

Motorization of Paddle Rickshaws in Bangladesh: A Socio-Economic Evaluation

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Abstract

There has been a dramatic increase in the number of motorized rickshaws in Bangladesh in recent years. The development represents an improvement over traditional paddle rickshaws in several ways, including speed, comfort, and convenience. This study aimed to examine the process of motorization of paddle rickshaws in Bangladesh and its socio-economic impacts on the rickshaw pullers. The findings revealed that the motorization of rickshaws has significantly impacted the socio-economic conditions of rickshaw pullers in Bangladesh. The motorization of rickshaws has led to an increase in their daily income and improved their working conditions. The process of motorization of rickshaws has been driven by the desire for improved financial stability and the desire to provide better services to customers. However, the motorization of rickshaws has had some negative impacts, such as the lack of safety measures in locally designed motorization, an increase in the risk of fatal accidents, and a relatively high initial cost. This study provides valuable insights into the process and impacts of the motorization of rickshaws in Bangladesh. The findings highlight the need for policy interventions to address the challenges faced by rickshaw pullers in motorizing their rickshaws while also ensuring that they reap the maximum benefits from motorization. It contributes to the growing body of research on the socio-economic impacts of motorization in developing countries and can inform policy-making aimed at improving the lives of rickshaw pullers in Bangladesh and beyond.

Key Words

Motorization of paddle rickshaw, rickshaw pulling, rickshaw pulling in Bangladesh, rechargeable battery rickshaw, rickshaw pullers in Bangladesh

1.0 INTRODUCTION

Rickshaws have historically been one of the primary modes of transportation in both Bangladesh and South Asia as a whole. Rickshaws are commonly thought to have originated in Japan. Because of the influence of Victorian phaetons, the first type of rickshaw, a *Jinrikisha*¹, was invented in Japan in 1869. The traditional rickshaw was essentially a cart-like bicycle pulled by a person. Because of this, it is known as a pulled rickshaw (Warren, 1997). The pulled rickshaw was gradually phased out and replaced by the cycle rickshaw, which relied on mechanical power rather than human force. Then the rickshaws were motorized, which further modernized this means of transportation and brought the human labor required down to an absolute minimum. The idea of a cabinet motor tricycle made for carrying loads was accepted by the Italian company "Piaggio" immediately following the end of World War II. In 1948, the first such vehicle, known as the

¹ A two-wheeled, open-topped cart that can be pulled by a single person

"Ape," entered the market (Mort, 2008). Vehicle localization is unavoidable as an urban landscape feature. The elements must interact with the geographical, cultural, economic, and other conditions of the land in order to gain access to citizens' shared memories (Rahmdel, 2015).

Though human-powered rickshaws had previously been introduced in Bangladesh, cycle rickshaws were first imported from Calcutta in 1938 by jute exporters living in Narayanganj and Netrokona (Imtiaz, 2011). Designed with brilliant, dynamic colors and embellished with colorful, lively tassels, glitter, plastic, and artwork that is one-of-a-kind and represents Bengali culture and tradition. Following the introduction of motorized rickshaws around the world, Bangladesh has also started using imported motorized auto rickshaws (Buliung et al., 2014). Electric motorized rickshaws have also been introduced in recent years. The inhumanity of rickshaw labor in Bangladesh has significantly decreased as a result of the motorization of these vehicles (Rahman, 2013). Both rickshaw pulling and its motorization have significant impacts on society and people's way of life.

BBS (Bangladesh Bureau of Statistics) (2020) reported that the informal sector employs 51.4 percent of the total national workforce or approximately 64 million people. They include rickshaw pullers, agriculture workers, construction workers, hawkers, rag pickers, transport workers, and part-time domestic workers, among others. Millions of people in Bangladesh work in the rickshaw-pulling sector, which is one of the largest sources of informal work. According to Wipperman & Sowula (2007), there are approximately two million rickshaw pullers employed throughout Bangladesh, and approximately 14% of the country's total population depends on rickshaw pulling indirectly for their livelihood (rickshaw-pullers families, manufacturers, garage owners, painters, and repairmen). In Dhaka alone, this equates to approximately 2.5 million people. Therefore, rickshaw pulling is essential to Bangladesh's socio-economic structure and employment generation, particularly for the most underprivileged people in the country (Momotaz et al., 2009).

Motorization and mechanization of rickshaws have been a continuous process since the second world war. In Bangladesh motorization of rickshaws has been in many forms and ways. Recently there have been improvisations in the motorization of rickshaws in Bangladesh. Traditional rickshaws have been motorized by simply adding rechargeable batteries and motors. This special type of motorization has changed many socio-economic aspects of rickshaw pulling in Bangladesh (Basri et al., 2014).

The broad-scale objective of this research is to assess the impacts of the motorization of cycle rickshaws in Bangladesh. The specific objectives are— (a) to analyze the process and forms of motorization of paddle rickshaws in Bangladesh and (b) to assess the socio-economic impacts of motorization of paddle rickshaws in Bangladesh;

Since the end of World War II, rickshaws have been steadily becoming more motorized and mechanized. Different types of motorized rickshaws have emerged in Bangladesh. In recent years, rickshaws in Bangladesh have been upgraded with motors. Adding rechargeable batteries and motors allowed traditional rickshaws to become motorized. The introduction of this novel form of propulsion has revolutionized the socioeconomics of rickshaw pulling in Bangladesh. There are various types of motorized rickshaws in Bangladesh. Adding motors and rechargeable batteries to classic rickshaws made them suitable for urban transportation. Though significant studies have

already been done on different aspects of rickshaw pulling, including its impact on internal migration and informal job creation, no study has been conducted on the socio-economic impacts of the motorization of traditional paddle rickshaws with rechargeable batteries and motors in Bangladesh.

The purpose of this research is to examine how and why paddle rickshaws in Bangladesh have been converted to electric power and to weigh the resulting social and economic effects. The study area covered four districts (Dhaka, Rajshahi, Pabna, and Satkhira) of Bangladesh, where the author was sent as a part of the 74th Foundation Training Course for district and village attachment as well as under the “Explore Bangladesh” program. This research included both densely populated urban areas and less populated rural ones.

Due to time and resource constraints, the researcher was unable to cover majority areas of the country. Similarly, the researcher was unable to reach a larger number of respondents for the same reasons. In addition to that, the scope of this study is restricted to the investigation of the motorization of paddle rickshaws alone, despite the fact that there is plenty of other types of motorization.

2.0 LITERATURE REVIEW

The motorization of paddle rickshaws in Bangladesh has been a topic of significant interest in recent years. This phenomenon has been studied from various perspectives, including economic, social, and environmental. In this literature review, we will examine the existing research on the motorization of paddle rickshaws in Bangladesh, with a focus on its socio-economic impacts. Gallagher (1992) wrote a classic book titled "The Rickshaws of Bangladesh" offering an in-depth analysis of the cycle-rickshaw's role in Bangladesh's transportation sector. Despite their significant contribution, rickshaws have been largely overlooked by policymakers, often viewed as inefficient and emblematic of underdevelopment. The government's stance has been to phase them out in favor of motor vehicles. However, Gallagher (1992) argued for their acceptance and integration into future urban planning. Replogle (1994) examined transportation challenges in developing countries, focusing on sustainable and equitable solutions and highlighted the importance of rickshaws as urban transport.

After surveying of 450 rickshaw users across six locations in Dhaka, Hossain and Susilo (2011) revealed that rickshaws are a primary mode of transport for commuting, social engagements, and recreational activities. They also concluded that rickshaw pullers would face increased social exclusion if rickshaws were banned. Tiwari (2014) argued that cycle rickshaws remain a crucial mode of mobility in South Asian cities, despite being marginalized by transport policies that blame them for congestion and exploitative labor conditions. Using data from previous studies, he challenged these views, demonstrating that rickshaws serve as essential feeder modes for expanding public transport networks, such as the Delhi Metro. Khan and Quaddus (2021) discussed the role of e-rickshaws in urban transportation, particularly their impact on sustainability. They highlighted that e-rickshaws are economically viable, contribute to reducing carbon emissions, and improve urban mobility.

Bangladesh is a rapidly urbanising country with an average annual urbanization rate of 5.34% since 1974. It projects that by 2050, 56% of the country's population will reside in urban areas (Roy et al., 2018). To support its urban transportation system, Bangladesh has been making massive investments in infrastructure, including the construction of expressways, metro rail lines, bridges, and railway networks (Barma et al., 2024). At the same time, policy decisions have been made to gradually phase out slow moving mode of transportation like rickshaws and discourage individual vehicles blaming them for congestion. On the other hand, motorization of rickshaws has not only reduced the physical labor required for it to a minimum; it has also added speed which made it a very convenient mode of urban transportation specially for the middle income people.

In a study by Nakshi and Debnath (2021), the authors analyzed the process and forms of motorization of paddle rickshaws in Bangladesh. They found that the process of motorization was driven by several factors, including the increasing demand for faster and more convenient transportation and the need to overcome the physical strain of pulling rickshaws by hand. The authors also noted that the most common form of motorization involved the installation of rechargeable battery kits, which can be fitted to existing rickshaws, transforming them into motorized vehicles.

A subsequent study by Mowla and Khaleda (1999) investigated the environmental impacts of the motorization of paddle rickshaws in Bangladesh. They found that motorized rickshaws have led to increased air pollution, particularly in urban areas, due to the emission of harmful pollutants from the engines of these vehicles. They also noted that the increased use of motorized rickshaws has resulted in increased noise pollution and traffic congestion in urban areas. However, they did not find any such environmental impact for motorized rickshaws through the installation of batteries. On the contrary, this type of motorization has been labeled as green transportation compared to fuel engine motorization (Majumdar et al., 2015; Nadimuthu and Victor, 2021 & Sameeullah and Chandel, 2016). However, the possible battery hazards arising from excessive and inconsiderate usage of Lithium-ion batteries is a matter of concern (Mohanty and Kotak, 2017; Kaushal, Panda and Kumar, 2020 & Khan et al., 2022)

In a more recent study by Mazumder and Roy (2018), the authors conducted a comprehensive assessment of the socio-economic impacts of the motorization of paddle rickshaws in Bangladesh. They found that motorized rickshaws have increased the daily income of rickshaw pullers and improved their working conditions. Additionally, the authors noted that motorized rickshaws have increased the speed and efficiency of transportation, making it easier for people to get around.

Given the potential consequences of motorization, it is important to understand the process by which rickshaws are motorized and the impact it has on the livelihoods of rickshaw pullers. A study by Goni and Uddin (2015) investigated the motivations of rickshaw pullers for motorizing their rickshaws. The author found that while the primary motivation was to increase income, there were also other factors, such as a desire to improve working conditions and to overcome the physical strain of pulling rickshaws by human force.

While the existing research provides a good understanding of the process of motorization of paddle rickshaws in Bangladesh, there is a need for further research in this area. In particular, there is a need for studies that examine the long-term socio-economic impacts of motorization, as well as

the impact of motorization on the environment. Additionally, there is a need for research that considers the views and experiences of rickshaw pullers themselves in order to gain a more nuanced understanding of the impact of motorization on their lives.

3.0 METHODOLOGY

This study adopted both qualitative and quantitative approaches to analyze the data and fulfill the objectives of this study. The first objective of this work is to analyze the process and forms of motorization of cycle rickshaws in Bangladesh. To fulfill this objective, both literature review and questionnaire survey of the rickshaw pullers, garage owners, and workshop operators involved in motorization were conducted. This study adopted quantitative approach using data gathered from questionnaire survey to fulfill the second objective of assessing the socio-economic impacts of motorization of paddle rickshaws in Bangladesh. There was a questionnaire survey of 86 rickshaw pullers. In addition to that 17 rickshaw pullers, 3 garage owners and 2 workshop owners were interviewed to gather qualitative data on the lives of rickshaw pullers/drivers and the process of motorization. The study area was limited to 4 districts (Dhaka, Rajshahi, Pabna and Satkhira) of Bangladesh where the researcher was sent as a part of 74th Foundation Training Course for district and village attachment as well as under “Explore Bangladesh” program. This research included both densely populated urban areas and less populated rural ones. Likert Scale (Allen and Seaman, 2007) was utilized to collect data on the items shown in the table 01. The respondents were asked to respond against a five-point likert scale (1= Strongly Disagree, 2= Disagree, 3= Neither Disagree not Agree, 4= Agree and 5= Strongly Agree)

Table 01: Questionnaire Description

Sections	Items
Section A: Demographic Information	This section includes demographic information about rickshaw pullers such as age, family size, number of school-aged children, district, gender, and marital status.
Section B: Socio-economic Condition	Consists of 7 items to measure Socio-economic Condition: I earn enough to cover basic needs of my family. My living conditions are good. Sometimes I struggle to buy food for my family. My economic condition is good. I have a decent level of education. My health condition is good. My job is decent.
Section C: Earning Capacity (After motorization)	Consists of 4 items to measure Earning Capacity: My income increased after having a motorized rickshaw. Earning is now easier with a motorized rickshaw. My living standard increased Access to nutrient food increased
Section D: Physical Labour and Health (After motorization)	Consists of 4 items to measure Physical Labour and Health: My health conditions improved. I feel less physically exhausted. I can now work longer hours. The decency of my job improved.

Section E: Safety, Risk and Price Barrier (of motorization)	Consists of 4 items to measure Safety, Risk and Price Barrier: Motorization of local rickshaws has been designed ensuring safety. Accidents did not increase due to this motorization. Price of motorized rickshaw is not a barrier to entry in this job. Risk of fatal injury is low.
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4.0 RESULT AND DISCUSSION

The analysis of data was performed using SPSS version 23 (Statistical Package for the Social Sciences). The analysis and interpretation of the data are organized by variable.

4.1 Demographic Data

4.1.1 District-Wise Distribution

This study used information from 86 rickshaw drivers in the four studied districts of Dhaka, Rajshahi, Pabna, and Satkhira. All the respondents are male and almost 92% of them are married. Table 02 shows the breakdown of the responses across the four different regions.

Table 02: District-Wise Distribution of the Respondents

District	Frequency	Percent	Valid Percent	Cumulative Percent
Dhaka	13	15.1	15.1	15.1
Pabna	20	23.3	23.3	38.4
Rajshahi	28	32.6	32.6	70.9
Satkhira	25	29.0	29.0	100.0
Total	86	100.0	100.0	

4.1.2 Age Distribution

Figure 1 shows the age distribution of the respondents. Around 46.5% respondents are 30-39 years old. The data on age distribution is centered around this range.

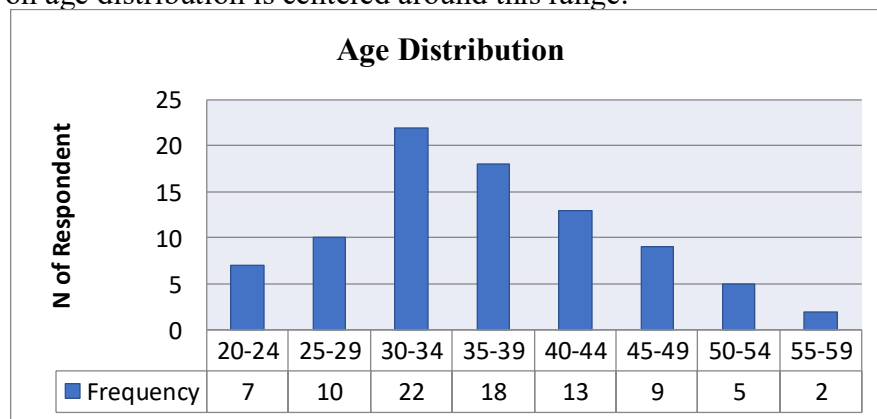


Figure 01: Age Distribution of the Respondents

4.1.3 Family Members

43.02% of the respondents have family size of 4 members, while 27.91% families consist of 5 members and 20.93% consist of 3 members. This data shows that the family size of the respondents is moderate.

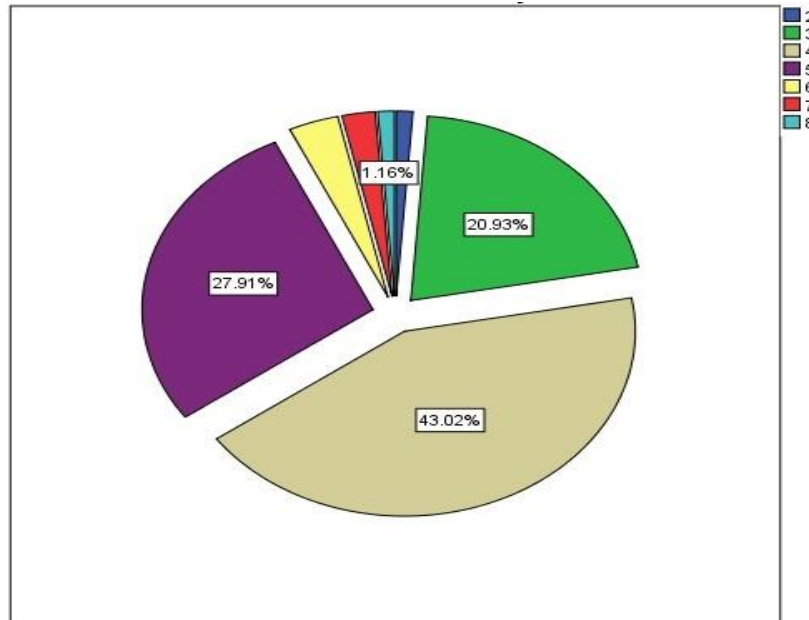


Figure 02: Family Size of the Respondents

4.1.4 School Going Children of the Respondents

Most of the respondents (77.9%) have one or two children who go to school. 15 respondents do not have any school going children either because their children are not in school going age group or because of their financial inability to send them to school.

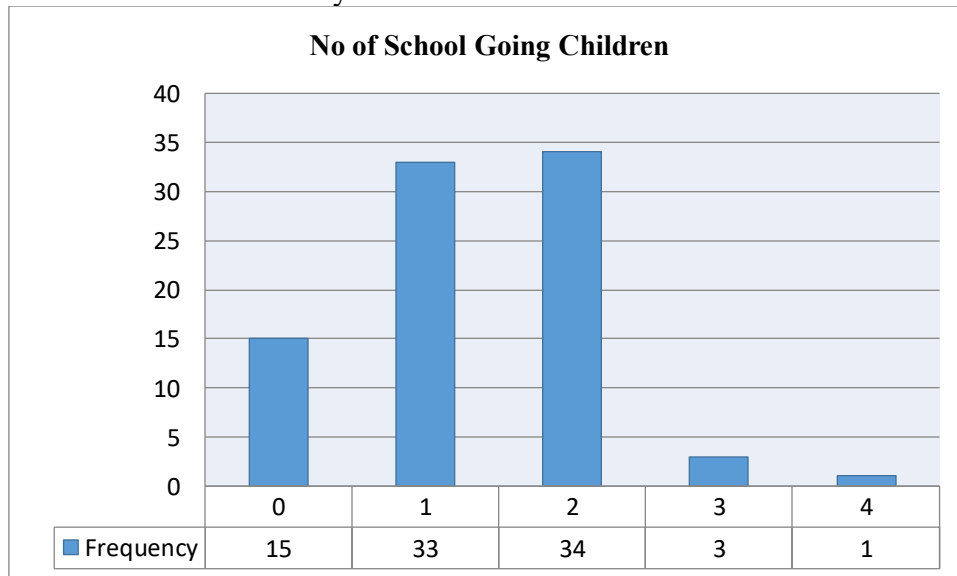


Figure 03: No. of School Going Children

4.2 Descriptive Statistics

According to Manikandan (2011), mean refers to the midpoint of a collection of numbers. It calculates a value that represents the mean and can be used to demonstrate central tendencies.

Table 4: Descriptive Statistics of the Variables

	N	Min	Max	Mean	Std. Deviation
Socio-economic Condition	86	1.71	4.00	2.8870	.51350
Earning Capacity	86	1.50	4.75	3.4390	.65970
Physical Labour and Health	86	1.75	4.50	3.0843	.80221
Safety, Risk and Price Barrier	86	1.00	3.50	1.9622	.67139

The means and standard deviations for the dependent and independent variables are shown in Table 4. The “Socio-economic Condition dependent variable has a mean score of 2.8870 and a standard deviation of 0.51350. “Earning capacity” has the highest mean (3.4390 on a five-point scale with a standard deviation of .65970) among the independent variables, while “safety, risk, and price barrier” has the lowest mean (1.9622). The high mean of “earning capacity” indicates that motorization has increased their potential to earn more, however the low mean of “Safety, Risk, and Price Barrier” indicates the absence of safety precautions in the motorization process, which creates risk, and the existence of a price barrier.

4.3 Reliability Test

The consistency and steadiness with which an instrument assesses a hypothesis and contributes to determining how well the data is produced is what is meant by a measure's reliability (Churchill and Pete, 1984). Cronbach's Alpha indicates the internal consistency, or the degree of similarity between items in a set (Streiner, 2003). Table 3 displays the various Cronbach's Alpha range values for measuring the value of Cronbach's Alpha.

Table 03: Reliability Statistics of the Variables

Variable Name	Number of Items	Cronbach's Alpha	Relationship
Socio-economic Condition	7	.832	Good
Earning Capacity	4	.791	Moderate
Physical Labour and Health	4	.806	Good
Safety, Risk and Price Barrier	4	.776	Moderate

With a Cronbach's Alpha of 0.832 and 7 items, the reliability of the dependent variable (respondents' socio-economic condition) is good, as seen in the table 3. The next step is to check the reliability of the independent variable, “earning capability,” for which the Cronbach Alpha is 0.791. In this case, the reliability was moderate, with four questions showing some degree of validity. The Cronbach Alpha for the four-item measure of "physical labor and health" is 0.806, suggesting that it is reliable. Finally, results for the independent variable "Safety, Risk, and Price

Barrier" indicate a reliability of 0.776, suggesting sufficient internal consistency in the measurement.

4.4 Analysis of Correlation

The statistical method of correlation can reveal the existence of a significant relationship and the degree to which two variables are linked (Taylor, 1990). One dependent variable (DV) is correlated with three independent variables (IVs) as measured by Pearson's Correlation Coefficient (IV). The magnitude of the link between DV and IV can be measured from the value of the correlation coefficient. Relationships are considered statistically significant when the p-value is less than 0.01 and 0.05 respectively for 99% and 95% confidence interval. The following is a description of the relationship using the scale model:

Table 5: Analysis of Pearson's Correlation

		Socio-economic Condition	Earning Capacity	Physical Labour and Health	Safety, Risk and Price Barrier
Socio-economic Condition	Pearson Correlation	1	.789**	.636**	-.400**
	Sig. (2-tailed)		.000	.000	.000
	N	86	86	86	86
Earning Capacity	Pearson Correlation	.789**	1	.718**	-.600**
	Sig. (2-tailed)	.000		.000	.000
	N	86	86	86	86
Physical Labour and Health	Pearson Correlation	.636**	.718**	1	-.637**
	Sig. (2-tailed)	.000	.000		.000
	N	86	86	86	86
Safety, Risk and Price Barrier	Pearson Correlation	-.400**	-.600**	-.637**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	86	86	86	86

****.** Correlation is significant at the 0.01 level (2-tailed).

Table 5 shows that all of the relationships between the independent and dependent variables are statistically significant. The strength of the relationships in this study ranges from good to moderate. It illustrates the connection between socio-economic conditions and factors like earning capacity, physical labor and health and safety, risk, and price barrier. Table 5 shows that a positive correlation (0.789) between earning capacity and socio-economic condition is statistically significant at the $p < 0.01$ (0.000) level. In addition, there is a positive correlation between socio-economic condition and physical labor and health (0.636) and significance at $p < 0.01$ (0.000). Moreover, there is a negative association (-0.400) between safety, risk, and price barrier and socio-economic condition ($p < 0.01$; 0.000). Safety, risk and price barrier is also negatively correlated with earning capacity and physical labour and health at -0.600 and -0.637 respectively at 99% significance level.

4.5 Analysis of Variance (ANOVA)

The purpose of Analysis of Variance (ANOVA) is to compare the dispersion of means (or averages) among different groups using a statistical formula (Anderson, 2001). In a variety of contexts, it is used to test the hypothesis that some groups have significantly different means from others. The following table (Table 06) shows the result of ANOVA test.

Table 06: Result of ANOVA Test
ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.615	3	4.872	51.233	.000 ^b
	Residual	7.798	82	.095		
	Total	22.413	85			

a. Dependent Variable: Socio-economic Condition

b. Predictors: (Constant), Safety, Risk and Price Barrier, Earning Capacity, Physical Labour and Health

The p-value of 0.00, which is less than 0.05, indicates that there is significant relationship between the dependent variable (Socio-economic condition) and independent variables (earning capacity; physical labour and health and safety, risk and price barrier). The F-value of 51.23 indicates that the variation between the group means is greater than the variation within the groups. This supports the hypothesis that enhancing earning capacity can improve the socio-economic condition.

4.6 Regression Analysis

According to McKelvey and Zavoina (1975) regression analysis is a method used in statistical modeling that entails a series of calculations to estimate the relationships between a dependent variable and a number of independent ones.

Table 07: Result of Regression Analysis
Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.185	.327		.567	.572
Earning Capacity	.577	.076	.741	7.631	.000
Physical Labour and Health	.142	.065	.223	2.207	.030
Safety, Risk and Price Barrier	.142	.067	.186	2.122	.037

a. Dependent Variable: Socio-economic Condition

The regression analysis of the four variables showed that Socio-economic Condition is significantly influenced by Earning Capacity, Physical Labour and Health, and Safety, Risk and Price Barrier. The results of the regression analysis indicate that Earning Capacity has the strongest positive relationship with Socio-economic Condition, with a correlation coefficient of .577 and a p-value of .00. This suggests that a 1% increase in Earning Capacity will result in a .577% increase in Socio-economic Condition, holding all other variables constant. Physical Labour and Health had a correlation coefficient of .142 and a p-value of .03, while Safety, Risk and Price Barrier had a correlation coefficient of .142 and a p-value of .037. The adjusted R Square value of .639 indicates that the independent variables in this analysis explain 63.9% of the variation in Socio-economic Condition. This result suggests that these independent variables are important predictors of Socio-economic conditions.

The results of this regression analysis suggest that Earning Capacity is the most significant predictor of socio-economic Condition, with a strong positive relationship. This highlights the importance of earning capacity in determining the socio-economic status of individuals. Physical Labour and Health, and Safety, Risk and Price Barriers also showed a significant positive relationship with socio-economic Condition, though to a lesser degree than Earning Capacity. This suggests that other factors such as physical labour and health, and safety, risk and price barriers also play an important role in shaping socio-economic status.

It is worth noting that while these results are statistically significant, they do not capture all the complexities and nuances of the relationship between socio-economic conditions and the independent variables. Further research could explore these relationships in more detail and with a larger sample size to strengthen the results.

4.7 Data Normality Test

Testing for normality in data is a crucial statistical technique for establishing if a data collection is roughly normally distributed. The normal distribution is represented by a bell-shaped curve that is symmetrical about its mean and has clearly outlined values for the mean, median, and mode. The assumption of normality is made in many statistical tests, and the findings may be unreliable if the data does not conform to the assumption. There are several methods available for testing for normality. We have utilized the following two methods to test normality for this study.

4.7.1 Histogram

A histogram is a graphical representation of the distribution of a set of continuous or discrete data. It is a representation of the frequency of the data points in each interval or bin. The height of each bar in the histogram represents the frequency of the data points that fall within the corresponding interval or bin.

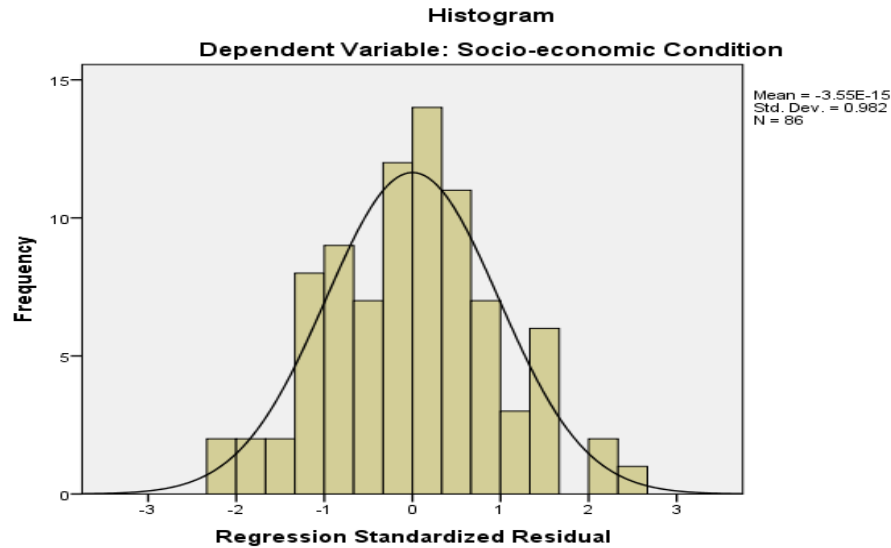


Figure 04: Histogram of the Regression Standardized Residual

Given the mean and standard deviation of a histogram with $N=86$ data points, the mean of $-3.55E-15$ and standard deviation of 0.982 suggests that the data is approximately symmetrical and distributed around the mean. The mean of $-3.55E-15$ is close to 0 , which indicates that the data points are centered around 0 . The standard deviation of 0.982 suggests that the data points are spread out with most of the data points falling within 2 standard deviations of the mean.

4.7.2 P-P Plot

A Probability-Probability (P-P) plot is a graphical representation used to compare two probability distributions. The basic idea behind a P-P plot is to plot the cumulative distribution function (CDF) of the observed data against the CDF of a theoretical distribution. The CDF of the theoretical distribution is usually a normal distribution, and the CDF of the observed data is estimated from the data itself.

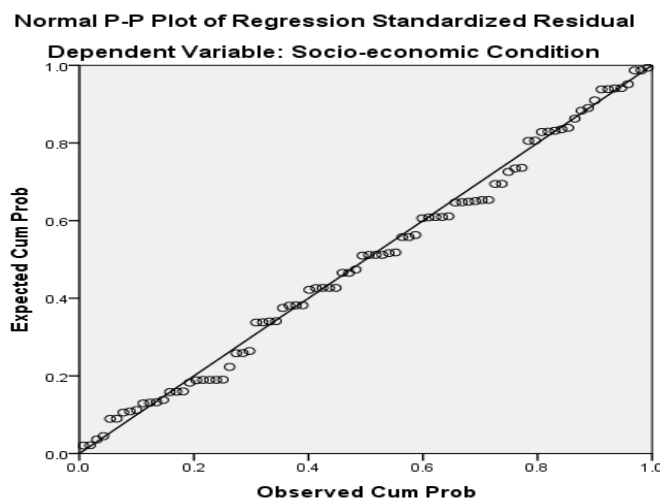


Figure 05: P-P Plot of the Regression Standardized Residual

Given the mean and standard deviation of a P-P plot with N=86 data points, the mean of $-3.55E-15$ and standard deviation of 0.982 suggest that the data is approximately normally distributed. If the observed data is indeed from a normal distribution, then the points on the P-P plot should form a roughly straight line. A straight line indicates that the observed data is consistent with the theoretical normal distribution, while deviations from a straight line suggest that the observed data is not normally distributed.

4.8 Process and Forms of Motorization of Paddle Rickshaws in Bangladesh

Motorization of paddle rickshaws in Bangladesh has been a significant development in the country's transportation sector. A paddle rickshaw, also known as a human-powered tricycle, is a common mode of transportation in Bangladesh, particularly in urban areas. The motorization of these rickshaws has had a profound impact on the lives of rickshaw pullers and the transportation sector as a whole.

The process of motorization of cycle rickshaws in Bangladesh can be traced back to the late 1980s and early 1990s, when rickshaw pullers started to adopt motorized rickshaws to improve their financial stability and provide better services to customers. The process of motorization was driven by several factors, including the increasing demand for faster and more convenient transportation and the need to overcome the physical strain of pulling rickshaws by hand.

The forms of motorization of cycle rickshaws in Bangladesh are diverse, ranging from simple engine kits that can be attached to existing rickshaws to fully motorized rickshaws with advanced features such as electric starters and hydraulic brakes. The most common form of motorization involves the installation of rechargeable battery kits, which can be fitted to existing rickshaws, transforming them into motorized vehicles. This type of motorization is the cheapest one. Lithium-ion batteries are being used for these innovations. However, safety measures are completely overlooked here. The traditional rickshaw has gained speed through these batteries but the mechanical structure is not suitable for this speed. Moreover, brake capacity has not been enhanced which leads to fatal accidents very frequently. However, some recent models of motorized rickshaws are modernized and added a better brake capacity which reduces risk and increases safety significantly.

“The design and technology used in motorized rickshaws are changing very rapidly. A few years ago, they were essentially the same paddle rickshaw with just a motor. But now, they are more mechanized, with better build quality, braking systems, mileage, and comfort” – Workshop owner #2, Dhaka, January, 2025

Besides this easiest type of motorization of the paddle rickshaws, imported electric rickshaws known as easy bike has emerged as the most convenient and comfortable mode of transportation. This easy bike is considered more efficient and relatively safe than the locally motorized rickshaws. During this study the author observed that the roads of Satkhira and Rajshahi are full of these easy bikes. Installing diesel engines to traditional tricycle vans is another type of motorization. Perhaps this type of motorization has been the most creative in terms of design, innovation, modification and improvisation. Diesel engine vans are in fact the first type of motorization in Bangladesh in pulling vehicle category and are usually found in the rural area.

*“Diesel engine vans (tricycles) have different local names depending on the region and their use, such as **Nosimon** (mainly used in rural and peri-urban areas for transporting goods and sometimes people), **Karimon** (similar to Nosimon but generally smaller and more commonly used for carrying people), and **Bhotbhoti** (named after the 'bhut-bhut' sound it makes). These engine vans have undergone various modifications and are commonly used in rural areas, primarily for transporting goods and occasionally people” – Workshop owner #1, Rajshahi, December, 2024*

In the past, there were numerous rickshaw garages in the big cities where marginal rickshaw pullers could rent paddle rickshaws on a daily basis. It was a profitable business for garage owners, who typically recovered the cost of a rickshaw within one year. Marginal pullers were also able to earn a livelihood, as they could not afford to buy a rickshaw themselves. Now, traditional paddle rickshaws have been almost entirely replaced by motorized ones. Workshops now primarily build and repair motorized rickshaws, while garage owners rent them out and sometimes handle minor repairs. However, building and renting motorized rickshaws has become a challenge for garage owners due to the high capital requirements and increased risk factors involved.

“Earlier, we used to only repair paddle rickshaws (simple frame, wheels and brakes). But now, motorized rickshaws come with electric wiring, batteries, lights, and gear systems. We had to learn new skills and invest in new tools to keep up. It’s more work, but also more business. The demand is high because people prefer the speed and comfort. Still, we worry about regulations. sometimes the authorities say these are illegal, sometimes they don’t. We just want clear rules so we can run our business peacefully” – Garage owner #3, Dhaka, January 2025

However, the process of motorization has not been without its challenges. The high cost of motorized rickshaws and limited access to credit have hindered the process of motorization. Additionally, the increased expenses for maintenance and fuel have reduced the financial gains made from motorization. Therefore, the process and forms of motorization of paddle rickshaws in Bangladesh have had a profound impact on the lives of rickshaw pullers and the transportation sector as a whole. While motorization has brought many benefits, it has also faced challenges that need to be addressed through policy interventions aimed at improving the lives of rickshaw pullers and ensuring that they reap the maximum benefits from motorization.

4.9 Lives of the Rickshaw Pullers

While rickshaw drivers are often portrayed solely in the context of their urban presence, this framing overlooks the broader socioeconomic realities that shape their lives. The majority of rickshaw drivers in Bangladesh are not permanent urban dwellers but rather circular migrants (Hasan, 2019). Landless farmers and laborers come to cities during agricultural off-seasons or in times of economic distress. Many migrate after being affected by natural disasters such as river erosion, coastal flooding, and drought. Others come to big cities in search of better earning opportunities. This mobility is not just economic but also deeply social and political, as these individuals navigate a dual existence between village life and the urban informal sector. However, once in the city, their rural identities are often erased, and they are reduced to their occupation, stripped of context.

Rickshaw pullers in urban Bangladesh often endure unfair treatment from the very passengers they serve, reflecting deep-rooted class divisions and social hierarchies. Many passengers speak to them with disdain, issue commands rather than requests, and often refuse to pay fair fares. Physical and verbal abuse is not uncommon, especially when drivers assert their rights or resist exploitation. This everyday humiliation is part of a broader system of antagonistic class relations, where the urban poor are expected to provide labor without dignity.

“The people of this city don’t see us as human beings. There’s no respect at all. They even raise their hands against elderly. I’m trapped here for survival—if I weren’t forced by necessity, I wouldn’t be here. My home was swallowed by the river, and now I have no choice but to struggle every day just to earn enough for two handfuls of food”

– **Rickshaw puller #11, Dhaka,**

January, 2025

The living standards of rickshaw pullers in urban Bangladesh are alarmingly low, reflecting their broader socioeconomic marginalization. Due to their limited and unstable income, most rickshaw pullers reside in densely populated informal settlements or slums, where housing is overcrowded, poorly constructed, and lacks basic amenities. These areas are typically located in environmentally degraded parts of the city, exposing residents to severe air and noise pollution, contaminated water sources, and unhygienic sanitation facilities. Consequently, rickshaw pullers and their families face a high risk of contracting waterborne and communicable diseases. Access to nutritious food and adequate healthcare remains severely limited, both financially and logistically. The cumulative impact of these conditions significantly deteriorates their physical and mental well-being.

“We live in crowded slums because we can’t afford anything better. The water is dirty, the toilets are broken, and the smell never goes away. Sometimes we fall sick, but going to a doctor costs more than we earn in a day. We eat just to fill our stomachs, not for health. All this makes our bodies weak and minds tired. Still, we have to go out and pull rickshaws every day, what else can we do?”

– **Rickshaw Puller #17, Dhaka, February 2025**

However, the motorization of rickshaws introduces a transformative dimension to the sector. The shift from manual paddling to motorized propulsion significantly reduces the physical labor involved, thereby enhancing driver comfort and productivity. In addition, the increased speed associated with motorized rickshaws allows drivers to complete more trips in a shorter time, potentially leading to higher earnings. Although the cost of acquiring a motorized rickshaw remains out of reach for many, access to informal credit from local garages has mitigated this barrier to some extent. Despite these benefits, motorized rickshaws face considerable regulatory challenges; they are often barred from VIP streets and busy urban areas. It not only limits their operational scope but also exposes drivers to potential mistreatment by traffic police and law enforcement agencies. Nevertheless, the overall impact of motorization on the living standards of rickshaw pullers appears to be predominantly positive, enhancing both economic opportunities and working conditions.

“Motorized rickshaw has really changed my work life. With motorized rickshaws, the physical strain is much less, and I can travel faster, which means I can earn more every day. Even though buying one is too expensive for me, I have taken one on rent from a garage. One problem, I can not go to VIP roads and main roads, and sometimes the traffic police treat us unfairly. But overall,

motorization has definitely improved my life” – Motorized Rickshaw Driver #6, Dhaka, February 2025

The lack of collective bargaining power among rickshaw pullers has historically excluded them from influencing policy decisions regarding rickshaws in Bangladesh. Policymaking in this sector has often been one-sided, failing to incorporate the voices and perspectives of the pullers themselves. Authorities have repeatedly taken initiatives to ban rickshaws from so-called VIP roads, and there has been a longstanding reluctance to recognize motorized rickshaws as a legitimate mode of urban transport. However, recent developments have significantly altered this dynamic. Following the student-led protest in July 2024, the changing socio-political climate has encouraged various marginalized groups to bring long-standing demands to the forefront of national discourse. Rickshaw pullers, too, have made unprecedented moves to assert their rights and concerns.

On August 26, 2024, paddle rickshaw pullers organized rallies across different parts of Dhaka and staged a blockade at the prominent Shahbagh intersection under the banner of the Dhaka City Corporation Rickshaw Owners' Unity. They submitted a memorandum to the Chief Adviser of the interim government, presenting a seven-point demand that included banning battery-powered rickshaws, which they argued created unfair competition and disorder on the roads (Abedin, 2024). They also called for inclusion in policy decision-making processes. In response, on the same day, drivers of battery-powered rickshaws organized a counter-protest, driving through several major streets of Dhaka, including Shahbagh, in support of battery-powered rickshaws. As a result of this rising tension and visibility, battery-powered rickshaws have since been allowed to operate freely in most parts of Dhaka, with the exception of select VIP roads. Notably, the Bangladesh Road Transport Authority Advisory Council had earlier decided on May 15 to ban battery-powered rickshaws in the city; however, this decision was revoked on May 20 following strong protests by battery-rickshaw drivers.

5.0 CONCLUSION AND RECOMMENDATION

The rickshaw has long been an integral part of daily life in Bangladesh and throughout South Asia. The prevailing belief is that Japanese culture is the cradle of the rickshaw. The motorization of rickshaws in Bangladesh has greatly reduced the inhumanity of rickshaw labor there. Whether a rickshaw is pulled by a human or powered by a motor, it has important consequences for culture and daily life. This study analyzed the process and forms of motorization of cycle rickshaws in Bangladesh and evaluates the subsequent social and economic impacts. From the viewpoints of social knowledge and policy in relation to this significant informal sector of Bangladesh, the findings of this study will be highly significant.

Over the past few years, there has been a rise in the number of motorized paddle rickshaws in Bangladesh. It is an improvement over traditional paddle rickshaws in several ways, including speed, comfort, and convenience. It also changed the socio-economic conditions of the rickshaw pullers. This study found positive and significant correlation between the motorization of paddle rickshaws and the socio-economic conditions of the rickshaw pullers. These developments, however, have raised concerns regarding congestion, safety, and environmental impact. The following policy suggestions are made to solve these issues and promote sustainable development:

Safety on the Road: The government should enact and strictly enforce safety restrictions for the use of motorized rickshaws on public roads. Passengers should be required to wear helmets, vehicles should be inspected regularly, and drivers should be required to participate in training programs to enhance their driving skills.

Environmental laws: Excessive and inconsiderate use of Lithium-ion batteries and their random disposal may lead to battery hazards. Appropriate laws should be enacted to minimize the environmental risks associated with improper battery disposal.

Controlling Traffic Congestion: The proliferation of motorized rickshaws in Bangladesh's urban areas has become a serious issue for traffic management. So that people can use motorized rickshaws without endangering themselves or others, the government should put money into traffic management infrastructure like traffic lights, road signs and dedicated lanes for motorized rickshaws.

Ensuring Safe Design: There is serious lack of safety measures in the design of locally motorized rickshaws leading to an increase in the number of fatal accidents. Government can invest in R&D to develop new designs ensuring safety measures.

Financial Support: Switching to motorized rickshaws can be costly for the poor rickshaw pullers. To ease the financial burden of making this change, the government can offer incentives including tax breaks, subsidies, and low-interest loans.

Governments should promote motorized rickshaw use by launching public awareness programs to inform citizens of the advantages and precautions associated with this mode of transportation. Sustainable mobility, pedestrian and bike safety, and the environment could all be topics for discussion. The administration should set up a framework to keep tabs on and assess how well the proposed reforms are working. This will be useful in making sure the policy's intended effects on the motorization of paddle rickshaws in Bangladesh are being realized. As a whole, these policy suggestions are made to strike a balance between the advantages of motorization and the necessity to guarantee sustainable development and deal with the problems caused by it. The government can play an important role in ensuring the motorization of paddle rickshaws in Bangladesh is done in a sustainable and responsible manner by enforcing these rules.

This study has shed light on the socio-economic transformations associated with the motorization of paddle rickshaws in Bangladesh, highlighting both the opportunities and challenges embedded in this evolving urban phenomenon. While motorization has improved income potential and reduced physical strain for rickshaw pullers, it has also introduced new risks related to safety, informality, and regulatory uncertainty. These findings underscore the urgent need for inclusive transport policies that not only address infrastructural and environmental concerns but also recognize and support the labor force that sustains this informal mobility sector. Future research may build on this work by exploring the gendered dimensions of motorized informal transport, long-term environmental implications of battery use, or comparative studies across South Asian cities. As Bangladesh navigates its path toward urban modernization, a socially just and evidence-

based approach to transport policy will be crucial to ensuring that marginalized workers are not left behind in the name of progress.

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