60,000

On the other hand the Honda and Yamaha franchises are selling motorcycles on the following rate:

- I. 70 CC Honda, Rs. 64,000
- II. 100 CC Honda, Rs. 71,900 , Yamaha Rs. 65,000 and Rs. 72,000
- III. 125 CC Honda, Rs. 87,500 and Rs. 109, 000
- IV. 150 CC Yamaha, Rs. 1,20,000

It was also learned that import duty on motorbikes is 90 percent, though at one time it was considered to be reduced to 50 percent⁹. Following are other major findings of the survey:

1. According to the interviewed dealers, 9 mentioned that the majority of the people buy motorbikes in the range of Rs. 40,000. Another 6 mentioned that most of the selling is done at Rs. 35,000. By having a careful look on the responses, it seems that most of the selling is done between Rs. 35,000 and Rs. 40,000 as 19 out of 25 dealers mentioned the selling range in between these two figures
2. Out of the 25 dealers who were surveyed only 8 dealers sell motorcycles on instalments. The packages available for instalments are for 3 months, 6 months, 12 months, 23 months and 24 months. Depending on the down payment, the amount of instalments and the tenure of the instalment, motorcycle costs inflate from 25 to 50 percent, when purchased on credit.
3. The instalment duration lasts from 3 months to 24 months and the duration of the instalments depends on the down payment and the mutual understanding of the dealer and the buyer.
4. The amount of down payment varies from Rs, 10,000 to Rs. 22,000, thus giving an average of Rs. 16,000.
5. The amount of instalments varies from Rs. 1200 to Rs. 5,000 per month, which works out to an average of Rs. 3,100 per month.
6. 21 dealers out of 25 also offer insurance. The cost of insurance is usually between 10 to 12 percent of the total cost of the motorcycles.
7. 23 of the interviewed dealers provide after sell services as well. The major maintenance issues, as per experience of the dealers include rust at frame, jumps/shock absorbers mal-functioning, horn, nut-bolt tuning, oil leakage and piston repair.

⁹ http://www.dailytimes.com.pk/default.asp?page=story_22-5-2005_pg7_18

8. Out of the 25 dealers 17 do not face any sort of problem in their business, whereas 8 mentioned inflation in the economy, excise tax, contemporary economic crisis and strikes as real as impediments for growth in business.
9. And lastly when asked about the reason for not importing electric motorbikes , 13 dealers thought that there is no demand for such product; 5 mentioned non-availability of electricity (for charging batteries); and another 3 talked about the duty and taxes as stumbling blocks in promotion of such ventures.

Findings from World Wide Web Survey:

Following are the important points from the survey of World Wide Web, about electronic motorbikes. It is important to note that almost all manufactures claim that the product is smoke free, environmental friendly and noiseless. The motorcycle comprises of three basic parts: motor, battery box and controller. Parallels are established between motor and battery of e-bikes/scooters with engine and gasoline of petrol run bikes, respectively. The e-scooters are considered more women friendly and cultural-fit, in South Asian context.

1. Besides countries of East Asia and Europe, a modified version of the product (referred as Hybrid Bike), is manufactured in Pakistan. The product operates on dual fuel and claims to cost less than a Rupee per kilometre¹⁰.
2. The price varies with specifications but ranges from Rs. 40,000 to Rs. 65,000
3. The fuel costs for electric power are approximately 25 percent the cost of gasoline power¹¹
4. Speed, again depends on power and varies from 30 to 90 Kilometres per hour and depends on the model, age, terrain and weight of the rider.
5. Batteries unit is in multiple of 12 Volts and varies from 48 Volts to 72 Volts
6. Batteries are made up of various materials and those include SAL, Silicon, LiFePo4 battery and Lithium.
7. Battery charging time is from 6 to 9 hours. Life span, depends on quality of maintenance. They usually last from one year to one a half years.
8. Distance covered in one charging is from 45 to 90 kilometres
9. Charging input for batteries could be 220 Volts or 100 Volts

¹⁰ <http://www.opfblog.com/11245/energy-efficient-hybrid-bike-to-hit-pakistan-markets-after-eid/>

¹¹ <http://www.indiastudychannel.com/experts/1241-Which-one-is-best-scooter-for-ladies.aspx>

10. Average charging cycle of battery is 800 cycles
11. The available power of the motorbikes ranges from 800 watts to 5000 watts
12. A scooter could weigh from 35 to 165 kilograms
13. The carrying capacity In terms of weight ranges from 150 kilogram to 200 kilograms. Two persons and toddlers can be easily accommodated on electric scooter, popularly referred as 'scooty'
14. For suppliers outside Pakistan, delivery period at Karachi Port varies from 15 to 30 days

7. CONCLUSIONS

On the basis of the surveys and further examination of CDGK and JICA literature, the authors have drawn a number of conclusions.

1. Whether one likes it or not, the reality is that motorbikes will increase faster and to a greater extent than what has been estimated by the study for the Karachi Transportation Improvement Project (KTIP)¹². The reasons for this are listed below:
 - Apart from the initial cost of purchasing a motorbike, it is far cheaper than other modes of transport. Its average monthly maintenance cost is Rs 784 (between Rs 250 – 1,000) as opposed to an average bus commuting cost of Rs 1,570 (Rs 1,248-3,000). An important factor in the above estimates is that the motorbike maintenance cost covers a number of other trips, including family outings, while the bus costs are only for the journey from home to work and back.
 - According to the respondents, travelling by motorbike reduces travel time by at least 50 percent as compared to commuting by bus.
 - A rail based mass transit system and an improved bus system as envisaged by the KTIP will take well over a decade to complete. Phase-1 of the Karachi Circular Railway will be completed in four years. On its completion, it will serve no more than 0.75 of the trips generated in the city. On completion of Phase-2, it will serve 2.25 trips generated. The project will cost 1.52 billion US dollars. The long time taken to complete this project and its small scale will be an incentive for the purchase of motorbikes.

¹². JICA and CDGK Karachi Mass Transit Cell; *Study for the Karachi Transportation Improvement Project: Progress Report – 2*; Karachi, February 2, 2011

- Cost of rail and improved transport systems will be much higher than today. Similar systems have been put in place in Bangkok, Delhi, Manila and Kuala Lumpur. Bangkok's light rail caters to 3 percent of the commuting public and its average fare one way is 25 Bhat (Rs 65). Delhi Metro average cost of a one way journey is Rs 19 (Pakistani Rs 38). A day travel card is Rs 100 (Pakistani Rs 200) and a three day travel card is Rs 250 (Pakistani Rs 500). Kuala Lumpur's costs are even higher. It is unrealistic to expect that the improved Karachi transport travel costs will be less. This will make public transport even more expensive as compared to commuting by motorbike and this will be an added incentive to purchase one.
 - Attractive loan packages already exist for the purchase of motorbikes. Repayment at Rs 1,200 per month is considered reasonable by most prospective purchasers. This is in spite of the fact that there is a 90 percent duty on motorbikes.
2. If women start riding motorbikes, the motorbike projections made by CDGK and JICA will increase. It is more than likely that this will happen for the following reasons:
- Surveys established that younger women wish to ride motorbikes and only five out of 68 respondents (7.35 percent) felt that riding a motorbike was against their religion, as opposed to 40 percent of men who thought that religious culture did not permit women to ride a motorbike.
 - Studies on family structures and behaviour patterns in Karachi show an increasing independence for women which is supported by their parents who are culturally very different from the older generation. As a result of the fading away of the joint family system, there has been a major change in societal values and gender relations.¹³ The authors and female NGO activists feel that the time has come to promote women riding motorbikes. The element one (a favourable context) and element two (value proposition) in the Economist's concept of "wominnovation" (mentioned in Item 6, sub section "Findings from 68 women respondents", paragraph 8), exists in the case of Karachi today.
 - It has been repeatedly observed that women in Pakistan (as in other South Asian countries) do not straddle the motorbike seat. As such, the introduction of the "scooty" would make it easier for them to adopt riding motorbikes.
 - Lahore Police women have been given motorbikes (not scooties). They are using them and there has been no objection regarding their use from them or from the public.
3. The number of motorbikes per thousand population is increasingly creating air and noise pollution, congestion and an increase in fatal road accidents and injuries.

¹³. Arif Hasan; *Demographic Change and its Socio-economic Repercussions: The Case of Karachi, Pakistan; International Development Planning Review, Volume 31, Number. 3, 2009*

- Today 39.2 percent (7.418 million) of Karachi's population of 18.93 million is economically active. This means that today there is one motorbike for 7.4 economically active persons (or 57 motorbikes for 1,000 Karachi population)¹⁴ and if two persons travel on a motorbike then two million persons use this facility. If even 25 percent of economically active women ride motorbikes, this will increase the number of motorbikes by about 10 percent.
 - It is estimated that in 2030, the economically active population of Karachi will be 43.3 percent (13.698 million) of the total population of 31.698 million. The number of motorbikes in 2030 is estimated at 3.642 million or 115.3 motorbikes per 1,000 population. This means that there will be one motorbike for 3.76 economically active male persons. These figures do not take into consideration women riding motorbikes.
 - Given the above estimates, there will be an enormous increase in pollution, accidents and congestion caused by the motorbikes. With women riding them, this will be more than what has been estimated.
4. Findings of the web search make a good case for the promotion of "green" motorbikes and scooters for the following reasons:
- Their cost is the same as that of normal petrol operated motorbikes.
 - The cost of operation is lower than that of petrol motorbikes at Rs 1 per kilometre as opposed to Rs 2 per kilometre for similar CC petrol motorbikes.
 - Given Karachi's electricity outages, the hybrid motorbike (which is being manufactured in Pakistan), is suitable since it can run on both petrol and electricity.
 - The fuel costs for electrical power are approximately 25 percent of the cost of gasoline power.

5. RECOMMENDATIONS

Based on the conclusions, the authors have formulated some recommendations which are given below. These recommendations are for the consideration of politicians, CDGK planners and JICA consultants, civil society organisations involved in development and social issues related programmes and projects, and academic institutions. It is realised that these conclusions are very basic and need to be elaborated. However, such elaboration would require a considerable amount of new research.

¹⁴. JICA and CDGK Karachi Mass Transit Cell; Study for the Karachi Transportation Improvement Project: Progress Report – 2; Karachi, February 2, 2011

1. The motorbike option is cheap and convenient for the users. It also reduces investment on very expensive to build and use public transport infrastructure. Therefore, it should be promoted by:
 - Making it an integral part of transport planning, traffic management and infrastructure design.
 - Reducing duties on motorbikes and related spare parts to make them affordable to a greater number of people.
 - Introducing micro-credit programmes for the purchase of motorbikes.
 - Promoting the use of motorbikes by women through encouraging pioneers and through the import of women friendly motor-scooters. Promotion can be done discretely by “civil society” organisations through discussions in seminars and workshops. University and college students and NGO activists are the most likely pioneers. There is no reason why women should not benefit from a commuting facility already enjoyed by men.
2. The government and motorbike manufacturers and importers must promote the use of “green” motorbikes. The print and especially the electronic media can be effectively used for it. The advantages of the green motorbikes have been discussed in the conclusions.
3. Battery charging facilities must be incorporated at every petrol pump and at relevant commercial and business centre. In addition, a system for the safe disposal of used batteries should be developed.
4. A physically segregated lane must be provided for motorbikes on all the major arteries of Karachi. Luckily, most of the arteries are wide enough to accommodate such a lane.
5. Options should be available to the motorbike purchaser for the type of seat he/she wishes for their vehicle. The seat size can be increased to accommodate three adults. It has been observed that people are already doing this themselves.
6. Building byelaws and zoning regulations of the city should accommodate the needs of motorbike owners and markets in relation to designs of flyovers, under-passes, expressways, housing projects and parking spaces. Architecture, planning and engineering professional and academic institutions can play an important role in this.
7. Most accidents involving motorbikes take place because of the absence of rear view mirrors. Motorbike riders complain that they get stolen. A product that cannot be stolen needs to be designed and marketed so as to save lives and injuries. Product designers and manufacturers could look into the problem and come up with a solution.

Annexure – 1

1. Questionnaire for Research on Commutation Preference of Commuters

(For Male Commuters: Also served to 18 Women Commuters)

Total Questionnaire: 100

Number of this questionnaire: 1/100

Place where the interview is conducted:

Date:

1. Name of the respondent:

2. Male/Female/Transgender:

3. Age of the respondent:

4. Where do you live?

5. How far is your home from office (in kilometres)?

6. How much time you spend in travelling from home to office and back to home?

7. How much money do you spend in travelling between home-office-home?

8. If you would have choice to abandon bus and buy motorcycle would you go for it?

Yes No

9. If yes why and if not why not (Pls narrate the reasons):

A. _____

B. _____

C. _____

10. If Yes, why haven't you buy one (Pls narrate reasons):

A. _____

B. _____

C. _____

11. For which of the following ranges you would prefer to invest for the purchase of motorcycle:

From Rs. 30,000 to Rs 40,000

From 40, 000 to Rs. 50,0000

From 50,000 onwards

12. Should women also get and drive motorcycles?

13. If yes why and if not why not (Pls narrate the reasons)?

A. _____

B. _____

C. _____

2. Questionnaire for Research on Commutation Preference of Commuters

(For Women Commuters)

Total Questionnaire: 50

Number of this questionnaire: .../50

Place where the interview is conducted:

Date:

1. Name of the respondent:

2. Age of the respondent:

3. Where do you live?

4. How far is your home from office (in kilometres)?

5. How much time you spend in travelling from home to office and back to home?

6. How much money do you spend in travelling between home-office-home?

7. If you would have choice to abandon bus and buy motorcycle would you go for it?

Yes No

8. If yes why and if not why not (Pls narrate the reasons):

A. _____

B. _____

C. _____

10. Will you be allowed by your guardians to commute through motorcycle?

Yes No

11. If yes why and if not why not (Pls narrate the reasons):

A. _____

B. _____

C. _____

12. If Yes, by when you will have one?

13. For which of the following ranges you would prefer to invest for the purchase of motorcycle:

From Rs. 30,000 to Rs 40,000

From 40, 000 to Rs. 50,0000

From 50,000 onwards

14. Do you see any moral implications of girls/women driving scoters in public sphere

Yes

No

15. If yes what are those implications: :

A. _____

B. _____

C. _____

3. Questionnaire for Research on Motorbike Dealers

Total Questionnaire: 25

Number of this questionnaire: .../25

Date:

1. Name of the respondent:

2. Name of the shop:

3. Place?

4. Are you:

Dependent

Independent

5. Brand(s) available with ranges and C.C:

a. _____

b. _____

c. _____

d. _____

6. Consumer's Preferred Brand and CC:

7. Preferred Range by the Consumer:

8. Do you sell motorcycles on instalments?

Yes

No

9. If Yes, than what is the procedure?

10. Down payment?

12. What is the Price difference?

13. Do you offer insurance?

Yes No

14. Cost of insurance?

15. Do you offer maintenance / after sell services?

Yes No

16. What are the major maintenance issues?

a. _____

b. _____

c. _____

d. _____

17. What are the problems you are facing in this business?

a) _____

b) _____

c) _____

d) _____

18. What do you think are the solutions to these problems?

a) _____

b) _____

c) _____

d) _____

19. What do you think is the rate of increment in the growth and sell of motorcycles in the last 3 years?

20. Do you consider Electric motorcycles?

Yes No

4. Six Questions for Motorbike Users

1. What are traffic and road related problems as faced by you?
2. What do you spend per month for the maintenance and fuel costs of your motorbike?
3. What is the frequency at which your motorbike has to be serviced or repaired?
4. What are the problems you face with the police if any and how much does that cost you?
5. Do you consider a motorbike a suitable transport for a family?
6. Is there a need to change the design of the seat to enhance the carrying capacity?
