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Article

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Research Article

Assessing the municipal service quality of residential neighborhoods based on SERVQUAL, AHP and Citizen's Score Card: A case study of Dhaka North City Corporation area, Bangladesh



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ABSTRACT

Rapid urban population growth stimulates the challenges of city government authorities in providing the municipal services adequately considering the citizen's demand. While the gap persists between the service provision and citizen's perception on it, the quality of life of cities may deteriorate due to psychological dissatisfaction of dwellers with urban services. Hence the evaluation of the urban service quality from the citizen's perspective and accordingly addressing the gap is necessary for sustainable urban management. This study shows a common framework incorporating SERVQUAL, Analytical Hierarchy Process (AHP) and Citizen's Score Card to define the quality of municipal services spatially and functionally based on the satisfaction of citizens. The items under the dimensions of SERVQUAL and the weightages of each dimension were set through literature review and expert opinion. Dhaka, the only megacity of Bangladesh is experiencing an impetuous growth towards its northern portion and Dhaka North City Corporation (DNCC) is the responsible authority to supply the municipal facilities within this area. Nine residential neighborhoods having homogeneous characteristics in terms of population density, residential land use, built up area and income level within the jurisdictional area of DNCC were selected to collect the data. The data were collected through household questionnaire survey using stratified random sampling technique where people responded for each SERVQUAL questions and scored the facilities provided by the DNCC. The result shows citizens are moderately satisfied (63.3%) with municipal services aggregately. To meet the demand of dwellers, the city government authority should be more functional, reliable and participatory and be equipped with qualified manpower and facilities. Despite the locational characteristics are uniform among the case areas, Ward 3, Ward 4 and Ward 31 are in unprivileged state in terms of municipal services. The facilities of public toilet, parking and disaster management activities performed by DNCC are commonly in unsatisfactory state in all areas that require special attention from the authority. Based on the findings, it could be stated that where the city government authority is roughly unsusceptible to meet the demand of the existing population, the enormous population growth within urban areas could affect the life quality poorly. Therefore this paper would fetch a course where the deficiency on urban services would be evaluated under a common arena considering the

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psychological aspect of citizen, thereby priority interventions could be ascertained for enhancing the life quality of urban areas.

1. Introduction

1.1. Urban service quality

Worldwide rapid urbanization is inducing the shift of population from rural to urban areas by offering better municipal facilities and lifestyle in cities. Following this perdurable trend, 55% of the global population are living in urban areas which could exceed over 68% by 2050 (UN, 2018). Several push and pull factors are influencing the rural to urban migration and consequently, the urban population is exploding. Such impetuous growth of the urban population may have a comprehensive impact on the local environment of contemporary cities. The city government authorities face an enormous challenge to improve the municipal services for ensuring the livability of urban spaces (De Guimarães et al., 2020). Likewise, the city dwellers rarely get saturated with their expected urban facilities (Bruno Fernandes et al., 2019). However, this predicament of service provision by the authorities and perception of citizens on services may affect the livability of the cities and consequently influence the quality of life to some extent in the long run.

There is no specific definition of quality of life, but commonly it encompasses a comprehensive idea comprising all aspects of life such as social, economic, environmental and psychological (Cárcaba et al., 2017; Ma et al., 2020; Yadav, 2019). Several studies argued that this is highly associated with livability, well-being and life satisfaction where a set of parameters are considered under each aspect (Mittal et al., 2020; Mouratidis, 2020; Okulicz-Kozaryn & Valente, 2019). The concept of quality of life is also context-specific and multi-dimensional, which could be evaluated by incorporating different subjective and objective measures. Several pieces of research comply that the quality of life appertains to the living conditions of people relative to their deserved facilities which could be estimated for a particular country, region, city or neighborhood and is not bounded to any hard and fast setting for portrayal and evaluation (Esmaily & Ashjaei, 2020; Mittal et al., 2020). These deserved facilities may include basic human needs and the services they demand from their space. In urban areas, there always exists a consonance among the residents that the city governments have failed to some extent in providing the municipal services at satisfactory levels to its habitants (Li & Shang, 2020; Luck, 2008; Masiya et al., 2019), that may affect the urban life quality. Therefore, evaluating the urban service quality from the citizen's perspective and accordingly addressing the gap in service provision is necessary for better urban management and assurance of urban life quality.

1.2. Review of literature

Several globally practiced techniques like the Human Development Index, World Happiness Report, Mercer Quality of Living Ranking and Global Livability Index are performed for nationwide assessment of the quality of life (Mittal et al., 2020). Again City Prosperity Index, Urban Living Index, AARP Livability Index and NYC Well-being Index are used to evaluate the livability of cities, sometimes at neighborhood scales (Garau & Pavan, 2018; Onnom et al., 2018; Veysi et al., 2019). These tools and techniques mainly investigate the condition of the areas from the prism of economic development and occasionally consider the amenities and opportunities delivered to the residents at the city scale (Mittal et al., 2020). Land use mix, site coverage, urban density, green space, infrastructural condition, municipal service quality and other built environment characteristics are some objective determinants that are commonly contemplated to measure the quality of city or neighborhoods (Bello et al., 2017; Garau et al., 2018; Nanor et al., 2018; Wang & Peng, 2020).

The condition of municipal services and infrastructure provided by the concerned authorities largely influence the quality of life and it has been argued that the provision of proper municipal facilities for the citizens considering their demand can assure a better community (Adhikari, 2011; Akther et al., 2009; Bello et al., 2017). Nevertheless, the citizen's perception towards such urban facilities and their experience of well-being are often overlooked which are exigent to address the psychological aspect of life quality as well as subjective well-being of the society (Ameen & Mourshed, 2019; Das, 2008; Hatami Nejad, 2017; Li et al., 2020). The subjective indicators like personal happiness, satisfaction with services, and life contentment reflect the citizen's appraisal of objective conditions of life (Lotfi & Solaimani, 2009; Mamuye & Gotu, 2015; Zorondo-Rodríguez et al., 2014). In some cases, subjective judgment towards the surrounding environment and acquired services unfolds the substantive condition of life expressly (Hatami Nejad, 2017; Mittal et al., 2020; Olapegba, 2020; Skevington & Böhnke, 2018). These can also indulge the enumeration of gaps with the desired life quality and build-up the way for better urban management by assuring the participation of the community. Therefore, it is necessary to assess the satisfaction of dwellers with urban services for comprehending the quality of life of urban areas entirely.

Municipal service quality is assessed at a city or sub-city scale following a secondary data-based top-down approach or downscaling the information from national and sub-national information (Mittal et al., 2020). This could be contradictory with the conventional sustainability paradigm in public policy where the emphasis is given on the approach of 'think global, act local'. In that case, neighborhood-scale assessment considering the perception of local people would be more reasonable to maintain the sustainability of urban management, as neighborhood satisfaction reveals the actual scenario of public facilities and social interaction of local community (Greenberg, 1999; Meersman, 2005; Onnom, 2018; Sawicki & Flynn, 1996). That may also support the inclusion of subjective, qualitative and bottom-up approaches in the realm of municipal service quality evaluation. Despite a few tools like AARP Livability Index, NYC Well Being Index, Liveable City Index (Onnom, 2018) are available for neighborhood-level analysis, the opinion from the local community are gently considered there. Still there exists a lack of consideration of local perception. The application of such an

assessment technique that considers the citizen's satisfaction on urban service quality can provide a way-out to reveal the actual scenario of urban life. SERVQUAL method could be employed in this regard. It is one of the widely used techniques to evaluate the satisfaction level of different sectors like water supply, healthcare, education, transport, banking and utility services (Curry & Sinclair, 2002; Ramez, 2012; Silalahi et al., 2017; Tan & Kek, 2004; Ukpabi et al., 2018).

Kansal et al. (2017) used this SERVQUAL method to understand the water service quality in Tanzanian towns and the service gap was evaluated. Alam and Mondal (2019) ascertained the sanitation service quality of urban slum through SERVQUAL and identified sections of the service which need to be improved. This method helps to reveal the service quality of any facility as well as to identify the underlying causes of quality deterioration. The consideration of customer or consumer's perception and expectation supports capturing the psychological aspect of quality determination (Y. Wang et al., 2015). In most of the studies, the weights of the dimensions of SERVQUAL were defined based on consumers' judgment which can generate the chances of biasness or partiality and make the model questionable. Awasthi et al. (2011) applied the Technique for Order Preference by Similarity to Ideal Solution method (TOPSIS) to determine the weightage of dimensions for transportation service delivery. Many studies all over the world applied AHP in defining weightage, priority or rank among the criteria in decision making (Zafri et al., 2020; Alam and Mondal, 2019; Boukhari et al., 2017; Zhu et al., 2011). However, in the case of municipal services people may be desponded with any particular facility that can affect their overall satisfaction. Such circumstances could be overlooked in the aggregate result of the SERVQUAL method. The incorporation of a citizen's scorecard for each facility with the SERVQUAL questionnaire can provide a concrete result in this regard and complement the output of quality assessment. It has been already evident that the citizen's scorecard is an effective tool to evaluate any service and ensure participatory governance (Belanche et al., 2016; Cavill & Sohail, 2004).

1.3. Need of the research

Bangladesh is the seventh most populous country in the world with 2.19% of total global population. Albeit this is a rural country in nature, 34% of the nation's population is living in urban areas. After the independence in 1971, the urban areas experienced a massive population expansion from 6.2 million to 34 million in 2011 (BBS, 2011). Urban opportunities in major cities and lack of facilities in rural areas are responsible for such population growth. It is predicted that more than 50% of the total population of Bangladesh will live in urban areas by 2050 (UN, 2014). However, such a population boom is varied among urban areas as some major cities are experiencing steep spikes.

Dhaka, the capital of Bangladesh and the only megacity of the country, has an urban population that is overwhelmingly the highest in the nation and is firmly increasing with time (Fig. 1). For better urban facilities and job opportunities in the city, more people are steadily convening towards Dhaka, especially within the Dhaka City Corporation area (Trotter et al., 2017). Currently, 12.6 million people are residing within two city corporation areas of Dhaka named: Dhaka North City Corporation (DNCC) and Dhaka South City Corporation (DSCC) (Akharuzzaman, 2014). The City Corporation or Municipality is the local government responsible for the provision of basic urban facilities in these areas to improve the quality of life of the citizens.

Different areas of the world perform differently in serving municipal facilities considering their local governance, socio-economic condition, geographic context, local demand, and capacity of responsible authorities (Hebdon & Jalette, 2008). In Bangladesh, the areal extent and the responsibilities of City Corporation towards citizens are delineated based on urban population, population density, local income level, areal economic importance, opportunities to enhance infrastructural facilities, the annual income of municipality, and public opinion. The City Corporation areas are further fragmented into the smaller administrative units cum neighborhood units called Ward for the ease of urban management (The Local Government Act, 2009). The jurisdictional area, population and residential use of land are higher in the DNCC than the DSCC. In DSCC, 35% of the total land use is residential, whereas it is 66% of the total land use in DNCC (RAJUK (Cartographer), 2016). Moreover, the city is also expanding towards the north that may propagate the population swiftly within the DNCC area in near future. As the DNCC is the key authority dedicated to the effective functioning of city affairs and the provision of urban amenities within northern Dhaka, it could be difficult for them to manage the urban facilities efficiently without knowing the perspective of citizens. That may further affect the urban life quality and livability negatively.

Previous studies on municipal service facilities were primarily focused on evaluating the existing urban service quality without consideration of citizen's expectations on municipal services or through downscaling the national information (Adhikari, 2011; Akther et al., 2009; CPD, 2013; Faridatul & Jahan, 2014). However, to complement the basic needs of the dwellers and enhance their quality of life, it could be adjutant to know the urban service quality at the neighborhood level considering citizen's expectations which are contemplated in this research.

This paper intends to assess the neighborhood level municipal service quality from the citizen's aspect. Firstly, the items of the SERVQUAL questionnaire were set in the context of municipal services. The citizen's perceptions and expectations were assessed next at the neighborhood level in case areas of Dhaka, Bangladesh from which the service gap was further determined. The overall satisfaction level of citizens was reckoned later to understand the quality of municipal services considering the community's psychological aspect. Again, this satisfaction level may vary within the services or even area to area which are explored further using citizen's scorecard. Finally, the conclusion was drawn based on the findings. The following sections of the paper have discussed them in detail. This study would fetch a course where the citizen's experience, assertion and deficiency on urban services would be evaluated under a common arena, and the psychological aspect of urban service quality assessment would be addressed for better urban management.

2. Methodology

2.1. Study area selection

Among the 36 Wards of Dhaka North City Corporation, Nine wards were found where the population density (around 73 thousand per square kilometer) and residential land use are considerably higher (Table 1).

The average total built-up land in all of these wards is also around 70% of total which is superior to others. Moreover, these neighborhoods are maintaining the same economic level to some extent which is reflected from the average income level of the areas. In this research, these nine Wards are selected based on their stated homogeneous natures (Fig. 1). Table 1 shows the detailed information of the case neighborhoods of this research.

2.2. Questionnaire design

The municipal activities in urban areas of Bangladesh are generally dictated by the “City Corporation Act, 2009” under 28 broad categories including public health; birth, death and matrimonial registration; medical facilities; water supply and sanitation; ferry facilities; local market and slaughterhouse management; town planning; building construction; road development; traffic control; public security; disaster management; graveyard and crematorium management; public space and forestry management; education and culture; and social welfare (*The Local Government Act, 2009*). The DNCC acts as a monitoring body and supply agency in the case areas to duly provide these municipal facilities and each ward office assists to manage these services. Nevertheless, some of the activities like water supply, town planning, ferry facilities, building construction, and educational and cultural facilities are done collaboratively with other agencies or even the City Corporation, who are less responsible for it and the services are not only limited within the urban areas. Therefore this study sorted the services which are solely provided by the City Corporation within its jurisdictional area. To select the services, a focus group discussion was held with the officials of City Corporation and representatives of Ward. And according to their suggestions, the provision of healthcare facilities, public toilet and parking space; waste disposal, development of drainage system, roads and pedestrian way; management of street light and local market; traffic control; disaster management; pest control and certificate registration were considered as the main urban services to collect data for from primary sources. A citizen’s scorecard is also attached to the questionnaire for these services. The respondents rated the services individually on a five-point Likert scale with the qualitative statements ranging from “very dissatisfied” to “very satisfied” which was represented by scores of 1–5 numerically.

To assess the quality of these services, a questionnaire has been prepared considering the SERVQUAL method. The potential questions under the dimensions of SERVQUAL were selected through reviewing comprehensive literature. The questions under tangibility and reliability deal with the physical appearance of the facilities and proficiency in performing the intended services respectively. The questions of responsiveness represent the allegiance of the service provider to serve the citizen’s needs. Again, the items of assurance and empathy mainly indicate the credibility and capacity of the service provider respectively. To finalize the items under each dimension of the SERVQUAL method, opinions from experts have been extracted. The authors consulted with four local experts who are experienced with urban planning practices and are involved with city management activities. Finally, a SERVQUAL

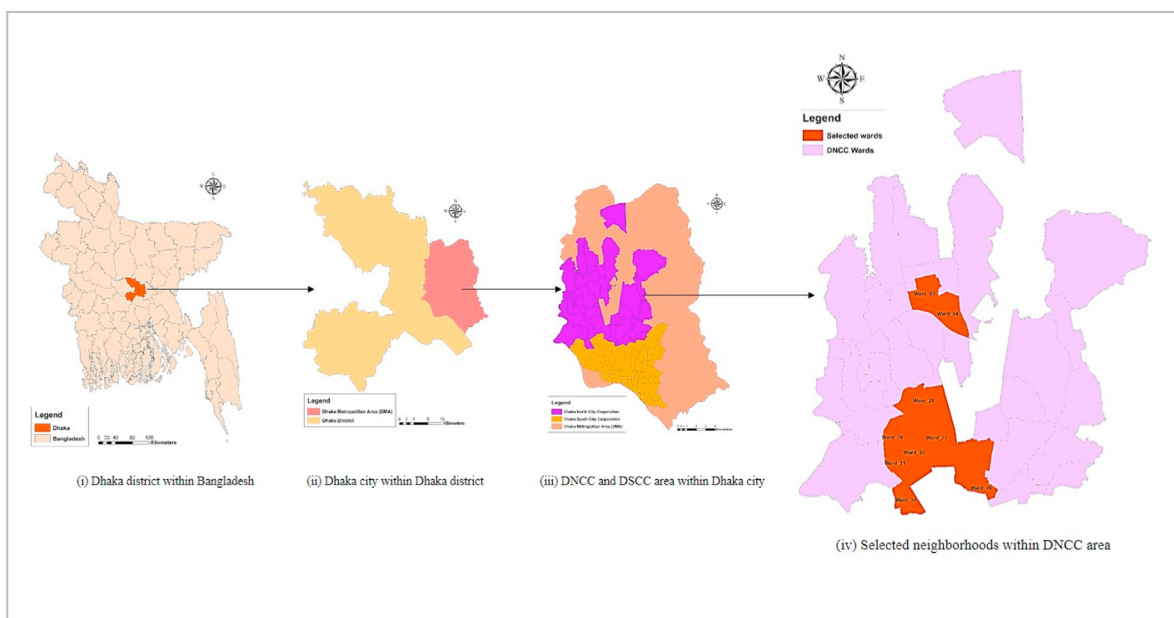


Fig. 1. Selected Wards of Dhaka North City Corporation area.

questionnaire, containing 22 questions related to municipal service quality indicators was developed. The questions were categorized under five dimensions in which four questions are about Tangibility; five are about Reliability; four are about Responsiveness; five are about Assurance; and the final four concern Empathy. The questionnaire items were set to score within 0–5 numerically by the respondents.

It is important to measure the validity and reliability of the questionnaire items in primary survey-based research so that the items can cover the full range of issues and reflect the true scenario. In this study, the validity index has been calculated for the 22 questionnaire items where their relevance was justified through expert opinions. The experts rated the relevance of each item on a Four-point Likert scale where 1 represents “irrelevant” and 4 refers to “very relevant”. Pearson correlation test was carried out in SPSS to assess the validity of each questionnaire item based on their significance value and by comparing the count value of correlation with *r* table product moment. The feedback of eight experts was analyzed. The final result of the content index was 0.796 which indicates good content validity.

Cronbach’s alpha method was applied in SPSS to measure the reliability based on the responses of 20 pilot questionnaire surveys. Cronbach’s alpha value was found to be 0.73, which indicates good reliability of the questionnaire items.

2.3. Data collection

To collect the data for this study, a household questionnaire survey has been conducted by the research team. The total number of households in the case areas is around 0.67 million (DNCC, 2017). A proportionate stratified random sampling method was accommodated to excerpt the information. Keeping the confidence level at 95% with a 5% margin of error, the sample size was deduced to be 384. The household heads from each household were surveyed as the respondent. During survey, communication has been carried out in the native language (Bangla) for ease of understanding. The respondents were asked to provide their basic information, service experience, and to specify their expectations and perceptions regarding municipal services. The distribution of samples among the study area has been shown in Table 1.

2.4. Assessment of citizen’s satisfaction on municipal services

This study involves a mongrel methodology combining AHP and SERVQUAL model. The weightage of each dimension of SERVQUAL was determined using Analytical Hierarchy Process (AHP) according to expert opinion. Based on the responses about perception and expectation for each question, the gap score for each dimension was evaluated. Citizen Satisfaction Index (CSI) was finally calculated by multiplying the weight and average perception score.

2.4.1. Defining the weights of dimensions using Analytical Hierarchy Process (AHP)

Due to procedural simplicity and rationality in use, the Analytic Hierarchy Process (AHP) is practiced widely in the field of decision making (Taha, 2006). Generally, AHP is conducted through three major steps: development of a comparison matrix, determining the weight of each factor and checking up the consistency. In this paper, a comparison matrix was developed based on the insight of four experts on municipal services of Dhaka. Here the parameters needed to be rated on a scale of 1–9 named Saaty scale (Table A1) where 1 represents that two parameters are valued equally while 9 indicates that one parameter is extremely important over the other.

The geometric mean of four expert’s opinion was calculated to bring their opinions into one matrix. After the preparation of the comparison matrix, the weight of each parameter was defined from row-multiplied value (RMV), unnormalized and normalized value

Table 1
Profile of the selected Wards.

Ward No.	Population	Localities under the areas	Density	Areas containing residential use over the whole Ward	Average Income level (BDT)	Sample Size
Ward-03	94664	Mirpur Section 10, Section 11	72818	63%	17,250	53
Ward-04	75246	Mirpur Section 13, 14, Baishteki	73054	57%	16,100	43
Ward-26	67876	Karwanbazar, Tejkunipara, Railway Colony	72209	51%	20,000	38
Ward-27	90224	Razabazar, Green road, Indira road, Monipuripara, Sherebangla-nagar	71043	49%	20,300	51
Ward-28	65984	Agargaon, Sherebanglanagar, Taltola-staff quarter, Shemoli road 1-4	73316	53%	20,450	37
Ward-29	54739	Mohammadpur (Block C,F), Johuri-mahallah, Tikkapara	77097	65%	22,300	31
Ward-31	51384	Mohammadpur (Block D,E)	73406	55%	20,200	29
Ward-32	72973	Lalmatia, Asad gate, Khili road, Babar road, Aurangzeb road, Pici culture	72973	54%	21,650	41
Ward-34	106548	West Dhanmondi, Rayerbazar, Sultanganj, Zafrabad	75034	59%	16,700	60

(Economic Census, 2013; BBS, 2011; RAJUK, 2016).

following equation (1) and equation (2):

$$\text{Unnormalized value, } m_i = \sqrt[n]{RMV} \quad (1)$$

$$\text{Normalized value, } N = \frac{m_i}{\sum_{i=1}^n m_i} \quad (2)$$

Here m_i represents the unnormalized value of the i th parameter and n indicates the total influential parameters. By using these formulae, the parameters were weighted and ranked at a scale of 0–1. Finally, weight consistencies between judgments of experts were checked from equation (3), equation (4), and equation (5).

$$\text{Consistency index, } CI = \frac{N_{max} - n}{n - 1} \quad (3)$$

$$\text{Random consistency, } RI = \frac{1.98(n - 2)}{n} \quad (4)$$

$$\text{Consistency Ratio, } CR = \frac{CI}{RI} \quad (5)$$

Here N_{max} represents the Eigenvalue of the pairwise comparison matrix. It is notable that if the consistency ratio is less than 0.1, the level of inconsistency is acceptable (Taha, 2006); otherwise the pairwise comparison needs to be re-performed. In this study, the CR value is 0.07 that indicates the consistency in pairwise comparison among the dimensions of municipal service quality. The final weights of each dimension are shown in Table 2.

2.4.2. SERVQUAL model to calculate the citizen satisfaction index

SERVQUAL is a noteworthy tool developed by Parasuraman et al. (1985), to identify the gaps between consumer perception and expectation about any service. It helps to determine the service quality by checking and evaluating the quality dimensions of the provided services (Arambewela & Hall, 2006; Kansal et al., 2017; Ramez, 2012). The SERVQUAL model contains the following five dimensions for estimating urban service quality:

- i. Tangibility: In this research, visual appearances of the equipment, visual appeal of materials associated with the services, and modernity and hygiene of structures and facilities used in serving are brought under consideration to check tangibility.
- ii. Reliability: Functionality, regular monitoring and maintenance, addressing the sudden arisen problem, and perpetuity of services are taken into account to understand the reliability of municipal services.
- iii. Responsiveness: The willingness of authorities to solve problems, sincerity, availability and regularity in the inspection of facilities are considered to ascertain the responsiveness.
- iv. Assurance: Assurance indicates the credibility, knowledge, capacity, courtesy and ability of the service provider to achieve the trust of citizens. Manpower, behavior and local knowledge, and safety and security of services are envisaged here to get an idea about the assurance of municipal services.
- v. Empathy: The consideration of all citizen groups in facilities designing, organizing awareness programs, and community participation are apprehended to understand empathy.

The respondents have given their feedbacks for 22 questions under the aforementioned dimensions for their perception and expectation. Based on their response, the average perception and expectation score of each question is calculated from which actual gap scores are assessed further. The average SERVQUAL perception, expectation and gap scores are comprehended for the aforesaid dimensions from their corresponding questions. The weighted gap scores of the dimensions are calculated by multiplying the gap score with their respective weights found from AHP. From the gap scores, the difference between the perception and expectation of citizens regarding urban services is easily understood, revealing in which facets they are deprived or benefitted.

To understand the satisfaction level of citizens, the Customer Satisfaction Index (CSI) is calculated using the following equation:

Table 2
Determination of weights of five dimension applying AHP.

Dimensions	Tangibility	Reliability	Responsiveness	Assurance	Empathy	RMV	mi	weight
Tangibility	1	0.4	0.81	0.62	0.38	0.076	0.598	0.110
Reliability	2.5	1	1.21	1.7	0.93	4.783	1.368	0.252
Responsiveness	1.23	0.83	1	1.2	0.4	0.490	0.867	0.160
Assurance	1.61	0.59	0.83	1	0.37	0.292	0.782	0.144
Empathy	2.63	1.08	2.5	2.7	1	19.173	1.805	0.333

$$\text{Citizen Satisfaction Index (CSI)} = \frac{\sum(\text{Wightage} \times \text{Perception})}{5} \quad (6)$$

The calculated CSI provides an idea about the gross scenario of municipal service quality. The satisfaction level of each neighborhood with each service is further investigated in a disaggregate fashion from the scorecard.

3. Results

3.1. Determination of gap score and citizen satisfaction index

The average perception, expectation and gap score of all aspects of the dimensions are exhibited in Table 3. The expectations of citizens dictate over perception in all circumstances despite the gap is differing from one another. The items that scored the highest in perception are “the convenient operating hours”, “adequate structural facilities and manpower for service”, and “visual appearances of equipment for the services”. Consequently, these also have the least gap between the perception and the expectation scores indicating that the municipal agency is in a comparatively much better position on these aspects.

However, although the appearance of the equipment is close to the expectations, they are mostly outdated and the facilities are not well equipped with modern instruments which can be linked to its higher gap score (−1.58) under the tangibility dimension. The city corporation needs to be more concerned to develop the equipment technology in service provision. Despite people being relatively satisfied with the quantity of manpower involved in managing the facilities, the quality of the staff is not satisfactory as found from the result of its higher gap score (−2.02) under assurance. From this scenario, it could be stated that the provision of services is not only important to meet the citizen’s demand but also the quality assurance of the services should be equally emphasized.

The gap is relatively higher (−1.93) in case of getting service at the right time which rendered the urban facilities unreliable to some extent. Therefore, the authority needs to be more assiduous about maintaining punctuality in service provision. The highest gap (−2.22) exists at the willingness of authority to respond immediately upon request. Moreover, citizens expect that the concerned authority should provide the services with security assuring full community participation, as indicated by their highest expectation score of 4.86. Nevertheless, they are deprived of their demand which can be understood from a higher negative gap score. Therefore, the city corporation should be more cooperative in facilitating the services. The participation of citizens in managing the urban services can enhance the service quality which is revealed evidently from this result.

From the data, the aggregate SERVQUAL gap score is assessed for each dimension and the weighted gap scores are then further developed incorporating the hybrid method of AHP and SERVQUAL as shown in Table 4.

The Citizen Satisfaction Index (CSI) denotes that the existing municipal service quality satisfies 63.3% of the expectation of city dwellers following the scale of Table A2 from Kansal et al. (2017) which is in the “Moderately Satisfied” category. The negative sign of the aggregate gap score and the weighted gap score implies that the municipal service cannot meet the demand of citizens. The aggregate score illustrates the service gap solely from citizens’ perspective whereby the weighted gap score shows the combination of citizens’ understanding and experts’ thinking on the importance of these dimensions in defining the municipal service quality.

The highest gap exists for assurance where people have expressed that they have the second-highest expectation score but on the contrary, are receiving the second-worst service. This points the knowledge and capacity discord of the service provider (Table 4) where the improvement of manpower, institutional capacity, and security of services need to be prioritized. On the other hand, the lowest gap

Table 3
Perception, expectation and gap score of each item of SERVQUAL.

Dimensions	Questionnaire Items	Perception	Expectation	Gap Score
Tangibility	Visual appearances of the equipment involved in municipal services	3.72	4.23	−0.51
	Materials associated with the service are visually appealing and eco-friendly	3.10	3.86	−0.76
	Using modern equipment to facilitate the services	2.75	4.33	−1.58
Reliability	Physical structures or facilities involved in services are neat and hygienic	3.91	4.25	−0.34
	The functionality of the provided services	3.53	4.52	−0.99
	Regular monitoring of the service facilities	2.93	4.15	−1.22
	Periodical maintenance of the service facilities	3.03	4.39	−1.36
Responsiveness	Addressing the emerged problems regarding services regularly	2.86	4.13	−1.27
	Getting all services at the right time	2.28	4.21	−1.93
	Service of concerned authority is always available when it is required	3.16	4.68	−1.52
Assurance	The concerned authority is sincere in solving the municipal problems as soon as possible	3.44	4.34	−0.90
	The concerned authority regularly inspects the conditions of service facilities and equipment	3.27	3.93	−0.66
	The willingness of authority to help the city dwellers at any time	2.44	4.66	−2.22
	Provision of secured facilities for all citizens	3.31	4.86	−1.55
Empathy	Maintenance of all standard of safety and hygiene	2.95	4.46	−1.51
	The number of structural facilities and manpower is enough to serve all citizens	3.84	4.54	−0.70
	The staff of concerned authority is polite and confident	2.73	4.27	−1.54
	Knowledgeable employees of the concerned authority	2.09	4.11	−2.02
	The services are provided with full community participation	2.99	4.86	−1.87
	A regular awareness program is arranged for the betterment of public facilities	3.40	4.74	−1.34
	Consideration of old and disables at the design of facilities	3.08	3.91	−0.83
Convenient operating hours to help the citizens	4.13	4.31	−0.18	

score at tangibility with a better score in perception indicates that people are comparatively satisfied with the physical appearance of service facilities. The result of the weighted gap score for empathy (-0.35) reveals that the authority should take initiatives to enhance community involvement in facilitating their activities. Besides that, the services demand special attention in increasing their functionality and reliability. Although the weighted gap scores of the dimensions are minuscule, the overall municipal service quality settles with a moderately satisfied state according to Kansal et al. (2017).

For the improvement of the quality of each dimension, it is necessary to identify and prioritize the aspects based on what their attention requirement. Moreover, the existence of service gaps in all aspects suggests that the interventions need to be incorporated following priority. Table 5 shows that the interventions are mostly necessary for the development of service quality under each dimension where the cooperation of authority has been found as the most highlighted intervention.

3.2. Spatial variation in service quality

Service quality scores provided by the citizens differ from area to area based on their satisfaction levels. Comparatively, a huge gap inhabits between the perception and expectation of people regarding municipal services at Ward 3, Ward 4, and Ward 31, though all areas have the same characteristics and are also served by the same authority (Fig. 2).

In the spatial context, more attention is demanded in these areas for the promotion of service quality. On the other hand, the satisfaction level is reasonable in the other areas and people are moderately satisfied with the service (Fig. 2).

Again, the satisfaction level of people of any area could be affected by any specific municipal service of City Corporation which has been revealed through comprehending the scorecard. Overall, the citizens are dissatisfied with the service from public toilets, parking facilities and disaster management activities performed by the City Corporation (Table 6). The absence of public toilets at several public spaces and their unhygienic state where available are responsible for its lower score according to the respondents. Lack of parking spaces within the locality and illegal on-street parking is a common scenario of these areas which make people discontent about the activities of the municipality.

Dhaka is one of the most vulnerable cities to earthquakes, urban floods, drought and many more anthropogenic hazards like building collapse (Kabir et al., 2017). To mitigate the risk of such hazards, community awareness could be a better way out and it is one of the major tasks of the City Corporation to make the localities aware to form the disaster management committee and to train the local volunteers for their emergence according to the act (*The Local Government Act, 2009*; Azad et al., 2019; Odiase et al., 2020). Nevertheless, the performance of the agency is not so conducive in this regard as revealed from the lowest median score at disaster management activities in all areas (Table 6).

The registration service of City Corporation is the only service with which the citizens are very satisfied. They can avail this service immediately whenever it is required. Moreover, people are also pleased with the healthcare facilities, waste disposal and management, and street light facilities.

Ward 3, Ward 4 and Ward 31 are at most unprivileged state found from the score of perception and expectation of citizens. Besides the commonly unsatisfactory services, some other facilities are identified as unsatisfactory as well in these neighborhoods. The healthcare facilities in Ward 3 are not provided according to the citizen's demands. In this neighborhood, no public healthcare institution is available and people claimed that the information of vaccination programs and public health awareness is not disseminated regularly by the municipality. The condition of the drainage system and local markets are unsatisfactory in Ward 4. The width of drains is inadequate causing water logging during heavy rainfall. Moreover, in some areas within the neighborhood, there are uncovered drains that could be perilous for the citizens. The residents claimed that the local markets are also unhygienic and the food quality is not inspected regularly which could be risky for public health.

4. Discussion

In Bangladesh, the urban areas are expanding faster with rapid population growth through attracting the rural migrants to the cities even though the capacity of municipal services are limited in terms of satisfying the demand of the residents. The supply of the urban service is getting confined to assimilate them by maintaining the desired quality of all facilities. The severity of such circumstances is enhanced when the gap persists between the perception and expectation of the existing citizens on different aspects of services. When the dwellers are psychologically dissatisfied with the facilities, it may cause deterioration of quality of life. Moreover, the incorporation of public opinion in urban management is one of the core ideas of participatory city planning and life quality improvement. According to the United Nations (2015), sustainable cities and communities are focused on in Sustainable Development Goal 11 where enhancing

Table 4
Summary of SERVQUAL scores.

Dimensions	Weight	Perception	Expectation	Gap score	Weighted gap score	CSI
Tangibility	0.11	3.37	4.17	-0.80	-0.09	63.3%
Reliability	0.25	2.93	4.28	-1.35	-0.34	
Responsiveness	0.16	3.08	4.40	-1.32	-0.21	
Assurance	0.14	2.98	4.45	-1.46	-0.21	
Empathy	0.33	3.40	4.46	-1.06	-0.35	
Total	1	15.76	21.75	-5.99	-1.20	

Table 5
Interventions required to improve the condition of urban services.

Dimensions	Highest gap score	Mostly required interventions
Tangibility	−1.58	Incorporation of modern equipment in urban services
Reliability	−1.93	Punctuality in service provision
Responsiveness	−2.22	Improving the response of authority in addressing citizen's problems
Assurance	−2.02	Enhancing the quality of the personnel involved in service provision
Empathy	−1.87	Ensuring community participation in urban management

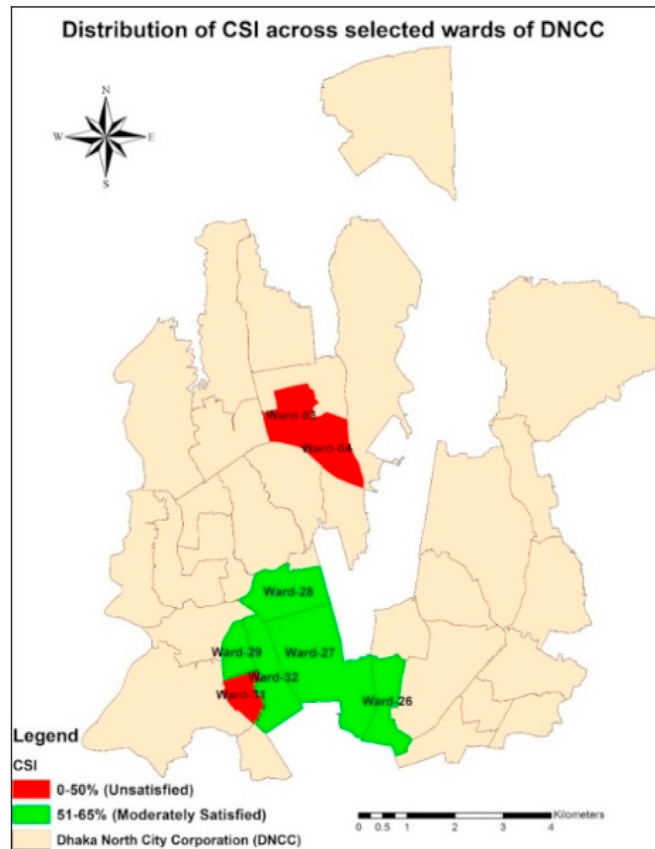


Fig. 2. Distribution of citizen satisfaction index among the study areas.

community participation in urban management is emphasized to build up safe, inclusive, functional, resilient and sustainable cities. After the Quito Declaration, inclusiveness and community concern are brought into city planning and management all over the world. This paper has introduced a combined method in which the perception, as well as the expectation of citizens on the quality of urban services and the expert thinking are jointly considered to evaluate the quality of urban services. Besides the mechanism of management, citizen's satisfaction could be weakened by any particular facility of urban services. These are also explored in this research using the citizen's scorecard. Sometimes in the urban quality evaluation, it is difficult to consider the qualitative statements of citizens but this limitation has been addressed in this paper through the SERVQUAL method. Neighborhood satisfaction of the municipal services and the facilities involved in providing services are evaluated here, thus the dimensions are also demonstrated in which the service provider agency is in dire states. This could be further incorporated with overall evaluation of quality of life of the city and the psychological aspects of life quality assessment could be immensely integrated.

To improve the municipal service quality in the residential neighborhoods of Dhaka North City Corporation areas, some important initiatives and functions need to be redacted according to the findings. In terms of the performance of the City Corporation authority, the municipal service quality is not reliable and empathetic as their weighted gaps are higher over other dimensions of the SERVQUAL (Table 4). Therefore the concerned authority should pay keen interest to develop the functionality of municipal facilities with full community participation. Regular monitoring and periodical maintenance of facilities need to be governed duly. The consideration of all social groups in facilities designing, necessary awareness programs regarding municipal responsibilities for the citizens, and participatory planning approaches should also be fetched into urban management. In this regard, the involvement of community-based

Table 6
Condition of services at the case areas of DNCC.

List of services	Service-wise median score of the neighborhoods									Median score of the services
	Ward-03	Ward-04	Ward-26	Ward-27	Ward-28	Ward-29	Ward-31	Ward-32	Ward-34	
Provision of healthcare facilities	1	3	3	4	3	4	4	4	4	4
Provision of public toilet	1	2	2	2	2	2	1	2	2	2
Provision of parking space	1	1	2	2	2	2	2	3	2	2
Facilities of waste disposal	3	3	4	4	4	4	4	4	4	4
Development of drainage system	3	2	3	3	3	4	3	4	3	3
Development of roads and pedestrian way	3	3	3	3	4	3	3	4	3	3
Management of street light	4	3	3	4	4	4	3	3	4	4
Management of local market	3	2	3	3	3	4	4	4	4	3
Traffic control facilities	2	3	3	3	3	3	3	3	3	3
Disaster management activities	1	2	2	2	2	2	2	3	2	2
Pest control activities	4	4	2	3	3	4	3	3	4	3
Registration of citizen certificate	5	5	4	4	5	4	5	4	5	5

Very dissatisfied

Somewhat dissatisfied

Neither dissatisfied nor satisfied

Somewhat satisfied

Very satisfied

organizations and representatives of the local community can play an important role as the binding material between the citizen and the authority to minimize the service disparity.

According to the satisfaction level, some neighborhood units like Ward 3, Ward 4, and Ward 31 are in an unprivileged state which require special attention for quality improvement (Fig. 2). The citizens are particularly discontented with disaster management, public toilet and parking facilities of municipality revealed from the citizen’s scorecard. The concerned authority should emphasize more in the provision of these services. On the contrary, people are highly satisfied with registration service offered by the municipality for birth, death or marriage. This denotes that the municipality could acquire the desired level of satisfaction of people through providing qualified services. And in service provision, the quality of facilities should be prioritized over quantity as identified from the perception of people. Overall, the result of this study shows the city government authority is not susceptible enough in service provision of the existing dwellers, the evolving population growth in future would threaten the circumstances and deadly affect the quality of urban life. The controlling of rapid urban growth and decentralization can also be suggested from this output. However, this article provides a sincere attempt to solve the problems of urban service quality assessment and determine the way out for better urban management considering the public opinion. By using such evaluation, an intercourse has been done between the thinking of dwellers and experts which could indicate the actual scenario of service quality.

5. Conclusion

Municipal service quality can put a significant impact on the urban governance system and make the overall management system questionable. As citizens are the primary stakeholders of such facilities, their thinking and input are vital to ensure a sustainable urban space. This study identified the perception and expectation of the citizens of the DNCC area applying the SERVQUAL technique to grab their satisfaction level empirically. The result shows that people are moderately satisfied (63.3%) with the existing service quality that still has potential for improvements. However, it should be noted that SERVQUAL follows an expectation disconfirmation model where the responses are dynamic with respect to time, place and psychological state meaning that the perception scores will hardly match or surpass the expectation scores. To overcome this obstacle, AHP was relied upon which integrated expert opinions and imposed weights

on the perception scores to estimate the CSI and thus proved the usefulness of this combined methodological approach. In addition to that, citizen's scores on different facilities help to define the service quality in a disaggregated fashion.

This research only considers some selected leading residential neighborhoods of DNCC to investigate the citizen's experience. Such evaluation could be further applied to every type of neighborhood and draw the better and complete picture of a city-wide service condition considering public demand. The implication of such an attempt can also assist to ascertain the service quality variation with the heterogeneity of neighborhoods and prescribe the solutions with the change of neighborhood characteristics. Moreover, service-specific dimensions of SERVQUAL could help with the detailed identification of functional difficulties and complexities on facilities that are barely explored in the aggregate result of this research. The research data were collected from the household heads during survey where the demographic information of households were not collected in so detail. Nevertheless there could be the chance that the satisfaction level varies with demographic characteristics of household or even with community to community. This is insignificantly explored in this paper. However, this study engaged an associated technique compiling SERVQUAL, AHP and score card to assess the service condition of urban facilities both in spatial and functional scale, and identified the points of intervention to develop the municipal facilities. The methods incorporated no quantitative requirements but rather assessed the condition under a qualitative framework. The findings of this research can aid urban planners, practitioners and researchers to get an understanding of the qualitative assessment of service facilities and the importance of peoples' opinions in determining the service quality for better urban management.

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Declaration of competing interest

The authors declare that they have no conflict of interest.

Appendix

Table A1

The scale of the absolute number for measuring priorities in AHP.

Intensity of Importance	Definitions	Description
1	Equal Importance	Two activities contribute equally to the objective
3	Moderate importance	Experience and judgment slightly favor one activity over another
5	Strong importance	Experience and judgment strongly favor one activity over another
7	Very strong or demonstrated importance	An activity is favored very strongly over another; its dominance demonstrated in practice
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation
Reciprocals of above	If activity 'k' has one of the above non-zero numbers assigned to it when compared with activity 'i', then 'i' has the reciprocal value when compared with 'k'	A reasonable assumption

(Taha, 2006).

Table A2

Performance and satisfaction levels.

Customer Satisfaction Index [CSI (%)]	Level of satisfaction	Weighted gap scores	(cumulative)
75–100	Highly satisfied	≥ 0	Excellent
65–75	Satisfied	$-1.0 \leq \text{gap} < 0$	Good
50–65	Moderate	$-2.0 \leq \text{gap} \leq -1.0$	Satisfactory
0–50	Unsatisfied	$\text{Gap} \leq -2.0$	Poor

(Kansal et al., 2017).

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