

Towards comprehensive urban sustainability: navigating predominant urban challenges and assessing their severity differential in Bangladeshi city corporations

Towards
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sustainability

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Abstract

Purpose – Despite city authorities in Bangladesh being concerned about urban sustainability, they often face difficulties in addressing predominant urban challenges threatening urban sustainability, due to limited relevant literature. To reduce this gap, this study aims to address the predominant urban challenges and assess their severity levels in four city corporations of Bangladesh, e.g. Rajshahi, Sylhet, Barishal, and Gazipur.

Design/methodology/approach – Using a mixed-method approach, this study rigorously analyzed field-level data obtained from 1,200 residents across selected cities using diverse statistical techniques. The quantitative analysis included descriptive analysis, exploratory factor analysis, and chi-square tests, whereas qualitative insights were derived through thematic analysis.

Findings – The study uncovered nine predominant urban challenges under two crucial factors “Feeble Urban Management” and “Illicit Activities” that collectively explain 62.20% variance. “Feeble Urban Management” explains 44.17% variance, whereas “Illicit Activities” accounts for 18.13%. Within these challenges, uncontrolled urban sprawl, inadequate disaster management, congested roads, and shabby drainage and waste management pose significant threats to urban sustainability. Illicit activities, manifested by encroachment on water sources, grabbing roadside, destruction of natural properties, and activities undermining social security, compound the urban sustainability issue. Severity analysis reveals Sylhet (54.5%), Rajshahi (46.4%), and Barishal (31.2%) as highly impacted, whereas Gazipur exhibits moderate severity (66.7%).



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Originality/value – The findings of this study reveal intrinsic insights into urban challenges in Bangladesh that will provide valuable guidance to city authorities, equipping them to implement integrated and effective initiatives and programs that overcome these predominant urban challenges, with a specific focus on Rajshahi, Sylhet, and Barishal city corporations.

Keywords Urban challenges, Urban sustainability, Illicit activities, Urban sprawl, Bangladesh

Paper type Research paper

1. Introduction

Cities are vibrant centers for modernization, communication, and economic growth (Girard, 2003; Henderson, 2010; Keivani, 2010; Colenbrander, 2016). However, they also face a host of complex challenges that hinder their sustainable development. They are voracious energy consumers and waste producers, and harbor illicit activities like corruption, extortion, and drug smuggling (Menes, 2003; Berry, 2018; Jones, 2019). Moreover, they grapple with issues such as limited amenities, congestion, inadequate housing, and crumbling infrastructure. Despite these, with the increasing demand for urban amenities like affordable housing, improved sanitation, and waste management services, cities are experiencing rapid urban sprawl globally.

Bangladesh, like many other developing countries, is witnessing rapid population growth as well as fastening urbanization. The rapid urban population growth is creating a substantial demand for public services and utilities and leading to the proliferation of slums in urban areas. Moreover, Bangladesh has an alarmingly high concentration of dwellers living in cities (GED, 2020). In this aspect, uneven human settlement patterns and widespread corruption are decelerating urban development (Siddique, 2015; Bay, 2020). The delayed disposal of waste and garbage, coupled with high carbon dioxide emissions, is causing urban environmental degradation. Furthermore, the urban areas of Bangladesh are plagued by criminal activities such as drug smuggling, land grabbing, extortion, and violence against women which are threatening social security and impeding urban development (Rahman, 2012; Thakur, 2018; Hasan and Khatun, 2020; Haque and Mumiruzzaman, 2020).

It is evident that urban sustainability and development are intricately intertwined, making it imperative to address the predominant urban challenges in Bangladesh. However, extensive examination via literature review highlights a variety of complex issues across Bangladeshi cities (outlined in Table 2) that hinder their ability to remain sustainable. Rana (2011) provided insight into the many challenges facing Dhaka city, including poor urban planning, weak governance, poor infrastructure, a dearth of basic amenities, environmental degradation, persistent traffic jams that cause accidents, and socioeconomic insecurities that lead to violence. This thorough analysis brought to light the complex network of issues endangering the city's sustainability initiatives. Haque (2019) also highlighted the urgent problems of inadequate water management governance, inadequate slum dweller facilities, and the ongoing water crisis in Dhaka city, highlighting the importance of water-related concerns in maintaining urban life.

In addition, Haq (2014) identified several significant obstacles to Dhaka's sustainability, including the complexities of illicit operations by local leaders (Mastans), urbanization, migration issues, and the impending water crisis. Expanding on this story, Akash *et al.* (2018) highlighted the negative effects of fast urbanization, pollution, environmental deterioration, low public knowledge of sustainable practices, and a lack of public involvement in supporting sustainable urban development. According to Roy *et al.*'s (2021) thorough investigation, Dhaka city faces a wide range of difficulties, including rising housing demands, excessive living expenses, the pressures of population growth, a lack of strong regulatory frameworks for

development, crowded housing, restricted accessibility, and inadequate drainage and sanitation facilities.

Kabir (2013), on the other hand, examined the complexities of urban spatial structures and activity allocation within the landscape of Dhaka city, highlighting the necessity of a thorough comprehension of these components for sustainable development. Siddiqy (2017) offered a comprehensive perspective by drawing attention to the lack of affordable housing and infrastructure, the disappearance of public parks and green spaces, the degradation of surface water quality as a result of excessive groundwater extraction, the high population density, and rapid urbanization and the effects of industrialization on the environment. In addition, Abdullah *et al.* (2010) emphasized the problems that Dhaka city faces, which include inadequate environmental services, traffic jams that cause accidents, and social vulnerabilities that fuel violence. Furthermore, Zaman *et al.* (2010) clarified the complex problems facing Dhaka city, highlighting problems caused by unplanned urbanization, inadequate planning for public transportation and road infrastructure, inadequate environmental considerations, and a lack of concern for the welfare of the impoverished and slum dwellers.

Simultaneously, Uddin's (2018) investigation conducted in Chittagong City clarified the difficulties associated with the restricted availability of reasonably priced housing, insufficient water and sanitation facilities, and the predominance of crowded and inadequate living arrangements. Additionally, Rahman (2016) identified two major barriers to sustainable development in Khulna city: the absence of appropriate planning for urban sustainability and the low level of public involvement in planning and policy creation. In the meantime, Mahmudul Haque *et al.* (2022) noted difficulties in Sylhet and Barishal Cities, highlighting problems with resource mobilization, organizational responsiveness and coordination, and inefficient implementation of environmental legislation as major obstacles to sustainable urban growth. Significant sustainability concerns in Rajshahi include excessive poverty, a lack of urban amenities, poor housing, and poor infrastructure (Rahman and Rana, 2015; Murad *et al.*, 2022).

Most of the collective studies have concentrated on addressing urban challenges, particularly in three major industrial cities of Bangladesh: Dhaka, Chittagong, and Khulna, considering the characteristics of megacities. Dhaka is a megacity with a population of 18.2 m people living in an area of 1,528 km² (Swapan *et al.*, 2017), whereas Chittagong is the second largest city in Bangladesh with a high concentration of population (Mia *et al.*, 2015), and Khulna is the third largest city transformed into a megacity (Morshed *et al.*, 2022). However, there is still a scarcity of research addressing this critical issue in other cities such as Rajshahi, Sylhet, Barishal, and Gazipur, which are also progressing toward transforming into megacities. This underscores the critical need for a comprehensive and integrated approach to addressing these pressing issues across other cities in Bangladesh. In this aspect, Bangladesh is striving to overcome the existing urban challenges and create safe and sustainable cities. However, it remains unclear which urban challenges should take precedence to make cities as comprehensive, safe, resilient, and sustainable, as research in this domain is lacking in Bangladesh. Therefore, this study aimed to identify the predominant urban challenges in Bangladeshi four city corporations, e.g. Rajshahi, Sylhet, Barishal, and Gazipur, which must be addressed first to make these cities comprehensive, safe, resilient, and sustainable. Additionally, this study investigated the variation in degrees of urban challenges' severity across selected cities in Bangladesh. By identifying the most critical challenges and understanding their distribution across cities, policymakers and stakeholders can develop integrated and effective policy programs and initiatives to transform cities into thriving sustainable urban centers.

2. Methods and materials

2.1 Data source and study area

Data were extracted from the dataset of the research project entitled- “Environmental governance for achieving SDGs in Bangladesh: assessing the initiatives of city governance institutions under 7th five year plan” and used for the scholarly analytical attempt of this study. The Department of Political Science of the University of Rajshahi, Bangladesh conducted this project in collaboration with the fund of the Ministry of Education of the Republic of Bangladesh across four cities, e.g. Rajshahi, Sylhet, Barishal, and Gazipur. These cities were randomly selected by considering the cluster of geographical locations, unique regional characteristics, and lack of available literature focusing on their urban challenges. The selected cities are strategically located in different regions of the country, ensuring geographic representation and capturing unique regional characteristics. Moreover, these cities are mostly the oldest and represent diverse urban issues prevalent in different regions of the country. Rajshahi, located in the northwestern part of Bangladesh, faces challenges such as inadequate housing and infrastructure as well as extreme poverty, and deprivation of urban amenities (Rahman and Rana, 2015; Murad *et al.*, 2022; Hossain *et al.*, 2023a). Gazipur, located at the center part of Bangladesh, experiencing rapid industrialization and urbanization, leading to challenges related to waste management and environmental pollution, land grabbing, numerous illicit activities, etc. (Khan *et al.*, 2014; Hassan, 2022; Haque *et al.*, 2023a, 2023b; Hossain *et al.*, 2023b). In Sylhet, located in the northeastern region, issues such as inadequate amenities and socioeconomic disparities are prominent (Hussain, 2007; Ahmed, 2011; Ahmed and Islam, 2014). Barishal, situated in the southern part of the country and proximity to the Bay of Bengal, confronts challenges associated with infrastructural development, and limited access to urban utilities (Rahman and Rahman, 2015; Abir *et al.*, 2023). Moreover, insights from a recent study highlight a lack of urban facilities in terms of water, sanitation, and hygiene in selected cities (Haque *et al.*, 2023a, 2023b). By studying these cities, researchers gain insights into a range of urban challenges, contribute to evidence-based policymaking, and develop targeted interventions for comprehensive urban development.

The project gathered information from a total sample size of 1,200 participants across the four selected city corporations, with the distribution as follows: Rajshahi (291 participants), Sylhet (308 participants), Barishal (301 participants) and Gazipur (300 participants). This sample size was determined randomly based on statistical validity and inclusivity criteria, ensuring representation across various socio-demographic characteristics such as gender, age, education level, profession, and household income status. A multistage sampling technique was used. Within each city corporation, wards (sublocal administrative areas) were designated as clusters, and a cluster sampling method was used to select a set of wards across selected city corporations. The respondents were then chosen using a simple random sampling technique within each ward, ensuring a representative sample that captures the diverse characteristics of the population in these areas. However, the project administered a questionnaire survey to the respondents of a sample size of 1,200. Before administrating the face-to-face interview with the respondents, the questionnaire was meticulously crafted and went through a rigorous review by the internal subject experts. Moreover, the review board from the Institutional Animal, Medical Ethics, Biosafety, and Biosecurity Committee (IAMEBBC) for Experimentations on Animal, Human, Microbes and Living Natural Sources of the Institute of Biological Sciences at the University of Rajshahi, Bangladesh, extensively reviewed the whole process including sample size selection and mandated the ethical approval with the reference of memo no: 110 (16)/320/IAMEBBC, Date: June 05, 2022. Before collecting data, the research team sought written consent from literate respondents whereas verbal consent was collected from illiterate respondents, showcasing the adherence to ethical guidelines of research. However, the

questionnaire captured valuable insights on urban issues, as illustrated in [Appendix](#). Additionally, the questionnaire captured the variables related to respondents, e.g. gender, age, education level, and profession. Respondents were asked to provide their perception of the state of each urban issue in city corporation areas. They provided their perception of the state of all urban issues on a 5-Likert scale presented in [Appendix](#).

However, the aforementioned project data grounded the foundation of the scholarly analytical attempt of this study. Therefore, this study extracted and statistically analyzed the data related to urban issues collected from 1,200 inhabitants across the selected city corporation to attain its objectives. Additionally, this study gathered qualitative information through conducting key informant interviews (KIIs) with stakeholders such as mayors, councilors, government officials, policymakers, civil society members, and other relevant stakeholders knowledgeable to augment the depth and breadth of analytical outcomes through quantitative analysis in this study.

2.2 Construction of determinant factors and their associated variables

To establish a factorial model of predominant urban challenges threatening the urban sustainability in selected city corporations, we assumed a construction (presented in [Table 1](#)) of some determinant factors (e.g. Inadequate Urban Amenities, Feeble Urban Management, Illegal Activities) with their associated existing urban issues. This construction is primarily developed based on a rigorous review of the literature in terms of prevalent urban challenges outlined in [Table 2](#). However, the construction guided us to identify the predominant urban challenges under these predefined determinant factors threatening urban sustainability and sustainable development in city corporations of Bangladesh.

2.3 Statistical analysis

This study adopted a mixed-methods approach, integrating the analytical techniques of both qualitative and quantitative data. An array of statistical techniques was used to analyze the quantitative data whereas thematic analysis was performed for qualitative data. All quantitative analysis was performed in Statistical Software Packages for Social Science (SPSS) and qualitative analysis (e.g. thematic analysis) was performed in NVivo software. The statistical techniques of quantitative analyses included descriptive analysis, exploratory factor analysis (EFA), and

Determinant factors	Observed urban issues
Inadequate urban amenities	Electricity supply, water supply, fuel supply, price of commodities, roads inside the city, communication system inside the city, safe local transportation, facilities for older and disabled, women's safety after evening, women's safety in public transport, universal access at public places, entertainment facilities, cooperative during contrariety
Feeble urban management	Uncontrolled urban sprawl, congested roads, inadequate disaster management, poor drainage maintenance, shabby garbage maintenance, insecurity in public places, irregular cleanliness in public places, crowded public places
Illegal activities	Thwarting local development, activities undermining social security, encroachment on water sources, grabbing roadside and footpaths, destroying natural resources, destroying heritage, influence for occupying land illegally, disobeying construction rules and impediment to private property

Table 1.
Determinant factors
and their
corresponding
observed urban
issues

Source: Created by authors

Study area	Urban challenges	Source
Dhaka city	<ul style="list-style-type: none"> ● Inadequate urban management planning ● Weak governance ● Inadequacy of infrastructural services ● Basic amenities and environmental goods ● Environmental degradation ● Traffic jams and accidents ● Violence and socioeconomic insecurity 	Rana (2011)
Chittagong city	<ul style="list-style-type: none"> ● Limited access to affordable housing ● Improved water and sanitation services ● Living in overcrowded, substandard and unhealthy conditions 	Uddin (2018)
Bangladesh	<ul style="list-style-type: none"> ● Uneven human settlement patterns ● Widespread corruption 	Siddique (2015)
Dhaka city	<ul style="list-style-type: none"> ● Poor governance in water management ● Lack of facilities in the slum dwellers ● Crisis of water continues 	Haque (2019)
Dhaka city	<ul style="list-style-type: none"> ● Illegal activities of Mastans (local leaders) ● Urbanization and migration ● Water crisis 	Haq (2014)
Dhaka city	<ul style="list-style-type: none"> ● Rapid urbanization ● Environmental issues ● Huge pollution ● Unawareness of human activities ● Lack of public participation in sustainable development 	Akash <i>et al.</i> (2018)
Dhaka city	<ul style="list-style-type: none"> ● Increasing demand for housing ● High cost of living ● Growing population ● Lack of development control regulations ● Congested housing ● Poor accessibility ● Inadequate drainage system ● Sanitation facilities 	Roy (2021)
Dhaka city	<ul style="list-style-type: none"> ● Inadequate understanding of the urban spatial structure ● Allocation of activities in the urban landscape 	Kabir (2013)
Dhaka city	<ul style="list-style-type: none"> ● Lack of reasonable housing and infrastructure ● Lack of swamps, open places and public parks ● Deforestation through cutting trees ● Surface water is becoming useless because of having extensive pumping of groundwater ● Impenetrable population with quick urbanization ● Industrialization and roadside or land-grabbing 	Siddiqy (2017)
Khulna city	<ul style="list-style-type: none"> ● Lack of proper planning regarding urban sustainability ● Lack of people's participation in planning and policies 	Rahman (2016)
Sylhet and Barishal cities	<ul style="list-style-type: none"> ● Ineffective enforcement of environmental laws and regulations ● Lack of organizational coordination, responsibility and responsiveness ● The deficiencies in resource mobilization 	Mahmudul Haque <i>et al.</i> (2022)
Dhaka city	<ul style="list-style-type: none"> ● Inadequacy of infrastructural services and basic amenities ● Environmental degradation ● Traffic jams and accidents ● Violence and socio-economic insecurity 	Abdullah <i>et al.</i> (2010)
Dhaka city	<ul style="list-style-type: none"> ● Unplanned spontaneous urbanization ● Lack of planning for utility services, shelter and infrastructure 	Zaman <i>et al.</i> (2010)

Table 2.
Urban challenges in
different cities of
Bangladesh

(continued)

Study area	Urban challenges	Source
	<ul style="list-style-type: none"> • Lack of planning for road infrastructure and public transportation • Lack of comprehensive urbanization • Absence of regulatory framework of urban public land and waterways • Inadequate environmental concerns • Lack of concern for poor and slum dwellers • Absence of a strong mechanism for coordination 	
Rajshahi city	<ul style="list-style-type: none"> • Inadequate housing and infrastructure • Extreme poverty • Deprivation of urban amenities 	Rahman and Rana (2015) Murad <i>et al.</i> (2022) Hossain <i>et al.</i> (2023a)
Gazipur city	<ul style="list-style-type: none"> • Waste management and environmental pollution • Land grabbing and numerous illicit activities 	Khan <i>et al.</i> (2014) Hassan (2022) Haque <i>et al.</i> (2023a, 2023b) Hossain <i>et al.</i> (2023b)
Sylhet city	<ul style="list-style-type: none"> • Inadequate amenities • Socioeconomic disparities 	Hussain (2007) Ahmed (2011) Ahmed and Islam (2014)
Barishal city	<ul style="list-style-type: none"> • Infrastructural development • Limited access to urban utilities 	Rahman and Rahman (2015) Abir <i>et al.</i> (2023)

Source: Created by authors

Table 2.

chi-square test. The descriptive analysis was executed to understand the respondents' background characteristics. As this study ultimately focuses on identifying the key urban challenges based on priority, EFA was used to construct a factor model encompassing the predominant urban challenges. Guided by insights from relevant studies, this study adopted EFA to uncover the predominant urban challenges under predefined determinant factors outlined in Table 1 (Chen *et al.*, 2023; Zhao *et al.*, 2023; Wang *et al.*, 2022; Zebardast and Ghanooni, 2019; Sayad *et al.*, 2017). Using EFA helps validate the assumed framework (Table 1) and develops a new model outlining crucial determinant factors related to major urban issues impacting the sustainability of selected city corporations. Factor analysis is chosen for its ability to uncover underlying patterns and structures within measured variables. This multivariate statistical method allows for the identification of a minimal number of hypothetical constructs that efficiently explain the observed interrelationships among measured variables (Omura *et al.*, 2022; Watkins, 2018). However, assuming the urban issues under each determinant factor in assumed construction (Table 1) are correlated, EFA adopting the principal axis factoring extraction with the promax rotation technique (the technique that is concerned with correlated variables and explains maximum variance on average) was accomplished. The technique based on eigenvalue >1 constructed the factor structure of the different sets of observed urban issues of loading communality score 0.30 and above. Bartlett's test of sphericity and Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy were used to reveal the test's significance at a confidence level of 99%.

Furthermore, factor indices were calculated from the score of each factor for each city corporation, and the city-wise composite factor index was calculated by taking the average of factor indices. These were calculated as following equations (1) and (2):

$$\text{Factor Indices, } F_{i,j} = \frac{[\text{Score of } F_{i,j} - \text{Minimum}(\text{Score of } F_{i,j})]}{[\text{Maximum}(\text{Score of } F_{i,j}) - \text{Minimum}(\text{Score of } F_{i,j})]} \quad (1)$$

where, $F_{i,j}$ = i^{th} factor for j^{th} city corporations; “ j^{th} ” refers to selected city corporations: Rajshahi, Sylhet, Barishal, and Gazipur, respectively.

The composite index was calculated as:

$$\text{Composite factor index, } C_{i,j} = \frac{\sum_{i=1}^n F_{i,j}}{n} \quad (2)$$

The composite factor index value ranges from 0 to 1, with 0 representing the lower bound and 1 representing the upper bound of the index. The calculated values of the composite index were used to measure the severity levels of urban challenges across selected cities. After calculating the city-wise composite factor index values, the city-wise severity differential of outlined predominant urban challenges was measured. Based on values of the composite index, the severity level was classified into three categories e.g. < 0.33 as moderately severe, $0.33\text{--}0.66$ as highly severe, and > 0.66 as extremely severe. The chi-square test was used to investigate the significant difference in city-wise severity of predominant urban challenges.

3. Results

3.1 Socio-demographic characteristics

Within the study, a diverse group of 1,200 respondents shed light on the urban challenges in the selected city corporation areas. Among them, 46.2% were males, and females comprised 53.8% of the group, offering a balanced representation. In addition, the distribution of respondents at various professions indicates a fair cross-section of the urban population. About 29.4% of respondents do jobs (the job can be either government or nongovernment categories), 24.8% of respondents do business and 25.8% and 20% of respondents' professions are agriculture and others (e.g. day labor, rickshaw puller, etc.), respectively, showcasing a diverse distribution of urban population. The mean age was for male 39.77 ± 12.37 years and female 35.29 ± 15.54 years. The majority of respondents demonstrated literacy, with only a small percentage (5.4%) reporting as illiterate. Among the literate individuals, 40.2% held postgraduate degrees, while 20.3% completed graduate and higher secondary and 13.8% completed secondary education. Furthermore, the monthly family income distribution of the respondents is showcasing a balanced representation of the urban population. Specifically, 30% of respondents were from low-income (monthly family income $\leq 20,000$ BDT) households, and 35.4% of respondents belonged to lower-middle-income (monthly family income between 21,000 and 35,000 BDT) households. In contrast, 20.1% of respondents were from upper-middle-income households (monthly family income between 36,000 and 50,000 BDT) and 14.5% belonged to high-income (monthly family income $> 50,000$ BDT) households.

3.2 Predominant urban challenges in selected city corporations

EFA uncovered two significant factors that captured the predominant urban challenges: “Feeble Urban Management” and “Illicit Activities”. Together, these factors explain a substantial 62.20% variance, shedding light on the prevalent urban challenges in the selected city

corporations (as presented in Table 3). “Feeble Urban Management” is identified as the dominant factor, accounting for 44.17% variance and posing a threat to urban sustainability. Following the factor “Feeble Urban Management” closely, the factor of “Illicit Activities” contributes 18.03% of the explained variance, further undermining urban development and threatening its sustainability in Bangladesh. These two factors highlighted nine urban issues that pose challenges to urban sustainability in the selected city corporations, as organized in Table 3. However, the urban issues are interrelated, the order of identified urban issues signifies their relative importance and the need to address them for sustainable urban development. The robustness of these findings is supported by the KMO test (0.826) and Bartlett’s test of sphericity ($p < 0.001$), confirming the adequacy of the sampling. Results also reveal that uncontrolled urban sprawl is leading to endangering sustainability in the selected city corporations. Overcoming maintenance issues related to disasters, drainage, congested roads, and solid waste has emerged as a prominent urban challenge. In addition, illicit activities were identified as a major factor undermining urban development and sustainability. The factor “Illicit activities” has manifested encroachment on water sources, destruction of natural properties, grabbing roadside and footpaths, and activities undermining social security as a few more major urban issues that are challenging urban sustainability across selected city corporations in Bangladesh. In addition, the results derived from the thematic analysis of qualitative data, as depicted in Figure 1, showcased that the outlined urban issues in (Table 3) are posing challenges to achieving comprehensive, safe, resilient, and sustainable cities in Bangladesh. The government officials, civil society members, and stakeholders mostly highlighted the outlined urban challenges in the studied city corporation areas whereas city mayors pointed out some issues related to governance and management. Intricately comprehending these insights, it is crucial to overcome the urban issues outlined in Table 3 to create selected city corporations as comprehensive, safe, resilient, and sustainable. By addressing these issues head-on, city authorities can pave the way for sustainable urban development.

3.3 City-wise differential in the severity of outlined urban challenges

Table 4 demonstrates the differential in the severity of urban challenges across the selected city corporations in Bangladesh. It becomes evident that the degree of severity varies

Predominant urban challenges	Factors	
	Feeble urban management	Illicit activities
Uncontrolled urban sprawl	0.806	
Inadequate disaster management	0.796	
Poor drainage maintenance	0.770	
Congested road	0.715	
Shabby garbage maintenance	0.668	
Encroachment on water sources		0.962
Destruction of natural properties		0.818
Grabbing roadside and footpaths		0.818
Activities undermining social security		0.634
Eigenvalue	3.96	1.62
Variance explained (total 62.20%)	44.17%	18.03%
KMO sampling adequacy = 0.826, Chi-square significant at $p < 0.001$, $N = 1200$		

Note: Methods: Principal axis factoring extraction with promax rotation technique

Source: Created by authors

Table 3.
Factor structural
model of identified
predominant urban
challenges

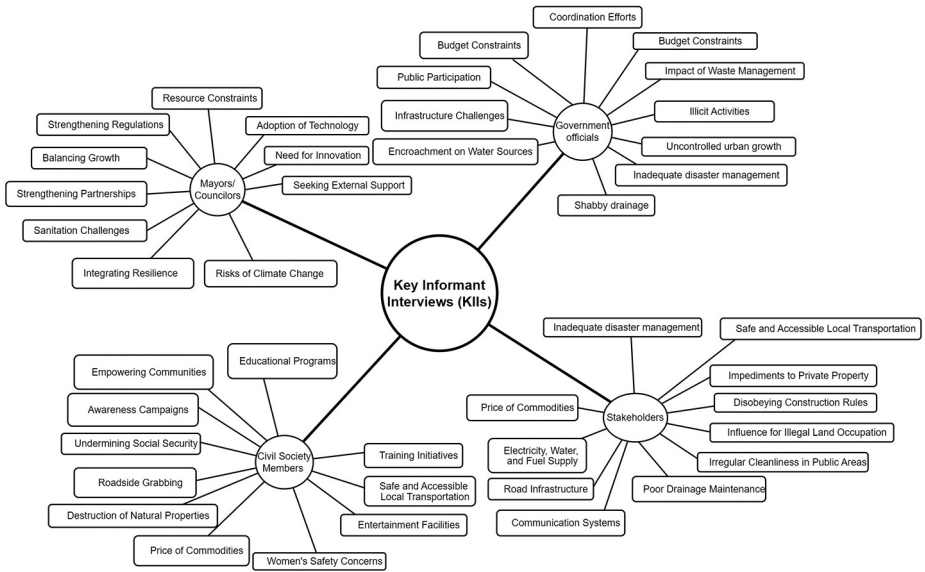


Figure 1. Urban challenges derived from thematic analysis of KIIs

Source: Created by authors

Table 4. City-wise comparison of the severity of underlined urban issues

City corporations	Moderately severe	Severity level		Chi-square statistic (df, N) p-value at 95% CI
		Highly severe	Extremely severe	
Rajshahi	31 (10.7%)	125 (43.0%)	135 (46.4%)	482.46 (6, 1200) 0.000
Sylhet	2 (0.6%)	138 (44.8%)	168 (54.5%)	
Barishal	58 (19.3%)	149 (49.5%)	94 (31.2%)	
Gazipur	200 (66.7%)	98 (32.7%)	2 (0.7%)	

Note: Chi-square test significant at p -value < 0.05 ; CI: confidence interval

Source: Created by authors

significantly among the selected cities. Sylhet City Corporation stands out as the most severely affected, followed closely by Rajshahi and Barishal. On the other hand, Gazipur City Corporation experienced a comparatively moderate level of severity. Examining the data presented in Table 4 offers further insight into the level of severity of outlined urban issues. Surprisingly, more than half of the cases in Sylhet City Corporation (54.5%) reflect an extremely severe appearance of the outlined urban issues. Similarly, significant proportions of cases in Rajshahi (46.4%) and Barishal (31.2%) exhibit the same level of severity. In contrast, the majority of cases in Gazipur City Corporation (66.7%) indicate a moderately severe impact of outlined urban issues. Furthermore, it is worth noting that a considerable percentage of cases in Rajshahi (43.0%), Sylhet (44.8%), Barishal (49.5%), and Gazipur (32.7%) city corporations demonstrate a high severity of the outlined urban issues. These findings underline the pressing need to address the urban issues and mitigate the urban

challenges in each city corporation, with particular attention to the cities experiencing extreme severity. By understanding the varying degrees of severity, policymakers and stakeholders can prioritize and implement targeted strategies to ensure the sustainable development and well-being of these urban areas.

4. Discussion

Urban challenges undermine the broader aims of sustainability. Both existing and forthcoming urban challenges threaten cities' security and sustainability. Urban sustainability and development are interlinked (Gibbs, 1997; James, 2014; Yavuz, 2016). This interconnection between urban sustainability and development has been widely recognized, making it a pressing concern for developing countries like Bangladesh. Building sustainable cities requires addressing urban challenges both existing and forthcoming. In alignment with the sustainable development goal-11 (SDGs-11) of "making cities comprehensive, safe, resilient, and sustainable" (DESA, 2016), this study has investigated the prevailing urban issues that undermine urban development and threaten its sustainability in Bangladesh. The findings of this study shed light on two critical factors threatening urban sustainability in Bangladesh: feeble urban management and illicit activities. The factor "Feeble Urban Management" is manifested by numerous major urban issues such as uncontrolled urban sprawl, inadequate disaster management, shabby drainage, and garbage management. However, uncontrolled urban sprawl is associated with a myriad of urban challenges, challenging urban sustainability in Bangladesh. The consequence of uncontrolled urban sprawl has emerged as environmental degradation, inadequate urban amenities and social insecurities (Mohapi, 2009; Kabir, 2013; Swapan *et al.*, 2017; Akash *et al.*, 2018). Furthermore, poor disaster management, congested roads, shabby drainage systems and ineffective waste management are exacerbating the urban challenges faced by city corporations in Bangladesh.

Illicit activities pose another significant threat to urban sustainability, manifested in this study through encroachment on water sources, destruction of natural properties, grabbing roadside and footpaths and activities undermining social security. The encroachment upon water sources exacerbates the issue of water scarcity, disproportionately affecting those living in urban slums (Hossain *et al.*, 2023c; Haq, 2014; Haque, 2019). Additionally, the grabbing of roadside and footpaths not only disrupts traffic flow but also poses significant risks to pedestrian safety, amplifying the likelihood of accidents. However illegal grabbing of roadside and footpaths by vendors and others goes unabated in urban areas of Bangladesh (Ahmed *et al.*, 2020). Furthermore, this study also highlights the prevalence of various illicit activities, including robbery, extortion, drug trafficking, smuggling and harassment, fretfully threatening social security in urban areas (Thakur, 2018; Hasan and Khatun, 2020; Rashid, 2021). The findings in this study align with the results of the depletion of natural resources, including deforestation, hill cutting and river filling, which have been revealed as major threats to urban sustainability in a few research (Cochard, 2011; Singh *et al.*, 2021). Such activities contribute to environmental degradation and imperil the delicate balance of biodiversity and ecosystems. Overcoming these outlined issues comprehensively and systematically is imperative to ensure safe, resilient and sustainable cities. Good governance and sustainable development are the two concepts explicitly tied together; therefore, good governance might be the pathway toward achieving urban sustainability in Bangladesh (Roy and Tisdell, 1998; Dhaoui, 2019; Kardos, 2012; Gaghman, 2020). Tight urban management must be prioritized to curtail chaotic urban sprawl, eliminate illegal activities, and enhance infrastructural development to ensure urban sustainability in Bangladesh. Moreover, the study reveals the significant variation in the severity of urban challenges among city corporations, necessitating targeted attention for cities facing extreme levels of severity. The outlined issues identified in this study serve as a guide for city authorities, facilitating the

implementation of integrated and effective initiatives and programs to address the predominant urban challenges, with a specific focus on Rajshahi, Sylhet, and Barishal city corporations.

5. Limitations and strengths of the study

This study acknowledges certain limitations, such as the focus on pre-existing urban challenges rather than future ones and the cross-sectional design providing a snapshot of the identified challenges at a specific time. Despite these limitations, the study has notable strengths. The findings of this study offer valuable insights for understanding and addressing urban challenges in Bangladesh, paving the way for more informed and effective urban planning and policy interventions. The comprehensive analysis, using various statistical techniques, offers a thorough understanding of the identified urban challenges. The categorization of challenges into two crucial factors, “Feeble Urban Management” and “Illicit Activities,” provides a comprehensive framework for addressing the diverse range of urban challenges faced by city corporations in Bangladesh. This study sets the foundation for future research by establishing the basis for confirmatory factor analysis of the outlined urban challenges. Moreover, the study provides detailed recommendations for city authorities, enabling them to put the findings into practice through successful projects and programs. Additionally, the study aligns with sustainable development goals, contributing to the broader agenda of sustainable development in Bangladesh.

6. Conclusion

The findings of this study highlight the interlink between urban sustainability and development, emphasizing the pressing need to address urban challenges in Bangladesh. Feeble urban management and illicit activities have emerged as the key factors that threaten the sustainability of urban areas in studied cities. The consequences of feeble urban management are evident in the uncontrolled urban sprawl, leading urban sustainability to a conundrum by creating densely populated cities, inadequate urban amenities, and social insecurities. Inadequate disaster management, congested roads, and poor waste management practices, coupled with various illicit activities such as encroachment on water sources, destruction of natural properties, and illegal grabbing of roadside and footpaths, further exacerbate the challenges faced in achieving urban sustainability across studied city corporations in Bangladesh. Toward the aim of making the studied cities safe, comprehensive, resilient, and sustainable, proactive measures are required to overcome these challenges. Strengthening the urban management system is imperative to curtail uncontrolled urban sprawl, eliminate illicit activities, and promote infrastructural development that effectively mitigates disastrous risks and ensures sustainable waste management. However, the considerable variation in the severity of urban challenges among city corporations emphasizes the need for targeted attention. The outlined issues identified in this study provide valuable guidance to city authorities, equipping them to implement integrated and effective initiatives and programs that overcome the predominant urban challenges, with a specific focus on Rajshahi, Sylhet, and Barishal city corporations. By addressing these pressing urban challenges and taking integrated and comprehensive initiatives and actions, city authorities can pave the way for urban sustainability in Bangladesh.

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Appendix

Urban issues	Coding
Electricity supply	1= very good, 2= good, 3= neither good nor bad, 4= bad, 5= severely bad
Water supply	1= very good, 2= good, 3= neither good nor bad, 4= bad, 5= severely bad
Fuel supply	1= very good, 2= good, 3= neither good nor bad, 4= bad, 5= severely bad
Price of commodities	1= severely low, 2= low, 3= neither low nor high, 4= high, 5= severely high
Roads inside the city	1= severely much, 2= much, 3= neither much nor less, 4= less, 5= severely less
Communication system inside the city	1= very good, 2= good, 3= neither good nor bad, 4= bad, 5= severely bad
Safe local transportation	1= severely much, 2= much, 3= neither much nor less, 4= less, 5= severely less
Women's safety after the evening	1= severely safe, 2= safe 3= neither safe nor unsafe, 4= unsafe, 5= severely unsafe
Women's safety in public transport	1= severely safe, 2= safe 3= neither safe nor unsafe, 4= unsafe, 5= severely unsafe
Facilities for older and disabled people	1= severely much, 2= much, 3= neither much nor less, 4= less, 5= severely less
Universal access at public places	1 = strongly disagree, 2= disagree, 3= neither disagree nor agree, 4= agree, 5= strongly agree
Entertainment facilities	1= severely much, 2= much, 3= neither much nor less, 4= less, 5= severely less
Co-operative during contrariety	1= very good, 2= good, 3= neither good nor bad, 4= bad, 5= severely bad
Uncontrolled urban sprawl	1= severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Congested road	1 = severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Inadequate disaster management	1 = strongly disagree, 2= disagree, 3= neither disagree nor agree, 4= agree, 5= strongly agree
Poor drainage maintenance	1 = strongly disagree, 2= disagree, 3= neither disagree nor agree, 4= agree, 5= strongly agree
Shabby garbage maintenance	1 = strongly disagree, 2= disagree, 3= neither disagree nor agree, 4= agree, 5= strongly agree
Insecurity in public places	1 = severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Irregular cleanliness in public places	1 = severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Crowds in public places	1= severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Thwart local development	1 = severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Activities undermining social security	1 = severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Encroachment on water sources	1 = severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Grabbing roadside and footpaths	1 = severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Destroying natural properties/ resources	1 = severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Destroying heritage	1 = severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Influence for occupying land illegally	1 = severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much
Disobeying construction rule	1= severely much, 2= much, 3= neither much nor less, 4= less, 5= severely less
Impediment to private property	1= severely less, 2= less, 3= neither less nor much, 4= much, 5= severely much

Table A1.
Categories of the
status of urban
issues with coding
value

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