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Article

Understanding the Perception and Attitude Toward Electric Vehicles Among Young Citizens of Bangladesh

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Abstract- This study recognizes the significance of young people as future consumers and industry decision-makers by examining their knowledge of and attitudes toward electric vehicles (EVs) in Bangladesh. People's awareness of and attitudes regarding electric cars (EVs) vary, according to preliminary findings from a poll of 102 participants. The study addresses the critical role of young people as future consumers and decision-makers by examining their knowledge and attitudes toward electric vehicles (EVs) in Bangladesh. Despite the global push for sustainability, awareness and acceptance of EVs in Bangladesh remain limited, partly due to a lack of targeted education campaigns. This underscores the need for targeted education campaigns. The study explores the relationship between acceptability and awareness of electric vehicles, identifying key factors influencing young people's perspectives. Beyond its scholarly significance, the research offers insights to industry stakeholders, educators, and legislators that will facilitate the development of tailored strategies to promote teenagers' use of electric vehicles. By encouraging optimistic and knowledgeable attitudes, this research aims to assist Bangladesh's transition to a greener, more sustainable future.

Keywords: Electric Vehicles; Awareness; Attitudes; Survey; Sustainability; Transportation

1. Introduction

In search of climate change mitigation and sustainable development, the global community pays more attention to renewable energy solutions [1]. As a promising approach to carbon emission reduction, energy security improvement, and promotion of sustainable economic growth [2,3], Electric Vehicles (EVs) are at the center of it all. Nevertheless, public awareness and attitudes towards these technologies play an important role in varying EV adoption rates by region [4].

Electric Vehicles (EVs) are a burgeoning division of the motor industry that offers a more environmentally friendly and sustainable alternative to conventional internal combustion engine vehicles that depend on fossil fuels. It is therefore important to understand public awareness, attitudes, and perceptions about the possibility of using EVs in Bangladesh and other countries facing severe environmental problems and escalating transport demand [5].

Renewable energy sources have gained significant global attention in addressing the issue of climate change and diversifying the energy mix. Despite mostly focusing on transition in power generation; transportation still plays a central role in attaining sustainability goals. Electric Vehicles become appealing due to their reduced emissions, less reliance on fossil fuel supplies as well as potential long-term cost savings [6,7].

Several hurdles obstruct the acceptance of electric vehicles in Bangladesh, including infrastructural barriers [8,9], affordability concerns, and lack of knowledge among the populace, especially the youth [10,11].

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Most of the studies have conducted investigations into citizen perspectives on Electric Vehicles (EVs) including Austria [12], India [13,14], South Africa [15], Italy [16], and Nepal [17]. However, these studies are not common in Bangladesh. This calls for research on what young citizens think about EVs that may have the potential to shape future transportation patterns and energy consumption trends. A similar Research on EVs was conducted among youths and young adults in Austria (Total participants: 351; Age: 18-30 years old). Participants were asked to fill out an online survey containing various items and scale measurements. Results concluded that 22% of participants already purchased an EV or intend to buy an EV as their next car and 38% stated an interest in purchasing an EV. This helped to identify potential adopters, which aligns with the aims of this study, which is intended to identify perceptions of young people whether they want to adopt EVs or not.

Hence, this study endeavors to bridge that gap by examining how much young people know about them, what they perceive, and whether they think of having EVs. Through these variables, this work aims to provide insights for policy formulation, educational initiatives, and public awareness campaigns towards sustainable transport alternatives for rapid transit solutions and facilitating a shift to a low-carbon economy. This research builds on findings from studies conducted in Austria and India, adapting them to the unique socio-economic and infrastructural context of Bangladesh to provide actionable insights for stakeholders

2. Methodological Approach

2.1. Methodology

This study used a cross-sectional survey, conducted on a predetermined population at a single point in time, and a quantitative research methodology to investigate how young people perceive Electric Vehicles. The study began with an examination of Bangladesh's current energy policies [18]. The participants for the survey were mostly engineering undergraduate students from the Military Institute of Science and Technology (MIST), Bangladesh. This is because of the presence of diverse types of students (both Civilians & Military students). The rest of the data were from pupils known to the authors. To collect responses for the e-survey questionnaire, the authors contacted about 400 undergraduate students from several departments and disciplines and gave them a Google Form-based questionnaire created especially for this study. The young people were informed about the survey's themes. The goal of this thorough investigation was to comprehend Bangladesh's transportation strategy and young perceptions.

2.2. Research Questions

A total of 102 responses were received. For this study, a questionnaire consisting of two parts and 10 multiple-choice questions was created, following a five-point Likert scale. Section 1 began with standard inquiries on the gender, age, institution, educational history, and qualifications of the students. In Section 2, students' perceptions and awareness of Electric Vehicles are examined. Multiple-choice questions are included, with the options "agree" and "strongly agree" denoting agreement with the policy, "disagree" and "strongly disagree" denoting disagreement, and "neutral," which denotes neither strong support nor opposition to the policies under discussion. The Questionnaire was developed and verified with the help of an Expert and with the help of previously conducted research.

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Table 1. Questionnaire.

Symbols	Questions
Q1	Have you been hearing about Electric Vehicles (EVs) more frequently in recent times before participating in this survey?
Q2	Would you highly rate your level of knowledge about Electric Vehicles (EVs)?
Q3	I believe Electric Vehicles (EVs) are a practical transportation solution for Bangladesh.
Q4	I would consider purchasing or using an Electric Vehicle (EV) in the future.
Q5	After a 10-20km distance, a charging station should be available
Q6	Electric Vehicles (EVs) offer significant environmental benefits compared to traditional vehicles
Q7	The cost of Electric Vehicles (EVs) is justified by their long-term benefits and savings.
Q8	The government should offer more incentives and subsidies to encourage the adoption of Electric Vehicles (EVs).
Q9	Electric Vehicles (EVs) will become the dominant mode of transportation in Bangladesh in the future.
Q10	Concerns about the limited range of Electric Vehicles (EVs) are a significant barrier to their widespread adoption.

3. Results and Discussion

3.1. Demographic Information

The total number of complete or partially complete questionnaires was 102. Among them the number of female respondents was 29, the number of male respondents was 66, and 7 participants preferred not to disclose. The gender disparity occurred due to the presence of fewer female students in engineering universities in Bangladesh. In terms of age, the majority (87) falls within the 18-24 age group, followed by 10 participants in the 25-34 while the rest are in under 18 and other categories. Regarding educational background, 69 participants are undergraduate students, 21 are high school students, and 9 are pursuing master's or above degrees, and the distribution across engineering, medical, business, and social/environmental/other fields is 88, 10, 2, and 2, respectively.

Table 2. The demographic composition of the samples.

Demographic profile	***N(number)***	***%***
Gender		
Female	29	28.4

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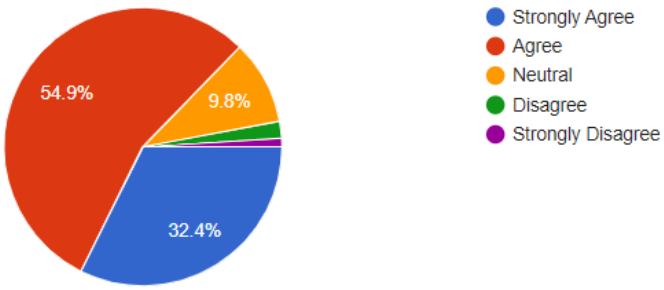
Demographic profile	*N(number)*	*%*
Male	66	64.7
Preferred not to say	7	6.9
Age		
Under 18	1	0.98
18-24	87	85.3
25-34	10	9.8
Other	4	3.9
Education		
High school students	21	20.58
Bachelor's students	69	67.64
Master's degree or above	9	8.82
Other	3	2.94
Field of study		
Engineering	88	86.28
Business/management	2	1.96
Medical/health science	10	9.8
Other	2	1.96

Respondents' Opinions about Electronic Vehicles in Bangladesh



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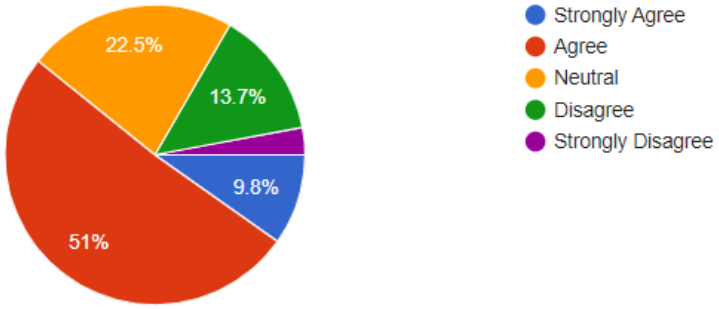

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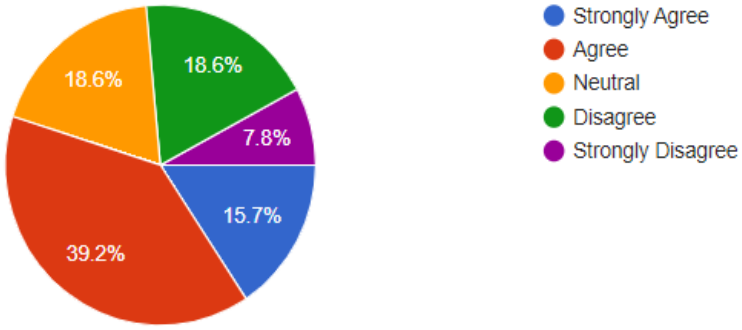

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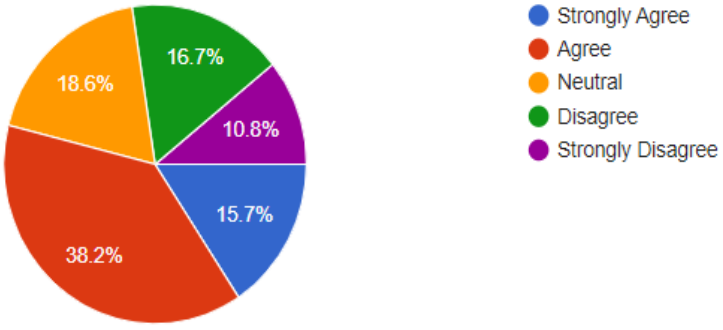

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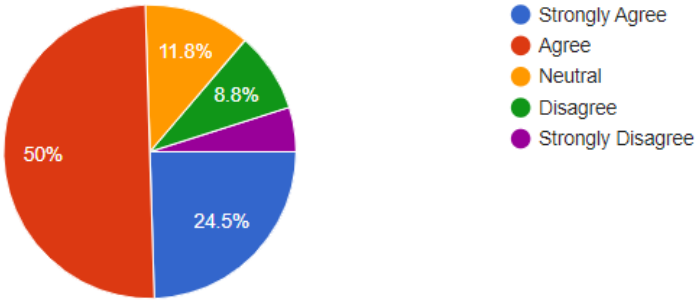

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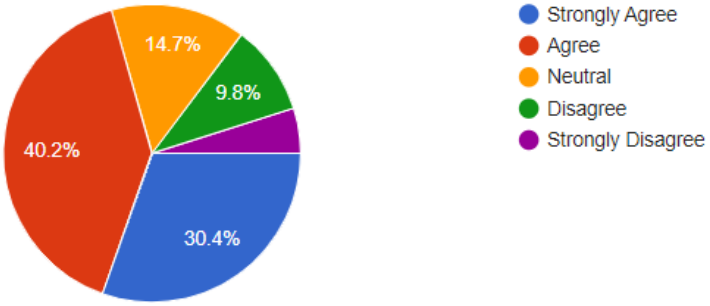

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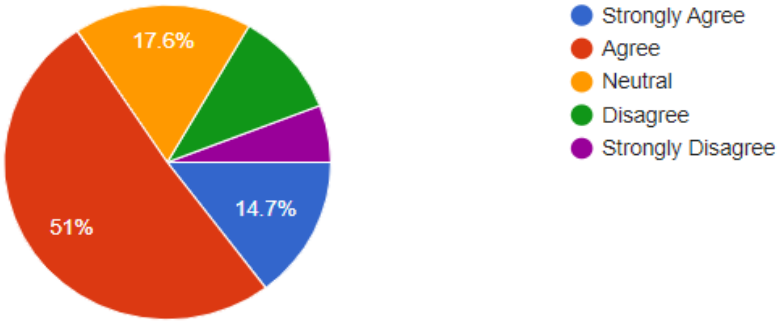

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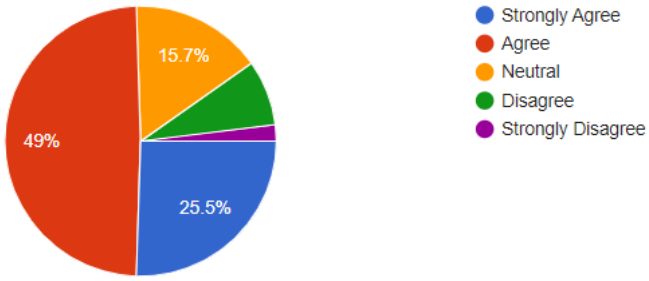

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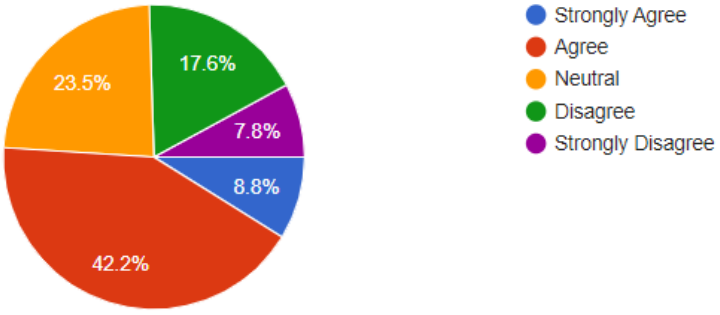

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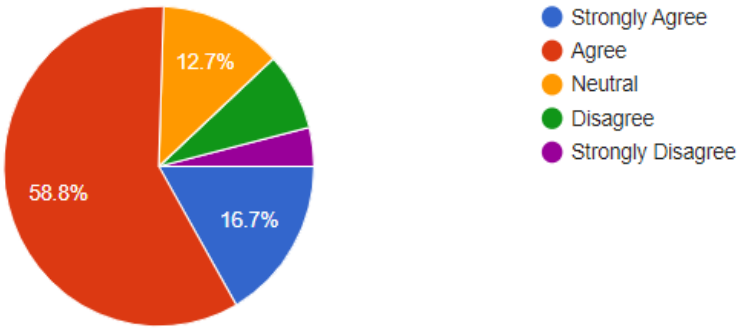

(j)

Figure 1. (a) Respondents' opinion on Q1. (b) Respondents' opinion on Q2. (c) Respondents' opinion on Q3. (d) Respondents' opinion on Q4. (e) Respondents' opinion on Q5. (f) Respondents' opinion on Q6. (g) Respondents' opinion on Q7. (h) Respondents' opinion on Q8. (i) Respondents' opinion on Q9. (j) Respondents' opinion on Q10.

The survey's findings show that respondents have a definite preference for adopting electric vehicles (EVs), with 39.2% of respondents saying that EVs are a workable transportation option for Bangladesh. Regarding their degree of understanding of EVs, a sizable portion of respondents—22.5 percent—express neutrality or disagreement (13.7%), while 51% of respondents believe they know enough. This implies that additional educational efforts to raise knowledge and awareness of EV technology would be necessary. While 18.6% of respondents are neutral and another 18.6% disagree, the majority of respondents either strongly agree (15.7%) or agree (39.2%) that EVs are a feasible transportation alternative for Bangladesh suggesting that people have a favorable opinion of EVs' potential to solve the nation's transportation problems and regarding their desire to buy or use an EV in the future, a sizable portion of respondents expresses uncertainty (18.6% are neutral and 16.7% strongly disagree). However, 38.2% of respondents say they would be likely to buy an EV in the future, indicating that they are open to utilizing emerging technologies. 50% of respondents agreed and 24.5% strongly agreed that a charging station should be accessible after traveling 10–20 km. This emphasizes how crucial infrastructure growth is to encouraging the use of EVs. The majority of responders (70.6%) accept that EVs are far more environmentally friendly than conventional cars. This indicates that people have a favorable opinion of EVs' ability to reduce environmental concerns. Although the majority indicated agreement, a sizeable percentage (34.4%) expressed doubt about the EVs' ability to justify their prices in the long run and 49% unanimously agreed that additional subsidies and incentives should be provided by the government to promote the use of EVs. This emphasizes how crucial it is for policies to support environmentally friendly transportation options and to lower costs and taxes. Over 50% of the participants express optimism and concur that electric vehicles will dominate transportation in the future. The majority of those who participated (75.5%) acknowledge that one of the main obstacles to EVs becoming widely adopted is worries about their short range. This emphasizes how crucial infrastructural development and technology improvements are to reducing range anxiety and boosting customer trust in EVs. The findings align with studies from developing regions like Nepal and South Africa, emphasizing the critical role of governmental incentives and infrastructure development in fostering EV adoption.

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3.2. Statistical Analysis

Table 3. Data analysis.

Questionnaire	*Mean*	*Standard Deviation*	*Mode*
Awareness	4.15	3.70	Agree
Knowledge	3.51	3.11	Agree
Practicality of EVs	3.36	3.05	Agree
Willingness to Purchase	3.31	3.03	Agree
Access to Charging Stations	3.80	3.43	Agree
Environmental benefits	3.81	3.46	Agree
Cost effectivity	3.58	3.21	Agree
More Govt Incentives	3.88	3.47	Agree
Dominance of EVs in the future	3.26	2.93	Agree
Limited range of options	3.76	3.36	Agree

It can be understood that the majority are concerned about the infrastructural limitations, lack of innovation in the battery, and lack of inclination towards renewable energy sources makes them concerned about the dominance of EVs in transportation in Bangladesh in the future. However, if the government is willing to create more policies and undertake more projects toward creating a favorable future for EVs, the respondents are more than willing to switch to the more environment-friendly solution that EVs will bring forth.

3.3. Limitations or Biases

This study primarily surveyed engineering undergraduate students from the Military Institute of Science and Technology (MIST), with a specific emphasis on those with a potential interest or exposure to EVs due to the presence of a Mechanical Engineering Department. As such, the findings may reflect a higher level of awareness and favorable perceptions of EVs than might be observed in a broader, more demographically diverse sample. The purposive sampling approach and reliance on respondents known to the authors further introduce the potential for sample bias. Future studies should consider more diverse and representative sampling strategies to ensure broader generalizability of the results.

4. Conclusions

The research highlights the need for policy interventions, such as subsidies and infrastructure development, alongside educational initiatives to bridge the knowledge gap and promote EV adoption among youth in Bangladesh. The examination of youth sentiments unveiled insights, such as understanding of opinions, which allowed us to assess the awareness and acceptance, that entails the perception and attitude towards Electric Vehicles in Bangladesh, five central findings come to light:

1. The survey findings indicate a notable increase in awareness and attention towards Electric Vehicles (EVs) among respondents before their participation

2. Although exposure to EVs has increased, a notable proportion of respondents remain uncertain or lack confidence in their knowledge, underscoring the need for targeted awareness campaigns.

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3. Respondents positively perceive the environmental benefits of EVs; however, challenges such as cost, inadequate infrastructure, and range anxiety remain significant barriers to adoption.

4. Government initiatives and technological innovations will be crucial in fostering the widespread adoption of EVs as a sustainable transportation solution in Bangladesh.

5. The survey results suggest a promising trajectory toward the integration of EVs into the transportation sector of Bangladesh. Continued efforts in education, infrastructure development, policy creation, and technological advancement can ease the process of EVs' dominant mode of transportation.

The study provides a foundational understanding of youth perspectives on EVs, offering valuable insights for tailoring policies and educational campaigns to accelerate the transition to sustainable transportation in Bangladesh.

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Conflicts of Interest: The authors declare no conflicts of interest

Abbreviations:

EV: Electric Vehicles

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