Measuring Social Sustainability for Socially Sustainable Urban Development: A Preliminary Study in Dhaka City, Bangladesh

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Abstract

Social sustainability in socially sustainable urban development is an escalating global concern to ensure the well-being of urban society. Uncontrolled and rapid urbanization has transformed Dhaka into one of the world's largest megacities, leading to severe social problems. Therefore, it influences the city's social sustainability. Due to the lack of attention to social sustainability, especially in cities of developing countries, this study aims to measure the current status of social sustainability in Dhaka city for socially sustainable urban development. A structured questionnaire survey was conducted among residents of Dhaka. Results revealed that Dhaka city residents have low satisfaction levels regarding social sustainability conditions. They are not getting adequate facilities related to social sustainability for socially sustainable urban development. The results provide empirical evidence of the current status of social sustainability to policymakers, urban planners, and implementing agencies in Dhaka city that can assist in formulating appropriate socially sustainable planning, policy formulation, and practical implementation. The study might also help researchers in developing countries expand their thinking about other cities encountering similar problems.

Keywords: *Social Sustainability; Socially Sustainable Urban Development; Developing Countries; Dhaka City; Bangladesh*

1. INTRODUCTION

Over the past 35 years, sustainable development has been introduced into the global arena as a key concept. Sustainable urban development evolves from the concept of sustainable development, which has also been receiving high attention among academics, urban planners, and policymakers recently (Wang et al., 2019; Larimian et al., 2020). United Nations Report of the *World Commission on Environment and Development: Our Common Future* stated that sustainable development depends on three dimensions, namely environment, economics, and social (United Nations, 1987). These three dimensions are also equally vital for sustainable urban development (Rafieian & Mirzakhalili, 2014; Baffoe & Mutisya, 2015). Despite the equal importance of the three dimensions in the sustainability agenda, social sustainability is constantly receiving less attention in academic literature (Haji Rasouli & Kumarasuriyar, 2016; Akan & Selam, 2018; Kumar & Anbanandam, 2019). Though social sustainability has become highly associated with sustainable urban development issues (Ali et al., 2019).

Recently, the socially sustainable urban development concept is gaining widespread attention in the literature with a greater emphasis on social aspects (Cho et al., 2015; Shirazi & Keivani, 2019a; Ring et al., 2021; Wrangsten et al., 2022). However, implementing social sustainability for socially sustainable urban development is challenging due to the growing trend of rapid urbanization. The world's population is growing significantly in urban areas. More than 76 per cent of urban people live in developing countries; it is forecast to be more than 83 per cent in 2050, while only about 16 per cent will live in developed countries (United Nations, 2019). Notably, the rapid urban expansion will decrease in developed countries and increase in developing countries. Rapid urbanization in most developing countries leads to severe social problems within urban areas (Zhang, 2016; Ghalib et al., 2017). Therefore, it is essential to reveal the social sustainability status for socially sustainable urban development in the cities of developing countries.

The context of Dhaka, as a city in a developing country, is also facing excessive urban expansion in the last few decades. In the previous 40 years, uncontrolled and rapid urbanization has made Dhaka one of the world's megacities with experienced massive population growth (Roy et al., 2018). Due to rapid urbanization, the urban community of Dhaka is immensely struggling with social problems, including standard housing, urban poverty, health facility, women empowerment, public transport, sanitation, shelter, illiteracy, slums, corruption, and open spaces (Satu & Chiu, 2019; Yasmin, 2019; Barai, 2020). The Theory of Urbanism also explained that rapid and unplanned urbanization creates extreme urban social problems (Wirth, 1938). The social problems are responsible for ensuring social sustainability that hinders sustainable urban development for city dwellers (Woodcraft, 2012; Ali et al., 2019). Hence, social sustainability requires adequate attention for socially sustainable urban development, which cannot be ignored, especially in cities in developing countries.

In the last two decades, many social scientists have worked on urban social sustainability. They emphasized some specific issues, such as 'socially sustainable urban design (Timmerman et al., 2019)', 'urban neighborhood (Dave, 2011; NEAMŢU, 2012; Woodcraft, 2012; Rafieian & Mirzakhalili, 2014; Neilagh & Ghafourian, 2018; Wang & Shaw, 2018; Shirazi & Keivani, 2019b; Shrivastava & Singh, 2019),' 'social sustainability of urban regeneration (Glasson & Wood, 2009; Chan et al., 2019)', and 'effects of urban form on social sustainability (Bramley et al., 2006; Bramley et al., 2009; Bramley & Power, 2009; Landorf, 2011; Dempsey et al., 2012; Kyttä et al., 2016; Ali et al., 2019)'. Furthermore, comprehensive literature suggests that most authors discussed the role of social sustainability in the urban context as it is essential for making sustainable cities (Deviren, 2010; Weingaertner & Moberg, 2014; Hemani et al., 2017; Chan et al., 2019). In the meantime, a group of social scientists concentrated on definitions and conceptualizing social sustainability as an emerging issue rather than its practical outcomes (McKenzie, 2004; Vallance et al., 2011; Haji Rasouli & Kumarasuriyar, 2016; De Fine Licht & Folland, 2019). However, measuring current status of social sustainability is essential in cities of developing countries to build a city socially sustainable. To fill the gaps in the existing literature, this study aims to measure the current status of social sustainability in Dhaka city.

The present study is evidence-based research that contributes in a specific way to the existing literature. First, this is the first attempt to measure the current status of social sustainability in the

context of Dhaka city based on the highest to lowest ranks of social sustainability themes. Previous studies focused on the assessment of social sustainability, but none of the studies specifically revealed the highest to the lowest rank of social sustainability themes. Therefore, this study contributes to this body of knowledge by obtaining concrete empirical evidence about the current status of social sustainability in Dhaka city that helps the government, policymakers, urban planners, urban municipalities, and implementing agencies in making appropriate plans, policy formulation, and practical implementation for a socially sustainable Dhaka city. Likewise, it helps them identify which social sustainability themes need to be addressed immediately. Second, this study is useful for those cities in developing countries facing the same problem as substantial urban social problems by rapid urbanization. Rapid urbanization is not only a concerning issue for Dhaka city but also, many other cities are facing the same situation, such as Kolkata, Delhi, Shanghai, Beijing, Mumbai, Osaka, Beijing, Cairo, and so on (United Nations, 2014). Third, this study also helps to achieve Sustainable Development Goals (SDG-11) titled "Sustainable Cities and Communities".

2. LITERATURE REVIEW

2.1. Social Sustainability Concept

In the late 1990s, social sustainability was a fundamental aspect of the sustainability agenda (Haji Rasouli & Kumarasuriyar, 2016). However, considering so far, there are five specific reasons why social sustainability is getting less priority. First, some theoretical arguments for defining social sustainability and even limited literature focus on this subject (Dempsey et al., 2011). Second, social sustainability still overlaps with the other two pillars of environmental and economic sustainability (Vallance et al., 2011). Third, social sustainability is often not considered due to its qualitative nature, which makes it challenging to evaluate and implement (Al-Dahmashawi et al., 2014). Fourth, some literature still covers social sustainability as social capital, social cohesion, social inclusion, and exclusion (Dempsey et al., 2011). Fifth, it is hard to conceptualize and provide an integrated framework, mainly in sustainability studies (Al-Dahmashawi et al., 2014).

Meanwhile, the definition of social sustainability creates some debate in the development world (Weingaertner & Moberg, 2014). The acceptable definition of social sustainability is somewhat complicated due to overlapping with other subjects (De Fine Licht & Folland, 2019). From the beginning, the focus was on a sustainable environment, while limited literature paid less attention to social sustainability (Haji Rasouli & Kumarasuriyar, 2016; Rocak et al., 2016). Thus, there was no definite definition of social sustainability in academic literature (Weingaertner & Moberg, 2014).

However, the social sustainability focus has increased in recent years with the number of authors' contributions to this area, who have developed its conceptual definition and integrated it into broader sustainability theory and practice. Thus, the meaning of social sustainability is more specific than ever in the academic literature (Partridge, 2014; McGuinn et al., 2020). Sachs (1999) defines *social sustainability* as human needs such as equitable incomes, access to goods, services, employment, human rights, and the importance of democracy. McKenzie (2004, p. 12) illustrates that "Social sustainability is a life-enhancing condition within communities and a process within communities that can achieve that condition". Ali et al. (2019) describe social sustainability as achieving a better quality of life through the participation and interaction of community members. Therefore, *social sustainability* can be defined as a favorable condition for a society where every individual can achieve a quality of life by ensuring human needs that help create a healthy and livable community for the current and future generations.

Since 1990, sustainable development has been associated with 'sustainable cities' or 'sustainable urban development' (Hemani & Das, 2016). Thereby, socially sustainable urban development has gained growing attention in the world. According to Enyedi and Kovács (2006), the concept of socially sustainable urban development is different from sustainable urban development, with more emphasis on social aspects. Socially sustainable urban development is accomplished when social aspects such as community involvement, social cohesion, solidarity, fairness, equity, participation, empowerment, and access are ensured in urban areas (Ogunsola, 2016). Therefore, socially sustainable urban development can be defined as a society and an urban condition where social aspects are gaining importance and being ensured in sustainable urban development.

2.2. Nexus Between Theory of Urbanism and Socially Sustainable Urban Development

In developing countries, rapid urbanization has created social problems that influence social sustainability and challenge building socially sustainable urban development (Woodcraft, 2012; Hemani et al., 2017; Ali et al., 2019; Khatun, 2019). In 1938, the Theory of Urbanism focused on how a city has grown with large population size, density, and heterogeneity due to rapid urbanization, leading to urban social problems. According to Wirth (1938), urbanisation in modern times makes extreme changes in almost every phase of urban social life. Consequently, he also mentioned that the rapid urbanization in the United States creates the intensity of urban problems. Eventually, urban social problems influence social sustainability (Hemani et al., 2017; Ali et al., 2019). In the context of cities in developing countries, ensuring the quality of life for the citizens becomes a severe issue for the city authorities as Wirth (1938) explained that rapid urbanization creates extra pressure on social life and increases the demand-pull of human needs. Therefore, social sustainability is crucial for ensuring socially sustainable urban development (Randeree & Ahmed, 2018; Timmerman et al., 2019; Saleem et al., 2020; Larimian & Sadeghi, 2021).

Before ensuring socially sustainable urban, measuring the current status of social sustainability for socially sustainable urban development in developing countries is essential. Measuring the current status of social sustainability helps to find out its actual conditions which assist city authorities to build socially sustainable cities. Considering this issue, this study intends to measure the current status of social sustainability for socially sustainable urban development in the context of Dhaka, as a city of developing countries.

2.3. Urban Social Sustainability in Dhaka City, Bangladesh

Urbanization is an effective process for global economic growth. Undoubtedly, urbanization brings economic benefits to a country, but adverse effects of rapid urbanization occur, especially in developing countries like Bangladesh. The urbanization pattern of Bangladesh has changed rapidly due to rural-urban migration (General Economic Division, 2016-2020). However, the pattern of urbanization was quite different for Bangladesh in 1950; 4.28 per cent of the population was living in urban areas, whereas the number of people in rural areas was 95.71 per cent. United Nations (2018b) forecasted that around 60 per cent urban population will live in 2050, whereas the rural population will be 40 per cent. Dhaka is the capital city of Bangladesh. The urbanization process in Dhaka city has become a megacity and suffering from the extensive growth of the population in recent decades. RAJUK (2015) stated that Dhaka's population increased by 63 per cent of the city's total growth due to migration, whereas only 37 per cent of growth happened from the natural increase. The trend of rural-urban migration in Dhaka creates a large population responsible for rapid urbanization.

The population and density growth started in Dhaka in 1971 (Roy et al., 2019). In terms of the total population living in urban areas, Dhaka ranked 9th out of 10 top cities in 2018 and is forecasted to rank 4th in 2030 (United Nations, 2018a). Dhaka has a population density of 41,000 per square kilometre, ranked 1st among the world cities to build urban areas by population density per square mile (Demographia, 2019). The city has grown with large population size, density, and heterogeneity, leading to urban social problems. As a result, Dhaka is struggling with high population density through rapid urbanization, which creates social problems and affects the status of social sustainability (Rahman, 2014; Roy et al., 2021; Khatun, 2019).

Currently, the sustainability issue in Dhaka city is getting significant concern to the city planner and the government (RAJUK, 2015). Due to this fact, it becomes difficult for city management authorities to ensure the quality of life for the citizens of Dhaka city (Degert et al., 2016; Wang & Sarker, 2020). Indeed, building a sustainable urban requires serious attention to social problems to ensure social sustainability (Ali et al., 2019). In 2019, the 'Safe Cities Index' depicted the nature of urban safety based on four indicators: digital, infrastructure, health, and personal safety; Dhaka ranked 56th out of 60 cities, which stands as the 5th least safe city (The Economist Intelligence Unit, 2019). Numbeo (2021) presents the quality-of-life index based on the cost of living, housing affordance, crime rate, health system, traffic, and pollution, where Dhaka ranks 238th out of 241 cities. Thus, measuring the current status of social sustainability is a prime issue for socially sustainable urban development in Dhaka city.

3. RESEARCH METHODOLOGY

3.1. Study Area

The study considered Dhaka city as a study area. Dhaka city is located at 23°42′ to 23°52’ latitude in the north and the 90°22′ to 90° 32’ longitude in the east (Roy et al., 2018). The total coverage area of this city is 302.92 square kilometers (Bangladesh Bureau of Statistics, 2013). Dhaka City Corporation has a self-governing system called the local government to manage the megacity. Dhaka City Corporation is divided into two city corporations: Dhaka North City Corporation (DNCC) and Dhaka South City Corporation (DSCC).

3.2. Population and Sample of the Study

According to the constitution of Bangladesh, when a citizen reaches the age of 18, they can participate in important decision-making events like national elections. Accordingly, this study sets the criteria for voters of Dhaka city to participate in the online survey by providing feedback. Likewise, voters have living experiences that help to provide insightful opinions about social sustainability in Dhaka. The study considers all Dhaka city residents as a population; only the voters are considered a target population. Due to the large population and financial and time limitations, a manageable sample size is required as it is difficult for the researcher to collect data from each voter. Johanson and Brooks (2010) suggest that 30 samples from the target population are reasonable for a pilot study. Finally, the researcher collected 109 responses from residents of two city corporations in Dhaka through an online survey for a pilot study.

Table 1. Demographic Profile of Pilot Study

Characteristics	N	Category	Frequency	Per cent (%)
Gender	109	Male	90	82.57
		Female	19	17.43
Age	109	19-28 years	26	23.85
		29-38 years	66	60.55
		39-48 years	17	15.60
Marital status	109	Married	71	65.14
		Single	37	33.94
		Others	1	0.92
Religion	109	Muslim	98	89.91
		Hindu	11	10.09
Education	109	S.S.C	1	0.92
		H.S.C	5	4.59
		Honors	24	22.02
		Master’s	76	69.72
		Others	3	2.75
Year of Living	109	0-09 Years	24	22.00
		10-19 Years	47	43.10
		20-29 Years	23	21.10
		30-39 Years	11	10.10
		40+ Years	4	3.70
DCC (Area)	109	DNCC	49	45.00
		DSCC	60	55.00

Note: N=Number of Respondents, DCC=Dhaka City Corporation, DNCC=Dhaka North City Corporation, DSCC=Dhaka South City Corporation.

3.3. Sampling Technique

This study adopted the multi-stage sampling technique to select its respondents. In the first stage, this study used the purposive sampling technique to select voters for participating in this online survey. In the second stage, this study also used the systematic sampling technique where we chose 06 wards from each city corporation to ensure the heterogeneity of the respondents' opinions. In the third stage, this study used a systematic sampling strategy to select the target respondents' houses, specifically for voters by collecting voters’ information from the respective ward

commissioner's office and the Bangladesh Election Commission. Hence, we excluded 11 responses to ensure voters' status from the 120 responses. Finally, this study selected 109 respondents for the pilot study.

3.4. Data Collection Processes

A survey technique was used for this study to collect primary data through a structured questionnaire. We distributed well-prepared leaflets to selected wards of two city corporations to participate in the online survey through Google Docs.

3.5. Research Instrument

The study developed a measuring framework of social sustainability based on the comprehensive literature review, Commission on Sustainable Development Framework, Sustainable Development Goal-11, and National Urban Sector Policy for Bangladesh. Initially, 64 indicators were selected under 11 social sustainability themes, namely 1) Health Facilities, 2) Gender Equality and Women's Empowerment, 3) Urban poverty and Slums Improvement, 4) Urban children, aged, the disabled, and the scavengers, 5) Transportation Availability, 6) Satisfied with Space, 7) Open Space, 8) Social Capital, 9) Safety, 10) Social Justice, and 11) Education Facilities. A five-point Likert scale (i.e., 5-Strongly agree, 4-Agree, 3-Neither agree nor disagree, 2-Disagree, 1-Strongly disagree)[1] was used in the survey questionnaire where respondents were required to respond to the items.

A pre-testing procedure needs to be conducted to develop a survey questionnaire or confirm the variables' measurability (Hilton, 2017; Ikart, 2019). This study followed the pre-testing procedure by measuring the content validity of the survey questionnaire (see details in Appendix A). To check the content validity for the individual item (I-CVI) and overall scale (S-CVI) scores, a structural questionnaire was placed on 06 experts who are highly experienced and top authorities, including Directors of Urban Planning and Development, City Planners, Consultants, and Program Analysts from national and international platforms with four scale degrees of relevance (consistency, representative of concepts, relevance to concepts, and clarity in terms). As per experts' suggestions, 01 items have to be merged with other existing items, and 02 items were suggested to be rearranged. Finally, based on experts' comments and relevance ratings, 62 items were selected under 11 variables for the pilot study (variables and items are shown in Appendix A).

Skewness and kurtosis explicate the normal distribution of a dataset (Hair et al., 2022). This pilot study performed a normality test by checking skewness and kurtosis values (see details in Appendix B). All the skewness and kurtosis values were within the threshold level (±2), except in Open Space (OS). As per the kurtosis values, three items, i.e., OS1 (public space availability), OS2 (use of public space), and OS4 (satisfaction level of public space), exceeded the threshold level (± 2). However, the skewness values for OS2 and OS4 were within the threshold level range (± 2). Only the skewness and kurtosis values exceeded the threshold level for OS1. Only 01 (OS1) out of 62 items exceeded the threshold for skewness and kurtosis values. Though it is not significant, the assumption of normality based on the results of skewness and kurtosis implies that the data is not normally distributed.

The reliability of the adopted items was measured using Cronbach's Alpha to examine the quality of the research instruments. Straub et al. (2004) have suggested that reliability results should be considered equal to or above 0.60 for a pilot study. Table 2 demonstrates the result of the reliability analysis of the pilot study. The overall Cronbach's Alpha value was 0.948 with 62 items. Likewise, variable-wise, Cronbach's Alpha was also calculated to ensure the reliability of this pilot study. Cronbach's Alpha values for all individual variables ranged from 0.643 to 0.887, revealing that 10 out of 11 variables were obtained greater than 0.70, indicating significantly higher reliability. Only 01 out of 11 attained Cronbach's Alpha values greater than .60, which is considered acceptable. Therefore, all the measuring variables meet the required threshold value of Cronbach's Alpha which is adequate, valid, and reliable for this study.

[1] Strongly disagree-experience and judgment are strongly not in favor of this aspect, Disagree-experience and judgment are not in favour of one over the other, neither agree nor Disagree-I have no experience, or I have experience, but my judgment is indifferent, Agree-experience and judgment are in favour of one over the other, and Strongly agree-experience and judgment strongly favour. For details-(Saaty, 1990; Coyle, 2004).

Table 2. Reliability Analysis of Pilot Study

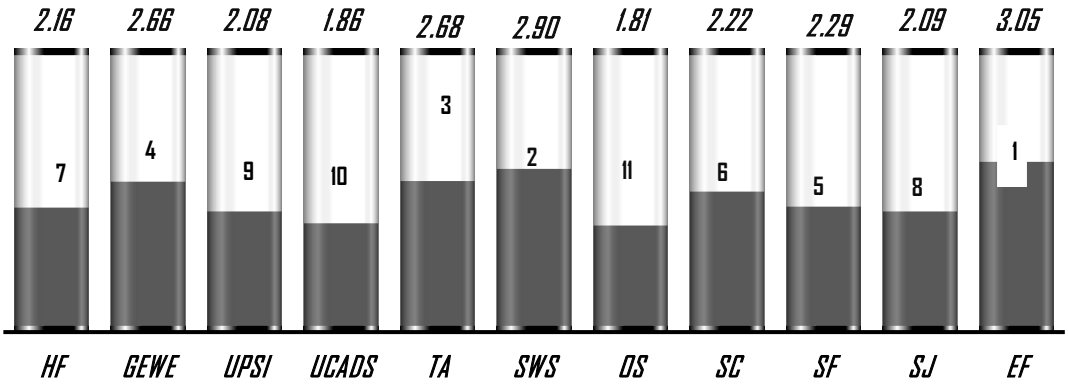
Name of Variables (Themes)	Cronbach's Alpha	Number of Items
Health Facilities	0. 643	5
Gender Equality and Women's Empowerment	0.814	7
Urban Poverty and Slums Improvement	0.824	6
Urban Children, Aged, Disabled, and Scavengers	0.859	8
Transportation Availability	0.814	4
Satisfied With Space	0.887	4
Open Space	0.722	5
Social Capital	0.709	8
Safety	0.863	6
Social Justice	0.796	4
Education Facilities	0.756	5
All Variables Altogether	**0.948**	**62**

3.6. Data Analysis

This study used the Social Package for Social Science (SPSS) and MS Excel to analyze data. To check the content validity, this study calculated I-CVI and S-CVI scores. Reliability was measured to assess the internal consistency of items, and Skewness and Kurtosis values were tested to check the assumption of normality for an individual variable. We used frequency distribution to get an overview of respondents' demographic profiles and descriptive statistics like Mean and Standard Deviation to analyze all variables and items. Likewise, the Kruskal-Wallis H test was used as a supplementary analysis to examine possible differences between respondents' age, gender, education, living area, living years, and all the items of social sustainability (see details in Appendix C and D).

4. RESULTS

This preliminary study measured the current status of social sustainability in the context of Dhaka city using 62 indicators. The individual mean of items (see Table 3) and the overall mean of each theme were calculated, illustrated in Figure 1.



Note: The mean of each theme is shown at the top of the '3D Glass Chart (3DGC)', rank paced within the 3DGC.
Figure 1. Current Status of Social Sustainability in Dhaka City

As shown in Figure 1, the social sustainability themes were ranked 1 to 11 based on the largest to lowest mean scores. The overall mean of 62 indicators was 2.35, representing the current status of social sustainability in Dhaka (see Table 3). The overall mean score implies 'Disagree' points on the Likert scale. The individual mean score of social sustainability themes (see detail Table 3) was discussed in the following paragraphs.

Table 3. Current Status of Social Sustainability in Dhaka City

Variables and items	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Std. Deviation	Mean	Rank
Health Facilities (HF)								
HF1	44	41	11	12	1	1.0168	1.945	**7**
HF2	14	49	18	21	7	1.1296	2.615	
HF3	35	41	22	10	1	0.9864	2.092	
HF4	39	48	8	13	1	0.9998	1.982	
HF5	30	46	17	16	0	0.9986	2.174	
Mean value: 2.16								
Gender Equality and Women's Empowerment (GEWE)								
GEWE1	35	42	18	11	3	1.0637	2.128	**4**
GEWE2	12	33	15	38	11	1.2282	3.028	
GEWE3	11	27	18	38	15	1.2386	3.174	
GEWE4	14	38	22	23	12	1.2236	2.826	
GEWE5	11	39	17	33	9	1.1828	2.908	
GEWE6	31	51	13	11	3	1.0249	2.119	
GEWE7	22	35	36	13	3	1.0318	2.450	
Mean value 2.66								
Urban Poverty and Slums Improvement (UPSI)								
UPSI1	38	39	10	17	5	1.2055	2.193	**9**
UPSI2	42	43	14	6	4	1.0357	1.963	
UPSI3	33	47	21	7	1	0.9168	2.046	
UPSI4	38	45	16	10	0	0.9328	1.982	
UPSI5	38	47	11	12	1	0.9907	2.000	
UPSI6	29	39	21	17	3	1.1129	2.321	
Mean value 2.08								
Urban Children, the Aged, the Disabled, and the Scavengers (UCADS)								
UCADS1	48	42	6	10	3	1.0517	1.881	**10**
UCADS2	54	38	8	8	1	0.9443	1.752	
UCADS3	48	39	10	8	4	1.0762	1.908	
UCADS4	48	40	11	5	5	1.0658	1.890	
UCADS5	51	39	10	9	0	0.9237	1.789	
UCADS6	42	42	6	17	2	1.1133	2.037	
UCADS7	48	43	10	7	1	0.9177	1.807	
UCADS8	45	47	12	4	1	0.8474	1.798	
Mean value 1.86								
Transportation Availability (TA)								
TA1	12	21	6	48	22	1.3079	3.431	**3**
TA2	25	32	13	30	9	1.3172	2.688	
TA3	47	42	5	13	2	1.0588	1.908	
TA4	25	32	13	30	9	1.3172	2.688	
Satisfied with Space (SWS)								
SWS1	21	30	13	32	13	1.3478	2.872	**2**
SWS2	24	26	12	38	9	1.3369	2.835	
SWS3	11	19	45	24	10	1.0840	3.028	
SWS4	21	30	13	32	13	1.3478	2.872	
Open Space (OS)								
OS1	66	35	2	2	4	0.9172	1.560	**11**
OS2	56	40	5	5	3	0.9555	1.706	
OS3	37	43	6	19	4	1.1851	2.174	
OS4	61	41	4	2	1	0.7395	1.541	
OS5	43	34	13	17	2	1.1429	2.092	
Mean value 1.81								

Social Capital (SC)								
SC1	24	39	34	11	1	0.9611	2.321	
SC2	24	32	16	30	7	1.2697	2.670	
SC3	10	24	16	45	14	1.2068	3.266	
SC4	34	48	15	11	1	0.9703	2.055	
SC5	34	48	15	11	1	0.9703	2.055	**6**
SC6	41	55	12	1	0	0.6825	1.752	
SC7	26	74	9	0	0	0.5473	1.844	
SC8	39	56	13	1	0	0.6853	1.780	
Mean value 2.22								
Safety (SF)								
SF1	18	36	15	32	8	1.2424	2.780	
SF2	64	29	9	6	1	0.9195	1.633	
SF3	39	35	11	17	7	1.2704	2.248	
SF4	35	50	12	8	4	1.0309	2.046	**5**
SF5	39	35	11	17	7	1.2704	2.248	
SF6	18	36	15	32	8	1.2424	2.780	
Mean value 2.29								
Social Justice (SJ)								
SJ1	38	36	15	9	11	1.2939	2.257	
SJ2	48	40	11	8	2	0.9951	1.862	
SJ3	41	46	9	9	4	1.0627	1.982	**8**
SJ4	31	41	18	18	1	1.0706	2.239	
Mean value 2.09								
Education Facilities (EF)								
EF1	12	17	13	47	20	1.2641	3.422	
EF2	9	19	14	44	23	1.2369	3.486	
EF3	16	37	36	18	2	0.9941	2.569	**1**
EF4	16	36	24	28	5	1.1375	2.725	
EF5	13	23	29	36	8	1.1504	3.028	
Mean value 3.05								
All Variables Altogether 2.35								

Rank 1: 'Education Facilities (EF)' were measured by 05 items with a mean score of 3.05, ranking 1st in Dhaka city's current social sustainability status. The mean score of education facilities indicated a 'Neither agree nor disagree' point on the Likert scale. According to the result, items EF2 (free secondary education for girls) and EF3 (specific educational zones) had the highest and lowest mean score of 3.49 and 2.57, respectively. Although EF achieved the highest rank, the residents' overall opinion was indifferent about Dhaka city's current educational facilities. Notably, the residents of Dhaka city are moderately satisfied with 03 items, i.e., EF1 (free and compulsory education at the primary level), EF2 (free secondary education for girls), and EF5 (awareness and advocacy programs) whereas EF3 (specific educational zones) and EF4 (arrangement of primary, non-formal, and vocational education) need to focus on ensuring adequate educational facilities within Dhaka city.

Rank 2: 'Satisfied with Space (SWS)' ranks 2nd with a mean score of 2.90; there were 04 measurement items. The mean value of satisfied with space showed the 'Disagree' stance of the Likert scale. The result shows that the items SWS3 (climatic comfort of my house during summer) had the highest mean value of 3.03, whereas SWS1 (spatial organization of the house), SWS2 (size of the house), and SWS4 (climatic comfort of the house during winter) received the lowest mean scores of 2.87, 2.84, and 2.87, respectively. It means residents are relatively satisfied with the 'climatic comfort of the house during summer (SWS3)'. Moreover, city authorities and urban planners' attention should be paid to 'spatial organization of the house (SWS1)', 'size of the house (SWS2)', and 'climatic comfort of the house during winter (SWS4)' to ensure/implement satisfied with space for the residents of Dhaka city.

Rank 3: To measure the current status of 'Transport Availability (TA)' in Dhaka city, 04 measuring items were used, ranking 3rd with a mean score of 2.68. The findings revealed that item TA1 (reaching to bus stop easily from my home) received a higher mean value of 3.43 whilst TA3 (satisfaction level of public transportation) got a lower mean value of 1.91. The current condition of TA3 was not satisfactory among the residents of Dhaka city. Still, item TA1 was at a moderately satisfying level. To make a socially sustainable Dhaka, it is necessary to pay attention to all the items of transport availability.

Rank 4: 'Gender Equality and Women's Empowerment (GEWE)' is in 4th rank with a mean score of 2.66, containing 07 measuring items. The items GEWE3 (women's employment opportunities) and GEWE2 (women's involvement in community development) had the highest mean value of 3.17 and 3.03, respectively, whereas GEWE6 (awareness initiatives for underprivileged women) and GEWE1 (gender-sensitive urban planning and management strategies) had the lowest mean value of 2.12 and 2.13, respectively. Overall, all gender equality and women's empowerment items except for GEWE3 and GEWE2 were below satisfactory levels, which require close attention from Dhaka city planners and policymakers.

Rank 5: 'Safety (SF)' was measured by 06 items with a mean value of 2.29, which ranked 5th in the current status of social sustainability in Dhaka city. The items SF1 (feeling safe walking during the day in Dhaka), SF2 (feeling safe walking during nighttime in Dhaka), SF3 (my house is safe during travel time), SF4 (feeling safe while using public transportation in Dhaka), SF5 (feeling safe in my neighborhood), and SF6 (satisfaction level of safety) have obtained mean values of 2.78, 1.63, 2.25, 2.05, 2.25, and 2.78, respectively. All safety items belong to the lowest satisfaction level among Dhaka city residents. In particular, residents of Dhaka feel that their homes are not safe during travel (SF2). Overall, the current safety status is not satisfactory, which is expecting close attention from the government, and city management/implementation authorities to ensure the safety of all the residents of Dhaka city.

Rank 6: 'Social Capital (SC)' was measured by 08 items, ranking 6th with a mean score of 2.22. Based on the results, SC3 (spending time with a neighbor) got the higher mean value of 3.27, whereas SC4 (chatting with neighbors) and SC5 (practicing social and ethical values) received the same mean value of 2.06. In addition, the mean score of SC1 (relationship with neighbors), SC2 (trusting neighbors), SC6 (year of residency), SC7 (plan to change their houses), and SC8 (plan to change it in the same neighborhood) were 2.32, 2.67, 1.75, 1.84, and 1.78, respectively. Based on the opinion of the Dhaka city residents, the significant concern is on the items SC6, SC7, and SC8, which are somewhat absent in Dhaka city.

Rank 7: 'Health Facilities (HF)' ranked 7th with a mean value of 2.16, measured by 05 items. The highest and lowest mean values for HF2 (hospitals located in the residential areas) and HF1 (free primary healthcare service) items were 2.62 and 1.95, respectively. Free primary healthcare service for women and children (HF1) and arrangements for protecting against transmitted diseases like aids (HF4) indicated lower satisfaction levels among residents. Though, all the items belong to the low level of satisfaction that represents citizens of Dhaka city are not getting adequate health facilities.

Rank 8: The 8th ranked acquired 'Social Justice (SJ)' with a mean value of 2.09; measured by 04 items. The items SJ1 (fair distribution of resources), SJ2 (equality of rights), SJ3 (equitable access for all people), and SJ4 (actively participating in communal activities and decision making) had a mean value of 2.26, 1.86, 1.98, and 2.24, respectively. Based on the results, residents believed that social justice has not been adequately implemented in Dhaka. Therefore, government, policymakers, city planners, and city management authorities must emphasize ensuring social justice in Dhaka city as social justice is necessary to make a city socially sustainable.

Rank 9: There were 06 measuring items to measure the condition of 'Urban Poverty and Slums Improvement (UPSI)', which ranked 9th with a mean value of 2.08. The mean value for all individual items, i.e., UPSI1 (upgrading and improvement of slums), UPSI2 (slum dwellers' resettlement is implemented), UPSI3 (ensuring tenure security), UPSI4 (special zones for the urban poor), UPSI5 (equal access to the essential urban services), and UPSI6 (supporting informal sector activities) range from 1.96 to 2.32. Additionally, a significant consideration is required in all the items to improve urban poverty and slums.

Rank 10: 'Urban children, aged, the disabled, and the scavengers (UCADS)' were measured by 08 items and ranked 10th with a mean value of 1.86. The mean value showed the 'Strongly Disagree' stance of the Likert scale. The mean value of all individual

items, i.e., UCADS1(ensure basic needs for children), UCADS2 (infrastructural designs for the disabled), UCADS3 (safety of children against all forms of abuse), UCADS4 (extend services for the children of working mother), UCADS5 (enforce laws dealing with child labor), UCADS7 (equal access to street children, scavengers, the aged, and disabled people), and UCADS8 (city authority ensures shelter) ranges from 1.75 to 1.91 except for UCADS6 (promote programs to eliminate malnutrition) with the mean value 2.04. The result indicated the least satisfaction among the residents of Dhaka city as they believed that all UCADS items are absent to ensure a socially sustainable urban, which needs serious consideration currently.

Rank 11: 'Open Space (OS)' was measured by 05 items with a mean value of 1.81, ranking 11th in terms of social sustainability in Dhaka city. All individual items, i.e., OS1 (public space availability), OS2 (use of public space), OS4 (satisfaction level of public space), mean values ranged from 1.54 to 1.71, except for OS3 (time to reach park) and OS5 (initiatives of recreational facilities for leisure). The result also showed that OS3 and OS5 had the disagreed position, and the remaining items were the least level of satisfaction for getting the facilities from open space in Dhaka city. As every city needs adequate open space for citizens' healthy livability, Dhaka's present open space condition is just a dream.

5. DISCUSSION

The study has developed a measurement framework for measuring social sustainability conditions in Dhaka city. The overall mean results reflected low levels of social sustainability satisfaction among Dhaka city residents. Specifically, the citizens of Dhaka city have shown the least level of satisfaction on two variables: urban children, the aged, the disabled, and the scavengers (UCADS) and open space (OS). On the other hand, variables appeared as moderate to low satisfaction levels on urban poverty and slum improvement, social justice, health facilities, safety, social capital, gender equality and women's empowerment, transportation availability, and satisfaction with space. Besides, education facilities received indifferent results regarding the current status of social sustainability in Dhaka city. Overall, analysis of the results revealed that the current situation of social sustainability is not satisfactory as its aspects are not getting that level of importance for ensuring socially sustainable urban development.

Since social sustainability is less focused, some studies have empirically measured it but had different purposes than this study. To exemplify, Dogu and Aras (2019) developed a measuring scale of social sustainability for Güzelyurt City, Northern Cyprus. The authors developed a measurement scale based on seven variables of social sustainability such as sense of belonging, social capital, perceived environment, social interactions/security, interaction with space, satisfied with space, voice, and influence. Based on the city of Güzelyurt, the variables of social sustainability were not found at a satisfactory level. Larimian and Sadeghi (2021) assessed social sustainability in Dunedin City, New Zealand's urban neighborhoods, and determined whether design quality influenced social sustainability. They used seven social sustainability variables, including social interaction, safety and security, social equity, social participation, neighborhood satisfaction, sense of place, and housing satisfaction, which revealed a significant positive relationship between quality of design and overall social sustainability.

Likewise, Ali et al. (2019) evaluated urban form's role in achieving better social sustainability results in Irbid, Jordan. Five features of urban form such as density, land use distribution, building height, type of housing, and accessibility were used to examine their impact on social sustainability variables such as access to services, open spaces, and parks, availability of transportation, job accessibility, social interaction, safety, residential stability, sense of belonging, and neighborhood as a place to live. Their findings revealed that urban form strongly impacted social sustainability as respondents' satisfaction was moderate to relatively low.

In addition, Yu et al. (2017) developed an assessment system to measure the social sustainability of urban housing demolition in Shanghai, China. They used 22 indicators to measure social sustainability. They found that health and safety, social equality, and adherence to the law must be considered critical in urban housing demolition's social sustainability. Therefore, this study measures the current status of social sustainability and found an overall low level of satisfaction with experiencing socially sustainable urban development in Dhaka; this city acts as an example of a developing country. The current status

of social sustainability should be measured by many other cities in developing countries that face the same problems of rapid urbanization.

Nonetheless, the limitations of this study are not to be overlooked. First, this study considered only 109 respondents from Dhaka city for a pilot study. Second, this study only used a questionnaire survey as a data collection method. Third, this study adopted all variables from the literature to measure the current status of social sustainability for socially sustainable urban development in Dhaka city. From the limitations of this study, there is a scope created for future researchers. For example, developing countries are concentrating less on this field of research. Researchers from developing countries could provide more effort to assess the social sustainability of socially sustainable urban development by including or considering many respondents for the large-scale study. In addition, mixed methods research allows the incorporation of different methods that help researchers to investigate various aspects of urban social sustainability. Furthermore, index development for social sustainability can be considered based on the city's culture and basic social needs. Overall, the study might help researchers in developing countries diversify their thinking on social sustainability for socially sustainable urban development.

6. PRACTICAL IMPLICATION AND CONCLUSION

Social sustainability for socially sustainable urban development is a prominent issue worldwide. Social sustainability is essential to ensure the long-run needs of people in a society. The lack of significance in social sustainability, especially in developing countries, increases the need for each stakeholder to know the current status of social sustainability. It helps to create insightful thinking for a socially sustainable urban for present and future generations.

From the result of the pilot study, all variables of social sustainability performed low satisfaction levels among Dhaka city's citizens. Notably, it appears that the current status of social sustainability is not in a good position for socially sustainable urban development in Dhaka city. Moreover, we empirically tested the framework to measure the current status of social sustainability regarding some demographic characteristics of respondents and found a statistically significant difference in respondents' age and gender. However, a study based on large sample size is required to confirm the results of this pilot study.

Based on the citizen's opinions and expectations on the current status of social sustainability in Dhaka city, it will help policymakers, urban planners, urban municipalities, and implementing agencies formulate specific solutions to make a socially sustainable urban. Moreover, this study can be an example for cities in developing countries where rapid urbanization creates social problems that influence the status of social sustainability. From this point of view, this study opens a further window for those cities facing similar problems that can use this measurement framework to identify the current condition of social sustainability.

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APPENDIX

Appendix A: The relevance ratings on the item scale by six experts									
Items (Social sustainability)	**Expert 1**	**Expert 2**	**Expert 3**	**Expert 4**	**Expert 5**	**Expert 6**	**Experts in Agreement**	**I-CVI**	**UA**
HF1	1	1	1	1	1	1	6	1.00	1
HF2	1	1	1	1	1	1	6	1.00	1
HF3	1	1	1	1	1	1	6	1.00	1
HF4	1	1	1	1	1	1	6	1.00	1
HF5	1	1	1	1	1	1	6	1.00	1
GEWE1	1	1	1	1	1	1	6	1.00	1
GEWE2	1	1	1	1	1	1	6	1.00	1
GEWE3	1	1	1	1	1	1	6	1.00	1
GEWE4	1	1	1	1	1	1	6	1.00	1
GEWE5	1	1	1	1	1	1	6	1.00	1
GEWE6	1	1	1	1	1	1	6	1.00	1
GEWE7	1	1	1	1	1	1	6	1.00	1
UPSI1	1	1	1	1	1	1	6	1.00	1
UPSI2	1	1	1	1	1	1	6	1.00	1
UPSI3	1	1	1	1	1	1	6	1.00	1
UPSI4	1	1	1	1	1	1	6	1.00	1
UPSI5	1	1	1	1	1	1	6	1.00	1
UPSI6	1	1	1	1	1	1	6	1.00	1
UCADS1	1	1	1	1	1	1	6	1.00	1
UCADS2	1	1	1	1	1	1	6	1.00	1
UCADS3	1	1	1	1	1	1	6	1.00	1
UCADS4	1	1	1	1	1	1	6	1.00	1
UCADS5	1	0	1	1	1	1	5	0.83	0
UCADS6	1	1	1	1	1	1	6	1.00	1
UCADS7	1	1	1	1	1	1	6	1.00	1
UCADS8	1	1	1	1	1	1	6	1.00	1
TA1	1	1	1	1	1	1	6	1.00	1
TA2	1	1	1	1	1	1	6	1.00	1
TA3	1	1	1	1	1	1	6	1.00	1
TA4	1	1	1	1	1	1	6	1.00	1
SWS1	1	1	1	1	1	1	6	1.00	1
SWS2	1	1	1	0	1	1	5	0.83	0
SWS3	0	1	1	1	1	1	5	0.83	0
SWS4	0	1	1	1	1	1	5	0.83	0
OS1	1	1	0	1	1	1	5	0.83	0
OS2	1	1	1	1	1	1	6	1.00	1
OS3	1	1	1	1	1	1	6	1.00	1
OS4	1	1	1	1	1	1	6	1.00	1
OS5	1	1	1	1	1	1	6	1.00	1
SC1	1	1	1	1	1	1	6	1.00	1
SC2	1	1	1	1	1	1	6	1.00	1
SC3	1	1	1	1	1	1	6	1.00	1
SC4	1	1	1	1	1	1	6	1.00	1
SC5	1	1	1	1	1	1	6	1.00	1
SC6	1	1	1	1	1	1	6	1.00	1
SC7	1	1	1	1	1	1	6	1.00	1
SC8	1	1	1	1	1	1	6	1.00	1
SF1	1	1	0	1	1	1	5	0.83	0
SF2	1	1	1	1	1	1	6	1.00	1
SF3	1	1	1	1	1	1	6	1.00	1
SF4	1	1	1	1	1	1	6	1.00	1
SF5	1	1	1	1	1	1	6	1.00	1
SF6	1	1	1	1	1	1	6	1.00	1
SJ1	1	1	1	1	1	1	6	1.00	1

SJ2	1	1	1	1	1	1	6	1.00	1
SJ3	1	1	1	1	1	1	6	1.00	1
SJ4	1	1	1	1	1	1	6	1.00	1
EP1	0	0	1	0	0	0	1	0.17	0
SEV1	1	0	1	1	1	1	5	0.83	0
EF1	1	1	1	1	1	1	6	1.00	1
EF2	1	1	1	1	1	1	6	1.00	1
EF3	1	1	0	1	1	1	5	0.83	0
EF4	1	1	1	1	1	1	6	1.00	1
EF5	1	1	1	1	1	1	6	1.00	1
Item Wise Individual Expert Relevance Agreement	**61**	**61**	**61**	**62**	**63**	**63**	**Mean I-CVI**	**0.97**	**55**
							S-CVI/UA	**0.86**	
Proportion Relevance	**0.95**	**0.95**	**0.95**	**0.97**	**0.98**	**0.98**	**Mean Expert Proportion**	**0.97**	

Note: I-CVI= content validity of individual items, S-CVI= content validity of the overall scale, UA= Universal agreement, score '1' means all the items achieved 100% experts in agreement, score '0' means not all the experts provided relevance rating of 1.

Appendix B: Skewness and kurtosis statistic

Item	Std. Deviation	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Access to health facilities					
H1	1.017	0.973	0.231	0.118	0.459
H2	1.130	0.534	0.231	-0.642	0.459
H3	0.986	0.639	0.231	-0.306	0.459
H4	1.000	1.000	0.231	0.280	0.459
H5	0.999	0.550	0.231	-0.695	0.459
Gender Equality and Women's Empowerment					
GEWE1	1.064	0.820	0.231	0.020	0.459
GEWE2	1.228	-0.084	0.231	-1.192	0.459
GEWE3	1.239	-0.220	0.231	-1.083	0.459
GEWE4	1.224	0.279	0.231	-0.966	0.459
GEWE5	1.183	0.112	0.231	-1.127	0.459
GEWE6	1.025	0.966	0.231	0.469	0.459
GEWE7	1.032	0.292	0.231	-0.460	0.459
Urban Poverty and Slum Improvement					
UPSI1	1.206	0.816	0.231	-0.429	0.459
UPSI2	1.036	1.195	0.231	1.132	0.459
UPSI3	0.917	0.716	0.231	0.173	0.459
UPSI4	0.933	0.734	0.231	-0.260	0.459
UPSI5	0.991	0.931	0.231	0.187	0.459
UPSI6	1.113	0.524	0.231	-0.643	0.459
Urban Children, the Aged, the Disabled, and the Scavengers					
UCADS1	1.052	1.313	0.231	1.108	0.459
UCADS2	0.944	1.324	0.231	1.251	0.459
UCADS3	1.076	1.275	0.231	1.042	0.459
UCADS4	1.066	1.392	0.231	1.571	0.459
UCADS5	0.924	1.081	0.231	0.363	0.459
UCADS6	1.113	0.952	0.231	-0.151	0.459
UCADS7	0.918	1.200	0.231	1.143	0.459
UCADS8	0.847	1.145	0.231	1.517	0.459
Transportation Availability					
TA1	1.308	-0.593	0.231	-0.925	0.459
TA2	1.317	0.201	0.231	-1.277	0.459
TA3	1.059	1.187	0.231	0.580	0.459
TA4	1.317	0.201	0.231	-1.277	0.459

Satisfied With Space					
SWS1	1.348	0.053	0.231	-1.324	0.459
SWS2	1.337	-0.047	0.231	-1.392	0.459
SWS3	1.084	-0.100	0.231	-0.392	0.459
SWS4	1.348	0.053	0.231	-1.324	0.459
Open Space					
OS1	0.917	2.314	0.231	5.872	0.459
OS2	0.956	1.726	0.231	3.016	0.459
OS3	1.185	0.845	0.231	-0.409	0.459
OS4	0.740	1.815	0.231	4.814	0.459
OS5	1.143	0.765	0.231	-0.570	0.459
Social Capital					
SC1	0.961	0.269	0.231	-0.566	0.459
SC2	1.270	0.177	0.231	-1.226	0.459
SC3	1.207	-0.400	0.231	-0.939	0.459
SC4	0.970	0.818	0.231	0.082	0.459
SC5	0.970	0.818	0.231	0.082	0.459
SC6	0.683	0.535	0.231	-0.021	0.459
SC7	0.547	-0.083	0.231	0.113	0.459
SC8	0.685	0.488	0.231	-0.082	0.459
Safety					
S1	1.242	0.134	0.231	-1.199	0.459
S2	0.920	1.528	0.231	1.831	0.459
S3	1.270	0.763	0.231	-0.605	0.459
S4	1.031	1.147	0.231	1.015	0.459
S5	1.270	0.763	0.231	-0.605	0.459
S6	1.242	0.134	0.231	-1.199	0.459
Social Justice					
SJ1	1.294	0.892	0.231	-0.272	0.459
SJ2	0.995	1.201	0.231	0.967	0.459
SJ3	1.063	1.216	0.231	0.976	0.459
SJ4	1.071	0.522	0.231	-0.772	0.459
Education Facilities					
EF1	1.264	-0.620	0.231	-0.739	0.459
EF2	1.237	-0.581	0.231	-0.738	0.459
EF3	0.994	0.152	0.231	-0.605	0.459
EF4	1.138	0.139	0.231	-0.982	0.459
EF5	1.150	-0.240	0.231	-0.857	0.459

Appendix C: Non-parametric test results (Kruskal–Wallis H test)

Variables and References	**Items (Indicators of Social Sustainability)**		**Non-parametric test (p-value*)**				
			Age	**Gender**	**Education**	**Area of Living**	**Years of Living**
Health Facilities (Committee on Urban Local Governments, 2011)	**HF1**	Free primary healthcare service (women and children).	0.221	0.645	0.512	0.226	0.278
	HF2	Hospitals are located in residential areas.	0.502	0.394	0.206	0.641	0.913
	HF3	Enough rehabilitation facilities for drug addicts.	0.002	0.775	0.148	0.128	0.469
	HF4	Arrangements for protecting against transmitted disease threats like aids.	0.416	0.479	0.861	0.275	0.903
	HF5	Urban social services for healthy urban development.	0.624	0.980	0.676	0.421	0.564

Gender Equality and Women's Empowerment (Committee on Urban Local Governments, 2011)	**GEWE1**	Gender-sensitive urban planning and management strategies.	0.042	0.844	0.466	0.385	0.125
	GEWE2	Women's involvement in community development.	0.074	0.357	0.228	0.854	0.862
	GEWE3	Women's employment opportunities.	0.988	0.050	0.786	0.573	0.672
	GEWE4	Women's equal access to housing, land, and finance.	0.780	0.117	0.114	0.420	0.973
	GEWE5	Women's participation in urban local bodies.	0.448	0.234	0.882	0.699	0.756
	GEWE6	Awareness initiatives for underprivileged women.	0.043	0.804	0.149	0.155	0.670
	GEWE7	Scientific compilation of data.	0.488	0.268	0.326	0.444	0.679
Urban Poverty and Slum Improvement (Committee on Urban Local Governments, 2011)	**UPSI1**	Upgrading and improvement of slums.	0.692	0.831	0.287	0.820	0.225
	UPSI2	Slum dwellers' resettlement is implemented.	0.985	0.798	0.402	0.678	0.216
	UPSI3	Ensuring tenure security.	0.694	0.671	0.246	0.228	0.801
	UPSI4	Special zones for the urban poor.	0.808	0.335	0.256	0.043	0.942
	UPSI5	Equal access to essential urban services.	0.120	0.398	0.078	0.015	0.223
	UPSI6	Supporting informal sector activities.	0.077	0.475	0.162	0.259	0.349
Urban Children, the Aged, the Disabled, And the Scavengers (Committee on Urban Local Governments, 2011)	**UCADS1**	Ensure basic needs for children without discrimination.	0.140	0.802	0.035	0.247	0.901
	UCADS2	Convenient infrastructural designs and buildings for the disabled.	0.004	0.941	0.044	0.041	0.242
	UCADS3	Safety of children against all forms of abuse.	0.204	0.174	0.416	0.177	0.658
	UCADS4	Extend services for the children of working mothers.	0.143	0.728	0.705	0.077	0.517
	UCADS5	Enforce laws dealing with child labor.	0.104	0.421	0.394	0.391	0.802
	UCADS6	Promote programs to eliminate malnutrition.	0.813	0.407	0.644	0.174	0.520
	UCADS7	Equal access to street children, scavengers, the aged, and the disabled.	0.012	0.270	0.441	0.885	0.921
	UCADS8	City authority ensures shelter for street children, scavengers, aged, and disabled people.	0.564	0.606	0.434	0.850	0.417
Transportation Availability (Munira & San Santoso, 2017; Ali et al., 2019)	**TA1**	Reach to bus stop easily from my home.	0.619	0.913	0.641	0.683	0.539
	TA2	Availability of public transport in Dhaka.	0.214	0.863	0.389	0.080	0.443
	TA3	Satisfaction level of public transportation.	0.461	0.433	0.430	0.170	0.166
	TA4	Public Transport accessibility (for example disabled).	0.214	0.863	0.389	0.080	0.443
Satisfied With Space (Doğu & Aras, 2019)	**SWS1**	Satisfied with the spatial organization of the house.	0.110	0.220	0.126	0.071	0.820
	SWS2	Satisfied with the size of the house.	0.943	0.551	0.511	0.197	0.885
	SWS3	Climatic comfort of my house during summer.	0.793	0.408	0.358	0.237	0.681
	SWS4	Climatic comfort of my house during winter.	0.110	0.220	0.126	0.071	0.820
Open Space (Al-Dahmashawi et al., 2014b; Ali et al., 2019)	**OS1**	Public Space availability.	0.328	0.588	0.565	0.151	0.540
	OS2	Use of Public space.	0.106	0.167	0.376	0.716	0.689
	OS3	Time to reach the park.	0.209	0.263	0.341	0.974	0.746
	OS4	Satisfaction level of public space.	0.457	0.173	0.373	0.950	0.408
	OS5	Initiatives of recreational facilities for leisure.	0.139	0.130	0.304	0.358	0.982

Social Capital (UN, 2001; Schieman, 2005; Doğu & Aras, 2019)	**SC1**	Relationship with neighbors.	0.564	0.005	0.217	0.553	0.417
	SC2	Trusting neighbors.	0.095	0.872	0.205	0.212	0.758
	SC3	Spending time with a neighbor.	0.084	0.454	0.402	0.595	0.895
	SC4	Chatting with neighbors.	0.039	0.351	0.192	0.529	0.966
	SC5	Practicing social and ethical values.	0.039	0.351	0.192	0.529	0.966
	SC6	Year of residency.	0.960	0.043	0.781	0.177	0.099
	SC7	Plan to change their houses.	0.617	0.005	0.362	0.047	0.246
	SC8	Plan to change it in the same neighborhood.	0.626	1.000	0.100	0.129	0.616
Safety (Ali et al., 2019)	**SF1**	Feeling safe walking during the day in Dhaka.	0.593	0.001	0.431	0.672	0.557
	SF2	Feeling safe walking during nighttime in Dhaka.	0.116	0.009	0.044	0.002	0.450
	SF3	My house is safe during travel time.	0.079	0.040	0.625	0.879	0.344
	SF4	Feeling safe while using public transportation in Dhaka.	0.035	0.001	0.467	0.956	0.828
	SF5	Feeling safe in my neighborhood.	0.079	0.040	0.625	0.879	0.344
	SF6	Satisfaction level of safety.	0.593	0.001	0.431	0.672	0.557
Social Justice (Cuthill, 2010)	**SJ1**	Fair distribution of resources especially to those most in need.	0.348	0.461	0.695	0.180	0.969
	SJ2	Equality of rights is ensured for every citizen of Dhaka.	0.061	0.966	0.451	0.366	0.589
	SJ3	Fair access for all people to economic resources, services, and rights.	0.007	0.513	0.394	0.627	0.961
	SJ4	Actively participating in communal activities and decision-making that affect their lives.	0.014	0.757	0.333	0.782	0.861
Education Facilities (Committee on Urban Local Governments, 2011)	**EF1**	Free and compulsory education at the primary level.	0.954	0.458	0.839	0.535	0.267
	EF2	Free secondary education for girls.	0.551	0.726	0.802	0.036	0.279
	EF3	Specific educational zones for secondary and tertiary education are located according to the urban plan.	0.046	0.183	0.072	0.952	0.873
	EF4	Arrangement of primary, non-formal, and vocational education with special programs for women.	0.602	0.474	0.394	0.371	0.518
	EF5	Education is expanding through organizing awareness and advocacy programs.	0.072	0.053	0.807	0.972	0.570
Notes: Kruskal-Wallis H test; $p < 0.05$							

Appendix D: Kruskal–Wallis H test (Supplementary Analysis)

In this pilot study, demographic information was collected to reveal the characteristics of the respondents. A study by Krajter Ostoić et al. (2017) tested the differences of the respondents' perception of the urban forest and green space based on the demographic information like age, gender, education, and income. Green space, also known as open space (Taylor & Hochuli, 2017) is also an essential variable for social sustainability (Larimian & Sadeghi, 2021). Inspired by the above study, this study conducted a supplementary analysis to determine whether any significant differences between demographic data and items of social sustainability.

Kruskal–Wallis H test is used as a non-parametric test to determine the statistically significant differences. Non-parametric tests are used if the data isn't normal (Field, 2017). As the data distribution was not normal for this study, the Kruskal–Wallis H test ($p < 0.05$) was used as a non-parametric test on all survey items. For Kruskal–the Wallis H test, this study considered testing the differences between demographic information, including age, gender, education, area of living, year of living, and all the items of social sustainability. Age was considered into five categories: '19-28', '29-38', '39-48',' 49-58', and 59^{+}. Gender was categorized into three, namely male, female, and others. Six selections were offered to attain the level of education, for instance, below S.S.C, S.S.C, H.S.C, Honors, Masters, and others. The area of Living in Dhaka was selected in two city corporations called North and South. There were five categories ('0-9', '10-19', '20-29',' 30-39', and 40+) to select the years of living in Dhaka.

The Kruskal–Wallis H test results show that there is a significant difference ($p < 0.05$) between demographic information and specific items of social sustainability (but not in all items) except years of living, as shown in Appendix C. There is a significant difference between 'Age' and HF3, GEWE1, GEWE6, UCADS2, UCADS7, SC4, SC5, SF4, SJ3, SJ4, and EF3 items while 'Gender' has a significant difference with items GEWE3, SC1, SC6, SC7, SF1, SF2, SF3, SF4, SF5, SF6, and EF5. Notably, the results of the Kruskal–Wallis H showed that there was a significant difference between gender and all the safety items. This means that the current safety status in Dhaka is not equal for all citizens, i.e., men and women (none of the respondents belongs to other gender categories). Moreover, only 03 items (UCADS1, UCADS2, and SF2) out of 62 items were found significantly different based on the respondents' Education', indicating that Dhaka city's current social sustainability status is less likely to vary on the citizens' educational qualifications. However, the current social sustainability conditions do not significantly differ in 'Area of Living' as we found only 07 items (UPSI4, UPSI5, UCADS2, SC7, SF2, and EF2) out of 62 items were statistically significant. Finally, the result analysis indicates that the current social sustainability status significantly differs with the Age and Gender of the respondents, but Education, Area of living, and year of living did not differ significantly in Dhaka city

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