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## Exploring the Influencing Factors on Urban Green Space Utilization: A Case Study of Galle Urban Park, Sri Lanka

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### ABSTRACT

Green urban areas are of great importance for environmental sustainability and the quality of life in rapidly urbanizing cities. This study aims to examine the key factors influencing the utilization of Galle Urban Park, Sri Lanka, focusing on accessibility, vegetation quality, urban density, and safety perception. Data were collected from 100 park users and analyzed using descriptive statistics, correlation, and regression analysis in SPSS. The descriptive analysis shows that 73% of visitors were between the ages of 18-44 and 52% visited 2 to 3 times a week and 59% used private vehicles as transportation mode to access the park. The correlation analysis revealed strong positive correlation between urban green space usage and accessibility (0.595), vegetation quality (0.660), and urban density (0.624), while in safety perception, the correlation was insignificant (0.065). The regression analysis revealed that accessibility, vegetation quality, and urban density were significant positive predictors of urban green space usage, as all predictors had p-values less than 0.05. Safety perception did not have a significant effect on usage. The model had a very high  $R^2$  value of 0.609, explaining 60.9% of the variance in urban green space usage, hence the factors identified strongly predict the usage patterns. Vegetation quality proved to be the strongest predictor of park use, and therefore, the maintenance of green spaces is essential. Accessibility improvements and considerations of urban density also weigh high to enable visits to parks. Such results suggest that access to green spaces, ecological enhancement, and equity in the distribution of parks across densely populated areas should be prioritized in integrated urban planning. This study contributes to the limited literature on urban green space utilization in mid-sized cities and provides practical recommendations for urban planners and policymakers. By addressing the specific challenges faced by the city of Galle, the research supports sustainable urban development through the promotion of inclusive and healthy public spaces.

### 1. Introduction

Urban Green Spaces (UGS) have instantly emerged as particularly important factors regarding preserving and guaranteeing the quality of life within sustainable city environments. Most pertain to issues related to or addressing rapid urbanization, these spaces such as parks, gardens, and recreational areas, provide critical ecological services [01]. They also foster social well-being by offering venues for relaxation, physical activity, and community interaction [02]. However, green space has had

a lot of pressure with rapid urbanization, especially in developing countries resulting in reduced and degraded areas; hence, there is a dire need to determine the factors affecting their usage and accessibility.

UGS is not only relevant because of the environmental benefits it offers. The role of urban green areas significantly contributes to social, economic, and health outcomes [03]. Some extra advantages include decreasing stress and offering refreshing mental renewals,

improving mental well-being [04]. UGS tend to be social magnets, facilitating human interaction from several walks of life, which consolidates social capital and provides them with a feeling of belonging among others in that society [05]. The socioeconomic benefits are equally significant, with well-maintained parks attracting tourists and supporting local economies through recreation-based businesses [06]. Despite the many advantages that they accrue to UGSs such as parks, they have some problems with their effective use. One of the greatest barriers is accessibility. Lack of maintenance and safety problems such as poor facilities, sanitation, and crime along with many more, deter people from visiting the green spaces[07,08]. It is also impacted by environmental aspects such as pollution and the heat island effect [09,10].

Like many other developing countries, Sri Lanka has faced rapid urbanization with the rising pressures on UGSs. Galle is a major coastal city in the southern Sri Lanka, which very well represents this phenomenon [09]. The growth of the city has led to the depletion of available green spaces, thereby increasing challenges related to urban sustainability. Jayasinghe et al. (2018) estimated that the per capita green space in Galle is only 4.1 m<sup>2</sup>, while the standard recommended by the World Health Organization (WHO) is 9 m<sup>2</sup> per capita [11]. The inadequacy of available green space further worsens with the fact that about 65% of the urban area in Galle is located far away from any public green space, hence limiting access to residents. In particular, the availability of green space in high-density areas such as the city center decreases to only 2.5 m<sup>2</sup> per person[11]. Green space distribution in Galle is indicative of high socioeconomic disparity, with limited numbers of public parks and recreational spaces in low-income areas. As well as one of the greatest barriers is accessibility and this is more evident in Galle [12].

Despite the growing body of literature on urban green space (UGS) utilization in Sri Lanka, most empirical studies have focused on large metropolitan areas such as Colombo. Limited attention has been given to mid-sized cities like Galle, particularly regarding how multiple environmental and perceptual factors collectively influence urban park usage. Previous studies in Galle have largely emphasized GIS-based assessments and socio-demographic characteristics, while empirical investigation of behavioral and

perceptual determinants of park use remains underexplored.

Therefore, this study aims to address this research gap by examining the combined influence of accessibility, vegetation quality, urban density, and safety perception on the usage of Galle Urban Park (Dharmapala Park). By empirically testing these determinants within a mid-sized Sri Lankan city, the study extends the applicability of established behavioral and social-ecological models to a new regional context.

Upon this context main objective of this study was to investigate the factors that affect the usage of Galle urban park. Evaluation of combining impacts of accessibility, vegetation quality, urban density, and safety perception of park usage was kept as secondary objective. The findings may also form a basis on which informed urban policies and strategies for planning could be founded to ensure better quality and access to these facilities. By integrating multiple determinants of park usage and testing them through established behavioral and social ecological models, this study provides a more holistic understanding of urban park engagement than previous Sri Lankan research, which has often examined these factors in isolation. It tried to highlight these shortcomings to add knowledge in the arena of urban parks to serve better the rapidly growing city in Sri Lanka. In this study tested the applicability of behavioral model developed by Zhang et al. 2015; Pinto et al. 2021[02,03] and social ecological model developed by Terefe & Hou (2024) [02].

The current study represents a significant academic contribution to the body of literature on planning for urban green spaces and environmental management in Sri Lanka. Since most of the previous literature concentrates on large cities, such as Colombo. The findings will add weight to the academic discourse on sustainable urban planning in developing countries, adding a regional perspective to global discussions. Also, the study provides policymakers and urban planners with evidence-based recommendations that could help optimize the design and management of UGSs.

## 2. Literature Review

Previous studies have tried to identify factors that affect the use of UGSs, which is helpful for

the case of Galle urban park. Zhang et al. in 2015 identified the factors affecting physical activity of urban green spaces in Beijing, where accessibility and environmental quality are the most significant factors[01]. They further showed that accessibility through transportation modes is the major factor for visiting parks. Pinto et al. in 2021 investigated socioeconomic and environmental factors associated with the utilization of green space in Coimbra, Portugal; accordingly, they reported that major causes of these variations include urban density and socioeconomic status[03]. According to them availability of transport modes and proximity of green areas to residential areas affected the utilization of urban parks. They concluded that accessibility by walking or through efficient public transport systems was an important factor in increasing visits. Terefe and Hou (2024) comprehensively reviewed determinants of urban green space accessibility and use to understand usage patterns within an urban cities [02]. They reviewed several studies from different countries and reiterated this point, thus adding weight to the previous assertion that accessibility is a critical determinant in the development of the overall usage of urban green space.

The works of Zhang et al., 2015; Pinto et al., 2021 further supported that diversity and maintenance of vegetation are among major factors affecting the attractiveness of urban green space [01,03]. Thus, well-maintained green areas contribute to physical activities, thus influencing mental and physical health outcomes. In these studies, the presence of different vegetation and greenery within urban parks improves user satisfaction. In addition, Kaymaz et al. (2019) established that children gain much of the intrinsic values of urban green space in terms of spaces to play and engage in their vital social networks [08]. Boulton et al. (2018) conducted a systematic review to highlight vegetation diversity in green open spaces around the world [13].Terefe and Hou (2024) emphasized that more on the accessibility of the use of urban green space and thus different vegetation types also attract more users into the space and improve ecological and aesthetic values [02].

Urban density and its impact on the utilization of green space have also been discussed in many previous studies. Zhang et al. (2015) investigated the relationship between urban density and green space utilization in Beijing, finding that overcrowding and the scarcity of

green spaces greatly reduced the frequency of their use for physical activities [01]. Likewise, Pinto et al. (2021) found that densely packed urban settings in Coimbra, Portugal, are associated with impaired green space accessibility. It would appear that more dense cities make the challenge of green space accessibility even more complex [03].

Safety perceptions are highly crucial in making use of the urban green spaces. Many studies have linked crime, poor lighting, and visibility with a decline in the usage of green spaces. Schipperijn et al. (2010) considered the relationship of safety perceptions to the usage of green space in Odense, Denmark[05]. Poor light and fear of crime reduced the use of the park, mainly in the evening. Similarly, Kaymaz et al. (2019) studied the factors that influence the use of urban green spaces for children in Istanbul and found that the perception of safety threatened by the incidence of crime prevented families from allowing their children to visit parks [08]. These studies therefore suggest a relationship where safety concerns disallow more frequent use of UGSs. Hence, improving safety could attract higher uses of spaces.

Sri Lankan context is far different from that with some emphasis on the mid-sized city of Galle. Jayasinghe et al. (2021) addressed the socio demographic drivers behind the usage of UGSs, except they did not inquire into access-related issues within small cities[12]. Findings showed that the majority of residents face difficulty in accessing green spaces, especially where infrastructure is less developed compared to the capital city of Colombo. Further, Jayasinghe and Hemakumara (2018) noted that though Galle has been doing well in terms of providing green spaces, accessibility issues related to public transport and connectivity from residential areas to parks have been largely left unaddressed [10]. This gap further supports the need for greater evidence on how far accessibility contributes to the use of parks in Galle city. Jayasinghe et al. (2018, 2021) studied GIS-based assessment and socio demographic factors in Galle, a comprehensive exploration into specific elements of use and non-use that were affecting Galle urban park was missing[11,12]. This brings up the need for localized studies to understand what exactly drives or hinders the usage of this park. Further, studies like (Herath et al., 2018; Wijewardhana & Senevirathna, 2021) [10,14] stress green infrastructure and its role in tropical urban contexts and could enrich this discussion for Galle. Herath et al. (2018) underline that green infrastructure plays the most important role in maintaining and assuring high-quality vegetation as a determinant factor for reducing the

urban heat island effect to improve the quality of life among its residents in tropical urban contexts in Sri Lanka [10]. Besides, Jayaweera et al. (2018) investigated the importance of green spaces within the condominium area of Sri Lanka and determined that vegetation was one of the key factors affecting overall satisfaction with the living environment of the residents [15].

Research on how vegetation quality can influence the attractiveness of a park itself in Galle is also underdeveloped, and empirical data remains scant. However, few studies in the Sri Lankan context, and particularly in Galle, relate vegetation quality directly to park attractiveness. While Wijesinghe et al., 2024; Dissanayake et al., 2020; Jayasinghe et al., 2021 studied land-use change in Galle, they did not look into how vegetation diversity and maintenance relate to green space attractiveness [09,16,12]. This highlights a clear research gap that needs to be filled with more focused studies concerning vegetation quality affecting park use in Galle city. Urbanization trends in Galle city are also indicative of the emerging challenges related to sustaining green spaces. Dissanayake et al. (2020) and Wijesinghe et al. (2024) observed that land-use changes in Galle, is decreasing green spaces due to urban sprawl, which in turn harms the possibility of residents being in contact with nature [16,12]. This is exacerbated by the rising population density. Wijewardhana and Senevirathna (2021) particularly stressed the need to bring green spaces into urban planning in Sri Lanka, pointing out that a higher urban population density requires the articulation of an overall strategy for integrating green spaces to promote the well-being of the residents along with environmental quality [14].

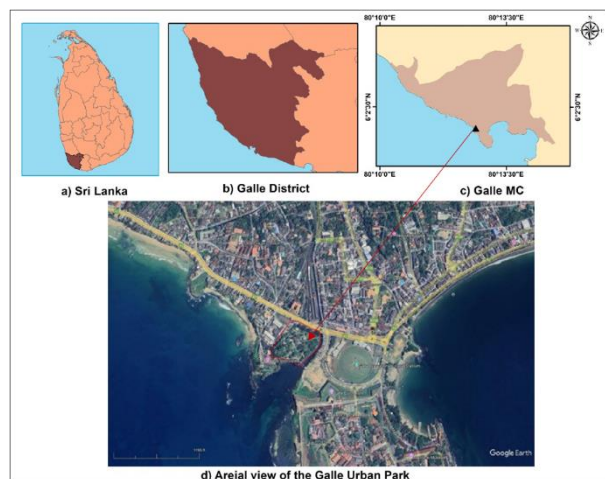
### 3. Material and Methods

#### 3.1 Study Area

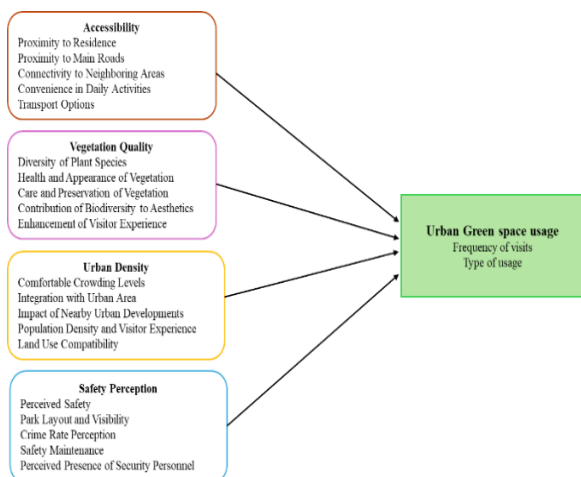
Figure 1 represents the geographical setting of Galle urban park. Galle was chosen for its unique characteristic social, ecological, and environmental parameters that render it of extreme importance for the study of park utilization. Relatively smaller compared to Colombo, Galle is among the overlooked areas in literature with regards to ensuring green spaces are accessible and used by the general public [12].

Galle urban park, also known as Dharmapala park, is centrally located in the heart of Galle, offering a vibrant urban green space. Its central location makes it easily accessible, providing an excellent outdoor recreational option for both locals and visitors. The park features a well-maintained playground,

complete with swings, slides, and climbing structures, making it an ideal spot for children to play, explore, and engage in physical activities. In addition to the playground, the park offers expansive grassy areas perfect for picnics, games, or simply unwinding in nature. These open spaces invite families to relax and enjoy the outdoors. Shaded areas under large trees provide welcome relief from the sun, offering cool spots for relaxation. Paved walking paths meander through the park, creating a pleasant environment for strolls or brisk walks. These paths are also ideal for children who enjoy riding their scooters or bicycles. The park is beautifully landscaped with colorful flowers and shrubs, enhancing its inviting and tranquil atmosphere. For those seeking physical activity, Dharmapala park offers jogging and cycling paths, as well as ample open spaces for games and sports. The well-maintained lawns are especially suitable for children to run and play freely, ensuring that the park is a family-friendly destination for all ages. The natural beauty of the park, combined with its various amenities, makes it a charming place to spend time outdoors. Dharmapala park is maintained by the Galle Municipal Council (MC), ensuring that it remains a clean and enjoyable space for the community.



**Figure 1. Geographical setting of the study area.**



**Figure 2: Conceptual framework of the study** (Source: Terefe & Hou, 2024; Pinto et al., 2021; Kaymaz et al., 2019; Kruize et al., 2019).

### 3.2 Materials

Data collection for this research was done through the administration of a structured questionnaire to users of Galle urban park. The structured questionnaire was designed based on the constructs outlined in the conceptual framework. That was divided into several sections, which capture the demographic profiles, perception on accessibility, vegetation quality, urban density, and safety. It is efficient in collecting a voluminous amount of standardized data from a diverse range of respondents within a short period [17]. Both multiple-choice and Likert-scaled questions were used to enhance clarity, allowing for relevant responses and ease of response, thus increasing the reliability and validity of the data collected as indicated by Creswell (2018)[18].

Accessibility, vegetation quality, urban density, and safety perception were measured using five items each, while park visit frequency was categorized as daily, 2–3 times per week, weekly, monthly, or less than once a month. The research population consists of residents, visitors, and other age groups using the urban Park. The sample size of 130 respondents resulted from the population by a random sampling method. Random sampling was justifiable in that it minimizes selection bias and, subsequently, enhances the representativeness of the sample [19]. In addition, this method ensures that every park user has an equal chance of being included, hence supporting the generalization of findings [20]. This is an approach assured that through a preferably pre-structured questionnaire and randomization of sampling, the research met methodological rigor for

providing a wholesome and unbiased insight into the park usage trend and factors determining that usage.

### 3.3 Methods

The data obtained for this study were analyzed and processed using IBM SPSS version 23. SPSS was selected in view of the excellent statistical options it offers as well as the easy-to-use interface, making it suitable for large datasets and complex analyses [21,22]. Descriptive statistics, such as mean values, were computed to find the main factors affecting park use in relation to accessibility, vegetation quality, urban density, and safety perception. Each variable's mean score helped determine the extent of its impact on urban park usage, with higher mean values indicating stronger positive perceptions or influences. For instance, green space accessibility was evaluated by calculating mean responses to statements related to proximity and transport convenience. Similarly, perceptions of safety were ascertained by taking average ratings of questions concerning safety. Also, it enabled underscoring a precise correlation analysis and regression modeling to explore relationships between independent variables and park usage by employing SPSS [17].

### 3.4 Ethical Considerations

Ethical considerations in primary research were adhered to, as researching to respect ethical requirements regarding procedure and participant protection rights [23,20]. Such an ethics checklist of considerations on the influencing factors affecting utilization in the study of Galle urban park informed consent, confidentiality of responses, and approvals regarding ethical review had to be taken care of accordingly. Ethical approvals from the institutional requirement were obtained before data collection was initiated, ensuring that ethical standards in research are maintained.

## 4. Results and Discussion

### 4.1 Response Rate

A total of 130 questionnaires were distributed, out of which 100 responses were returned. This gave a valid response rate of 76.92% as shows in Table 1, considered very impressive engagement on the part of the respondents targeted.

**Table 2. Response rate.**

No. of questionnaires distributed	No. of responses received	Effective response rate
130	100	76.92%

Source: Survey data analysis (2025).

### 4.2 Demographic Analysis

Table 2 reveals the demographic characteristics of the respondents in this survey. According to Table 2, the gender distribution is almost equal, with 52% identifying as male and 48% as female. This will make for fair participation and hence a variety in analyzing the pattern of park usage. The age group visiting the park falls within the 18-29 age brackets, constituting 37% of the respondents, followed by visitors aged 30-44 at 36%. Another 14% of respondents are in the 45 to 59 age group while 12% are over and above 60. Only 1% consisted of respondents who were less than 18 years old, indicating that very few of the visitors were youths.

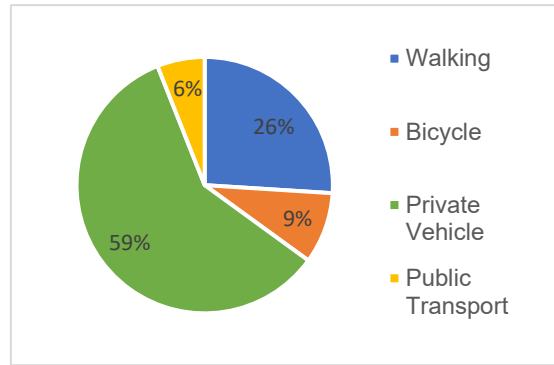


Figure 4. Modes of transport used to visit the park by respondents

Table 2: Frequency results of demographic factors

Gender	Valid %	Age	Valid %	Park visit frequency	Valid %	Transport mode	Valid %	Visit duration	Valid %
Male	52.0	Under 18	1.0	Daily	11.0	Walking	26.0	Less than 30 mints	21.0
Female	48.0	18-29	37.0	2-3 times a week	52.0	Bicycle	9.0	30 minutes to 1 hour	18.0
		30-44	36.0	Weekly	15.0	Private Vehicle	59.0	1 to 2 hours	52.0
		45-59	14.0	Monthly	16.0	Public Transport	6.0	More than 2 hours	9.0
		Above 60	12.0	Less than once a month	6.0				

Source: Survey data analysis (2025).

According to Figure 3 and Table 2, 52% of respondents visited the park 2-3 times per week, 11% visited daily, 15% weekly, 16% monthly, and 6% less than once a month, indicating diverse patterns of park use. As shown in Table 2 and Figure 4, the main mode of transport is private vehicles including 59% of the park visitors, implying dependence on motor vehicles. Next is walking at 26%, which shows pedestrian accessibility. Bicycling accounts for 9% of transport use, and public transport is the least used at 6%.

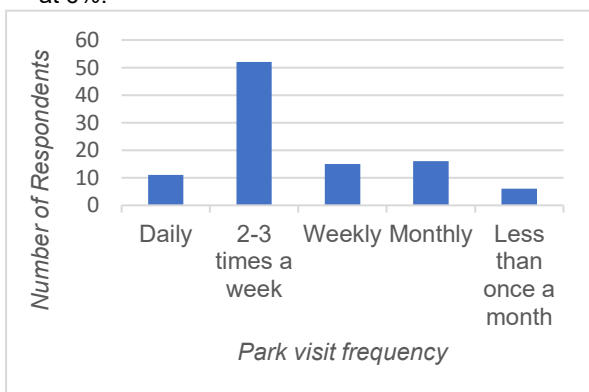


Figure 3. Park Visit Frequency Among Respondents

As illustrated in Figure 5 and Table 2, Most respondents (52%) reported a park visit duration of 1-2 hours, suggesting great appeal for longer visits. 17% of respondents visit for 30 minutes, while 21% average between 30 minutes and 1 hour. Only 9% visit longer than 2 hours, indicating limited usage with extended duration.

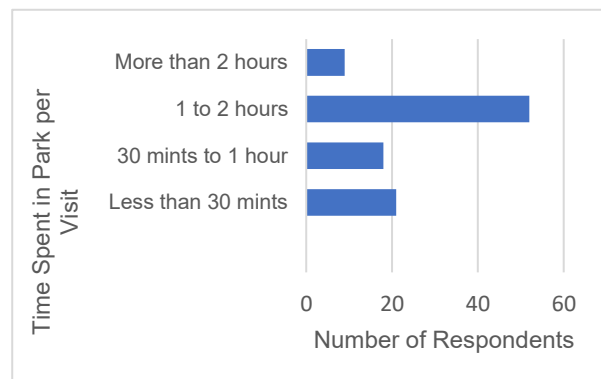


Figure 5. Duration of park visits among respondents

### 4.3 Reliability and Validity Test

Reliability for the variables was determined through Cronbach's Alpha. The Cronbach's Alpha for Accessibility is 0.527, classified as "Poor," hence having weak internal consistency. Vegetation Quality scored 0.918, classified as "Excellent," hence very reliable. Urban density had a value of 0.894, rated "Good," and hence highly reliable. Safety perception recorded 0.731, considered "Acceptable," while UGS usage scored 0.762, also "Acceptable."

KMO values assess the adequacy of the samples. KMO > 0.7 is recommended to be at an acceptable minimum level. Access with a KMO of 0.700 shows marginal inadequacy in sample size, or else all the other remaining items, including Vegetation quality with 0.877, Urban density with 0.871, safety perception with 0.733, and finally, the UGS usage scale of 0.763, had values > 0.7 as shown in Table 3, ensuring appropriate construct validates.

**Table 3. Reliability and validity results.**

	Cronbach's Alpha value	KMO value
Accessibility	0.527	0.700
Vegetation quality	0.918	0.877
Urban density	0.894	0.871
Safety perception	0.731	0.733
Urban green space usage	0.762	0.763

Source: Survey data analysis (2025).

### 4.4 Descriptive Statistics

Regarding UGS usage the average score of 4.14 signifies that the majority agreed or strongly agreed with the high usage of urban green spaces (Table 4). The median at 4.20 and a mode of 4 indicate consistency in the trend of the responses. A standard deviation of 0.605 means that there is relatively low variation, meaning opinions are consistent, with scores lying within the range between disagree to strongly agree.

**Table 4: Discriptive analysis of the variables**

	Mean	Median	Mode	Std. Deviation	Minimum	Maximum
Urban green space usage	4.14	4.20	4	.605	2	5
Accessibility	3.85	4.00	4	.599	1	5
Vegetation quality	4.01	4.20	4	.915	1	5
Urban density	4.22	4.20	4	.621	1	5
Safety perception	4.12	4.20	4	.603	2	5

Source :; Survey data analysis (2025).

In case of accessibility an average of 3.85 indicates an overlying consensus from the respondents on the statements that accessibility to urban green spaces is good. Both the median and mode recorded are 4, further confirming an agreement. There was very low dispersion, 0.599 being the standard deviation from strongly disagree to strongly agree, few disagreements were thus evidenced.

For the vegetation quality the mean of 4.01 reveals that the general agreement is on the quality of good vegetation. The media and mode stand at 4.20 and 4, respectively, confirming this trend. However, a higher standard deviation of 0.915 reflects greater variation of opinion, as scores range from strongly disagree to strongly agree.

Results revealed that responses reporting perceptions about urban density suggest strong agreement, with a mean score of 4.2. The median and the mode are both at 4.20 and 4 respectively, giving it more strength. With a standard deviation of 0.621, there is low variability with responses quite closely in between partly disagree and strongly agree.

Upon safety perception the mean score of 4.12 represents that respondents generally agree on the safety of the urban green space. The median level is 4.20 and the mode is 4, signifying consensus where a low variation of 0.603 insists that the responses differ between disagree and strongly agree.

### 4.5 Correlation Analysis

The Pearson correlation analysis shows the varied relationship of UGS usage with independent variables (Table 5).

In the case of Accessibility, the correlation coefficient comes out to be 0.595, showing a strong positive relation, and thus with better accessibility, the usage of urban green space is high. Vegetation quality has a value of 0.660, showing again a strong positive relationship, which means higher vegetation quality increases the usage of urban green space. Likewise, the urban density correlation is 0.624; this shows it

has a strong positive relation; hence, the higher the urban density, the greater the use of green space would be. In contrast, the safety perception yields a value of 0.065, hence this variable holds no significant importance to the usage of the urban green space as it falls close to zero and hence has a value more than 0.05 significant value.

**Table 5. Pearson correlation coefficient values.**

		Urban green space usage
Accessibility	Pearson Correlation	.595**
	Sig. (2-tailed)	.000
	N	100
Vegetation quality	Pearson Correlation	.660**
	Sig. (2-tailed)	.000
	N	100
Urban density	Pearson Correlation	.624**
	Sig. (2-tailed)	.000
	N	100
Safety perception	Pearson Correlation	.065
	Sig. (2-tailed)	.519
	N	100

Source: Survey data analysis (2025).

**4.6 Multicollinearity Statistics**

All the results from the multicollinearity statistics are within acceptable limits, reflecting no multicollinearity issues severe enough to raise concerns. Usually, VIF is considered to be acceptable if it is less than 10, and the tolerance above 0.1 is acceptable. Safety perception has the highest tolerance with 0.984 and the lowest VIF at 1.017, reflecting very low multicollinearity. Tolerance and VIF values for these variables are as follows: 0.742 and 1.348 for vegetation quality, 0.608 and 1.646 for urban density, and 0.562 and 1.779 for accessibility. From the above values, it would appear that each predictor variable is sufficiently independent, thus allowing for reliable multiple regression.

**4.7 Multiple Regression Analysis**

The multiple regression analysis indicates the model fit overall and prediction capability. According to the results, from the  $R^2$  of 0.780, there is a strong positive relationship between predictors such as accessibility, vegetation quality, urban density, and safety perception on one side and the dependent

variable, UGS usage. Applying a given R square which is 0.609 value means that it explains 60.9 percent of UGS usage variance as anticipated by predictors that stand to mean its strong explanation or goodness-of-fit measures of the overall model and by the values through  $F = 36.950$  with the significance level of  $0.000$ ; stating its overall significant nature, in particular implying that as the predictors of UGS uses are considered conjointly explaining the variations are reliable. The Durbin-Watson statistic is 1.696, showing that residuals are independent, hence with minimum autocorrelation. Overall, this is a strong and well-fitting model, as viewed from the significant F-test with a high value of  $R^2$ .

**Table 6. Regression coefficient results**

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
1 (Constant)	.549	.403		1.365	.176
Accessibility	.205	.086	.203	2.375	.020
Vegetation Quality	.283	.049	.428	5.751	.000
Urban Density	.311	.080	.320	3.882	.000
Safety Perception	.084	.065	.084	1.301	.196

**a. Dependent Variable: Urban Green Space Usage**

Source: Survey data analysis (2025).

The Table 6 shows the results of the regression coefficient. Accordingly, accessibility, having an unstandardized coefficient of 0.205 ( $\beta = 0.205$ ) with a standard error of 0.086, realizes a t-value of 2.375. This value goes with a significance level of 0.020, which is below 0.05 ( $P < 0.05$ ) and is therefore significant, and indicates that accessibility is positively related to UGS usage. As the accessibility to urban green space goes up, this space tends to see more usage.

The unstandardized coefficient for vegetation quality is high at 0.283 ( $\beta = 0.283$ ), while the standard error is 0.049. The t-value stands at 5.751, while the significance level is 0.000 ( $P < 0.05$ ); therefore, it is highly significant and positively related to UGS usage. This implies that better vegetation quality goes along very strongly with increased usage of urban green spaces. It is also evident that urban density shows a strong positive relationship, with a coefficient of 0.311 ( $\beta = 0.311$ ) and a standard error of 0.080. The t-value and significance level are 3.882 and 0.000 ( $P < 0.05$ ), respectively; further providing

evidence that the factor of urban density significantly affects the usage of urban green spaces. On the other hand, the unstandardized coefficient for safety perception is 0.084 ( $\beta = 0.084$ ),  $t=1.301$ , and a significance level of 0.196, which is above 0.05 ( $P > 0.05$ ). This variable is insignificant in explaining the usage of urban green space.

The regression results indicate that accessibility ( $\beta = 0.205$ ,  $t = 2.375$ ,  $p = 0.020$ ) has a positive and statistically significant effect on urban green space (UGS) usage, suggesting that improved ease of access contributes to increased park utilization. Vegetation quality ( $\beta = 0.283$ ,  $t = 5.751$ ,  $p < 0.001$ ) emerged as a highly significant predictor, demonstrating that well-maintained and aesthetically pleasing green environments strongly encourage park use. Urban density ( $\beta = 0.311$ ,  $t = 3.882$ ,  $p < 0.001$ ) also shows a significant positive relationship with UGS usage, indicating that residents in densely populated areas are more likely to rely on public green spaces, possibly due to limited private outdoor areas. In contrast, safety perception ( $\beta = 0.084$ ,  $t = 1.301$ ,  $p = 0.196$ ) was not statistically significant ( $p > 0.05$ ), implying that, within this sample, safety concerns did not play a decisive role in determining park usage compared to the other predictors.

## 5. Discussion

### 5.1 Key Drivers of Galle Urban Park Usage

The most significant factor that affects park usage was urban density, with a mean of 4.14, showing a strong trend of usage. This would appear to indicate that the greater the density of the urban surroundings in which one lives, the higher the usage of the park. As urban centers continue to grow and expand, green spaces such as parks offer critical recreational options for city residents. In relation, vegetation quality was also another significant predictor of usage at a mean of 4.01. From this result, it can be confirmed that participants strongly agreed that parks with high vegetation quality, such as well-maintained lawn areas with diverse plant species and clean surroundings, would attract more users. This result is supported by previous studies, such as Zhang et al.[01], which indicate that well-maintained green spaces encourage people to spend more time outdoors, especially in urban settings.

Also, accessibility has become an essential determinant of park usage, which scored 3.85 on average. The participants attached high value to the factors that enabled easy accessibility of the park on foot, by public transportation, or a vehicle. According to Terefe & Hou [02], comfort in traveling to a park is a crucial determinant for the use of the park, and this

was reflected in our study. Long time taken to travel or accessibility issues was considered a barrier for park usage. This further explains that a suitably planned infrastructure of transportation is required for accessibility of the urban parks among all the residents, especially for the people living in highly populous neighborhoods.

The result on the influence of safety perception on the use of the parks was lower, hence having a weaker relation with the real pattern of use. The mean for safety was 3.60, showing that there is a moderate level of agreement on the safety of the park. Nevertheless, this study has not found that safety is perceived as a major factor in hindering them from making use of the park. This challenges the thought that generally, safety is the central issue regarding the use of urban parks. Indeed, this may be related to studies, such as Gozalo et al. [24], which indicated safety is very context-dependent and perhaps less important a determinant within some urban park settings, especially for areas that are entirely covered by low-crime areas. While safety cannot be taken completely off from being a usage factor, it would thus seem that other factors, such as accessibility and the quality of the green space, become more fundamental for users in urban parks.

### 5.2 Impact of Key Factors on Park Usage

Building from the second research objective, the section outlines the relationship that exists between accessibility, vegetation quality, urban density, and UGS usage. From the correlation and regression analysis, the following results were deduced focusing on the relationship between variables in terms of strength.

Correlation analysis revealed positive associations of park usage with accessibility ( $r = 0.595$ ), vegetation quality ( $r = 0.660$ ), and urban density ( $r = 0.624$ ). These validate the perception that the easier the access, the better the quality of green space and the surrounding urban environment, and the more frequently the green space is used. Similarly, studies such as those by Pinto et al. (2021)[03] identify that accessibility in the context of living closer to green spaces increases the chances of one using them more frequently. Kaymaz et al. (2019)[08] have also echoed that good quality vegetation characterized by trees, flowers, and cleanliness adds aesthetic value to green spaces. As a result, this factor can solely increase the usage of green spaces because such an environment is considered suitable for recreation and leisure activities.

Accessibility in the regression was found to have a coefficient value of 0.205, indicating that a one-unit

increase in accessibility raises one's probability of using parks by 20.5%. This result resonates with what was asserted in Zhang et al. (2015)[01] study that pointed out one of the strong predictors for the frequent utilization of parks was ease of access. One would observe from the value coefficient that vegetation quality, bearing the highest coefficient value of 0.283, exerts the most remarkable influence on using green spaces—it interprets as meaning the better quality the vegetation surroundings are, the more likely people are to go. This also holds with Terefe & Hou, 2024[02], as their research proved the greener and better managed these open areas appear, the higher the number of visits received.

Urban density was related to park utilization:  $\beta = 0.311$ , indicating that the higher the urban density, the more the park will be used. These results align with Xu et al. (2019)[25] suggest that people living in highly dense urban settings tend to have greater needs for public space since they lack private open green spaces. Results indicate that urban planners must be sensitive to both the physical and social contexts when generating green open spaces within any city.

In contrast, safety perception had a very minor effect on park usage:  $\beta = 0.084$ . Although safety is an important factor in the overall design and usage of parks, our findings suggest that this might not be as crucial in comparison with other factors, such as accessibility and condition of the park. This might be explained by the low rate of crime around urban parks, thus agreeing with the arguments of Li et al. (2021) on safety concerns, which are higher in high-crime areas[26].

### 5.3 Implications for Urban Planning

This research will have profound effects on urban planning in Sri Lanka. Few things seem to be as strongly related as accessibility and quality of the vegetation with density, hence urban planners and policymakers need to concentrate attention on improving access to parks and the environmental quality.

First of all, the design of an urban park should be accessible. Accessibility can easily be improved by means of pedestrian walkways, bikeways, and public transportation routes for frequent visits to the parks. Integrating urban transport infrastructure with locations of parks should not isolate the green areas; instead, it becomes part of the greater urban tissue. This would include building highly pedestrian-friendly zones, improved public transportation, and well-planned roadways to the parks.

Secondly, the management of the park should also focus on vegetation quality. Frequent maintenance and landscaping improvements, with more varied and diverse plant species, may add to the aesthetic appeal of urban parks. Sustainable practices like using native plants and organic fertilizers so-called ecological enhancing practices- must also be put into effect to heighten vegetation quality that perpetuates the overall appeal of the park.

Third, it is the density of the urban setting that influences the demand for green spaces. As more and more people settle and expand their urban environments, the demand for public parks will be felt more acutely. In this regard, planners should anticipate further green space demands and make requisite provisions to match demand. This could include creating smaller-scale green spaces within the confines of urban neighborhoods or the conversion of empty lots into usable parks.

The low significance of safety perception in this study is the last in this regard, and further research is needed to understand how safety concerns vary across different urban areas. Indeed, safety is important; however, this study has implied that in low-crime areas, factors such as accessibility and the quality of the vegetation may have more impact on park usage than actual safety concerns.

Urban park usage in Galle is primarily driven by vegetation quality, urban density, and accessibility, while safety plays a minor role. Policymakers and planners should prioritize enhancing green space quality, ensuring connectivity, and integrating parks within dense neighborhoods. Future research should explore usage patterns in other mid-sized Sri Lankan cities, considering temporal, social, and cultural factors, to inform evidence-based urban planning.

### 5.4 Limitations and Future Directions

Despite the valuable insights this study has provided, there are several limitations that need to be acknowledged. One major limitation is the sample size. Though the survey had a respectable number of participants, it was limited to those living in the vicinity of urban park. Thus, findings may not be generalized for other urban areas in Sri Lanka, where park usage patterns may vary according to local context, demographics, and infrastructure. This will also be extended to include different urban settings in Sri Lanka for a wider representation of perspectives.

In addition, the relatively small sample size may have limited the statistical power of the analysis,

particularly detecting more subtle relationships among variables. The choice of on-site sampling and the use of a structured questionnaire were intentional, as the study aimed to capture real-time perceptions and experiences of actual park users. However, this approach may have excluded non-users or infrequent users who face accessibility, time, or mobility constraints, thereby introducing a degree of selection bias into the sample. As a result, the findings primarily reflect the perspectives of active park users and may underrepresent barriers experienced by marginalized or less mobile population groups.

Another limitation of this study is that it is based on self-reported data. While questionnaires are appropriate to obtain opinions from the participants, they may also be subjected to biases like social desirability bias or recall bias. In the future, further studies may consider complementing the survey method with objective measures of the actual use of parks, such as foot traffic analysis or GPS tracking. Despite these limitations, questionnaire-based surveys remain a widely accepted and effective method in urban green space research for examining perceptual and behavioral dimensions, particularly in contexts where large-scale observational or sensor-based data are not readily available. Nevertheless, triangulating self-reported responses with observational or spatial data could improve the robustness and validity of future findings.

It also did not consider such moderate variables as socioeconomic status, education, or time of day in which visits take place. These would be additional factors to consider that could influence variation in park use. Further research may look at these variables to offer a fuller understanding of how people use urban parks.

Additionally, since the study was confined to one park of Galle alone, it does not reflect the diverse complexities of urban parks in many different parts of Sri Lanka. Future research can be conducted at different parks and also explore contextual variables such as neighborhood safety, local culture, and resources valued by local people that might influence park use. Similar studies should be conducted in other medium-sized cities, incorporating interviews and focus groups alongside surveys. Longitudinal research can track changes over time, while exploring socio-economic, educational, and cultural factors can inform inclusive urban planning. GIS mapping, foot traffic analysis, and sensor data can provide objective insights to identify underutilized areas and improve park accessibility and engagement. Comparative studies across multiple cities would further enhance the generalizability of

findings and support national-level urban green space planning.

Finally, the cross-sectional nature of this study limits the ability to establish causal relationships between influencing factors and urban green space usage, highlighting the need for longitudinal and mixed-methods approaches in future research. Such approaches would allow researchers to examine changes in park use behavior over time and better understand cause–effect relationships.

## 6. Conclusion

This research assessed factors influencing UGS usage, finding that frequent visits (52% visiting 2-3 times weekly) were driven by accessibility, vegetation quality, and urban density, with strong correlations (0.595, 0.660, and 0.624, respectively). While safety perception showed no significant impact, regression analysis confirmed accessibility, vegetation quality, and urban density as key predictors, explaining 60.9% of usage variance ( $R^2 = 0.609$ ). Weak accessibility reliability (0.527) contrasted with high scores for vegetation quality (0.918) and urban density (0.894), highlighting the importance of improving these factors to boost UGS utilization. It highlights accessibility and vegetation quality as key drivers of park use, aligning with global research on green infrastructure's role in promoting physical activity, mental health, and social interaction. Enhancing urban park requires regular maintenance, planting diverse native vegetation, and creating smaller green spaces in dense urban areas to meet recreational needs. Incorporating green infrastructure into the city's master plan alongside development and engaging local communities in planning and management will promote ownership, usage, and balanced urban growth. Emphasizing the integration of green spaces into dense urban areas, the study offers policy guidance for sustainable, inclusive urban green spaces, contributing to healthier environments and supporting broader sustainable development goals.

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