A Holistic Approach to Evaluate the Competitiveness of Electric Vehicle

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APPROVAL

This is to certify that the thesis submitted by Jamil-Un-Nabi entitled as "**A Holistic Approach to Evaluate the Competitiveness of Electric Vehicle**" has been approved fulfilling the requirements for the Bachelor of Science degree in Civil Engineering.

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DECLARATION

I declare that the undergraduate research work reported in this thesis has been performed by me under the supervision of Assistant Professor Moinul Hossain. I have exercised reasonable care to ensure that the work is original and has not been taken from the work of others.

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ABSTRACT

Global warming due to climate change has turned out to be the top concern at present. Millions of people are affected owing to global warming as it effects the food production, forests and life of wild animals, sea level rise etc. Emission of GHGs has already reached at the alarming level. Transportation sector emits the biggest portion of carbon in the atmosphere which is why reduction of carbon emission in this sector has become a major obligation for the researchers and scientists. To cope with the world Bangladesh is also trying to improve the transportation sector. Application of electric vehicle in the public transportation sector has become popular in recent years in many countries including Bangladesh. Electric Rickshaw is being used in many areas of Bangladesh as a new mode of public transportation. This study refers an initiative to prove the competitiveness of electric vehicle comparing with other existing mode of transportation in Dhaka city.

PESTLE, AHP and TOPSIS are the three popular methods that have been used in this study to evaluate the competitiveness of Electric Rickshaw in the roads of Dhaka city. PESTLE has been selected as it takes environmental factors into account along with other political, economic, social, technological and legal factors as well as produces a framework for further analysis. Further analysis is done by using TOPSIS where AHP is required. AHP refers to Analytic Hierarchy Process which is being used worldwide as a decision making tool. The AHP is a decision support tool which can be used to solve complex decision problems. It uses a multi-level hierarchical structure of objectives, criteria, sub criteria, and alternatives. In this study, Electric Rickshaw, Leguna and Rickshaw have been taken as three alternatives to be compared and the criterions are set from PESTLE framework. AHP analysis produces the normalized weighted value which is used in the steps of TOPSIS analysis. The overall proposed methodology is to identify the criteria to be used by PESTLE, determination of normalized weighted value by using AHP, evaluation of alternatives with TOPSIS and determination of the final rank.

In this study, Electric Rickshaw, Leguna and Rickshaw have been taken as three alternatives to be compared. After all calculation, Leguna has been preferred to convey passengers instead of Electric Rickshaw. Finally the research shows that the acceptance

of electric vehicle is still not up to the mark. But the current situation can be motivated by acquiring some proper measures. If the reasons behind the hindrance of moving electric vehicle on the roads can be optimized, it will be very much possible to possess an eco-friendly transportation system.

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CHAPTER 1
INTRODUCTION

1.1 Background

Climate change has become the major issue nowadays. GHGs are the major element of this climate change behavior. Numerous man-made activities from the very beginning of the Industrial Revolution are liable for GHGs emission (Raman, 2012). Threats to ecosystem, food production, human security, forest and diversity, water supplies and sustainable socio-economic system are some of the major impacts of climate change (Harvey, 2010). According to TAR report the atmospheric concentrations of carbon dioxide, methane and nitrous oxide have grown by about 31%, 151% and 71% respectively between 1975 and 2000 (Third Assessment Report, 2001, cited in Raman, 2012). The report also indicates that 1990s have also been awarded as the warmest decade. Many scientists and researchers have already warned about the warming which might change the world's temperature up to 2° Celsius (Nakicenovic et al., 2000). Asia is one of the major contributors which contribute about 35% of worldwide energy related CO_2 emission of which 70% comes from the People's Republic of China. This percentage will increase up to 45% within 2030 if greater use of renewable energy and improved energy efficiency are not introduced. At present, 7 out of 10 countries are at great risk of global warming in Asia and the Pacific including Bangladesh. About 20 million people of Bangladesh will be directly and indirectly affected and most of them are living in the coastal zones. (ADB, 2013)

Waste and waste water (3%), energy supply (26%), transportation (13), residential & commercial buildings (8%) industry (13%), agriculture (14%) and forestry (17%) are the major sectors of greenhouse gas emission (IPCC, 2007). The actual share of CO_2 emission in transportation sector can become substantially higher as a large share of energy supply is for the transportation sector and several industries directly work in supporting the transportation sector. The global primary energy consumption and the total anthropogenic GHG emissions are respectively about 20% and 18% in transportation

sector where only road transport uses 72% of the total worldwide energy use and more than 80% of the total carbon dioxide emissions (Holmberg et al., 2012). Transportation sector has become the largest contributor of carbon emissions in US which is nearly one third of the total emissions (Roxana, 2014) and China has got over the position in recent years (Ahiduzzaman, 2011). Brazil, China, Islamic Republic of Iran, Indonesia, Kazakhstan, Malaysia, South Africa, Saudi Arabia, Chinese Taipei and Thailand are the top ten non –ITF(International Transport Forum) countries emitting most of the world's carbon dioxide emissions which is about 55% (Solaymani et al., 2015). Per capita GDP (Gross Domestic Product), transportation energy intensity and population growth are the main factors in Asian countries for increased amount of carbon dioxide in the atmosphere which have been determined by exploring various indicators during 1980-2005 (Timilsina and Shrestha, 2009). Petroleum fuel is mostly consumed by transportation sector which is about 45% of total consumption (Ministry of Finance, Bangladesh, 2012).

Carbon emission in transportation sector can be reduced by modal and policy intervention. Introducing Electric Vehicles (EV) as modal intervention can be helpful to reduce carbon emission in transportation sector. Public transportation contributes a huge portion of energy consumption and carbon emission in the atmosphere. In many countries, bicycling is being promoted as a viable transportation mode for many trips (Harvey, 2010, p. 259). For instance, about 40% urban trips are not more than 3.2 km (Gardner, 1998, cited in Harvey, 2010) in US where bicycling is a good option in allowable weather. But in the developing countries like Bangladesh, where the cities are too compacted, bicycling is not a very safe option. Using EVs as a mode of public transportation can assist in reduction of GHGs as well as can meet the demand of transporting more people at a time from one place to another. From various analytical findings, it is found that energy demand and emissions can be reduced by taking on suitable policy intervention (Solaymani et al., 2015). Policy interventions, in China and Korea, like fuel tax, controlling private vehicles etc. help to reduce GHGs emission in those countries (Van, 2009 and Yan, 2009). Introducing public transportation can possibly minimize carbon emission but the quality of the public transportation should be improved (Almselati et al., 2011). Above studies show that introducing public

transportation cannot reduce the carbon emission alone. Hybrid Electric Vehicle (HEV) and ALL Electric Vehicle (AEV) are two of the categories of electric powered vehicle. Modern HEV was first introduced by Toyota named as TOYOTA PRIUS in 1997 which was actually gasoline-electric hybrids. (Harvey, 2010) The current scenario because of GHG emissions is so worse that even overnight vanishing of all the GHGs cannot stop the rise of Earths average temperature for few hundreds of years (Solomon et al., 2009). The GHGs emissions must be minimize to 50% within 2050 which is now globally concerned unanimously. The author also mentioned the sectors as work, transport, city planning etc. Before 2020, EU has taken challenge to reduce GHGs emissions almost 30% and they also target to attain through the use of 20% of renewable energy and energy efficiency by that time. European Strategic Energy Technology (SET) plan has been introduced by EU to fight against climate change in Europe (Maria, 2012). Maria also added that the investment on research and innovation will be boosted in Europe to establish the SET.

1.2 Problem Statement:

Carbon dioxide emission can be added as a criterion among the various criterions such as cost, time, comfort, safety, convenience, on which a trip is assessed. Criterions like cost, time, comfort, safety, convenience, on which a trip is assessed. Rickshaw, CNG, Truck, Bus and Minibus, Imported private car, Motorcycle, Covered Van etc. vehicles are being used legally in Bangladesh. To introduce a new mode of transportation in Dhaka city, a method is required to evaluate the competitiveness of the mode. Methods from the field of business in comparing various products i.e. SWOT can be used. But SWOT analysis does not consider environmental impacts. sSWOT, DPSIR, PESTLE are some other methods which includes environmental dimension to evaluate the competitiveness. But all these methods will produce a qualitative framework. A quantitative method is also required to get the best result. AHP, ANP, TOPSIS etc. can be used as a quantitative method. Again these methods need a qualitative framework. In this case, PESTLE will be used as a qualitative method and AHP & TOPSIS will be used as a quantitative method.

From the PESTLE analysis the various external political, economic, social, technological, legal and environmental factors can be identified. Formulating the skeleton from the PESTLE, then TOPSIS+AHP will be used for evaluation of the best mode.

1.3 Purpose and Objectives

The purpose of this research is to develop a framework for the developing countries to evaluate the competitiveness of a new mode of transport keeping environment as a factor among the determinants of competitiveness.

The objectives are to calculate CO_2 emission by varying competing modes which are EV, Rickshaw & Leguna, to compare the competitiveness of available modes in the lights of safety, comfort, cost, travel time from demand perspective and to present PESTLE+AHP+TOPSIS as a method to evaluate competing modes.

1.4 Scope

The main scope of this study is to find the best competitive mode of public transportation in Dhaka city. The study area is going to cover three prime location of Dhaka city.

1.5 Limitations

This kind of analysis requires huge data and information. But the criterions and the alternatives in the analysis are limited here. Though the outcome will not be accurate, the methods used here will create a framework to identify the best choice of mode.

CHAPTER 2
LITERATURE REVIEW

2.0 General

This chapter provides a self-contained summary of all the major concepts and developments needed to be known for understanding the state of the art of this thesis topic.

2.1 Climate change and its causes

The earth is warming undoubtedly. Many scientists and researchers have already warned about the situation. Global climate change has become the number one issue nowadays. Natural reasons behind warming have been beat by the human activities. Even the ecosystem has already been breached by the effects of climate change. Impacts are crucial. More and more gases are being released every day in the open air. Time is running out to take any action against global warming. (Raman et el., 2012). It must be a real hard combat to stop warming for us. Clearly we have to stop emitting greenhouse gases in every way possible. But it will be a hard job to stop emitting gases as we are addicted to energy nowadays. And we cannot survive without energy. To produce this huge amount of energy, we have no other option than using fossil fuel, coal. At first, we need an alternative way to find another source of energy. Again this search for a solution may take extensive time and the whole situation may undergo beyond our control. (Ming et el., 1014). Climate change has become a global issue not only because of its natural impact but also for its effects on political, economic and social stability. The developing and the under developed countries are enduring its worst impacts. According to the World Bank 84 developing countries will be directly or indirectly affected because of only one meter sea level rise due to global warming. Global warming is also causing increase in natural disaster in last 10 years alarmingly. Many people have become homeless and displaced to another place because of various natural disasters. Being in the

tropical region, Bangladesh is also facing multifarious natural calamity due to climate change. Bangladesh is one of the most densely populated countries in the world. It has also become one of the most vulnerable countries to climate change. Though Bangladesh is not an energy addict country, it will face climate change impacts because of temperature rise by 2030. The countries agricultural sector and most importantly the water resource sector are greatly being affected creating occupational hazard. Water resource management is getting harder day by day. (Mahmood, 2012)

Greenhouse gas emission is the main reason behind the climate change. Among all the sectors, transportation sector alone shares 19.2% of carbon emission in the atmosphere. Other sectors are land use, power, agriculture, industry, etc. The impacts can be reduced up to 4% introducing adequate and effective measures. (Abraham, 2012) As transportation sector shares a major portion of carbon emission, reducing carbon emission from this sector has also become a primary concern. This reduction in emission can be obtained in various ways. In Europe planning and implementation of diverse effective measures has already begun. They have set the priority to divert people to use less carbon emitting modes of traffic. (Nocera, 2011)

2.2 Electrifying transportation

Development in electric vehicle as a transportation mode can abate this climate change issue. Though electric vehicle is not a new thing to introduce, it has been popular in recent years. Many countries have developed new policies to use electrifying transportation. Electric vehicles are considered as a promising technology not only in terms of environmental issues but also economic benefits. Surprisingly electric powered vehicle was very popular after the invention of electric motor in 18th century. In that period, electric vehicle was preferred over fuel powered vehicle because of lack of fuel resources. New York City first introduced an electric taxi commercially which was powered by a DC motor and rechargeable battery in 1897. But after the invention of fuel powered vehicle, electric vehicle lost its appeal. (Yong et el, 2015)

Lebanon is one of those countries which are facing the scarcity of fossil fuel to run their existing transportation system. The increase in daily passenger trips and the increase in car ownership have pushed the country to change the transportation pattern. As an effective solution, Lebanon is interested in electrification of conventional transportation modes. Public authorities and other stakeholders also get interested in this regard. The logic behind electrification of existing modes is mainly to solve the energy issue which also includes environmental issues. To reduce the consumption of extra fuel, adaptive solution may be proper use of Stop and Start sign which would change driving pattern. (Mansour et el, 2011)

2.3 Comparing methods

Various organizations are using various business strategies to analyse the impacts of various factors and to modify their present condition. There are many methods that can assume the likely impacts and opportunities to change the existing situation. SWOT, DPSIR, TOPSIS, AHP, ANP are some of the methods. These strategic methods help an organization to analyse the external environment, assessing the internal capabilities and finally to determine the strategies needed to implement.

SWOT is a popular business strategy which implies to Strength, Weakness, Opportunities and Threats. It helps to determine the strengths and weaknesses of an organization as well as the opportunities and the threats an organization may face. It is a qualitative method to determine the best way to achieve future growth. SWOT analysis does not have any particular rules or method to evaluate as the strengths, weaknesses, opportunities and threats for different companies will be different. It actually can be used as a guide for the organization and often considered as the first step of strategy analysis. The important stakeholders and other representatives work together to perform the SWOT analysis so that all the important factors come out. The process goes through brainstorming and discussing briefly to identify as many factors as possible. (Team FME)

DPSIR is a recommended process to develop a strategy for Integrated Environmental Assessment by European Environmental Agency (EEA). It distinguishes driving forces, pressures, states, impacts and responses. Driving force is the primary needs for an individual which may include population, transport, power plants, industry etc. Driving forces create pressure on the environment leading to human activities which may include production of waste, noise, hazard, vibration, radiation etc. State links physical, chemical and biological conditions of the environment. The changes in state determine the impacts on the environment. (Kristensen, 2004)

PESTLE is another qualitative method to identify the external factors which have impacts on the operation of an organization. The organizations do not have any control over these factors. PESTLE analysis includes Political, Economic, Social, Technological, Legal and Environmental factors. If a company or organization has a plan to enter into a new market, PESTLE analysis will assist to evaluate the current condition of the market. There are some common variations of PESTLE which are ETPS, STEP, STEEPLE, PEST, STEPE, STEEPLED. (Team FME) PESTLE cannot be applied to measure the quantitative dimensions which are the first problem of using this method. Secondly, the factors are measured by brainstorming and independently. So some factors may have great impact while other important factors have limited impact for the organization. (Yuksel, 2012)

AHP implies to Analytic Hierarchy Process which was developed by Thomas L. Saaty in early 1970's. It is a quantitative multi-criteria decision making approach. It assists complex decision making by using a set of pairwise comparison matrix. It also can be used to determine probable solution for real life cases. It determines the relative importance and gives a ranking to the alternatives. It evaluates the importance based on some criterions. (Triantaphyllou, 1995)

TOPSIS is another simple multi-criteria decision making method which was first introduced by Yoon and Hwang. It includes both qualitative and quantitative framework to evaluate the relative importance. It takes into account all kinds of subjective and objective criteria. It is an easy and straight forward process. (Bhutia, 2012)

Chapter 3

Methodology

3.1 Introduction

A series of task have been performed to fulfil the research needs and stated objectives. Firstly the competing modes have been selected. Then the factors affecting the modes have been determined by using PESTLE method. Finally, AHP+TOPSIS method gives the output from which the ranking have been determined. The overall work flow is shown below:
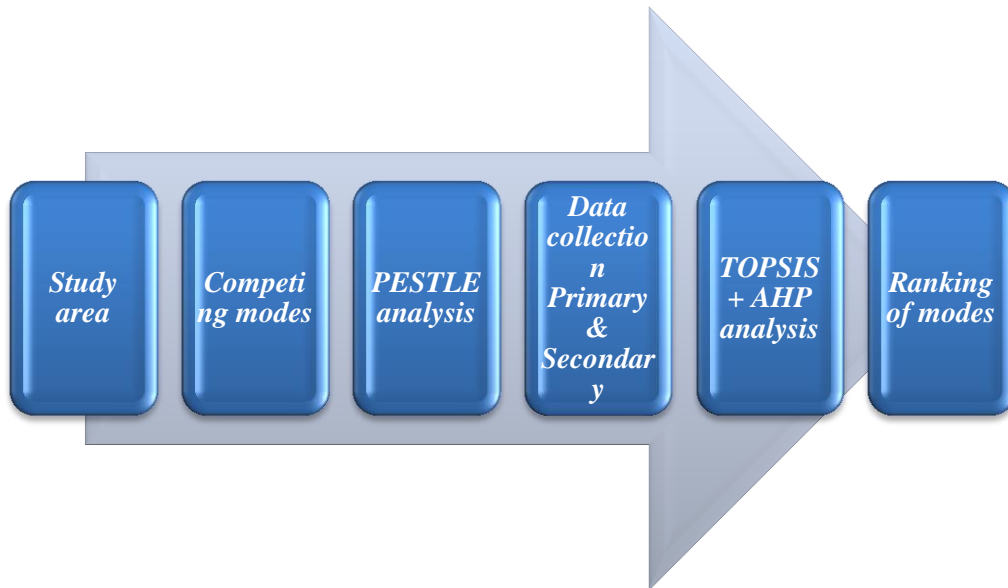
Figure 3.1: Overall workflow of the methodology

3.2 Study Area and the Data

To achieve the purpose of the study, a suitable study area must be selected. Eco-friendly bikes are mainly being used in local areas of Dhaka city as it is not allowed to wend in the main roads. Three different locations have been selected for the research. Various

modes are being used in these three locations to facilitate the public transportation. Auto rickshaw is already being used in Ajampur to Uttarkhan area and Khilgaon to Goran area. Rickshaw uses is common in three different areas. Leguna is available in Boardbazar to Patagur area where Auto Rickshaw is not being used. These areas are highly populated and have the most trip generation of the competing modes. So the data collected from these three areas can be used as a model data to evaluate the competitiveness of Electric Rickshaw or Auto Rickshaw.
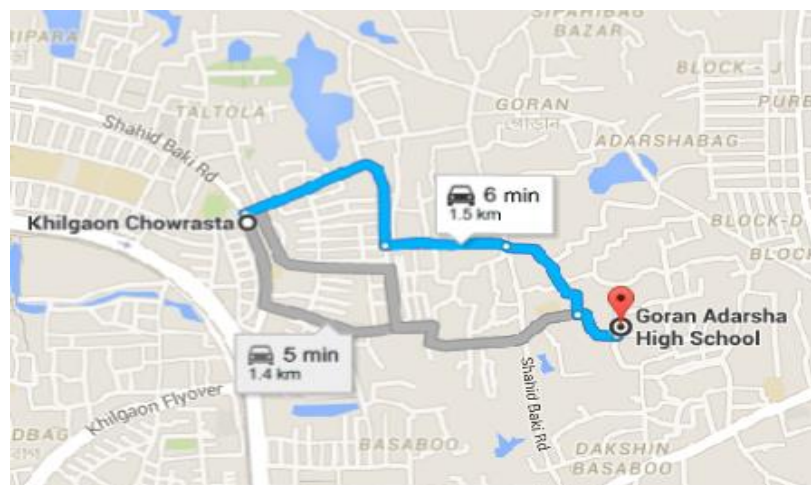
(a)
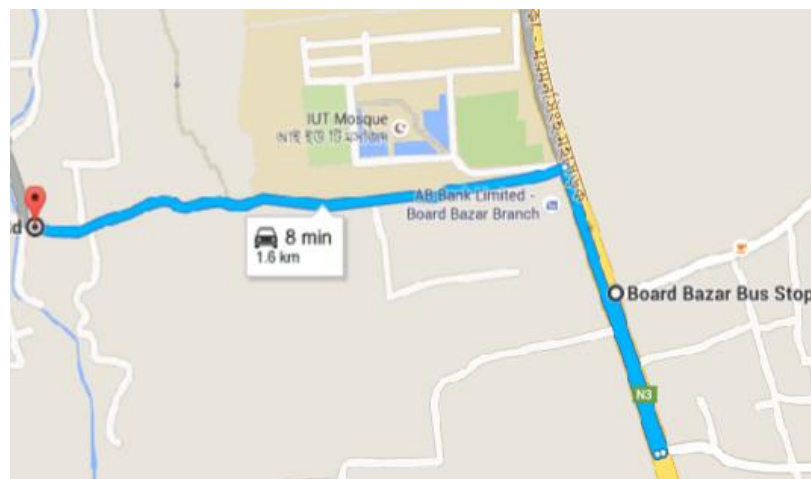
(b)
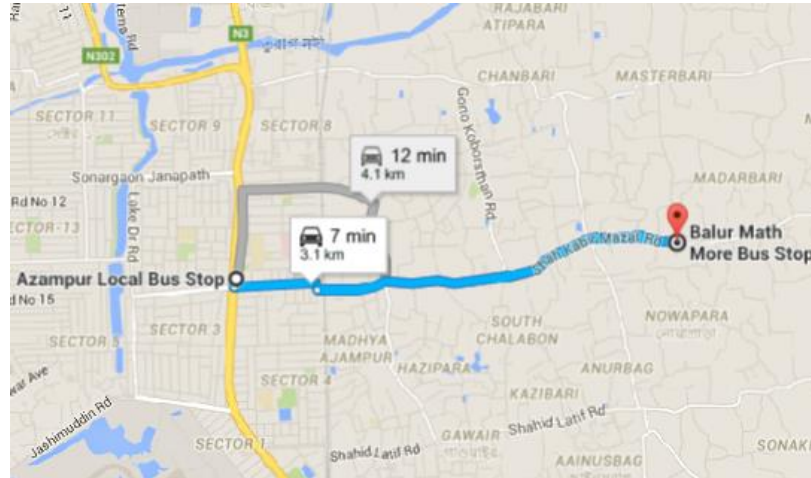
(c)

Figure 3.2: Study areas; (a) Khilgaon Chowrasta to Goran Adarsha School; (b) Boardbazar Bus Stop toPatagur; (c) Ajampur Bus Stop to Balur Math More Bus Stop

3.3 Competing Modes

Three different public transportation modes are selected to evaluate the study.

Eco-friendly bikes, which are commonly known as Auto Rickshaw or Tomtom or Battery in Bangladesh, are being used as a public transportation mode in various locations of Dhaka city nowadays. It has become a popular mode of transportation in local areas to travel short distances. It is a light weight three wheeled bike, driven by six or seven small batteries, which can accommodate up to six passengers excluding the driver.

Rickshaw is a three wheeled vehicle without any motor and driven by a puller, who is commonly known as rickshaw puller. It generally may convey two persons but in some cases it can carry up to four persons.

Leguna is actually the modified version of small microbus. It is driven by a diesel engine. It can carry up to fourteen passengers at a time.

Figure 3.3: Rickshaw (top left), Leguna (top right) and Electric Rickshaw (bottom left)

3.4 Comparing Methods

Three methods have been applied to define the competitiveness of different modes. Initially, PESTLE method has been applied to determine the factors affecting the modes of transportation and to produce a qualitative framework. TOPSIS analysis needs an AHP

framework to precede the analysis. So an AHP framework is also developed from which the Weighted Normalized Value is determined.

3.4.1 PESTLE Method

PESTLE analysis harvests a qualitative framework to analyses and monitors various external factors including environmental components that have an impact on the organization. This method is selected to produce a layout of elements having impact on the competing modes.

PESTLE analysis consists of the following:

- Political
- Economic
- Social
- Technological
- Legal
- Environmental

The steps that are followed to perform a PESTLE analysis are noted bellow:

- Brainstorm and list key issues
- Broadly identify the implications of each issue
- Rate its relative importance (e.g. critical, extensive important, significant, moderate, or insignificant)
- Rate the likelihood of it occurring
- Briefly consider the implications if the issue did occur

To explore the external environment several questions are asked and further discussed. These are the types of questions asked for the study:

- What are the leading political factors?
- What are the important economic factors?
- What cultural aspects are most important?

➢ What technological innovations are likely to be occurred?

➢ What contemporary and forthcoming regulations may affect the mode of transportation?

➢ What are the environmental elements?

.

3.4.2 TOPSIS Method

TOPSIS method is used to determine the closest relative solution. It is a goal based approach to find the ideal alternative. General TOPSIS process is described below:

Step1:

Construct a decision matrix. The structure of the matrix can be expressed as follows:

$$D_m = \begin{pmatrix} x_{11} & x_{12} & x_{13} \\ x_{21} & x_{22} & x_{23} \\ \vdots & \vdots & \vdots \\ x_{i1} & x_{i2} & x_{ij} \end{pmatrix} \quad \ldots \quad \ldots (1)$$

Where, x_{ij}= the numerical value of ith alternative with respect to j^{th} criteria

Step 2:

Normalize the decision matrix D_m which is denoted as D_N.

$$D_N = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{n} x_{ij}^2}} \quad \ldots \quad \ldots (2)$$

Step 3:

Construct the weighted normalized decision matrix -Assume we have a set of weights for each criterion w_j for j = 1…n. -Multiply each column of the normalized decision matrix by its associated weight. -An element of the new matrix is:

$$D_{ij} = w_j D_N \quad \ldots \quad \ldots (3)$$

Step 4:

Determine the positive ideal P^+ and negative ideal solutions P^-

Step 5:

Calculate the separation measures for each alternative

-The separation from the ideal alternative is:

$$S_i^+ = [\Sigma_j(v_j^+ - D_{ij})^2]^{1/2} \quad \ldots \quad \ldots (4)$$

Where i= 1...m

-Similarly, the separation from the negative ideal alternative is:

$$S_i^- = [\Sigma_j(v_j^- - D_{ij})^2]^{1/2} \quad \ldots \quad \ldots (5)$$

Where i= 1...m

Step 6:

Calculate the relative closeness to the ideal solution RC

$$RC = \frac{S_i^+}{(S_i^+ + S_i^-)} \quad \ldots \quad \ldots (6)$$

3.4.3 AHP Method

AHP is a popular decision making method which implies to Analytic Hierarchy Process. AHP is needed in this study to formulate the decision matrix required in the very first step of TOPSIS analysis.

Simple process for AHP analysis is listed below:

- ➢ List the overall goal, criteria and decision alternatives
- ➢ Develop a pairwise comparison matrix
- ➢ Develop a normalized matrix

➢ Develop the matrix vector

➢ Rank the preferred criteria

To fabricate the comparison matrices Table 3.1 is preferred by many individuals and groups.

Table 3.1: Scale of Importance used in AHP

Importance Scale	Numeric Value
Extreme	9
Very strong	7
Strong	5
Moderate	3
Equal	1

CHAPTER 4
RESULTS AND ANALYSIS

4.1 Introduction

The results acquired through the previously outlined methodologies are presented in this chapter. In order to evaluate the competitiveness of the public transportation modes, comparison between the modes are performed by using three popular multi-criteria decisions making methods named PESTLE, AHP and TOPSIS. The steps noted below are followed to complete the process:

> ➢ PESTLE analysis
> ➢ Questionnaire preparation
> ➢ Surveying
> ➢ Collection of other data
> ➢ Determination of weighted normalized value using AHP
> ➢ Final calculation using TOPSIS
> ➢ Ranking

4.2 PESTLE Analysis

Using the PESTLE analysis method, a structure of affecting impacts on the competitiveness of the modes has been developed. The structure is shown in Figure 4.1.
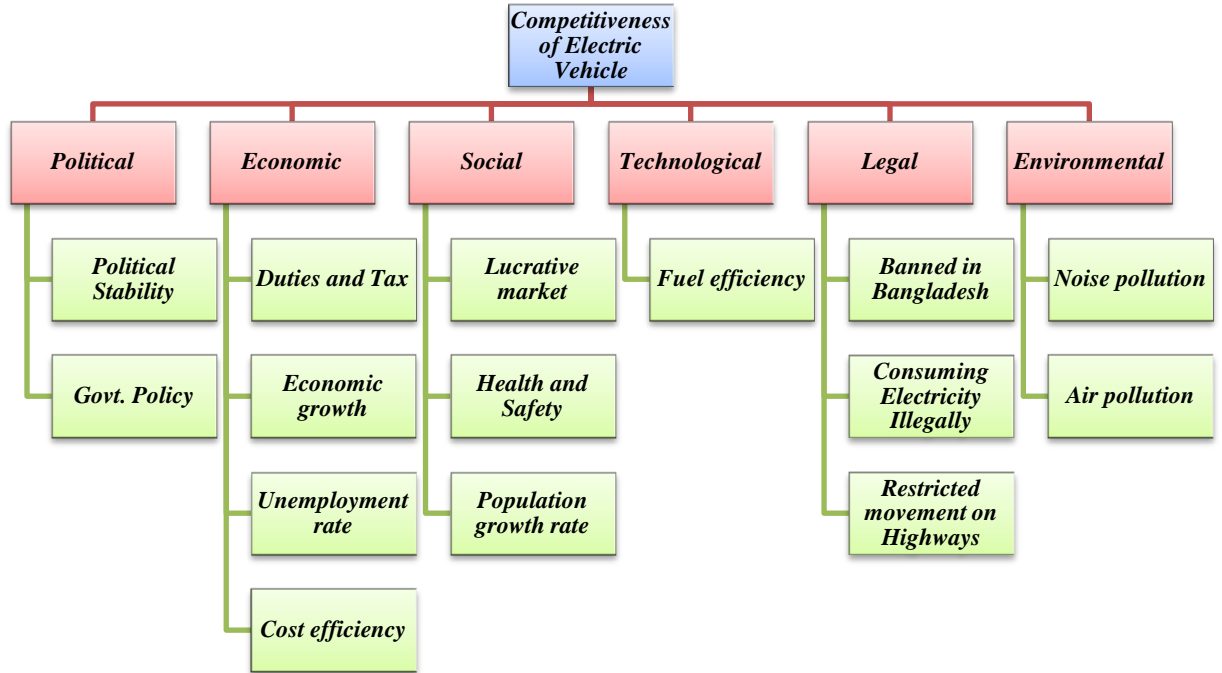
Figure 4.1: Result of PESTLE analysis

Each of the factors determined here is mainly based on brainstorming. Convenient movement of any public vehicle greatly depends on the political stability of the area. Public transportation service organizations' are losing a huge percentage of benefit every year only because of various political protests as public vehicles have become the primary target for the protestors. Again existing policies, which are implemented by the authority of road and transportation, may be altered because of political pressure.

Economic factors include duties and taxes, economic growth, unemployment rate and cost efficiency. Duties and taxes vary for different vehicles. Nationally around 60 lakh people are engaged with Rickshaw at present. Though there is no exact statistics of how many people are associated with Leguna and Electric Rickshaw, the number is not negligible. Cost is one of the most important criteria for a successful public transportation mode.

The company which is providing public transportation obviously look for a lucrative market so that they can get their invested money back. But the most important criterion for the people is the health and safety issue. If people feel that the vehicle is not safe, they will not be interested to use that mode of transportation. With the increase in population, the pressure is rising on the public vehicle. So it must be taken under consideration for introduction of any public vehicle.

Fuel efficiency is a very important factor for a public transport. It can save you money, reduces climate change and oil dependency, as well as increases energy sustainability. This factor is included in the technological sector.

Electric Rickshaw is currently banned in Bangladesh as it has no legal permission on road. Rickshaw and Leguna are also banned in many areas including highways as it is considered risky. But these vehicles are moving on the road due to public demand. In many areas government has restricted the movement of these vehicles.

At the moment, environmental issues regarding use of vehicles have become a major concern as transportation sector shares a huge percentage of carbon emission in the atmosphere. Though Electric Rickshaw is called eco-friendly, the electricity consumed by an Electric Rickshaw is still being produced in old fashioned way in Bangladesh.

4.3 Questionnaire Preparation and Surveying

A sample questionnaire has been prepared for public survey which is available in Appendix A. The relative importance of the modes for each of the factors obtained through PESTLE analysis is determined based on the questionnaire survey. Another questionnaire has been prepared for collecting other missing data which is available in Appendix B.

Surveying was done by a team lead by the author himself in three different locations. Some key points to be remembered during pubic survey:

➢ Design the survey questionnaire based on what information is needed

➢ Who to survey

➢ When to survey

➢ How many people to survey

➢ Safety issues

➢ Collecting comments

Around 100 people have been interviewed during the survey using the questionnaire prepared. After the interview the data have been stored and later than all the data from three locations have been counted together. Table 4.1 shows the data collected from the survey:

Table 4.1: Collected data from public interview

Question number	Options chosen by the interviewee			
	A or Rickshaw*	B or Electric Rickshaw*	C or Leguna*	d
1	1	16	58	-
2	16*	39*	21*	-
3	42*	31*	3*	-
4	36*	14*	26*	-
5	11*	4*	5*	-
6	26*	31*	19*	-
7	25	40	16	4
8	10	20	9	2
9	8	10	22	1
10	32	21	22	-

4.4 Determination of Weighted Normalized Value Using AHP

Using AHP method weighted normalized values are detected which will further be used in TOPSIS calculation. Table 4.2 shows the weighted normalized value obtained from the AHP analysis. Detailed procedure is given in Appendix C.

Table 4.2: Weighted normalized value of Electric Rickshaw, Rickshaw and Leguna for different factors

	Electric Rickshaw	*Rickshaw*	*Leguna*
Govt. policy	*0.20*	*0.33*	*0.47*
Political stability	*0.33*	*0.20*	*0.47*
Duties ad taxes	*0.24*	*0.33*	*0.43*
Economic growth	*0.29*	*0.18*	*0.53*
Unemployment rate	*0.18*	*0.53*	*0.29*
Cost efficiency	*0.18*	*0.53*	*0.29*
Lucrative market	*0.21*	*0.16*	*0.63*
Health and safety	*0.20*	*0.33*	*0.47*
Population growth rate	*0.27*	*0.09*	*0.64*
Fuel efficiency	*0.33*	*0.43*	*0.24*
Banned in Bangladesh	*0.43*	*0.33*	*0.24*
Consuming electricity illegally	*0.82*	*0.09*	*0.09*
Restricted movement	*0.47*	*0.33*	*0.20*
Noise pollution	*0.29*	*0.18*	*0.53*
Air pollution	*0.27*	*0.09*	*0.64*

4.5 Final Calculation and Ranking Using TOPSIS

TOPSIS analysis is performed to determine the relative closeness of the competing modes from which the ranking is set. The values from Table 4.2 are used in the first step. Then the steps are followed according to the methodology described in Chapter 3.

Detailed process is attached in Appendix C. Table 4.3 shows the final result and ranking of the modes.

Table 4.3: Final ranking of the competing modes

Competing Modes	The Relative Closeness Value	Ranking
Electric Rickshaw	0.47	2
Rickshaw	0.31	3
Leguna	0.57	1

Final result shows that Leguna obtained first position, Electric Rickshaw gained second position and Rickshaw obtained the last position. This result indicates that Leguna prevails in the competitiveness among the three modes of transportation.

CHAPTER 5
CONCLUTIONS

5.0 General

This study evaluates the competitiveness of the Electric Rickshaw in the roads of Dhaka city. This chapter summarizes the key findings based on the pre-set objectives.

5.1 Result Discussion

The relative closeness value of Electric rickshaw, Rickshaw and Leguna are 0.47, 0.31 and 0.57 respectively. The ranking depends on these values. The maximum value gets the highest ranking. In this study Leguna gets the highest value of relative closeness which determines that Leguna is the best choice of mode among the three modes. The value can be altered if the impacts of any factor changes.

5.2 Findings from Survey

Due to lack of time and manpower, only 100 people have been interviewed during survey. Though it does not give a full picture of the situation, a simple framework can be produced from the survey. Some key findings from the survey are noted down:

➢ In the term of health and safety most people have chosen Leguna. As Leguna has a well and strong body shape, people think it's safer than the other comparing modes.

➢ Unlike Leguna, Electric Rickshaw has a very weak body structure which is why most of people avoid it taking safety issue under consideration.

➢ In comparing between the three modes Leguna has been cheaper. It also takes less time to reach the destination as it is faster than Electric Rickshaw and Rickshaw. So in the matter of time and money Leguna is complete solution for most of the passengers at present.

➢ Most of the people do not know about the benefits of Electric vehicle. In fact some people do not even know what an electric vehicle means. They just use it because they have to.

➢ Electric Rickshaw is considered more risky in case of an accident though more people have faced casualty in Rickshaw.

➢ Political instability effects mainly Leguna and Electric Rickshaw. But in the time of political protest Rickshaw becomes the only available transportation for the fare payers.

5.3 Comments from the interviewee

Throughout the interview some facts have been come up during the conversation. Some vital points are listed below:

➢ Electric Rickshaw is thought of as risky not only because of its body shape. Some people think that it is the road condition which is another major reason for causing accidents.

➢ Rickshaw can take passengers to their exact destination. But Leguna and Electric Rickshaw maintain their own route and people have to travel as per the routes selected.

➢ Electric Rickshaw has been promoted by some intellectuals as it is environmental friendly and new technology. Most of the people would embrace a new technology if it costs less time and money.

5.4 Limitations and Future Scope

This study shows that Leguna should be provided for public transportation as it is accepted more widely. But introduction of Electric vehicle in Bangladesh would draw a dramatic change in transportation. The only existing and used electric vehicle in public transportation sector of Bangladesh is Electric Rickshaw which cannot fulfil all the demand of public transportation facility. As this study has already created a framework, it can be further stretched to find out what should be changed to introduce electric vehicle in the roads of Bangladesh.

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Appendix-A

Appendix

The questionnaires that have been used to conduct public interview is given below. Red marked options have been chosen by the interviewees.

Sample 1

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Leguna
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
   a) Yes   b) May be   c) No

Comment: _____

Sample 2

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 3

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 4

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 5

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
    a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
    (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
    (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
    (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
    (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 6

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Rickshaw
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 7

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Rickshaw
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 8

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 9

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 10

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 11

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: Need to change the road infrastructure

Appendix

Sample 12

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Rickshaw
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 13

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 14

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Electric rickshaw
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 15

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 16

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 17

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 18

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 19

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 20

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 21

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

<u>Sample 22</u>

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 23

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 24

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
    a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
    (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
    (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
    (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
    (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 25

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 26

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Electric Rickshaw
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 27

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
    a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
    (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
    (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
    (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
      LEguna
6. In case of an accident which one is more risky if you are in that vehicle?
    (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 28

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Leguna
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 29

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
     Leguna
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

<u>Sample 30</u>

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 31

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
     Rickshaw
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 32

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 33

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Leguna
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 34

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 35

Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 36

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

<u>Sample 37</u>

\Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 38

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 39

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Rickshaw vs Truck
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 40

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

<u>Sample 41</u>

Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Rickshaw vs Bus
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 42

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 43

Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Rickshaw vs Bus
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 44

Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 45

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 46

Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 47

Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 48

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

<u>Sample 49</u>

Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 50

Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
    a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
    (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
    (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
    (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
    (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

<u>Sample 51</u>

Gender: Male   Female   Profession: Private Service   _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Car vs Rickshaw
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 52

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 53

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
    a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
    (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
    (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
    (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
    Electric Rickshaw vs Leguna
6. In case of an accident which one is more risky if you are in that vehicle?
    (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 54

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
    a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
    (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
    (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
    (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
    (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 55

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
    a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
    (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
    (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
    (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
    (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 56

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 57

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Sample 58

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

<u>Sample 59</u>

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
   Rickshaw vs EV
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 60

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

<u>Sample 61</u>

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week   b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes b) May be   c) No

Comment: _____

Appendix

Sample 62

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
    a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
    (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
    (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
    (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
    (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 63

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 64

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 65

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 66

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 67

Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
    a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
    (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
    (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
    (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
    Rickshaw vs Bus
6. In case of an accident which one is more risky if you are in that vehicle?
    (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 68

Gender: Male   Female   Profession: _____

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 69

Gender: Male   Female   Profession: _____   _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Sample 70

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 71

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 72

Gender: Male   Female   Profession: Private Service

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 73

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Sample 74

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
    a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
    (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
    (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
    (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
    (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
    a) Once in a week   b) More than once in a week
    c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 75

Gender: Male   Female   Profession: _____   _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?

6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix

Sample 76

Gender: Male   Female   Profession: _____ _

Age   :   15-25yrs   25-40yrs   Over 40yrs

1. How often a political protest does happen here?
   a) Once in a week b) Once in a month   c) Once in a year
2. Which one is more affordable to you?
   (Rickshaw/Electric Rickshaw/Leguna)
3. Which one is rapidly available?
   (Rickshaw/Electric Rickshaw/Leguna)
4. Which mode you think is safer?
   (Rickshaw/Electric Rickshaw/Leguna)
5. Did you face any accident, if any, on which mode?
     Rickshaw
6. In case of an accident which one is more risky if you are in that vehicle?
   (Rickshaw/Electric Rickshaw/Leguna)
7. How frequently does accident happen in Electric Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
8. How frequently does accident happen in Rickshaw?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
9. How frequently does accident happen in Leguna?
   a) Once in a week   b) More than once in a week
   c) Once in a month   d) More than once in a month
10. Do you prefer a new technology/mode in this road such as electric rickshaw?
    a) Yes   b) May be   c) No

Comment: _____

Appendix-B

Questionnaire for collecting other data is noted down:

1. How much it cost to travel from Boardbazar Bus Stop to Patagur by Rickshaw?
   50 BDT
2. How much it cost to travel from Boardbazar Bus Stop to Patagur by Leguna?
   15 BDT
3. How much it cost to travel from Boardbazar Bus Stop to Patagur by Electric Rickshaw?
   20 BDT
4. Does an owner get back the invested money per day?
   Yes
5. How much is the price of a single?
   Rickshaw- 25,000 BDT
   Electric Rickshaw- 1,50,000 BDT
   Leguna- 5,50,000 BDT
6. Do the manufacturers/importers know the Govt. rules/policies?
   a)Excellent   b)Moderate   c)Unsatisfactory
   Ans.: Unsatisfactory
7. Do the rules are being obeyed by the importers/ manufacturers?
   a)Excellent   b)Moderate   c)Unsatisfactory
   Ans.: Unsatisfactory
8. How much is the profit?
   Rickshaw- 300BDT/Day
   Electric Rickshaw- 400 BDT/Day
   Leguna- 1200 BDT/Day
9. How many people fit in an Electric Rickshaw?
   6 Person
10. How many people fit in a Rickshaw?
    2 Person
11. How many people fit in a Leguna?
    14 Person
12. How much electricity is an electric rickshaw consuming for a full charge of battery?
    7000 W
13. How much time it takes to complete a full charge of an electric rickshaw?
    3-4 hours for new vehicle
14. How much fuel does a Leguna consume per day?
    30 unit
15. What is the source of the electricity?
    Directly consuming from the main supplier line

Appendix-C

Appendix

Detailed TOPSIS calculation is shown here which has been done using Microsoft Excel.

Table A1: Shows the weighted decision matrix

	Govt. Policy	Political stability	Duties & Tax	Economic growth	Unemployment rate	Cost efficiency	Lucrative market	Health & Safety
Electric Vehicle	0.20	0.33	0.24	0.29	0.18	0.18	0.21	0.20
Rickshaw	0.33	0.20	0.33	0.18	0.53	0.53	0.16	0.33
Leguna	0.47	0.47	0.43	0.53	0.29	0.29	0.63	0.47

Table A1 (contd.):

	Population growth rate	Fuel efficiency	Banned in Bangladesh	Electricity consumption	Restricted movement	Noise pollution	Air pollution
Electric Vehicle	0.27	0.33	0.43	0.82	0.47	0.29	0.27
Rickshaw	0.06	0.43	0.33	0.09	0.33	0.18	0.09
Leguna	0.64	0.24	0.24	0.09	0.20	0.53	0.64

Table A2: Shows the positive ideal solution and negative ideal solution

	Govt. Policy	Political stability	Duties & Tax	Economic growth	Unemployment rate	Cost efficiency	Lucrative market	Health & Safety
A+	0.47	0.47	0.43	0.53	0.53	0.53	0.63	0.47
A-	0.20	0.20	0.24	0.18	0.18	0.18	0.16	0.20

Table A2 (contd.):

	Population growth rate	Fuel efficiency	Banned in Bangladesh	Electricity consumption	Restricted movement	Noise pollution	Air pollution
A+	0.64	0.43	0.43	0.82	0.47	0.53	0.64
A-	0.06	0.24	0.24	0.09	0.20	0.18	0.09

Table A3: Separation measure for A+ (step-1)

	Govt. Policy	Political stability	Duties & Tax	Economic growth	Unemployment rate	Cost efficiency	Lucrative market	Health & Safety
Electric Vehicle	-0.27	-0.13	-0.19	-0.24	-0.35	-0.35	-0.42	-0.27
Rickshaw	-0.13	-0.27	-0.10	-0.35	0.00	0.00	-0.47	-0.13
Leguna	0.00	0.00	0.00	0.00	-0.24	-0.24	0.00	0.00

Table A3 (contd.):

	Population growth rate	Fuel efficiency	Banned in Bangladesh	Electricity consumption	Restricted movement	Noise pollution	Air pollution
Electric Vehicle	-0.37	-0.10	0.00	0.00	0.00	-0.24	-0.36
Rickshaw	-0.58	0.00	-0.10	-0.73	-0.13	-0.35	-0.55
Leguna	0.00	-0.19	-0.19	-0.73	-0.27	0.00	0.00

Table A4: Separation measure for A+(step 2)

	Govt. Policy	Political stability	Duties & Tax	Economic growth	Unemployment rate	Cost efficiency	Lucrative market	Health & Safety
Electric Vehicle	0.07	0.02	0.04	0.06	0.12	0.12	0.18	0.07
Rickshaw	0.02	0.07	0.01	0.12	0.00	0.00	0.22	0.02
Leguna	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00

Table A4 (contd.):

	Population growth rate	Fuel efficiency	Banned in Bangladesh	Electricity consumption	Restricted movement	Noise pollution	Air pollution
Electric Vehicle	0.14	0.01	0.00	0.00	0.00	0.06	0.13
Rickshaw	0.34	0.00	0.01	0.53	0.02	0.12	0.30
Leguna	0.00	0.04	0.04	0.53	0.07	0.00	0.00

Table A5: Separation measure for A+

Electric Vehicle	*1.01*
Rickshaw	1.33
Leguna	0.89

Appendix

Table A6: Separation measure for A- (step 1)

	Govt. Policy	Political stability	Duties & Tax	Economic growth	Unemployment rate	Cost efficiency	Lucrative market	Health & Safety
Electric Vehicle	0.00	0.13	0.00	0.12	0.00	0.00	0.05	0.00
Rickshaw	0.13	0.00	0.10	0.00	0.35	0.35	0.00	0.13
Leguna	0.27	0.27	0.19	0.35	0.12	0.12	0.47	0.27

Table A6 (contd.):

	Population growth rate	Fuel efficiency	Banned in Bangladesh	Electricity consumption	Restricted movement	Noise pollution	Air pollution
Electric Vehicle	0.21	0.10	0.19	0.73	0.27	0.12	0.18
Rickshaw	0.00	0.19	0.10	0.00	0.13	0.00	0.00
Leguna	0.58	0.00	0.00	0.00	0.00	0.35	0.55

Table A7: Separation measure for A- (step 2)

	Govt. Policy	Political stability	Duties & Tax	Economic growth	Unemployment rate	Cost efficiency	Lucrative market	Health & Safety
Electric Vehicle	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00
Rickshaw	0.02	0.00	0.01	0.00	0.12	0.12	0.00	0.02
Leguna	0.07	0.07	0.04	0.12	0.01	0.01	0.22	0.07

Table A7 (contd.)

	Population growth rate	Fuel efficiency	Banned in Bangladesh	Electricity consumption	Restricted movement	Noise pollution	Air pollution
Electric Vehicle	0.04	0.01	0.04	0.53	0.07	0.01	0.03
Rickshaw	0.00	0.04	0.01	0.00	0.02	0.00	0.00
Leguna	0.34	0.00	0.00	0.00	0.00	0.12	0.30

Table A8: Separation measure for A-

Electric Vehicle	0.88
Rickshaw	0.60
Leguna	1.18

Table A9: The Relative Closeness

	RC	Ranking
Electric Vehicle	0.47	2
Rickshaw	0.31	3
Leguna	0.57	1