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### Supervisor



### Moinul Hossain, Ph.D.

Professor  
Department of Civil and Environmental Engineering  
Islamic University of Technology (IUT)  
Board Bazar, Gazipur, Bangladesh.

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## Chapter 1 Introduction

### 1.1 Background

In the dynamic realm of transportation engineering, the landscape is shifting toward innovative methodologies that have the potential to revolutionize how we monitor, influence, and control road-network users' behavior. Thinking about positive change. And digital storytelling can bring a new era in this lively progression. Digital storytelling (DST) has the potential to significantly influence human behavior. By engaging emotions and addressing non-conscious levels, DST effectively changes individuals' perceptions and actions. DST's ability has been proven to reshape people's attitudes and behaviors, opening new avenues for impactful messaging and communication (Grindle, 2014).

Digital storytelling has demonstrated its effectiveness across various sectors. In education, it enhances student engagement (Smeda et al., 2014) and learning outcomes by integrating instructional content with engaging activities (Malita & Martin, 2010). In marketing, it strengthens narrative transportation in commercial, user-generated, and one-on-one contexts, offering practical insights (Van Laer et al., 2019). In medical education, it improves critical thinking and communication skills (Zarei et al., 2021). In public health, digital storytelling influences behavior, engaging emotions and non-conscious levels, offering a feasible approach for both public health and commerce (Grindle, 2014). It aids students in understanding climate change effects (Otto, 2017), enhances speaking abilities and critical thinking in high schools (Syafryadin et al., 2019) and provides technology integration in primary education (Sweeney-Burt, 2014). Furthermore, it supports patient knowledge translation in healthcare (Park et al., 2021) and improves foreign language acquisition (Pardo, 2014). Therefore, it showcases its potential to impact diverse sectors.

However, a significant underutilization of digital storytelling is observed in the domain of transportation and road safety. This phenomenon can be attributed to the inherent conservatism characterizing these sectors, which have traditionally placed strong reliance on technical and engineering solutions. The adoption of digital storytelling necessitates a shift toward more user-centric and holistic methodologies, which, in practice, encounter challenges and resistance across diverse fields.

The research objectives set forth in this study revolve around harnessing the potential of digital storytelling to monitor, influence, and control road-network users' behavior positively. This research aims to incorporate storytelling into transportation and road safety to align the technicality and engineering with the holistic approaches of the road users. There are various sorts of digital storytelling like video, infographics, podcasts, social media stories, blogs, social media posts, photography, chatbots, and conversational interfaces. Among these, the research will primarily choose the notion of infographics, social media posts, photographs, and videos to incorporate into the research. This digital storytelling will be targeted at the road network users, specifically on the pedestrians and drivers of different vehicles. Bangladesh has one of the biggest user bases on social media. In January 2023, the country was home to 44.70 million social media users, equating to 26% of the total population (Aftabunnahar, 2023). It will be comparatively easier to engage people with the impact measurement of digital storytelling for this research. The found result will encompass an overall understanding of the emotional impact of digital stories, exploring their potential to engage users across platforms. Besides, it will be able to be scaled to a massive portion of the population with more manpower contributing to the data collection.

In the future, this paper may pave a path envisioning a future where AI will analyze GIS-based maps and the demography of the location along with the psychology of the native people to accelerate the process of creating narratives through digital storytelling that influence informed policy-making in transportation engineering. Besides, Bangladesh, being a dreamer of a developed country and already being one of the fastest-growing economies in South Asia, will gradually move towards Autonomous Vehicle (AV) technology that is expected to enhance road safety, mobility, service, and comfort for road users and hence will be able to serve the purpose of Intelligent Transportation Systems (ITS). The data derived from digital storytelling and its impact will establish sustainable communication among on-road connected automated vehicles (CAV) systems to improve their safety features, even in auto-driving modes, through future research endeavors.

<sup>10</sup> In the subsequent sections of this paper, the research will delve into the methodologies, findings, and implications of these research objectives, with the vision of propelling the transportation engineering sector toward a new era of informed, emotionally engaging, and user-centric decision-making processes that drive positive changes in road-network user behavior and, ultimately, the efficiency and sustainability of transportation systems.

## 1.2 Problem Statement

Bangladesh, characterized by its high population density, grapples with a pressing road safety concern. Recent data from the Bangladesh Road Transport Authority (BRTA) and law enforcement agencies reveal a troubling scenario in the first two months of the year. A total of 636 lives were lost, and 752 individuals suffered injuries in 630 road accidents, as reported by the BRTA. Concurrently, the police reported 542 fatalities and 420 injuries in 557 road crashes during the same period (Adhikary, 2023). The primary settings for these road accidents comprise highways, accounting for 29.1% of the incidents, and streets, representing 58.4% of the cases. Causative factors are predominantly attributed to speeding, which contributes to 46.5% of accidents, and careless driving, responsible for 48.8% of incidents (Ahsan et al., 2011).

In response to this alarming road safety crisis, a range of strategies has been proposed, encompassing interventions such as the installation of medians, shoulder improvements, enhancement of traffic control devices, better intersection design, speed control, provision of facilities for non-motorized vehicles (NMVs), road surface maintenance, treatment of hazardous roadside objects, and initiatives aimed at augmenting road user safety awareness and driver training (Ahsan et al., 2011). However, the implementation of these strategies is often constrained by financial barriers and infrastructural management complexities.

Installing medians can be expensive due to land acquisition, construction, and maintenance expenses. Median construction costs vary from \$100,000 to \$1 million per mile. Expanding road shoulders can be costly, especially in urban areas, with project costs ranging from \$200,000 to \$1 million per lane-mile (Poole, 2013). Upgrading traffic control devices requires ongoing maintenance and can consume a significant part of transportation budgets. Retrofitting intersections for safety improvements is expensive, particularly for complex intersections. Speed control measures like speed cameras may face resistance and

require significant law enforcement resources. Providing facilities for non-motorized vehicles (NMVs) is costly, especially in urban areas with limited space. Routine road maintenance necessitates continual funding to avoid more expensive rehabilitation or reconstruction later. Treating hazardous roadside objects is expensive and often involves infrastructure redesign. Safety awareness campaigns and driver training programs need ongoing funding and face challenges in changing driver behavior. Effective programs and campaigns can be complex and costly.

However, when it pertains to raising awareness, the financial burden may not be as significant as that associated with previous initiatives. Endeavors aimed at enhancing road user safety awareness and implementing driver training programs often grapple with the fiscal considerations required for maintaining successful campaigns. Regarding to that, this very study acknowledges the unexplored potential of digital storytelling and its application within the realm of transportation engineering, specifically for altering illegal driving behaviors, remains relatively uncharted territory, particularly in Bangladesh.

This research aims to evaluate that exact thing; which is the effectiveness of digital storytelling in transportation planning compared to the above discussed infrastructure-intensive solutions. It seeks to identify the factors influencing road users' perceptions and involvement in the planning process through digital storytelling. Additionally, the study intends to create a systematic approach for processing digital storytelling responses to inform policy decisions.

### 1.3 Purpose and Objectives

The primary objectives of this research study encompass a detailed exploration and evaluation of various facets of digital storytelling in the context of transportation planning. Specifically, the goals are as follows:

- To evaluate the effectiveness of digital storytelling, utilizing planning data, in encouraging public participation in transportation planning.
- To assess the impact of digital storytelling on enhancing public comprehension of transportation planning processes.
- To investigate the potential of utilizing public responses to digital storytelling as valuable inputs for shaping informed policies in the transportation sector.
- To analyze the correlation between digital storytelling and informed policy-making, aiming to optimize its role in enhancing transportation systems based on public feedback.

### 1.4 Scope of the Study

Text-based Digital Storytelling (DST) methods are the main aim of this research which supports a collective vision for a sustainable transportation system in Bangladesh. This will be achieved by the study through gathering and integrating different perspectives from people of all ages to enable a comprehensive understanding that considers both convergent and divergent viewpoints.

The specific objectives within the scope of this study include:

- **Developing Text-Based DST Methods:** The research will focus on creation and refining of text-based digital storytelling techniques. These techniques are aimed at involving as many people as possible. This is regardless of their differences. The goal is to capture various experiences and aspirations connected with transport among Bangladeshi citizens.
- **Encouraging a Collective Vision:** By employing these DST methods the study aims to promote a unified vision for a sustainable transportation system. This will involve taking into consideration opinions given by individuals belonging to different age groups. Thus ensuring that all the community's needs are accounted for during the transportation planning process.
- **Acknowledging Diverse Viewpoints:** In order to accommodate various perspectives, this study will consider viewpoints from both sides that acknowledge that sustainability in terms of transport must embrace differing opinions. It is aimed at fostering an integrated approach through which a more comprehensive planning process.
- **Bridging the Visualization Gap:** Among the goals of the study is to fill the visualization gap between those responsible for planning and what people in general expect. The research uses DST methodologies to strengthen communications and understanding between transportation planners and the public in order to make the planning process more clear, open and inclusive.
- **Utilizing Facebook for Data Collection:** The research will use Facebook as its primary data collection instrument. This method will encourage large scale interactions with Bangladesh's citizens leading to a diverse representation of opinions and ideas during this study.

These objectives focus on making sure that transportation planning processes in Bangladesh become more inclusive and effective; thus eventually developing a transport system that better serves its people.

## 1.5 Thesis Structure Overview

The thesis is structured into seven comprehensive chapters, each detailing a specific aspect of the research. Below is a brief description of each chapter:

- **Chapter 1: Introduction** - Introduction This chapter <sup>17</sup> introduces the research by providing necessary background information and a list of research components to be discussed. It begins with an explanation of why the research topic is important and its relevance, which gives context and significance about it. Then, it states core issues and challenges addressed by the study for clear problem statement. Consisting of aims and specific goals, the purpose and objectives are explained in order to clarify the aim. In addition, it describes boundaries of research thereby defining scope of study. Lastly, this paper summarizes structure along with content that follows in other chapters hence provides an overview regarding how the thesis is organized.
- **Chapter 2: Literature Review** - Literature Review Here we reviewed different literature that had been written about digital storytelling within various industries as well as its use in transport sectors. This has surveyed previous studies on digital storytelling across diverse grounds to give general comprehension on how it was used for or studied under different circumstances.

Furthermore it scrutinizes literature on utilization of digital storytelling in transportation sector explicitly looking at available studies

- **Chapter 3: Study Area and Data Collection** - This section explains the area of concern, which in this case is geography and the methods used during data collection and processing. It defines the research geographical scope by explaining why the selected study area is relevant to the objectives of such a survey. The tools that were employed for gathering appropriate information are discussed, thus an explicit comprehension of how data was collected is provided. Consequently, this chapter outlines all steps taken when processing and preparing collected data for analysis to ensure that it becomes ready for subsequent examination. This chapter makes sure to have transparency and rigor in the data collection process.
- **Chapter 4: Methodology** - This chapter provides a workflow and techniques applied in research through which specific techniques used in this study are explained. There is an elaborate description of what really happens during research right from data collection down to its analysis step by step. The discussion focuses on text mining techniques employed in analyzing data as well as extracting meaningful insights highlighting how these approaches contribute to the objectives of the research. With regard to replicability and robustness of research methodology, Chapter Four serves as a clear roadmap illustrating how this survey was carried out.
- **Chapter 5: Analysis and Results** - This chapter presents the analysis of collected data and resulting findings. It details the methods and procedures used for data analysis. The data was examined and interpreted. The results of the analysis are presented. Key findings and insights derived from data are highlighted. This chapter provides a comprehensive understanding of research outcomes linking findings back to research objectives and questions.
- **Chapter 6: Conclusion** - This chapter summarizes key findings, acknowledges limitations of the study and suggests directions for future research. It highlights main conclusions drawn from research. Their significance and implications are emphasized. The constraints faced during the study are discussed. This provides an honest assessment of study's limitations. Finally the chapter proposes areas for future investigation. It suggests how subsequent research can build on the current study's findings. This chapter provides a thoughtful reflection on the research process and its contributions.
- **Chapter 7: References** - This chapter provides comprehensive list of all the sources and references cited throughout the thesis. It ensures that all the academic and empirical works referenced in the study are properly acknowledged. This supports the credibility and reliability of the research. This chapter serves as a resource for readers. They can explore the referenced works further. This enhances the study's academic rigor and integrity.

## **Chapter 2 Literature Review**

### **2.1 Previous Studies on Digital Storytelling in Different Sectors**

In the field of consumer psychology studies by Adaval et al. (2007) and Pennington and Hastie (1988) highlight that perceiving a story as more than just series of sentences can trigger significant cognitive, emotional and behavioral changes in consumers. These studies underscore the power of narrative in shaping consumer perceptions and actions. They suggest that stories can engage individuals on a deeper level. Simple factual information cannot achieve this same engagement.

Despite the limited literature directly related to the current research project prior studies have illuminated a distinctive aspect of digital storytelling (DST). One key area of focus has been the impact of the narrator's actual voice. In the narrative, this element of DST has been found to foster a sense of self-reflection among listeners. The personal nature of the narrator's voice creates a more intimate and engaging storytelling experience. The presence of the narrator's voice adds a layer of authenticity and personal connection. This can enhance the reflective process for both storyteller and audience.

Research has also explored the applicability of DST. This is particularly in contexts involving marginalized groups. These groups often have untapped potential for knowledge translation and advocacy. DST has emerged as powerful tool in these areas. By providing platform for marginalized voices. DST facilitates the sharing of personal experiences and stories. Otherwise they might remain unheard. This application of DST can promote greater understanding and empathy. Encouraging reflection. And collaboration among diverse communities.

The process of engaging with DST is not without challenges. While it encourages reflection and collaboration. It can evoke strong emotional responses. The act of sharing personal stories especially those involving trauma or hardship, can be emotionally taxing. This affects both the storyteller and the audience. Despite these challenges. DST serves as valuable tool. It aids professional growth and education. It allows individuals to convey complex nuanced experiences in way factual reporting often cannot achieve.

Community projects utilizing DST remain relatively scarce. They hold significant potential for fostering community engagement. Development is another potential outcome. In research contexts DST has proven effective in capturing sensory and emotional experiences. It offers a rich immersive understanding. This deep insight captures participants' perspectives. However this approach also demands careful ethical considerations. Researchers must navigate issues of consent and confidentiality. They must also consider potential emotional impact on participants.

Overall DST represents multifaceted tool with ability to bridge gaps in knowledge translation. It aids in advocacy. Community engagement is another area it enhances. Its capacity to elicit cognitive, emotional and behavioral changes underscores its potential impact. This potential spans across various domains. These domains range from consumer psychology to professional education and community development. However the implementation of DST requires thoughtful approach. An ethically informed approach is necessary. This ensures the maximization of its benefits while mitigating potential emotional challenges.

## 2.2 Previous Studies on Digital Storytelling in Transportation Sector

Previous study examines public perceptions of transport policies and subsequent impact on behavior. Research has shown that policies aimed at enhancing public transport generally receive strong public support. Those designed to restrict or affect car use often face significant resistance. For effective behavioral influence. Enhancements in public transport infrastructure and services are crucial. This aligns with the findings of a multifactorial study. The study evaluated transport options for Salerno's accessibility using the Analytic Hierarchy Process. The study highlighted option A2 as the preferred choice due to its superior services. Benefits related to modal shifts were noted. However it also revealed that cost considerations play significant role in decision-making. Emphasizing the importance of financial factors in the evaluation process.

In addition to transportation studies scholarly investigations have extensively explored the use of digital storytelling (DST) in education. These studies have demonstrated that DST can effectively enhance both teaching and learning experiences. It reaches a wide audience. They provide valuable recommendations. Guidelines for educators who aim to employ digital storytelling as educational tool are outlined; underlining its effectiveness in engaging students and fostering a deeper understanding of the material.

Despite the growing body of research on digital storytelling there is notable gap in exploring how roadway users can contribute to transportation planning through DST. Previous research has largely focused the influence of digital storytelling on decision-making within Western countries. These include Australia, Canada New Zealand, the UK and the USA. Zimbabwe is an exception. This geographical concentration leaves a significant research gap concerning the impact of DST in the context of Bangladesh. Given the scarcity of research in this area within the transportation engineering community investigating the participatory culture of roadway users in Bangladesh through DST is valuable. It represents a promising future endeavor.

Overall, existing studies provide a robust foundation for understanding public perceptions of transport policies. They also highlight the educational benefits of DST. However there is a clear

need for further research on the application of DST in transportation planning, particularly in regions like Bangladesh.

## **Chapter 3** Study Area and Data Collection

### **3.1 Study Area**

The study area for this research will predominantly encompass the entire country of Bangladesh. This research is designed to involve active participation from vital stakeholders. This includes local communities government authorities and transportation experts. The comprehensive methodology as delineated in the research proposal emphasizes the utilization of digital storytelling. It also leverages data-driven insights. This approach presents a detailed roadmap for inclusive public engagement. It also informs policy formulation within the domain of transportation planning.

By involving local communities, the study ensures voices of people directly affected by transportation policies are heard. It also considers these voices. Engaging government authorities is crucial. This aligns the research with current policies and regulations. Ensuring that the findings can be seamlessly integrated into existing frameworks. Collaboration with transportation experts provides technical insights. It enhances the credibility and feasibility of the proposed solutions.

The use of digital storytelling in this research is particularly significant. It not only makes complex data more accessible and engaging for the general public. But it also facilitates deeper understanding of the personal and communal impacts of transportation policies. By incorporating narratives and personal experiences. Digital storytelling bridges the gap between data and human experience fostering more empathetic and informed dialogue among stakeholders. Data-driven insights form another cornerstone of the methodology. Through rigorous data collection and analysis. The study aims to uncover patterns, preferences and pain points in the current transportation system. This empirical approach ensures the recommendations are grounded in real-world evidence. It enhances their relevance and impact.

### **3.2 Data Collection**

In our research we are utilizing the social media platform Facebook to collect data and assess the potential of digital storytelling. This approach aims to help transportation planners comprehend public perspectives, expectations and suggestions regarding Bangladesh's transportation sector. To ensure representative sample of the total population we have established private Facebook group titled 'Road Planners Bangladesh'. (accessible at [<https://www.facebook.com/groups/1592684484812350>]).



Shahajida, Note page-1

বাংলাদেশ ফাউন্ডেশন, জাতীয় সদর দফতর  
৬০ আব্দুল মান্নান মুফিদুল ইসলাম সড়ক, কাকরাইল, ঢাকা-১০০০

পত্র নং- বাঃ ফাঃ (সমাজ উন্নয়ন ও স্বাস্থ্য)/২৪০০(০৮)/২০২৪

তারিখঃ ১৭ বৈশাখ ১৪৩১  
৩০ এপ্রিল ২০২৪

সম্পাদক

বাংলাদেশ ফাউন্ডেশন, রোডার/রেলওয়ে, নৌ ও এয়ার অঞ্চল

বিষয়ঃ Transport Planning Research বিষয়ক Facebook Page-এ রোডার ফাউন্ডেশনের সম্পৃক্তকরণ  
সম্পর্কীয়।

জনাব

উপর্যুক্ত বিষয়ের প্রেক্ষিতে জানাচ্ছি যে, Islamic University of Technology (IUT)-এর Department of Civil & Environmental Engineering (CEE) বিভাগের আহ্বের প্রেক্ষিতে উক্ত প্রতিষ্ঠানের Research Team এর সাথে বাংলাদেশ ফাউন্ডেশন এর একটি মত বিনিময় সভা অনুষ্ঠিত হয়। IUT Research Team বাংলাদেশে নিরাপদ Transport এর জন্য সচেতনতামূলক কাজ করেছে। এ লক্ষ্যে তারা একটি Facebook Page পরিচালনা করছে যেখানে Transport সম্পর্কিত যেকোন পোস্ট, ভিডিও কিংবা ছবি ও মতামত প্রদানের সুযোগ রয়েছে। Facebook Page এর লিংক নিম্নরূপ:

<https://www.facebook.com/share/8X5hjNYgPuCWafcd/?mibextid=K35Xff>

Ambassador program recruitment google form-এর লিংক নিম্নরূপ :

[https://docs.google.com/forms/d/e/1FAIpQLSeqfhrQJpxbOhGMsk9xcTt83\\_wTXOdOk7CSAERSBefjmTEWlg/viewform](https://docs.google.com/forms/d/e/1FAIpQLSeqfhrQJpxbOhGMsk9xcTt83_wTXOdOk7CSAERSBefjmTEWlg/viewform)

এ বিষয়ে উক্ত টীমের একটি প্রমোশনাল ভিডিও রয়েছে। লিংক নিম্নরূপ:

<https://www.facebook.com/groups/1592684484812350/permalink/1618883838859081/?mibextid=W9r1R>

উল্লিখিত প্রেক্ষিতে, উক্ত Linkসমূহ রোডার ফাউন্ডেশনের মাঝে ছড়িয়ে দেয়ার মাধ্যমে গুপল ফর্ম পূরণ করার প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য আপনাকে অনুরোধ জানাই।

  
১৭/০৪/২০২৪  
(উঃ চিঃ)  
নির্বাহী পরিচালক (অ.দা.)  
বাংলাদেশ ফাউন্ডেশন

বিতরণ কার্যার্থেঃ

- ১। উপ পরিচালক, বাংলাদেশ ফাউন্ডেশন, রোডার/রেলওয়ে, নৌ ও এয়ার অঞ্চল;
- ২। সহকারী পরিচালক (আইসিটি), বাংলাদেশ ফাউন্ডেশন

সদয় জ্ঞাতার্থেঃ

- ১। জাতীয় কমিশনার (সমাজ উন্নয়ন ও স্বাস্থ্য), বাংলাদেশ ফাউন্ডেশন;
- ২। জাতীয় উপ কমিশনার (সমাজ উন্নয়ন ও স্বাস্থ্য), সকল, বাংলাদেশ ফাউন্ডেশন;



### **3.3 Data Processing**

After creating Excel database from gathered data the next step in our data processing journey involves transforming this dataset into CSV format. This prepares the data for further analysis. Subsequently, we employ R Studio to delve into text mining. This process encompasses several critical steps aimed at extracting meaningful insights from the textual data.

The initial stage of text mining entails examining word frequency within the dataset. This allows us to identify most commonly occurring terms. This quantitative analysis provides valuable insights into the predominant themes. It reveals topics present in collected texts.

Following the analysis of word frequency we employ visualization techniques. One such technique is creating a word cloud. This visual representation offers a clear depiction of most frequent words. Size indicates relative frequency. This facilitates easy interpretation of the key themes and concepts.

Additionally, we explore word collocation. This involves identifying words that frequently occur together. This analysis sheds light on significant word pairings or phrases. It offers deeper insights into the contextual relationships between terms.

Moving forward our text mining process encompasses topic modeling. It is sophisticated statistical technique aimed at uncovering latent topics within textual data. By employing algorithms such as Latent Dirichlet Allocation we identify clusters of words. These words frequently co-occur. The clusters represent underlying themes or topics present in dataset.

Finally we extract topic proportions from generated topic models. This step quantifies prevalence of each identified topic within dataset. It provides comprehensive understanding of the distribution of themes. It allows us to discern the most salient topics within collected texts.

Through this meticulous and iterative process of text mining. We aim to extract rich insights from textual data. This enables us to gain nuanced understanding of public perspectives. And sentiments regarding transportation planning in Bangladesh.

## **Chapter 4 Methodology**

### **4.1 Text Mining**

The research process started with an extensive literature search with the aim of identifying the major literature review that discusses prior research and information related to the research issue being investigated. These comprised of a thorough review of the existing literature as the first step. It was crucial for the development of the questionnaire survey. To ensure that the survey questions were up-to-date, the following procedures were followed:

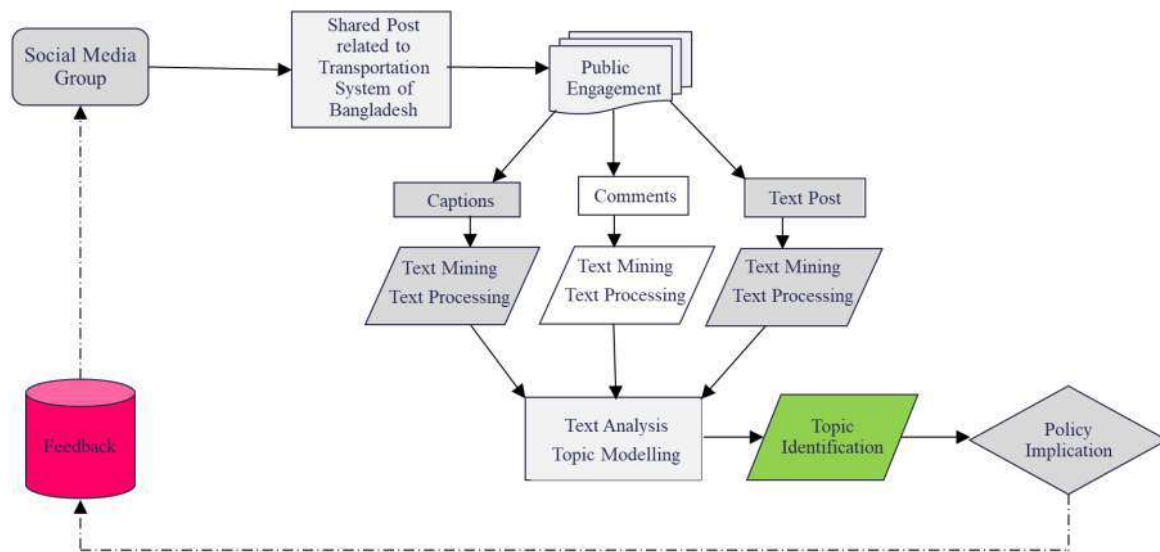
Concerned relevant questions in the context of transport planning. After the literature review, a database was developed from the data obtained from the 'Road Planners Bangladesh' Facebook group. This database was the main source of information for this research. It contained a wealth of opinions and perspectives. Furthermore, it presented the perceptions of the members of the public on the transportation system of Bangladesh.

Next, text mining code was written to extract information from textual data stored in an Excel CSV file. All this code was run using RStudio as the input console. This made it possible to obtain the following: Gain useful information from the textual data. It is also important to note that the tuning of the text mining model was quite robust. Optimization based on advice of specialists. Engineering judgments and insights derived from prior literature. This iterative process made it possible to fine-tune the text mining model to fit the expected outcomes. Capture and analyze details that may not be easily visible or discernible in the dataset.

Last but not the least, the improved text mining model was used to extract the main topics and themes shared by participants in the 'Road Planners Bangladesh' Facebook group. By analyzing the on the textual data, the model was able to identify the sentiments, issues, and priorities of the people about the present state of the transportation system in Bangladesh.

This final step enabled the research to obtain critical information on the perception and consumer preference among the public. Which could inform future policy making and planning decisions in the transport sector.

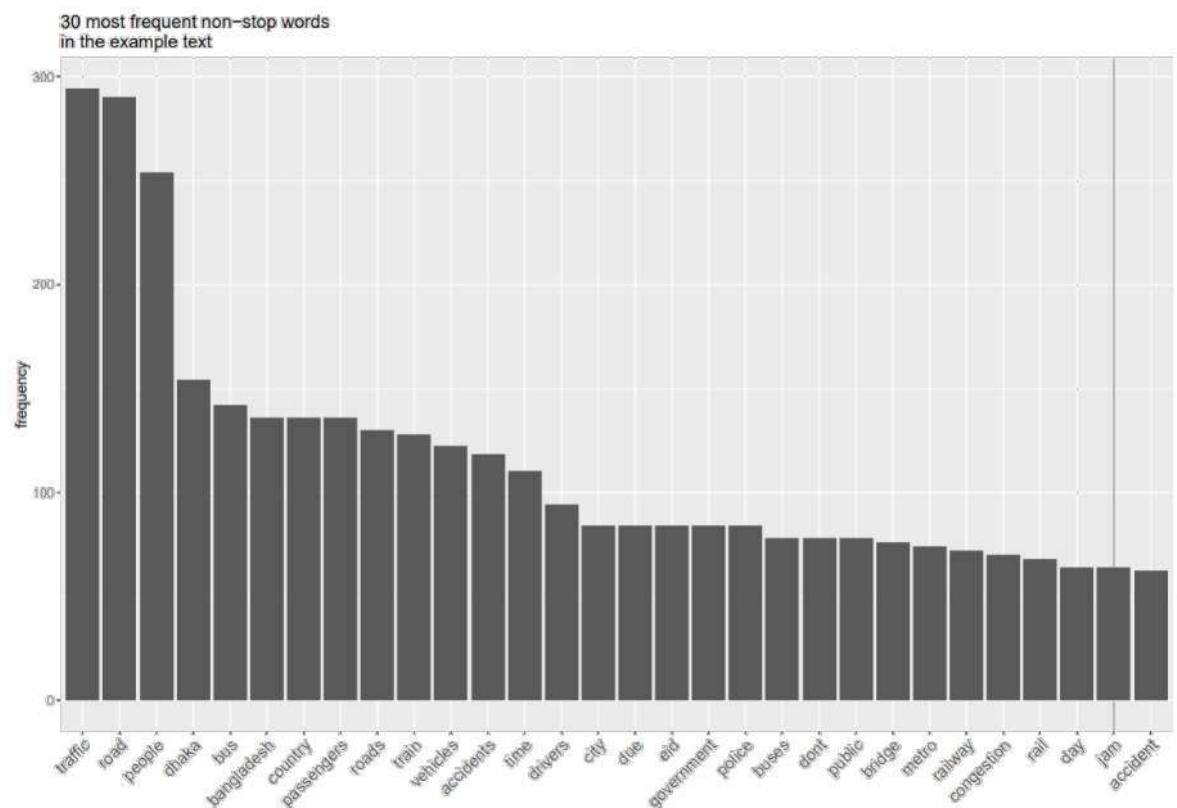
## 4.2 Work Flow of the Research



## Chapter 5 Analysis and Result

### 5.1 Word Frequency

In the first step in our analysis that is the word frequency analysis, we got the following results. General words obtained from the textual data collected from the official Facebook page of 'Road Planners Bangladesh' group. It gave a basic idea of the analysis that was done and the final results. The results of the literature synthesis allowed for the definition of the major themes and topics discussed by participants. It enlightened me on the major issues of interest and the areas that have attracted the most attention to almost all sectors of the Bangladeshi economy including the transportation sector.



#### 5.1.1 Top Words Identified

The word frequency analysis revealed several prominent terms that frequently appeared in the discussions. The highlighted terms included "traffic". "Road". "People". "Dhaka". "Bus". And "Bangladesh". These words emerged as most commonly used. This indicates their central importance in the conversations about transportation.

### ***5.1.2 Frequency Comparison***

To quantify the prevalence of these terms we compared their frequencies within the dataset. The following counts were recorded for each of the top words.

Traffic: 290 occurrences.  
Road: 285 occurrences.  
People: 255 occurrences.  
Dhaka: 160 occurrences.  
Bus: 135 occurrences.  
Bangladesh: 130 occurrences.

These frequency counts provide a clear indication of the terms that dominate the discourse among the participants. "Traffic" and "road" emerged as the two most frequently mentioned words. They were closely followed by "people." The term "Dhaka" representing the capital city and a major hub of transportation issues, also featured prominently. Additionally "bus" and "Bangladesh" were significant. These counts highlight the focus on public transportation and national-level transportation concerns.

### ***5.1.3 Outliers Detected***

The analysis also identified certain terms as outliers due to their significantly higher frequencies compared to other terms in the dataset. Specifically the words "traffic," "road" and "people" stood out as outliers. These terms not only had highest frequencies but also indicated key areas of concern and focus among participants.

- **Traffic:** The high frequency of this term underscores the pervasive issue of traffic congestion. It's a common challenge in urban areas. Particularly in Dhaka. Participants frequently discussed traffic-related problems. This reflects the urgent need for effective traffic management solutions.
- **Road:** The frequent mention of "road" highlights critical importance of road infrastructure. Discussions often centered around the condition of roads, road safety and the need for improvements in road networks.
- **People:** The term "people" indicates a strong focus on the human aspect of transportation. This includes concerns about the impact of transportation policies on everyday commuters the accessibility of transportation options and overall user experience.

The significantly higher frequencies of these terms suggest that traffic congestion road infrastructure and the human element of transportation are primary concerns among the public.



### **5.2.1 Key Words Identified**

The word cloud explained some of the top important keywords used in the presentation. Among these “will,” “traffic” “people,” “Dhaka,” “passengers,” and “accidents” were particularly common. The larger the size of the words used and the more the use of capital letters to write these words in the word cloud of the word, the more the influence of these words in the public discourse on transportation.

- Will: This word was rife in the texts that focused on the expected opportunities. It also included the strategies for solving the transport problems and the probable solutions to the transport problems.
- Traffic: This is a brief look into the present-day complications associated with traffic jams. It was one of the most frequently used terms in the analysis of the media and the presidential campaigns’ engagement prominent. They mentioned one of the worries that were considered serious.
- People: Exposing an aspect of transport that has to do with the people that use the transport facilities. This term was frequently used during the great discussion regarding the nature and role of federalism in the United States and many other countries. Controversies and disputes concerning the place of commuting in the social and cultural frameworks.
- Dhaka: Especially when the capital city of Bangladesh was Dhaka, it was in the middle of it. Some of what was discussed includes some of the issues of discussion which included transportation issues and most likely solutions.
- Passengers: This word was more aimed at the feelings and worries of the people who are using this word in public transportation.
- Accidents: Safety issues were among the major topics mentioned often as the following subjects show. Here, it was observed that there was a tendency to overemphasize accidents and the crucial role that safety plays in transport structures.

### **5.2.2 Clusters Identified**

There were several areas of clustering as seen from the word cloud analysis. These clusters provided deeper information regarding the context and topics of the discussions. These clusters assist in the analysis of the larger patterns and subthemes within the data provided.

- Dhaka: This cluster had a connection with the urban environment of the capital. It included transportation infrastructure or other regions. Discussions often revolved around particular issues that Dhaka has had to grapple with. This included its population density and the high population density that comes with its transportation issues.

- Traffic: Terms like traffic congestion and transportation also accompanied this one significant cluster. Issues relating to traffic congestion were often raised with peak time as well as events such as Eid being mentioned. This cluster pointed to the fact that there was a need to manage traffic efficiently. Management and solutions to reduce congestion which is a common problem in large cities.

People: This cluster included cultural, religious, and social perspectives on transportation. It captured the multifaceted needs and activities of the commuters. They stressed the role of the public in the process of decision-making in transportation for meeting various social factors in society.

### ***5.2.3 Insights Derived***

The word cloud provided several key insights into primary concerns and themes discussed by participants. These insights are crucial for understanding public perspective and for informing transportation planning and policy.

- Transportation Challenges. Urban congestion emerged as a major issue. Participants discussed potential solutions to alleviate peak-time traffic problems. This insight highlights the need for innovative and efficient traffic management strategies.

- Public Safety. The frequent mention of accidents and related terms underscored the importance of safety in transportation planning. Participants expressed concerns about accident prevention. They emphasized passenger well-being. This indicates a critical area for policy focus.

- Cultural Context. The influence of cultural religious, social factors on transportation was evident in discussions. Understanding these cultural dynamics is essential. It aids in developing transportation solutions that are culturally sensitive and widely accepted by the public.



### ***5.3.1 Contextual Exploration:***

#### **1. Traffic Control and Willpower:**

- **Relationship:** The terms selected include “traffic control,” “willpower of the people,” and “government” which frequently appeared together. This shows a tripartite relationship.
- **Insight:** This collocation adds to the interdependency of traffic management societal willpower and government initiatives. It implies that in the opinion of the public, traffic control is easily managed.

A collective activity that needs to involve individuals from two distinct organizations. But it also demands willpower from the people. This must be backed by sound government policies and measures in place to ensure this happens. This relationship underscores the importance of a systemic approach. Public cooperation and governmental adequate provision of traffic control and support are considered essential in handling traffic centralization.

#### **2. Traffic in Dhaka Roads:**

- **Relationship:** The words “Dhaka road” and “traffic” co-occurred frequently, which means that they were used in the same context, often as a direct relationship.
- **Insight:** This collocation sheds light on this major area of concern in that there is very high traffic density on the roads of Dhaka. It highlights the congestion problem that has plagued the city resulting in the development of several sub-urban roads. The frequent use together shows that traffic congestion remains a constant concern even in Dhaka. This leads us to understand the need to take a more focused approach to addressing issues to do with roads and highways. Traffic flow in the capital, thus it is important to have proper management of traffic flow in the capital.

#### **3. Traffic Congestion and Road Connectivity:**

- **Relationship:** The words “traffic congestion,” “road” and “connected” were more recurrent in the body of the articles together. This can be considered as proof of a direct relationship.
- **Insight:** This collocation suggests a strong relationship between traffic congestion and factors including the quality and availability of roads in a certain region. It implies that the public has a way in which it expects traffic to move and this may not be due to the physical layout of the roads but other factors for instance, cultural and or perceived norms of congestion as being an area that relied mostly on the quality of the roads and their linkages. The study establishes that poor-quality road networks and lack of access roads are some of the causes of congestion. This underlines the need to provide infrastructure enhancements to help overcome traffic issues.

### **5.3.2 Implications of Colocation Analysis:**

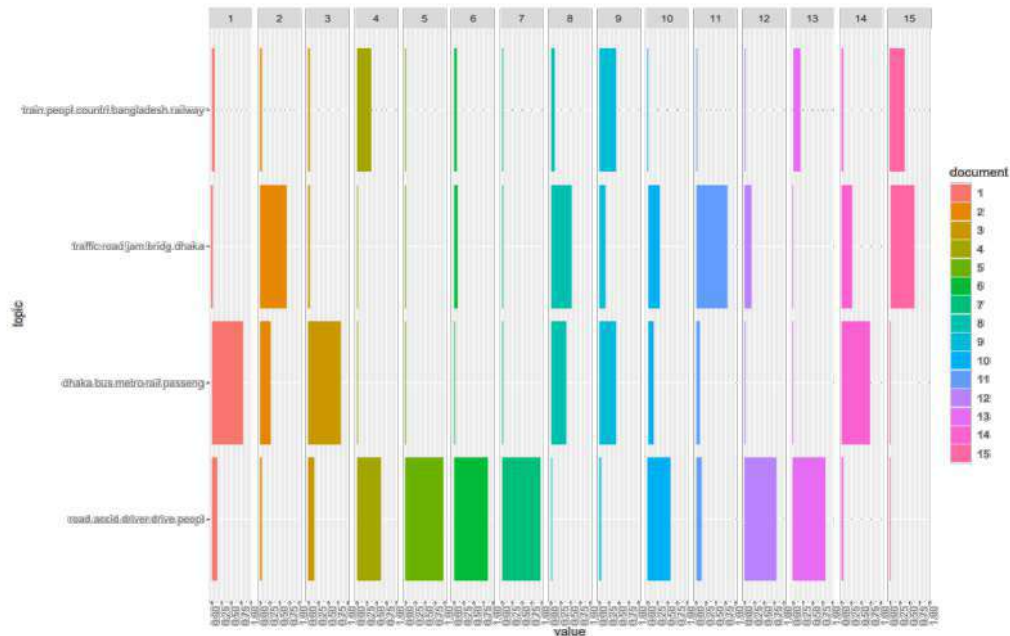
The insights derived from word colocation analysis provide valuable context for understanding key issues and relationships in transportation planning as perceived by the public. These relationships reveal:

- **Traffic Management Requires Multi-Stakeholder Efforts.** Effective traffic control is seen as collective responsibility. This involves not just the government but also participation of the community. Initiatives to manage traffic must therefore consider strategies to engage and mobilize public willpower. They must also implement government policies.
- **Urban Congestion in Dhaka:** The high frequency of colocated terms related to traffic and Dhaka's roads underscores the critical need for addressing urban congestion. This calls for targeted solutions. Solutions must be tailored to the specific challenges faced by Dhaka's road infrastructure. They must also address traffic patterns.
- **Importance of Road Connectivity:** The strong association between traffic congestion and road connectivity highlights that improving the quality and connectivity of roads can significantly impact traffic flow. Policymakers should prioritize infrastructure development projects that enhance road networks and connectivity. This will help mitigate congestion issues.

In summary word colocation analysis enriches our understanding of the public discourse. It illuminates the contextual relationships between key terms. It provides nuanced perspective on how the public perceives the challenges and solutions related to traffic management. And road conditions and urban congestion. These insights are crucial for informing transportation planning. And policy-making. Ensuring that interventions are responsive to the interconnected nature of these issues.

## **5.4 Topic Proportion from Topic Modelling**

The final section of our analysis involves topic modeling. This is a <sup>22</sup> sophisticated statistical method used to uncover latent themes within the textual data. By applying **topic modeling techniques such as Latent Dirichlet Allocation (LDA)** using RStudio we identified several key topics discussed by participants in the 'Road Planners Bangladesh' Facebook group. Each topic encompasses various sub-themes. This provides a comprehensive overview of the public's concerns and suggestions regarding transportation system in Bangladesh. The proportions of these topics within the dataset highlight their relative importance. The frequency of discussion is also noted.



### 5.4.1 Key Topics Identified

#### 1. Eid Railway Travel:

- Main Focus: The importance of the railway system during Eid.
- Key Points: People often talk about how crucial the railway system is during Eid when travel demand goes through the roof. They express hope for a reliable railway service that can ease the burden on other modes of transportation, especially during the busiest travel periods.
- Additional Points:
- Optimism: Many people are optimistic about the potential of railways to offer a smoother travel experience during Eid.
- Challenges: However, there are practical difficulties to tackle, such as overcrowding and ticket shortages, which continue to be major issues.
- Safety Concerns: Passenger safety and security become even more critical during the travel rush.
- Corruption Allegations: There have been allegations of corruption that affect ticket distribution and railway operations.

#### 2. Road Safety Challenges:

- Principle Emphasis: The imperative and pressing necessity for amelioration in road safety protocols.
- Core Concepts: The discourse on this subject underscored an essential requirement to magnify and bolster prevailing road safety measures nationwide. The dialogues

navigated through diverse variables. These variables play contributory roles in precipitating road accidents. Additionally, they encompassed potential solutions intended to attenuate these occurrences.

- Specific Themes:
- Enhanced Enforcement: There exist advocacies for the augmentation and intensification of the enforcement of traffic regulations. Such measures aim to forestall reckless driving behaviors and, concurrently, strive to enhance the holistic safety landscape.
- Infrastructure Modernization: The call for the modernization and enhancement of road infrastructure. Such initiatives are pivotal in diminishing the potential for accidents. Moreover, they serve to ameliorate overall travel conditions.
- Responsibility: The critical significance of holding both governing entities and drivers responsible for the adherence and perpetuation of established road safety standards.

### **3. Concerns about Traffic Infrastructure:**

- Main Focus: Dealing with challenges related to traffic congestion and infrastructure.
- Key Points: During the discussions, participants raised various concerns regarding traffic congestion. They also emphasized the role of inadequate infrastructure in exacerbating the problem. The importance of comprehensive planning was highlighted, as well as the need for active public engagement.
- Subtopics:
  - Planned Infrastructure: The significance of well-planned infrastructure projects that can cater to both current and future traffic demands.
  - Public Engagement: Encouraging the active participation of the public to ensure that infrastructure projects align with community needs.
  - Traffic Management: Implementing effective strategies for managing traffic to alleviate congestion and improve traffic flow.

### **4. Urban Transportation Improvement:**

- Focus: Enhancing urban transportation in Dhaka.
- Themes: This topic is centered around various strategies. Improvements needed to enhance urban transportation in Dhaka. These aim for a more efficient and sustainable system.
- Sub-Themes:
  - Service Distribution: Ensuring equitable distribution of transportation services focusing on various urban areas.

- **Safety:** Implementing measures to enhance safety of urban transportation. We aim to ensure protection for all users.
- **Sustainability:** Incorporating sustainable practices. We utilize technologies to create an environmentally friendly transportation system.
- **Technology:** Leveraging advanced technologies to improve efficiency. Enhancing user experience in urban transportation.

#### ***5.4.2 Topic Proportions and Insights:***

The data in this dataset gives us some interesting insights into what the public cares about the most. Let's take a look at the different topics:

1. **Eid Railway Travel:** This topic got a lot of attention in the discussions. It shows how important the railway system is, especially during busy travel times like Eid. People talked about both the potential and the challenges, which gives us a balanced view. It also brought up some issues that need to be addressed in the railway system.
2. **Road Safety Challenges:** This topic stood out as a major concern for many people. Improvements are urgently needed. The discussions focused on things like better enforcement, upgrading infrastructure, and holding people accountable. We need a multi-faceted approach to tackle these issues.
3. **Traffic Infrastructure Concerns:** A big part of the discussions revolved around traffic congestion and the inadequacy of our infrastructure. These are major concerns for the public. People talked about planned infrastructure projects and the importance of involving the public in these decisions. We need to think carefully and inclusively when it comes to infrastructure.
4. **Urban Transportation Improvement:** This topic came up a lot in the discussions, showing that people are interested in improving urban transportation in Dhaka. The discussions focused on things like better service distribution, safety, sustainability, and technology. People want a comprehensive approach to improving our urban transportation systems.

In conclusion, this analysis of the topics discussed by the public gives us a detailed and nuanced understanding of their concerns about transportation in Bangladesh. The identified topics and their proportions highlight areas that need immediate attention and provide valuable guidance for policymakers. This information can help planners develop effective and responsive transportation strategies.

## Chapter 6 Conclusion

The research conducted through 'Road Planners Bangladesh' Facebook group and the subsequent text mining analysis has yielded several critical insights into the transportation challenges and public sentiments in Bangladesh. These key findings highlight the urgent issues that need awareness creation. They also need focused attention by planners and policymakers. By incorporating public opinion these insights guide resource allocation. They also guide policy development towards more effective, sustainable transportation solutions.

### 6.1 Key Findings

#### 6.1.1 Critical Issues Identified

- **Traffic Congestion and Urban Infrastructure:** The discussions overwhelmingly pointed to traffic congestion especially in Dhaka, as primary concern. The public's emphasis on improving urban infrastructure to address congestion issues underscores the need. Comprehensive urban planning is necessary. Traffic management strategies must be implemented.
- **Road Safety:** There is a significant public outcry for enhanced road safety measures. Frequent mentions of accidents and the call for stricter enforcement of traffic laws indicate that road safety should be top priority for planners. This includes both infrastructural improvements. Policy measures are also needed to enforce traffic regulations.
- **Public Transportation:** The need for reliable and efficient public transportation systems particularly during peak travel periods like Eid, was recurring theme. Public support for enhancing the railway system and bus services suggests that investment in public transportation could alleviate some pressure. This would reduce some of the congestion on road networks.
- **Government Accountability and Public Engagement:** Data highlights demand for greater government accountability and transparency in transportation planning. Public engagement is seen as crucial. Developing effective policies requires involving community voices in decision-making processes.
- **Technological Integration:** Discussions about leveraging technology for transportation improvements suggest public readiness for smart solutions. Implementing advanced technologies for traffic management. Safety monitoring and efficient service delivery could address many identified challenges.

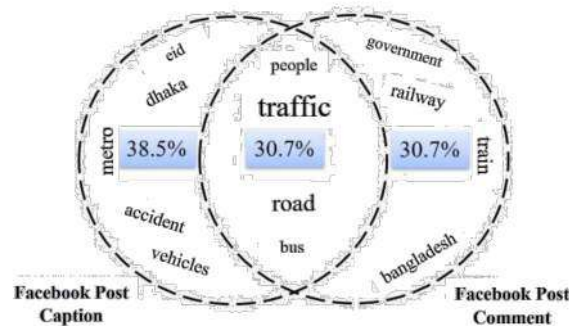
### **6.1.2 Resource Allocation and Policy Development**

When it comes to prioritizing infrastructure projects, planners need to listen to the public and focus on tackling the issue of traffic congestion head-on. One way to do this is by improving road connectivity. Investing in expanding and upgrading urban road networks, as well as creating efficient bypasses, can really help ease the traffic situation in our cities.

- **Prioritizing Infrastructure Projects:** Another crucial aspect is implementing safety programs. Allocating resources to road safety initiatives, like public awareness campaigns, stricter law enforcement, and infrastructure safety enhancements, is essential. These programs should specifically target high-risk areas and times, such as during major festivals and rush hours.
- **Implementing Safety Programs:** To make public transport more attractive and convenient, policies should support the expansion and modernization of public transport systems. Initiatives like increasing the frequency of buses and trains during peak periods, as well as improving the overall service quality, can make public transport a much more viable option for daily commuters.
- **Enhancing Public Transport:** It is important to promote public involvement in transportation planning. This can be achieved by developing platforms that allow continuous public engagement. By actively involving the community through methods like digital storytelling and other participatory approaches, we can ensure that transportation policies truly reflect their needs and preferences.
- **Promoting Public Involvement:** By implementing these strategies, we can prioritize infrastructure projects, enhance safety measures, improve public transport, and actively engage the public in transportation planning. This will ultimately lead to better transportation solutions that meet the needs of our communities.
- **Integrating Technological Solutions:** Embracing technology in transportation planning can lead to smarter and more responsive systems. Investments in intelligent transportation systems (ITS) and real-time traffic monitoring. Data analytics can enhance efficiency and safety.

## **6.2 Ven Diagram Analysis**

The Venn diagram below illustrates the most frequently used words in Facebook posts and comments within the 'Road Planners Bangladesh' group. The analysis highlights the commonalities. It also shows the differences in the vocabulary used by group members when discussing transportation issues.



### 6.2.1 Key Words in Both Posts and Comments:

- ✓ Dhaka
- ✓ Traffic
- ✓ People
- ✓ Road

These terms appear prominently in both posts and comments. This indicates common concerns. It also shows discussions around these topics. The frequent mention of "Dhaka" the capital city, underscores focus on urban transportation issues. "Traffic" "people," and "road" suggest that congestion and human factors as well as infrastructure, are central to the discussions.

### 6.2.2 Unique Words in Posts:

- ✓ Bangladesh
- ✓ Bus

In this case the frequency of used terms "Bangladesh" and "bus" is higher. There is more frequent and extensive discourse on transportation at the national level. This goes to show that bus transport plays an important role in the country in question.

### 6.2.3 Unique Words in Comments:

- ✓ Passengers
- ✓ Accidents

The words that are used more often in comments are 'passengers' and 'accidents'. This suggests which indicates that commenters are frequently referring to particular accidents and their individual observations like passengers' safety concerns and traffic accidents.

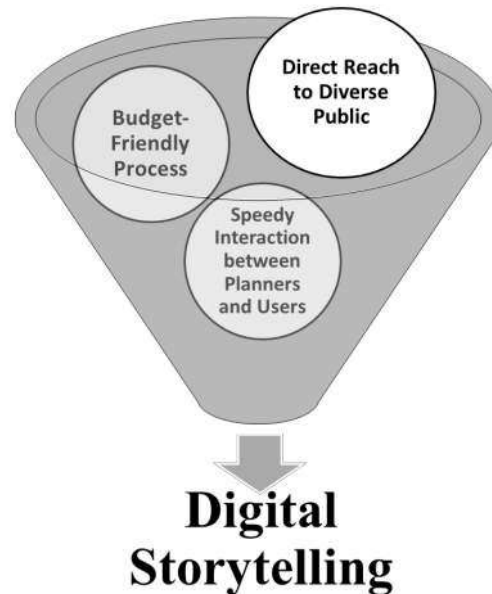
#### **6.2.4 Insights from the Venn Diagram:**

- **Transportation Challenges:** Here ‘Dhaka’, ‘traffic’, ‘people’ and ‘road’ words have been used in the posters and as all these words are interlinked, that means both posters are regarding traffic and roads in Cities. Commenters share these concerns.
- **Public Safety:** But even while making comments, one is forced to use terms like ‘accidents’ it shows a lot of concern. Safety is another in reference to the need to ramp up the traffic regulations and signs since such incidence can recur.
- **Public Transport:** That the term ‘bus’ appears only one with the function of signaling the signification of bus services. This word is used very often when the prospects of the available transit are discussed.

The analysis above presents the brief investigation of the linguistic features in the public discussions. The recommendations given in this paper will assist the planner as well as policymakers to redress the problems as pointed out properly.

### **6.3 Limitation and Future Scope**

Future research directions of this research focus on the enhancement of this subject and the discovery of new ways of digital storytelling. It also focuses on the integration of other modern AI technologies. The use of models such as AHP and the enhancement of the public’s involvement in the planning of transportation are important. In the exploration of these areas the planners can come up with better, inclusive and sustainable transport solutions to meet the public’s needs.



- 1. Collecting and constructing Public Opinion or Using Reviews to develop Digital Stories:** As for the further work, the attempts can be made to develop the techniques that would help to transform the public opinion into the official decision more smoothly. Having a longer and denser structure, such works contain more elaborate mannerisms of storytelling. These stories can offer a good deal of clarity and reach more than the mere call to attention in the concern of global warming. The translation of the views of the public to the planner. As you can see, this approach is meant to help better understand and organize DST in order to make it more accurate. And effective in informing the public opinions and expectations of a given issue.
- 2. AI Integration:** As for now, open-modelled tools like the recently unveiled OpenAI Sora could soon change that. AI can -
  - Help to simplify the procedures in the creation of videos. This make it possible to conduct operations and tasks in a more faster and efficient manner.
  - Generation of quality digital information as a crucial success factor. This technological advancement not only demonstrates the effectiveness of an idea, but also shows how the idea can be implemented.
  - Improves the DST process, but at the same time it also introduces new possibilities for the further development of the AI realm.
  - Increased public participation and innovation in transportation.
- 3. Application of Analytic Hierarchy Process (AHP):** The process of creating AHP questionnaires depends on distinct choices, various questions, and decision-making concerns. from Text Mining Results. Based on the concerns of text mining future research can

- Design the AHP questionnaires to reflect public's opinion in a manner that will ensure that planners' priorities reflect the opinion of the public. The Analytic
  - If the situation allows, Hierarchy Process can be utilized. It can then systematically analyze and rank multiple
  - The changes in the field of transportation planning can be defined as follows: This method ensures that the variations are random and have no performance effect of the system by testing it with a variation and then without it.
  - it has a much clearer view of the overall decision-making process. It is also the best strategy from a community perspective.
  - needs and preferences.
- 4. Bridging the Gap Between Planners and Users:** To that end, public opinions will be used to identify and determine. Planners' Decisions. Some of the future scope can be considered essential for improvement. Informing planners' decisions is one of them. By integrating the public opinion in the planning map, The distance between the public and planning conclusions can be narrowed here to some extent. This approach promotes meaningful public participation. It makes sure that there is a transportation policy as well as an implementation procedure in cases where they are lacking. There are indications that such projects are more conformative to the community's real requirements and aspirations.

In conclusion, this research explains the importance of digital storytelling (DST) and big data analysis in transportation planning. The significance of problems in Bangladesh's transportation sector, which the study addresses, is evident in the sample through engaging public opinions in the form of Facebook posts, analysed with the help of advanced text mining. These include traffic congestion, road safety and lack of proper public transport systems. So, the findings support the use of AI tools to improve the DST process. They also recommend the adoption of such formal decision-making methodologies such as the Analytical Hierarchy Process (AHP). Further fostering a more diverse and inclusive system of planning that can close the gap between the public's expectations and what the policies have to offer. In conclusion, this research yields a sound framework that can assist planners and policymakers in creating better and more appropriate forms of inclusive and efficient transport solutions. It is essential to consider the needs and goals of the people in the community to ensure that their will is driving the planning and decision-making process.

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## **Participatory Transportation Planning: AHP Questionnaire for Public Feedback**

### **Form Description:**

Welcome to the "Prioritizing Transportation Challenges: AHP Questionnaire."

Thank you for participating in this important survey. Your input will help us prioritize key transportation challenges and improve the transportation planning process in Bangladesh.

Instructions:

#### **1. Understanding the Scale:**

- You will be expressing your opinion on various transportation-related factors using a 0-10 scale.
- The scale ranges from 0 to 10, where:
  - **0** means you strongly disagree.
  - **3** means you disagree.
  - **5** means you are neutral.
  - **7** means you agree.
  - **10** means you strongly agree.
  - Intermediate values (**1, 2, 4, 6, 8, 9**) can be used if your opinion falls between these descriptions.

#### **2. Expressing Your Opinion:**

- For each question, select the value that best represents your opinion based on the provided options.
- Carefully read each question and choose the value that aligns with your viewpoint.

#### **3. Providing Honest Feedback:**

- Please be honest and thoughtful in your responses. Your feedback is crucial for identifying the most pressing transportation issues and potential solutions.

#### **4. Completing the Survey:**

- Ensure you answer all questions to the best of your ability.
- The survey should take approximately 10-15 minutes to complete.

Your responses are anonymous and will be used solely for research purposes to enhance transportation planning and policy-making.

Thank you for your valuable contribution!

Name: \*

Your answer

Email Address \*

Your answer

Institution/Organization \*

Your answer

Contact number \*

Your answer

Age range \*

18-25

26-40

41-60

60+

**Current state of transportation system of Bangladesh? \***

	10	9	8	7	6	5	4	3	2
Well-developed and efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adequate but in need of improvements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate and requires significant upgrades	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developing, with ongoing infrastructure projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Congested and overwhelmed by traffic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Limited accessibility in rural areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vulnerable to natural disasters and climate change impacts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Efficient for certain modes of transport but lacking integration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Solve one transportation-related challenge in Bangladesh that you face the most \***

	10	9	8	7	6	5	4	3	2
Traffic congestion in urban areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate public transportation infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Road safety and high accident rates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor road conditions and maintenance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of integration between different modes of transport	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental pollution from transportation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

◀ ▶

**Role of public participation and engagement play in shaping future transportation initiatives and policies in Bangladesh \***

	10	9	8	7	6	5	4	3	2
Essential	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Important but not critical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irrelevant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Neutral	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

◀ ▶

**Top three things the general public wants from transportation planners and government officials \***

	10	9	8	7	6	5	4	3	2
Safe and reliable transportation infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Affordable and accessible public transportation services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmentally sustainable transportation initiatives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Efficient and time-saving transportation systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transparent and inclusive decision-making processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced traffic congestion and better road conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovative and technology-driven transportation solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

◀  ▶

Thesis Project: Public Participation through Digital Storytelling in Transportation Planning

**Engagement with the public to gather feedback or opinions on transportation issues \***

	10	9	8	7	6	5	4	3	2
Yes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Limited engagement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Active involvement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engagement through digital platforms and social media channels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regular engagement with community representatives and stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

◀ ▶

**What do you think would help people feel like their opinions are important during a town hall meeting about transportation planning? \***

	10	9	8	7	6	5	4	3	2
Opportunities for open discussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactive activities or workshops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessible and transparent information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Utilizing digital platforms for remote participation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engagement with local community leaders and influencers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Providing avenues for anonymous feedback	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

◀ ▶

**Would you opt for a system that collects important public opinions and delivers them to you in a simple digital story format that's easy to understand?** \*

	10	9	8	7	6	5	4	3	2
Yes, I would find that very helpful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No, I prefer to gather information through other means	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm not sure, I would need more information before deciding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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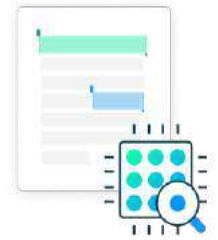
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# Chapter 1 Introduction

## 1.1 Background

In the dynamic realm of transportation engineering, the landscape is shifting toward innovative methodologies that have the potential to revolutionize how we monitor, influence, and control road-network users' behavior, bringing about positive change. And digital storytelling can bring a new era in this lively progression. Digital storytelling (DST) has the potential to significantly influence human behavior. By engaging emotions and addressing non-conscious levels, DST effectively changes individuals' perceptions and actions. DST's ability has been proven to reshape people's attitudes and behaviors, opening new avenues for impactful messaging and communication (Grindle, 2014).

Digital storytelling has demonstrated its effectiveness across various sectors. In education, it enhances student engagement (Smeda et al., 2014) and learning outcomes by integrating instructional content with engaging activities (Malita & Martin, 2010). In marketing, it strengthens narrative transportation in commercial, user-generated, and one-on-one contexts, offering practical insights (Van Laer et al., 2019). In medical education, it improves critical thinking and communication skills (Zarei et al., 2021). In public health, digital storytelling influences behavior, engaging emotions and non-conscious levels, offering a feasible approach for both public health and commerce (Grindle, 2014). It aids students in understanding climate change effects (Otto, 2017), enhances speaking abilities and critical thinking in high schools (Syafryadin et al., 2019) and provides technology integration in primary education (Sweeney-Burt, 2014). Furthermore, it supports patient knowledge translation in healthcare (Park et al., 2021) and improves foreign language acquisition (Pardo, 2014). Therefore, it showcases its potential to impact diverse sectors.

However, a significant underutilization of digital storytelling is observed in the domain of transportation and road safety. This phenomenon can be attributed to the inherent conservatism characterizing these sectors, which have traditionally placed strong reliance on technical and engineering solutions. The adoption of digital storytelling necessitates a shift toward more user-centric and holistic methodologies, which, in practice, encounter challenges and resistance across diverse fields.

The research objectives set forth in this study revolve around harnessing the potential of digital storytelling to monitor, influence, and control road-network users' behavior positively. This research aims to incorporate storytelling into transportation and road safety to align the technicality and engineering with the holistic approaches of the road users. There are various sorts of digital storytelling like video, infographics, podcasts, social media stories, blogs, social media posts, photography, chatbots, and conversational interfaces. Among these, the research will primarily choose the notion of infographics, social media posts, photographs, and videos to incorporate into the research. This digital storytelling will be targeted at the road network users, specifically on the pedestrians and drivers of different vehicles. Bangladesh has one of the biggest user bases on social media. In January 2023, the country was home to 44.70 million social media users, equating to 26% of the total population (Aftabunnahar, 2023). It will be comparatively easier to engage people with the impact measurement of digital storytelling for this research. The found result will encompass an overall understanding of the emotional impact of digital stories, exploring their potential to engage users across platforms. Besides, it will be able to be scaled to a massive portion of the population with more manpower contributing to the data collection.

In the future, this paper may pave a path envisioning a future where AI will analyze GIS-based maps and the demography of the location along with the psychology of the native people to accelerate the process of creating narratives through digital storytelling that influence informed policy-making in transportation engineering. Besides, Bangladesh, being a dreamer of a developed country and already being one of the fastest-growing economies in South Asia, will gradually move towards Autonomous Vehicle (AV) technology that is expected to enhance road safety, mobility, service, and comfort for road users and hence will be able to serve the purpose of Intelligent Transportation Systems (ITS). The data derived from digital storytelling and its impact will establish sustainable communication among on-road connected automated vehicles (CAV) systems to improve their safety features, even in auto-driving modes, through future research endeavors.

In the subsequent sections of this paper, the research will delve into the methodologies, findings, and implications of these research objectives, with the vision of propelling the transportation engineering sector toward a new era of informed, emotionally engaging, and user-centric decision-making processes that drive positive changes in road-network user behavior and, ultimately, the efficiency and sustainability of transportation systems.

## 1.2 Problem Statement

Bangladesh, characterized by its high population density, grapples with a pressing road safety concern. Recent data from the Bangladesh Road Transport Authority (BRTA) and law enforcement agencies reveal a troubling scenario in the first two months of the year. A total of 636 lives were lost, and 752 individuals suffered injuries in 630 road accidents, as reported by the BRTA. Concurrently, the police reported 542 fatalities and 420 injuries in 557 road crashes during the same period (Adhikary, 2023). The primary settings for these road accidents comprise highways, accounting for 29.1% of the incidents, and streets, representing 58.4% of the cases. Causative factors are predominantly attributed to speeding, which contributes to 46.5% of accidents, and careless driving, responsible for 48.8% of incidents (Ahsan et al., 2011).

In response to this alarming road safety crisis, a range of strategies has been proposed, encompassing interventions such as the installation of medians, shoulder improvements, enhancement of traffic control devices, better intersection design, speed control, provision of facilities for non-motorized vehicles (NMVs), road surface maintenance, treatment of hazardous roadside objects, and initiatives aimed at augmenting road user safety awareness and driver training (Ahsan et al., 2011). However, the implementation of these strategies is often constrained by financial barriers and infrastructural management complexities.

Installing medians can be expensive due to land acquisition, construction, and maintenance expenses. Median construction costs vary from \$100,000 to \$1 million per mile. Expanding road shoulders can be costly, especially in urban areas, with project costs ranging from \$200,000 to \$1 million per lane-mile (Poole, 2013). Upgrading traffic control devices requires ongoing maintenance and can consume a significant part of transportation budgets. Retrofitting intersections for safety improvements is expensive, particularly for complex intersections. Speed control measures like speed cameras may face resistance and

require significant law enforcement resources. Providing facilities for non-motorized vehicles (NMVs) is costly, especially in urban areas with limited space. Routine road maintenance necessitates continual funding to avoid more expensive rehabilitation or reconstruction later. Treating hazardous roadside objects is expensive and often involves infrastructure redesign. Safety awareness campaigns and driver training programs need ongoing funding and face challenges in changing driver behavior. Effective programs and campaigns can be complex and costly.

However, when it pertains to raising awareness, the financial burden may not be as significant as that associated with previous initiatives. Endeavors aimed at enhancing road user safety awareness and implementing driver training programs often grapple with the fiscal considerations required for maintaining successful campaigns. Regarding to that, this very study acknowledges the unexplored potential of digital storytelling and its application within the realm of transportation engineering, specifically for altering illegal driving behaviors, remains relatively uncharted territory, particularly in Bangladesh.

This research aims to evaluate that exact thing; which is the effectiveness of digital storytelling in transportation planning compared to the above discussed infrastructure-intensive solutions. It seeks to identify the factors influencing road users' perceptions and involvement in the planning process through digital storytelling. Additionally, the study intends to create a systematic approach for processing digital storytelling responses to inform policy decisions.

### 1.3 Purpose and Objectives

The primary objectives of this research study encompass a detailed exploration and evaluation of various facets of digital storytelling in the context of transportation planning. Specifically, the goals are as follows:

- To evaluate the effectiveness of digital storytelling, utilizing planning data, in encouraging public participation in transportation planning.
- To assess the impact of digital storytelling on enhancing public comprehension of transportation planning processes.
- To investigate the potential of utilizing public responses to digital storytelling as valuable inputs for shaping informed policies in the transportation sector.
- To analyze the correlation between digital storytelling and informed policy-making, aiming to optimize its role in enhancing transportation systems based on public feedback.

### 1.4 Scope of the Study

Text-based Digital Storytelling (DST) methods are the main aim of this research which supports a collective vision for a sustainable transportation system in Bangladesh. This will be achieved by the study through gathering and integrating different perspectives from people of all ages to enable a comprehensive understanding that considers both convergent and divergent viewpoints.

The specific objectives within the scope of this study include:

- **Developing Text-Based DST Methods:** The research will focus on creation and refining of text-based digital storytelling techniques. These techniques are aimed at involving as many people as possible. This is regardless of their differences. The goal is to capture various experiences and aspirations connected with transport among Bangladeshi citizens.
- **Encouraging a Collective Vision:** By employing these DST methods the study aims to promote a unified vision for a sustainable transportation system. This will involve taking into consideration opinions given by individuals belonging to different age groups. Thus ensuring that all the community's needs are accounted for during the transportation planning process.
- **Acknowledging Diverse Viewpoints:** In order to accommodate various perspectives, this study will consider viewpoints from both sides that acknowledge that sustainability in terms of transport must embrace differing opinions. It is aimed at fostering an integrated approach through which a more comprehensive planning process.
- **Bridging the Visualization Gap:** Among the goals of the study is to fill the visualization gap between those responsible for planning and what people in general expect. The research uses DST methodologies to strengthen communications and understanding between transportation planners and the public in order to make the planning process more clear, open and inclusive.
- **Utilizing Facebook for Data Collection:** The research will use Facebook as its primary data collection instrument. This method will encourage large scale interactions with Bangladesh's citizens leading to a diverse representation of opinions and ideas during this study.

These objectives focus on making sure that transportation planning processes in Bangladesh become more inclusive and effective; thus eventually developing a transport system that better serves its people.

## 1.5 Thesis Structure Overview

The thesis is structured into seven comprehensive chapters, each detailing a specific aspect of the research. Below is a brief description of each chapter:

- **Chapter 1: Introduction** - Introduction This chapter introduces the research by providing necessary background information and a list of research components to be discussed. It begins with an explanation of why the research topic is important and its relevance, which gives context and significance about it. Then, it states core issues and challenges addressed by the study for clear problem statement. Consisting of aims and specific goals, the purpose and objectives are explained in order to clarify the aim. In addition, it describes boundaries of research thereby defining scope of study. Lastly, this paper summarizes structure along with content that follows in other chapters hence provides an overview regarding how the thesis is organized.
- **Chapter 2: Literature Review** - Literature Review Here we reviewed different literature that had been written about digital storytelling within various industries as well as its use in transport sectors. This has surveyed previous studies on digital storytelling across diverse grounds to give general comprehension on how it was used for or studied under different circumstances.

Furthermore it scrutinizes literature on utilization of digital storytelling in transportation sector explicitly looking at available studies

- **Chapter 3: Study Area and Data Collection** - This section explains the area of concern, which in this case is geography and the methods used during data collection and processing. It defines the research geographical scope by explaining why the selected study area is relevant to the objectives of such a survey. The tools that were employed for gathering appropriate information are discussed, thus an explicit comprehension of how data was collected is provided. Consequently, this chapter outlines all steps taken when processing and preparing collected data for analysis to ensure that it becomes ready for subsequent examination. This chapter makes sure to have transparency and rigor in the data collection process.
- **Chapter 4: Methodology** - This chapter provides a workflow and techniques applied in research through which specific techniques used in this study are explained. There is an elaborate description of what really happens during research right from data collection down to its analysis step by step. The discussion focuses on text mining techniques employed in analyzing data as well as extracting meaningful insights highlighting how these approaches contribute to the objectives of the research. With regard to replicability and robustness of research methodology, Chapter Four serves as a clear roadmap illustrating how this survey was carried out.
- **Chapter 5: Analysis and Results** - This chapter presents the analysis of collected data and resulting findings. It details the methods and procedures used for data analysis. The data was examined and interpreted. The results of the analysis are presented. Key findings and insights derived from data are highlighted. This chapter provides a comprehensive understanding of research outcomes linking findings back to research objectives and questions.
- **Chapter 6: Conclusion** - This chapter summarizes key findings, acknowledges limitations of the study and suggests directions for future research. It highlights main conclusions drawn from research. Their significance and implications are emphasized. The constraints faced during the study are discussed. This provides an honest assessment of study's limitations. Finally the chapter proposes areas for future investigation. It suggests how subsequent research can build on the current study's findings. This chapter provides a thoughtful reflection on the research process and its contributions.
- **Chapter 7: References** - This chapter provides comprehensive list of all the sources and references cited throughout the thesis. It ensures that all the academic and empirical works referenced in the study are properly acknowledged. This supports the credibility and reliability of the research. This chapter serves as a resource for readers. They can explore the referenced works further. This enhances the study's academic rigor and integrity.

## Chapter 2 Literature Review

### 2.1 Previous Studies on Digital Storytelling in Different Sectors

In the field of consumer psychology studies by Adaval et al. (2007) and Pennington and Hastie (1988) highlight that perceiving a story as more than just series of sentences can trigger significant cognitive, emotional and behavioral changes in consumers. These studies underscore the power of narrative in shaping consumer perceptions and actions. They suggest that stories can engage individuals on a deeper level. Simple factual information cannot achieve this same engagement.

Despite the limited literature directly related to the current research project prior studies have illuminated a distinctive aspect of digital storytelling (DST). One key area of focus has been the impact of the narrator's actual voice. In the narrative, this element of DST has been found to foster a sense of self-reflection among listeners. The personal nature of the narrator's voice creates a more intimate and engaging storytelling experience. The presence of the narrator's voice adds a layer of authenticity and personal connection. This can enhance the reflective process for both storyteller and audience.

Research has also explored the applicability of DST. This is particularly in contexts involving marginalized groups. These groups often have untapped potential for knowledge translation and advocacy. DST has emerged as powerful tool in these areas. By providing platform for marginalized voices. DST facilitates the sharing of personal experiences and stories. Otherwise they might remain unheard. This application of DST can promote greater understanding and empathy. Encouraging reflection. And collaboration among diverse communities.

The process of engaging with DST is not without challenges. While it encourages reflection and collaboration. It can evoke strong emotional responses. The act of sharing personal stories especially those involving trauma or hardship, can be emotionally taxing. This affects both the storyteller and the audience. Despite these challenges. DST serves as valuable tool. It aids professional growth and education. It allows individuals to convey complex nuanced experiences in way factual reporting often cannot achieve.

Community projects utilizing DST remain relatively scarce. They hold significant potential for fostering community engagement. Development is another potential outcome. In research contexts DST has proven effective in capturing sensory and emotional experiences. It offers a rich immersive understanding. This deep insight captures participants' perspectives. However this approach also demands careful ethical considerations. Researchers must navigate issues of consent and confidentiality. They must also consider potential emotional impact on participants.

Overall DST represents multifaceted tool with ability to bridge gaps in knowledge translation. It aids in advocacy. Community engagement is another area it enhances. Its capacity to elicit cognitive, emotional and behavioral changes underscores its potential impact. This potential spans across various domains. These domains range from consumer psychology to professional education and community development. However the implementation of DST requires thoughtful approach. An ethically informed approach is necessary. This ensures the maximization of its benefits while mitigating potential emotional challenges.

## 2.2 Previous Studies on Digital Storytelling in Transportation Sector

Previous study examines public perceptions of transport policies and subsequent impact on behavior. Research has shown that policies aimed at enhancing public transport generally receive strong public support. Those designed to restrict or affect car use often face significant resistance. For effective behavioral influence. Enhancements in public transport infrastructure and services are crucial. This aligns with the findings of a multifactorial study. The study evaluated transport options for Salerno's accessibility using the Analytic Hierarchy Process. The study highlighted option A2 as the preferred choice due to its superior services. Benefits related to modal shifts were noted. However it also revealed that cost considerations play significant role in decision-making. Emphasizing the importance of financial factors in the evaluation process.

In addition to transportation studies scholarly investigations have extensively explored the use of digital storytelling (DST) in education. These studies have demonstrated that DST can effectively enhance both teaching and learning experiences. It reaches a wide audience. They provide valuable recommendations. Guidelines for educators who aim to employ digital storytelling as educational tool are outlined; underlining its effectiveness in engaging students and fostering a deeper understanding of the material.

Despite the growing body of research on digital storytelling there is notable gap in exploring how roadway users can contribute to transportation planning through DST. Previous research has largely focused on the influence of digital storytelling on decision-making within Western countries. These include Australia, Canada New Zealand, the UK and the USA. Zimbabwe is an exception. This geographical concentration leaves a significant research gap concerning the impact of DST in the context of Bangladesh. Given the scarcity of research in this area within the transportation engineering community investigating the participatory culture of roadway users in Bangladesh through DST is valuable. It represents a promising future endeavor.

Overall, existing studies provide a robust foundation for understanding public perceptions of transport policies. They also highlight the educational benefits of DST. However there is a clear

need for further research on the application of DST in transportation planning, particularly in regions like Bangladesh.

## **Chapter 3 Study Area and Data Collection**

### **3.1 Study Area**

The study area for this research will predominantly encompass the entire country of Bangladesh. This research is designed to involve active participation from vital stakeholders. This includes local communities government authorities and transportation experts. The comprehensive methodology as delineated in the research proposal emphasizes the utilization of digital storytelling. It also leverages data-driven insights. This approach presents a detailed roadmap for inclusive public engagement. It also informs policy formulation within the domain of transportation planning.

By involving local communities, the study ensures voices of people directly affected by transportation policies are heard. It also considers these voices. Engaging government authorities is crucial. This aligns the research with current policies and regulations. Ensuring that the findings can be seamlessly integrated into existing frameworks. Collaboration with transportation experts provides technical insights. It enhances the credibility and feasibility of the proposed solutions.

The use of digital storytelling in this research is particularly significant. It not only makes complex data more accessible and engaging for the general public. But it also facilitates deeper understanding of the personal and communal impacts of transportation policies. By incorporating narratives and personal experiences. Digital storytelling bridges the gap between data and human experience fostering more empathetic and informed dialogue among stakeholders. Data-driven insights form another cornerstone of the methodology. Through rigorous data collection and analysis. The study aims to uncover patterns, preferences and pain points in the current transportation system. This empirical approach ensures the recommendations are grounded in real-world evidence. It enhances their relevance and impact.

### **3.2 Data Collection**

In our research we are utilizing the social media platform Facebook to collect data and assess the potential of digital storytelling. This approach aims to help transportation planners comprehend public perspectives, expectations and suggestions regarding Bangladesh's transportation sector. To ensure representative sample of the total population we have established private Facebook group titled 'Road Planners Bangladesh'. (accessible at <https://www.facebook.com/groups/1592684484812350>).

Thesis Project: Public Participation through Digital Storytelling in Transportation Planning

A	B	C	D	E	F	G	
1	SI	Date	Post Link	Post	English Translation	Total Post Reacts	Comments
2							Best!
3							It's a magical innovation for us. 🙌
4	11	March 15, 2024	<a href="https://www.facebook.com/groups/1592684484812350/permalink/1620519278625537/">https://www.facebook.com/groups/1592684484812350/permalink/1620519278625537/</a>	So! What do you think about Dhaka Metro Rail?	So! What do you think about Dhaka Metro Rail?		Metro rail timings should be extended till 10 pm. This Mofjheel from Utrara find it difficult to return due to the day. All such routes are there. If you extend it till the improvement of people will be correct.
5							Keeping a tight grip on regulations is key to maintain the image shows. Let's hope this arrest reminds every rules and keeps our streets safer for all.
6	12	March 17, 2024	<a href="https://www.facebook.com/groups/1592684484812350/permalink/162169691857773/">https://www.facebook.com/groups/1592684484812350/permalink/162169691857773/</a>	(Image showing the arrest of the persons who provided ladders to the pedestrians after taking money to hop over the high divider in the video: <a href="https://www.facebook.com/share/r/GawoAE2iG99Y5L/7mbexid:Ni5oz">https://www.facebook.com/share/r/GawoAE2iG99Y5L/7mbexid:Ni5oz</a> )	(Image showing the arrest of the persons who provided ladders to the pedestrians after taking money to hop over the high divider in the video: <a href="https://www.facebook.com/share/r/GawoAE2iG99Y5L/7mbexid:Ni5oz">https://www.facebook.com/share/r/GawoAE2iG99Y5L/7mbexid:Ni5oz</a> )	245	রেন টিকে কেন মানুষ সঠিক জায়গায় কড়ে লাগায় না খুঁটুউঁটু মুখজনক 😞 If you do not provide the public with their basic facility planning, idiots like these are bound to take advantage Also chittagore 🙄 চিটাগং এ ডেইলি সকালে সেওয়ানঘাটে নির্দিষ্ট স্টপে ধাক্কা সকেও হেয়ারবা এই কাজ টা করে উঠানোর জন্য...একরে আমাদের নিজেদেরই যথেষ্ট দরকার। আমরা যথামিনে নিজের পরিকর্তন না হইতে পারবে,স নাহ... 😞 কথায় কথায় বাস না থামিয়ে নির্ধারিত স্টপেজে ২ মিনি চট্টগ্রাম এ বিশেষ কষ্ট না মিলে পাড়ি চলেনা। Bhai minimum koyta gali dile bus 60/70kmh g cholie? সড়ক অতিট একটা নির্দিষ্ট মেয়াদ পর্যন্ত কার্যকর করা। নির্মাণের এত বছরের মধ্যে নষ্ট হলে নিজ দায়িত্ব ঠিক। আমনি ব্যবস্থা নেয়ার বিধান থাকতে পারে। দিন বদলের দিনে
7							Write your solution without hesitation in the comment section below. 🙌
8							
9							
10	13	March 20, 2024	<a href="https://www.facebook.com/groups/1592684484812350/permalink/1623112515102926/">https://www.facebook.com/groups/1592684484812350/permalink/1623112515102926/</a>	আপনার কি মনে হয়? আসলে কি করলে হেয়াররা পেসেঞ্জার নেওয়ার জন্য ব্যবহার বাস থামিয়ে দেওয়া বন্ধ করবেন? 😞 আপনার যেই সমাধানই মাথায় আসুক না কেনো, নির্দিষ্ট নিচে দিন নিচে কমেন্ট সেকশনে। 🙌	What do you think? Should helpers stop repeatedly stopping the bus to pick up passengers? 🙌 Write your solution without hesitation in the comment section below. 🙌		
11							
12							
13							
14	14	March 20, 2024	<a href="https://www.facebook.com/groups/1592684484812350/permalink/1623204803400017/">https://www.facebook.com/groups/1592684484812350/permalink/1623204803400017/</a>	বাংলাদেশের অবস্থা তো মনে হয় না এমন। নাকি???	Bangladesh does not face similar situation, does it? 🙌		

Within this group we gather opinions and insights from common people by extracting text from posts and comments. This data is organized. It is stored in an Excel database for analysis. Additionally, to ensure inclusivity and accessibility all text is translated into English and preserved within the database.

To expand our research initiative, Bangladesh Scouts has officially joined. Rover Scouts and Adult leaders are actively contributing to the 'Road Planners Bangladesh' group. They share posts. They assist in the collection of data in various text formats. This collaborative effort enhances diversity and comprehensiveness of the data. It provides understanding of public perceptions and preferences related to transportation planning in Bangladesh.

Shahjada, Note page-1

বাংলাদেশ ফ্লাউটস, জাতীয় সদর দফতর  
৬০ আব্দুল মান্নান মুফিদুল ইসলাম সড়ক, কাকরাইল, ঢাকা-১০০০

পত্র নং- বাঃ ফ্লাঃ (সমাজ উন্নয়ন ও স্বাস্থ্য)/২৪০০(০৮)/২০২৪

তারিখঃ

১৭ বৈশাখ ১৪৩১  
৩০ এপ্রিল ২০২৪

সম্পাদক

বাংলাদেশ ফ্লাউটস, রোভার/রেলওয়ে, নৌ ও এয়ার অঞ্চল

বিষয়ঃ Transport Planning Research বিষয়ক Facebook Page-এ রোভার ফ্লাউটদের সম্পৃক্তকরণ সম্পর্কীয়।

জনাব

উপর্যুক্ত বিষয়ের প্রেক্ষিতে জানাচ্ছি যে, Islamic University of Technology (IUT)-এর Department of Civil & Environmental Engineering (CEE) বিভাগের অধ্যাপকের প্রেক্ষিতে উক্ত প্রতিষ্ঠানের Research Team এর সাথে বাংলাদেশ ফ্লাউটস এর একটি মত বিনিময় সভা অনুষ্ঠিত হয়। IUT Research Team বাংলাদেশে নিরাপদ Transport এর জন্য সচেতনতামূলক কাজ করছে। এ লক্ষ্যে তারা একটি Facebook Page পরিচালনা করছে যেখানে Transport সম্পর্কিত যেকোন পোস্ট, ভিডিও কিংবা ছবি ও মতামত প্রদানের সুযোগ রয়েছে। Facebook Page এর লিংক নিম্নরূপ:

<https://www.facebook.com/share/8X5hjNYgPuCWafCD/?mibextid=K35XfP>

Ambassador program recruitment google form-এর লিংক নিম্নরূপ :

[https://docs.google.com/forms/d/e/1FAIpQLSeqfhrQJpXbOhGMsk9xcTt83\\_wTXOdOk7CSAERSBefjmTEWlg/viewform](https://docs.google.com/forms/d/e/1FAIpQLSeqfhrQJpXbOhGMsk9xcTt83_wTXOdOk7CSAERSBefjmTEWlg/viewform)

এ বিষয়ে উক্ত টীমের একটি প্রমোশনাল ভিডিও রয়েছে। লিংক নিম্নরূপ:

<https://www.facebook.com/groups/1592684484812350/permalink/1618883838859081/?mibextid=W9r1R>

উল্লিখিত প্রেক্ষিতে, উক্ত Linkসমূহ রোভার ফ্লাউটদের মাঝে ছড়িয়ে দেয়ার মাধ্যমে গুগল ফর্ম পূরণ করার প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য আপনাকে অনুরোধ জানাই।



নির্বাহী পরিচালক (অ.দা.)  
বাংলাদেশ ফ্লাউটস

বিতরণ কার্যার্থেঃ

- ১। উপ পরিচালক, বাংলাদেশ ফ্লাউটস, রোভার/রেলওয়ে, নৌ ও এয়ার অঞ্চল;
- ২। সহকারী পরিচালক (আইসিটি), বাংলাদেশ ফ্লাউটস

সদয় জ্ঞাতার্থেঃ

- ১। জাতীয় কমিশনার (সমাজ উন্নয়ন ও স্বাস্থ্য), বাংলাদেশ ফ্লাউটস;
- ২। জাতীয় উপ কমিশনার (সমাজ উন্নয়ন ও স্বাস্থ্য), সকল, বাংলাদেশ ফ্লাউটস;



### 3.3 Data Processing

After creating Excel database from gathered data the next step in our data processing journey involves transforming this dataset into CSV format. This prepares the data for further analysis. Subsequently, we employ R Studio to delve into text mining. This process encompasses several critical steps aimed at extracting meaningful insights from the textual data.

The initial stage of text mining entails examining word frequency within the dataset. This allows us to identify most commonly occurring terms. This quantitative analysis provides valuable insights into the predominant themes. It reveals topics present in collected texts.

Following the analysis of word frequency we employ visualization techniques. One such technique is creating a word cloud. This visual representation offers a clear depiction of most frequent words. Size indicates relative frequency. This facilitates easy interpretation of the key themes and concepts.

Additionally, we explore word collocation. This involves identifying words that frequently occur together. This analysis sheds light on significant word pairings or phrases. It offers deeper insights into the contextual relationships between terms.

Moving forward our text mining process encompasses topic modeling. It is sophisticated statistical technique aimed at uncovering latent topics within textual data. By employing algorithms such as Latent Dirichlet Allocation we identify clusters of words. These words frequently co-occur. The clusters represent underlying themes or topics present in dataset.

Finally we extract topic proportions from generated topic models. This step quantifies prevalence of each identified topic within dataset. It provides comprehensive understanding of the distribution of themes. It allows us to discern the most salient topics within collected texts.

Through this meticulous and iterative process of text mining. We aim to extract rich insights from textual data. This enables us to gain nuanced understanding of public perspectives. And sentiments regarding transportation planning in Bangladesh.

## Chapter 4 Methodology

### 4.1 Text Mining

The research process started with an extensive literature search with the aim of identifying the major literature review that discusses prior research and information related to the research issue being investigated. These comprised of a thorough review of the existing literature as the first step. It was crucial for the development of the questionnaire survey. To ensure that the survey questions were up-to-date, the following procedures were followed:

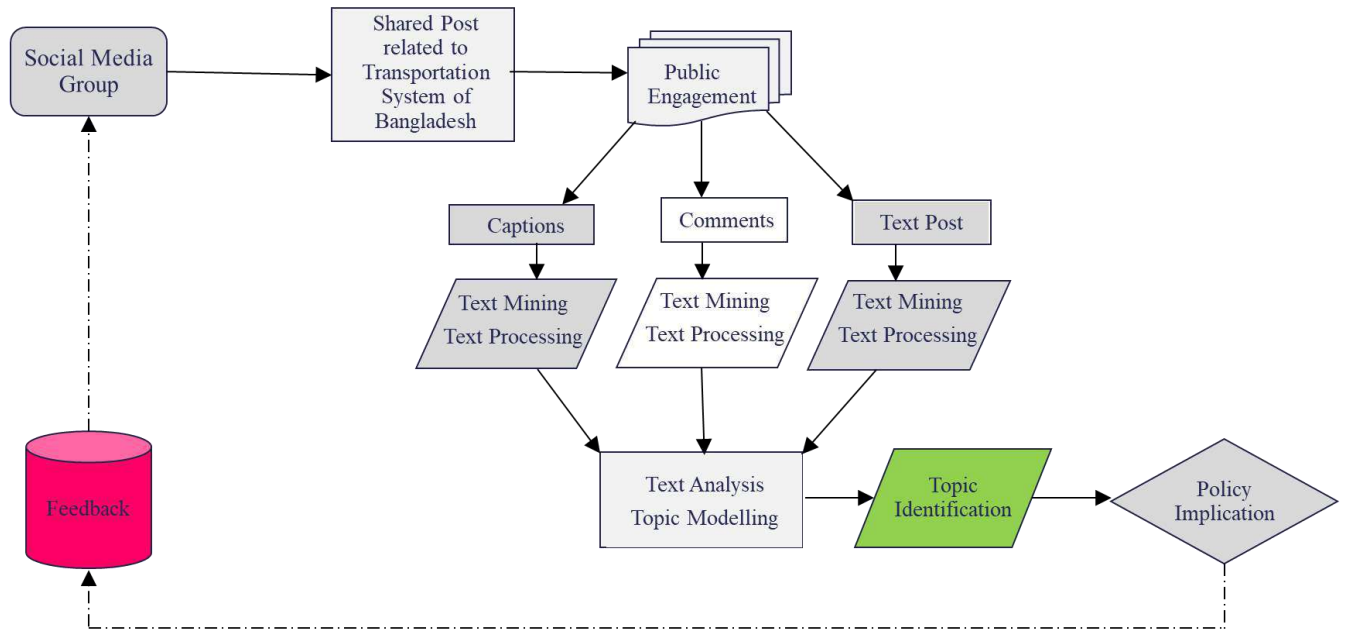
Concerned relevant questions in the context of transport planning. After the literature review, a database was developed from the data obtained from the 'Road Planners Bangladesh' Facebook group. This database was the main source of information for this research. It contained a wealth of opinions and perspectives. Furthermore, it presented the perceptions of the members of the public on the transportation system of Bangladesh.

Next, text mining code was written to extract information from textual data stored in an Excel CSV file. All this code was run using RStudio as the input console. This made it possible to obtain the following: Gain useful information from the textual data. It is also important to note that the tuning of the text mining model was quite robust. Optimization based on advice of specialists. Engineering judgments and insights derived from prior literature. This iterative process made it possible to fine-tune the text mining model to fit the expected outcomes. Capture and analyze details that may not be easily visible or discernible in the dataset.

Last but not the least, the improved text mining model was used to extract the main topics and themes shared by participants in the 'Road Planners Bangladesh' Facebook group. By analyzing the on the textual data, the model was able to identify the sentiments, issues, and priorities of the people about the present state of the transportation system in Bangladesh.

This final step enabled the research to obtain critical information on the perception and consumer preference among the public. Which could inform future policy making and planning decisions in the transport sector.

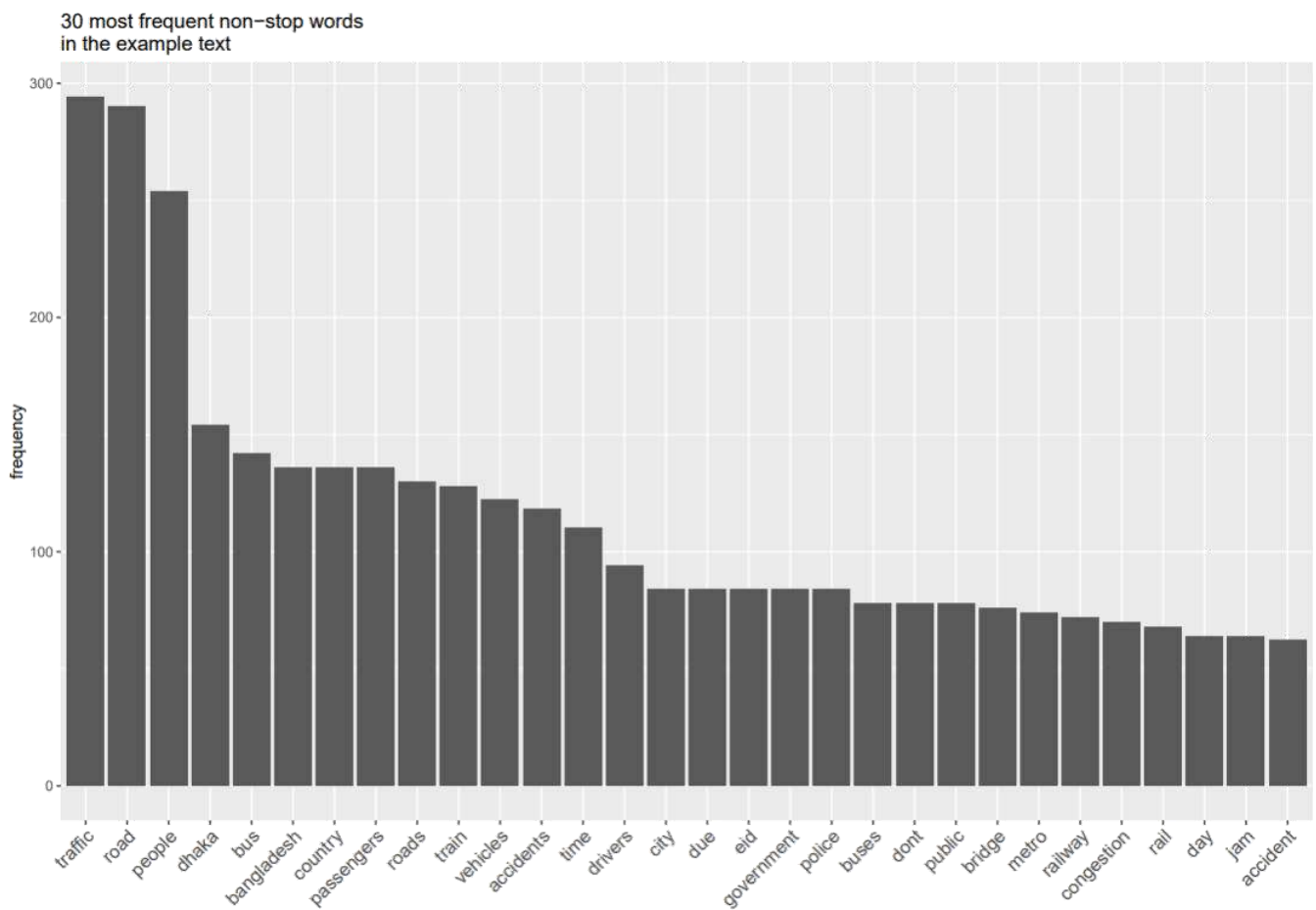
## 4.2 Work Flow of the Research



## Chapter 5 Analysis and Result

### 5.1 Word Frequency

In the first step in our analysis that is the word frequency analysis, we got the following results. General words obtained from the textual data collected from the official Facebook page of ‘Road Planners Bangladesh’ group. It gave a basic idea of the analysis that was done and the final results. The results of the literature synthesis allowed for the definition of the major themes and topics discussed by participants. It enlightened me on the major issues of interest and the areas that have attracted the most attention to almost all sectors of the Bangladeshi economy including the transportation sector.



#### 5.1.1 Top Words Identified

The word frequency analysis revealed several prominent terms that frequently appeared in the discussions. The highlighted terms included "traffic". "Road". "People". "Dhaka". "Bus". And "Bangladesh". These words emerged as most commonly used. This indicates their central importance in the conversations about transportation.

### 5.1.2 Frequency Comparison

To quantify the prevalence of these terms we compared their frequencies within the dataset. The following counts were recorded for each of the top words.

Traffic: 290 occurrences.

Road: 285 occurrences.

People: 255 occurrences.

Dhaka: 160 occurrences.

Bus: 135 occurrences.

Bangladesh: 130 occurrences.

These frequency counts provide a clear indication of the terms that dominate the discourse among the participants. "Traffic" and "road" emerged as the two most frequently mentioned words. They were closely followed by "people." The term "Dhaka" representing the capital city and a major hub of transportation issues, also featured prominently. Additionally "bus" and "Bangladesh" were significant. These counts highlight the focus on public transportation and national-level transportation concerns.

### 5.1.3 Outliers Detected

The analysis also identified certain terms as outliers due to their significantly higher frequencies compared to other terms in the dataset. Specifically the words "traffic," "road" and "people" stood out as outliers. These terms not only had highest frequencies but also indicated key areas of concern and focus among participants.

- Traffic: The high frequency of this term underscores the pervasive issue of traffic congestion. It's a common challenge in urban areas. Particularly in Dhaka. Participants frequently discussed traffic-related problems. This reflects the urgent need for effective traffic management solutions.
- Road: The frequent mention of "road" highlights critical importance of road infrastructure. Discussions often centered around the condition of roads, road safety and the need for improvements in road networks.
- People: The term "people" indicates a strong focus on the human aspect of transportation. This includes concerns about the impact of transportation policies on everyday commuters the accessibility of transportation options and overall user experience.

The significantly higher frequencies of these terms suggest that traffic congestion road infrastructure and the human element of transportation are primary concerns among the public.



### ***5.2.1 Key Words Identified***

The word cloud explained some of the top important keywords used in the presentation. Among these “will,” “traffic” “people,” “Dhaka,” “passengers,” and “accidents” were particularly common. The larger the size of the words used and the more the use of capital letters to write these words in the word cloud of the word, the more the influence of these words in the public discourse on transportation.

- **Will:** This word was rife in the texts that focused on the expected opportunities. It also included the strategies for solving the transport problems and the probable solutions to the transport problems.
- **Traffic:** This is a brief look into the present-day complications associated with traffic jams. It was one of the most frequently used terms in the analysis of the media and the presidential campaigns’ engagement prominent. They mentioned one of the worries that were considered serious.
- **People:** Exposing an aspect of transport that has to do with the people that use the transport facilities. This term was frequently used during the great discussion regarding the nature and role of federalism in the United States and many other countries. Controversies and disputes concerning the place of commuting in the social and cultural frameworks.
- **Dhaka:** Especially when the capital city of Bangladesh was Dhaka, it was in the middle of it. Some of what was discussed includes some of the issues of discussion which included transportation issues and most likely solutions.
- **Passengers:** This word was more aimed at the feelings and worries of the people who are using this word in public transportation.
- **Accidents:** Safety issues were among the major topics mentioned often as the following subjects show. Here, it was observed that there was a tendency to overemphasize accidents and the crucial role that safety plays in transport structures.

### ***5.2.2 Clusters Identified***

There were several areas of clustering as seen from the word cloud analysis. These clusters provided deeper information regarding the context and topics of the discussions. These clusters assist in the analysis of the larger patterns and subthemes within the data provided.

- **Dhaka:** This cluster had a connection with the urban environment of the capital. It included transportation infrastructure or other regions. Discussions often revolved around particular issues that Dhaka has had to grapple with. This included its population density and the high population density that comes with its transportation issues.
- **Traffic:** Terms like traffic congestion and transportation also accompanied this one significant cluster. Issues relating to traffic congestion were often raised with peak time as well as events such as Eid being mentioned. This cluster pointed to the fact that there was a need to manage traffic efficiently. Management and solutions to reduce congestion which is a common problem in large cities.

**People:** This cluster included cultural, religious, and social perspectives on transportation. It captured the multifaceted needs and activities of the commuters. They stressed the role of the public in the process of decision-making in transportation for meeting various social factors in society.

### ***5.2.3 Insights Derived***

The word cloud provided several key insights into primary concerns and themes discussed by participants. These insights are crucial for understanding public perspective and for informing transportation planning and policy.

- **Transportation Challenges.** Urban congestion emerged as a major issue. Participants discussed potential solutions to alleviate peak-time traffic problems. This insight highlights the need for innovative and efficient traffic management strategies.
- **Public Safety.** The frequent mention of accidents and related terms underscored the importance of safety in transportation planning. Participants expressed concerns about accident prevention. They emphasized passenger well-being. This indicates a critical area for policy focus.
- **Cultural Context.** The influence of cultural religious, social factors on transportation was evident in discussions. Understanding these cultural dynamics is essential. It aids in developing transportation solutions that are culturally sensitive and widely accepted by the public.



### 5.3.1 Contextual Exploration:

#### 1. Traffic Control and Willpower:

- Relationship: The terms selected include “traffic control,” “willpower of the people,” and “government” which frequently appeared together. This shows a tripartite relationship.
- Insight: This collocation adds to the interdependency of traffic management societal willpower and government initiatives. It implies that in the opinion of the public, traffic control is easily managed.

A collective activity that needs to involve individuals from two distinct organizations. But it also demands willpower from the people. This must be backed by sound government policies and measures in place to ensure this happens. This relationship underscores the importance of a systemic approach. Public cooperation and governmental adequate provision of traffic control and support are considered essential in handling traffic centralization.

#### 2. Traffic in Dhaka Roads:

- Relationship: The words “Dhaka road” and “traffic” co-occurred frequently, which means that they were used in the same context, often as a direct relationship.
- Insight: This collocation sheds light on this major area of concern in that there is very high traffic density on the roads of Dhaka. It highlights the congestion problem that has plagued the city resulting in the development of several sub-urban roads. The frequent use together shows that traffic congestion remains a constant concern even in Dhaka. This leads us to understand the need to take a more focused approach to addressing issues to do with roads and highways. Traffic flow in the capital, thus it is important to have proper management of traffic flow in the capital.

#### 3. Traffic Congestion and Road Connectivity:

- Relationship: The words “traffic congestion,” “road” and “connected” were more recurrent in the body of the articles together. This can be considered as proof of a direct relationship.
- Insight: This collocation suggests a strong relationship between traffic congestion and factors including the quality and availability of roads in a certain region. It implies that the public has a way in which it expects traffic to move and this may not be due to the physical layout of the roads but other factors for instance, cultural and or perceived norms of congestion as being an area that relied mostly on the quality of the roads and their linkages. The study establishes that poor-quality road networks and lack of access roads are some of the causes of congestion. This underlines the need to provide infrastructure enhancements to help overcome traffic issues.

### ***5.3.2 Implications of Colocation Analysis:***

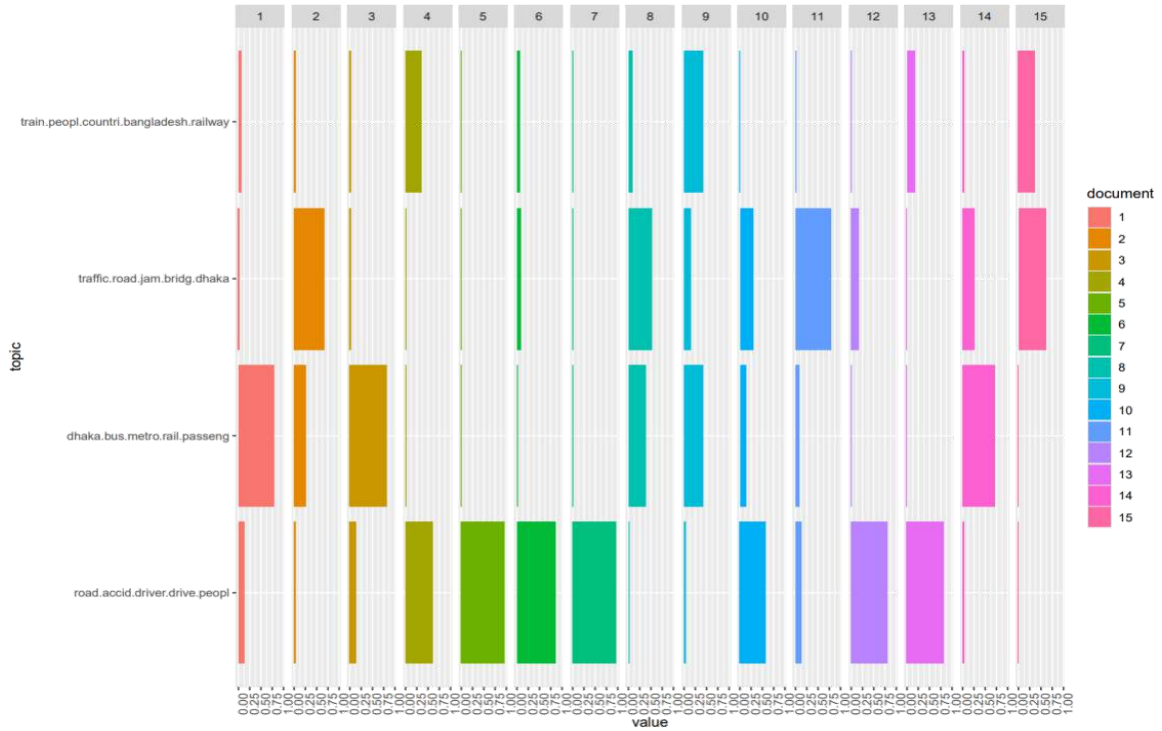
The insights derived from word colocation analysis provide valuable context for understanding key issues and relationships in transportation planning as perceived by the public. These relationships reveal:

- **Traffic Management Requires Multi-Stakeholder Efforts.** Effective traffic control is seen as collective responsibility. This involves not just the government but also participation of the community. Initiatives to manage traffic must therefore consider strategies to engage and mobilize public willpower. They must also implement government policies.
- **Urban Congestion in Dhaka:** The high frequency of colocated terms related to traffic and Dhaka's roads underscores the critical need for addressing urban congestion. This calls for targeted solutions. Solutions must be tailored to the specific challenges faced by Dhaka's road infrastructure. They must also address traffic patterns.
- **Importance of Road Connectivity:** The strong association between traffic congestion and road connectivity highlights that improving the quality and connectivity of roads can significantly impact traffic flow. Policymakers should prioritize infrastructure development projects that enhance road networks and connectivity. This will help mitigate congestion issues.

In summary word colocation analysis enriches our understanding of the public discourse. It illuminates the contextual relationships between key terms. It provides nuanced perspective on how the public perceives the challenges and solutions related to traffic management. And road conditions and urban congestion. These insights are crucial for informing transportation planning. And policy-making. Ensuring that interventions are responsive to the interconnected nature of these issues.

## **5.4 Topic Proportion from Topic Modelling**

The final section of our analysis involves topic modeling. This is a sophisticated statistical method used to uncover latent themes within the textual data. By applying topic modeling techniques such as Latent Dirichlet Allocation (LDA) using RStudio we identified several key topics discussed by participants in the 'Road Planners Bangladesh' Facebook group. Each topic encompasses various sub-themes. This provides a comprehensive overview of the public's concerns and suggestions regarding transportation system in Bangladesh. The proportions of these topics within the dataset highlight their relative importance. The frequency of discussion is also noted.



### 5.4.1 Key Topics Identified

#### 1. Eid Railway Travel:

- Main Focus: The importance of the railway system during Eid.
- Key Points: People often talk about how crucial the railway system is during Eid when travel demand goes through the roof. They express hope for a reliable railway service that can ease the burden on other modes of transportation, especially during the busiest travel periods.
- Additional Points:
- Optimism: Many people are optimistic about the potential of railways to offer a smoother travel experience during Eid.
- Challenges: However, there are practical difficulties to tackle, such as overcrowding and ticket shortages, which continue to be major issues.
- Safety Concerns: Passenger safety and security become even more critical during the travel rush.
- Corruption Allegations: There have been allegations of corruption that affect ticket distribution and railway operations.

#### 2. Road Safety Challenges:

- Principle Emphasis: The imperative and pressing necessity for amelioration in road safety protocols.
- Core Concepts: The discourse on this subject underscored an essential requirement to magnify and bolster prevailing road safety measures nationwide. The dialogues

navigated through diverse variables. These variables play contributory roles in precipitating road accidents. Additionally, they encompassed potential solutions intended to attenuate these occurrences.

- Specific Themes:
- Enhanced Enforcement: There exist advocacies for the augmentation and intensification of the enforcement of traffic regulations. Such measures aim to forestall reckless driving behaviors and, concurrently, strive to enhance the holistic safety landscape.
- Infrastructure Modernization: The call for the modernization and enhancement of road infrastructure. Such initiatives are pivotal in diminishing the potential for accidents. Moreover, they serve to ameliorate overall travel conditions.
- Responsibility: The critical significance of holding both governing entities and drivers responsible for the adherence and perpetuation of established road safety standards.

### 3. Concerns about Traffic Infrastructure:

- Main Focus: Dealing with challenges related to traffic congestion and infrastructure.
- Key Points: During the discussions, participants raised various concerns regarding traffic congestion. They also emphasized the role of inadequate infrastructure in exacerbating the problem. The importance of comprehensive planning was highlighted, as well as the need for active public engagement.
- Subtopics:
  - Planned Infrastructure: The significance of well-planned infrastructure projects that can cater to both current and future traffic demands.
  - Public Engagement: Encouraging the active participation of the public to ensure that infrastructure projects align with community needs.
  - Traffic Management: Implementing effective strategies for managing traffic to alleviate congestion and improve traffic flow.

### 4. Urban Transportation Improvement:

- Focus: Enhancing urban transportation in Dhaka.
- Themes: This topic is centered around various strategies. Improvements needed to enhance urban transportation in Dhaka. These aim for a more efficient and sustainable system.
- Sub-Themes:
- Service Distribution: Ensuring equitable distribution of transportation services focusing on various urban areas.

- **Safety:** Implementing measures to enhance safety of urban transportation. We aim to ensure protection for all users.
- **Sustainability:** Incorporating sustainable practices. We utilize technologies to create an environmentally friendly transportation system.
- **Technology:** Leveraging advanced technologies to improve efficiency. Enhancing user experience in urban transportation.

#### ***5.4.2 Topic Proportions and Insights:***

The data in this dataset gives us some interesting insights into what the public cares about the most. Let's take a look at the different topics:

1. **Eid Railway Travel:** This topic got a lot of attention in the discussions. It shows how important the railway system is, especially during busy travel times like Eid. People talked about both the potential and the challenges, which gives us a balanced view. It also brought up some issues that need to be addressed in the railway system.
2. **Road Safety Challenges:** This topic stood out as a major concern for many people. Improvements are urgently needed. The discussions focused on things like better enforcement, upgrading infrastructure, and holding people accountable. We need a multi-faceted approach to tackle these issues.
3. **Traffic Infrastructure Concerns:** A big part of the discussions revolved around traffic congestion and the inadequacy of our infrastructure. These are major concerns for the public. People talked about planned infrastructure projects and the importance of involving the public in these decisions. We need to think carefully and inclusively when it comes to infrastructure.
4. **Urban Transportation Improvement:** This topic came up a lot in the discussions, showing that people are interested in improving urban transportation in Dhaka. The discussions focused on things like better service distribution, safety, sustainability, and technology. People want a comprehensive approach to improving our urban transportation systems.

In conclusion, this analysis of the topics discussed by the public gives us a detailed and nuanced understanding of their concerns about transportation in Bangladesh. The identified topics and their proportions highlight areas that need immediate attention and provide valuable guidance for policymakers. This information can help planners develop effective and responsive transportation strategies.

## Chapter 6 Conclusion

The research conducted through 'Road Planners Bangladesh' Facebook group and the subsequent text mining analysis has yielded several critical insights into the transportation challenges and public sentiments in Bangladesh. These key findings highlight the urgent issues that need awareness creation. They also need focused attention by planners and policymakers. By incorporating public opinion these insights guide resource allocation. They also guide policy development towards more effective, sustainable transportation solutions.

### 6.1 Key Findings

#### 6.1.1 Critical Issues Identified

- **Traffic Congestion and Urban Infrastructure:** The discussions overwhelmingly pointed to traffic congestion especially in Dhaka, as primary concern. The public's emphasis on improving urban infrastructure to address congestion issues underscores the need. Comprehensive urban planning is necessary. Traffic management strategies must be implemented.
- **Road Safety:** There is a significant public outcry for enhanced road safety measures. Frequent mentions of accidents and the call for stricter enforcement of traffic laws indicate that road safety should be top priority for planners. This includes both infrastructural improvements. Policy measures are also needed to enforce traffic regulations.
- **Public Transportation:** The need for reliable and efficient public transportation systems particularly during peak travel periods like Eid, was recurring theme. Public support for enhancing the railway system and bus services suggests that investment in public transportation could alleviate some pressure. This would reduce some of the congestion on road networks.
- **Government Accountability and Public Engagement:** Data highlights demand for greater government accountability and transparency in transportation planning. Public engagement is seen as crucial. Developing effective policies requires involving community voices in decision-making processes.
- **Technological Integration:** Discussions about leveraging technology for transportation improvements suggest public readiness for smart solutions. Implementing advanced technologies for traffic management. Safety monitoring and efficient service delivery could address many identified challenges.

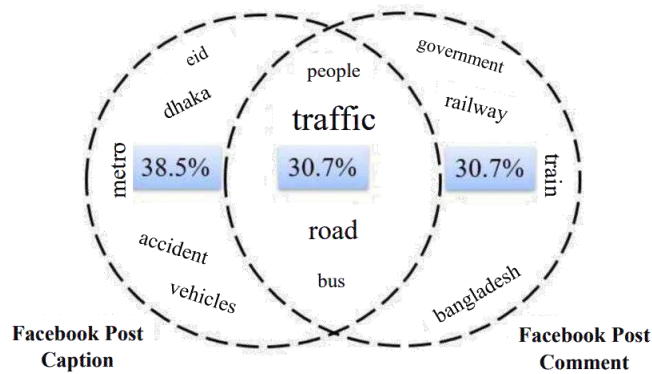
### 6.1.2 Resource Allocation and Policy Development

When it comes to prioritizing infrastructure projects, planners need to listen to the public and focus on tackling the issue of traffic congestion head-on. One way to do this is by improving road connectivity. Investing in expanding and upgrading urban road networks, as well as creating efficient bypasses, can really help ease the traffic situation in our cities.

- **Prioritizing Infrastructure Projects:** Another crucial aspect is implementing safety programs. Allocating resources to road safety initiatives, like public awareness campaigns, stricter law enforcement, and infrastructure safety enhancements, is essential. These programs should specifically target high-risk areas and times, such as during major festivals and rush hours.
- **Implementing Safety Programs:** To make public transport more attractive and convenient, policies should support the expansion and modernization of public transport systems. Initiatives like increasing the frequency of buses and trains during peak periods, as well as improving the overall service quality, can make public transport a much more viable option for daily commuters.
- **Enhancing Public Transport:** It is important to promote public involvement in transportation planning. This can be achieved by developing platforms that allow continuous public engagement. By actively involving the community through methods like digital storytelling and other participatory approaches, we can ensure that transportation policies truly reflect their needs and preferences.
- **Promoting Public Involvement:** By implementing these strategies, we can prioritize infrastructure projects, enhance safety measures, improve public transport, and actively engage the public in transportation planning. This will ultimately lead to better transportation solutions that meet the needs of our communities.
- **Integrating Technological Solutions:** Embracing technology in transportation planning can lead to smarter and more responsive systems. Investments in intelligent transportation systems (ITS) and real-time traffic monitoring. Data analytics can enhance efficiency and safety.

## 6.2 Ven Diagram Analysis

The Venn diagram below illustrates the most frequently used words in Facebook posts and comments within the 'Road Planners Bangladesh' group. The analysis highlights the commonalities. It also shows the differences in the vocabulary used by group members when discussing transportation issues.



### 6.2.1 Key Words in Both Posts and Comments:

- ✓ Dhaka
- ✓ Traffic
- ✓ People
- ✓ Road

These terms appear prominently in both posts and comments. This indicates common concerns. It also shows discussions around these topics. The frequent mention of "Dhaka" the capital city, underscores focus on urban transportation issues. "Traffic" "people," and "road" suggest that congestion and human factors as well as infrastructure, are central to the discussions.

### 6.2.2 Unique Words in Posts:

- ✓ Bangladesh
- ✓ Bus

In this case the frequency of used terms "Bangladesh" and "bus" is higher. There is more frequent and extensive discourse on transportation at the national level. This goes to show that bus transport plays an important role in the country in question.

### 6.2.3 Unique Words in Comments:

- ✓ Passengers
- ✓ Accidents

The words that are used more often in comments are 'passengers' and 'accidents'. This suggests which indicates that commenters are frequently referring to particular accidents and their individual observations like passengers' safety concerns and traffic accidents.

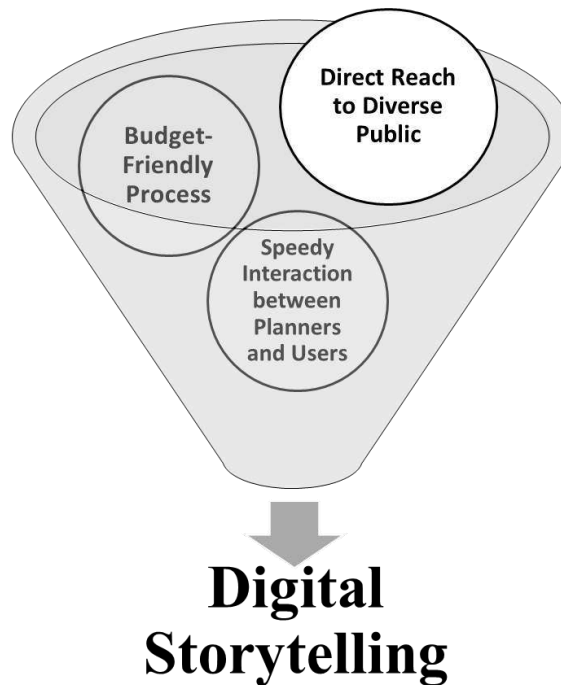
#### ***6.2.4 Insights from the Venn Diagram:***

- **Transportation Challenges:** Here ‘Dhaka’, ‘traffic’, ‘people’ and ‘road’ words have been used in the posters and as all these words are interlinked, that means both posters are regarding traffic and roads in Cities. Commenters share these concerns.
- **Public Safety:** But even while making comments, one is forced to use terms like ‘accidents’ it shows a lot of concern. Safety is another in reference to the need to ramp up the traffic regulations and signs since such incidence can recur.
- **Public Transport:** That the term ‘bus’ appears only one with the function of signaling the signification of bus services. This word is used very often when the prospects of the available transit are discussed.

The analysis above presents the brief investigation of the linguistic features in the public discussions. The recommendations given in this paper will assist the planner as well as policymakers to redress the problems as pointed out properly.

### **6.3 Limitation and Future Scope**

Future research directions of this research focus on the enhancement of this subject and the discovery of new ways of digital storytelling. It also focuses on the integration of other modern AI technologies. The use of models such as AHP and the enhancement of the public’s involvement in the planning of transportation are important. In the exploration of these areas the planners can come up with better, inclusive and sustainable transport solutions to meet the public’s needs.



- 1. Collecting and constructing Public Opinion or Using Reviews to develop Digital Stories:** As for the further work, the attempts can be made to develop the techniques that would help to transform the public opinion into the official decision more smoothly. Having a longer and denser structure, such works contain more elaborate mannerisms of storytelling. These stories can offer a good deal of clarity and reach more than the mere call to attention in the concern of global warming. The translation of the views of the public to the planner. As you can see, this approach is meant to help better understand and organize DST in order to make it more accurate. And effective in informing the public opinions and expectations of a given issue.
- 2. AI Integration:** As for now, open-modelled tools like the recently unveiled OpenAI Sora could soon change that. AI can -
  - Help to simplify the procedures in the creation of videos. This make it possible to conduct operations and tasks in a more faster and efficient manner.
  - Generation of quality digital information as a crucial success factor. This technological advancement not only demonstrates the effectiveness of an idea, but also shows how the idea can be implemented.
  - Improves the DST process, but at the same time it also introduces new possibilities for the further development of the AI realm.
  - Increased public participation and innovation in transportation.
- 3. Application of Analytic Hierarchy Process (AHP):** The process of creating AHP questionnaires depends on distinct choices, various questions, and decision-making concerns. from Text Mining Results. Based on the concerns of text mining future research can

- Design the AHP questionnaires to reflect public's opinion in a manner that will ensure that planners' priorities reflect the opinion of the public. The Analytic
  - If the situation allows, Hierarchy Process can be utilized. It can then systematically analyze and rank multiple
  - The changes in the field of transportation planning can be defined as follows: This method ensures that the variations are random and have no performance effect of the system by testing it with a variation and then without it.
  - it has a much clearer view of the overall decision-making process. It is also the best strategy from a community perspective.
  - needs and preferences.
- 4. Bridging the Gap Between Planners and Users:** To that end, public opinions will be used to identify and determine. Planners' Decisions. Some of the future scope can be considered essential for improvement. Informing planners' decisions is one of them. By integrating the public opinion in the planning map, The distance between the public and planning conclusions can be narrowed here to some extent. This approach promotes meaningful public participation. It makes sure that there is a transportation policy as well as an implementation procedure in cases where they are lacking. There are indications that such projects are more conformative to the community's real requirements and aspirations.

In conclusion, this research explains the importance of digital storytelling (DST) and big data analysis in transportation planning. The significance of problems in Bangladesh's transportation sector, which the study addresses, is evident in the sample through engaging public opinions in the form of Facebook posts, analysed with the help of advanced text mining. These include traffic congestion, road safety and lack of proper public transport systems. So, the findings support the use of AI tools to improve the DST process. They also recommend the adoption of such formal decision-making methodologies such as the Analytical Hierarchy Process (AHP). Further fostering a more diverse and inclusive system of planning that can close the gap between the public's expectations and what the policies have to offer. In conclusion, this research yields a sound framework that can assist planners and policymakers in creating better and more appropriate forms of inclusive and efficient transport solutions. It is essential to consider the needs and goals of the people in the community to ensure that their will is driving the planning and decision-making process.

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# Participatory Transportation Planning: AHP Questionnaire for Public Feedback

## Form Description:

Welcome to the "Prioritizing Transportation Challenges: AHP Questionnaire."

Thank you for participating in this important survey. Your input will help us prioritize key transportation challenges and improve the transportation planning process in Bangladesh.

## Instructions:

### 1. Understanding the Scale:

- You will be expressing your opinion on various transportation-related factors using a 0-10 scale.
- The scale ranges from 0 to 10, where:
  - **0** means you strongly disagree.
  - **3** means you disagree.
  - **5** means you are neutral.
  - **7** means you agree.
  - **10** means you strongly agree.
  - Intermediate values (**1, 2, 4, 6, 8, 9**) can be used if your opinion falls between these descriptions.

### 2. Expressing Your Opinion:

- For each question, select the value that best represents your opinion based on the provided options.
- Carefully read each question and choose the value that aligns with your viewpoint.

### 3. Providing Honest Feedback:

- Please be honest and thoughtful in your responses. Your feedback is crucial for identifying the most pressing transportation issues and potential solutions.

### 4. Completing the Survey:

- Ensure you answer all questions to the best of your ability.
- The survey should take approximately 10-15 minutes to complete.

Your responses are anonymous and will be used solely for research purposes to enhance transportation planning and policy-making.

Thank you for your valuable contribution!

Name: \*

Your answer

Email Address \*

Your answer

Institution/Organization \*

Your answer

Contact number \*

Your answer

Age range \*

- 18-25
- 26-40
- 41-60
- 60+

**Current state of transportation system of Bangladesh? \***

	10	9	8	7	6	5	4	3	2
Well-developed and efficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adequate but in need of improvements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate and requires significant upgrades	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developing, with ongoing infrastructure projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Congested and overwhelmed by traffic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Limited accessibility in rural areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vulnerable to natural disasters and climate change impacts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Efficient for certain modes of transport but lacking integration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Solve one transportation-related challenge in Bangladesh that you face the most \***

	10	9	8	7	6	5	4	3	2
Traffic congestion in urban areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate public transportation infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Road safety and high accident rates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor road conditions and maintenance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of integration between different modes of transport	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmental pollution from transportation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Role of public participation and engagement play in shaping future transportation initiatives and policies in Bangladesh \***

	10	9	8	7	6	5	4	3	2
Essential	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Important but not critical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irrelevant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Neutral	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Top three things the general public wants from transportation planners and government officials \***

	10	9	8	7	6	5	4	3	2
Safe and reliable transportation infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Affordable and accessible public transportation services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environmentally sustainable transportation initiatives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Efficient and time-saving transportation systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transparent and inclusive decision-making processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced traffic congestion and better road conditions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovative and technology-driven transportation solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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### Thesis Project: Public Participation through Digital Storytelling in Transportation Planning

**Engagement with the public to gather feedback or opinions on transportation issues \***

	10	9	8	7	6	5	4	3	2
Yes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Limited engagement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Active involvement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engagement through digital platforms and social media channels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regular engagement with community representatives and stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**What do you think would help people feel like their opinions are important during a town hall meeting about transportation planning? \***

	10	9	8	7	6	5	4	3	2
Opportunities for open discussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactive activities or workshops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessible and transparent information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Utilizing digital platforms for remote participation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engagement with local community leaders and influencers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Providing avenues for anonymous feedback	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Would you opt for a system that collects important public opinions and delivers them to you in a simple digital story format that's easy to understand?**

	10	9	8	7	6	5	4	3	2
Yes, I would find that very helpful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No, I prefer to gather information through other means	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm not sure, I would need more information before deciding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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