

# The Impact of Security Perception Regarding the Existence of Information and Communication Technology on Public Space Utilization: The Case of Kalbu Palem Park, Bandung, Indonesia

Heru Purboyo Hidayat Putro <sup>a</sup>, Sri Maryati <sup>a</sup>, Petrus Natalivan Indradjati <sup>a</sup>, Andy Malik <sup>b,\*</sup>

<sup>a</sup> School of Architecture, Planning, and Policy Development, Institute Technology of Bandung, Bandung, 40132, Indonesia

<sup>b</sup> Urban and Regional Planning, Sam Ratulangi University, Manado, 95115, Indonesia

Corresponding author: \*andymalik@unsrat.ac.id

**Abstract**— The existence of the rise of public space, especially with the presence of information and communication technology (ICT) causes direct interaction between individuals overlapping in terms of public space utilization. Even several studies show that the presence of ICT makes it a new public space that presents features of social interaction between individuals and groups. The impact of the development of ICT can reduce the urge of people to use the park, even though the research does not show a relationship between the security perception of the community with the utilization of parks as part of urban public space. Previous studies showed that the community's utilization of parks is based on social functions related to security perceptions, specifically towards ICT presence. The analysis results show that the higher the frequency of community visits to the park, the lower the duration of park use. This study also found that the higher the utilization of ICT in the park, the higher the frequency and duration of visits the park. This research argued the previous research statement, which states that the utilization of ICT reduces the utilization of using the park as public spaces. This research contributes to the management of urban public spaces such as public parks concerning the existence of information and communication technology that can encourage the utilization of public space by the local community.

**Keywords**— Parks; security perception; information and communication technology.

Manuscript received 15 Feb. 2021; revised 21 May 2021; accepted 29 Jun. 2021. Date of publication 31 Aug. 2022.  
IJASEIT is licensed under a Creative Commons Attribution-Share Alike 4.0 International License.



## I. INTRODUCTION

Parks are absolute physical (physical, tangible, visible) public spaces that have a variety of functions related to ecological, aesthetic, recreational, social, educational, and economic functions [1], [2]. The presence of parks as part of public space in the context of urban planning and design should take a strategic role in supporting and strengthening city security [3].

This research will focus on the existence of parks related to their social functions. The social function of parks is a vital function of parks that can provide strong ties individually as well as interactions with the environment and community. It also has a role in reducing social problems (including urban crime) by strengthening the knot of social ties between urban communities that can increase public awareness of urban environmental conditions (increasing public awareness of the urban environment) [4], [5].

Associated with its social function, the park is still needed to represent the needs of the whole community for urban communities both individually as a "place of retreat" (a place to reflect and interact with the natural environment) and as a place where interaction between communities (communities) in the urban environment which can create a binding social node in society through social interaction (place of interaction) for urban sustainability [6]. Parks should be a space for people to express creativity and daily spontaneity, both individuals and groups, free of cost, free of fear, free from physical barriers, open to various groups, including the poor, and can improve relations between urban communities because of the activities that occur in it [7].

Previous studies of "the end of public space" [8], [9] have not been able to explain the correlation between the perception of community security related to the decrease in the drive to use parks as a social function. According to Rutha and Abbas [10], the success of public spaces (parks) depends on their ability to create a sense of security in the community,

it means that the sense of security that is presented by public spaces improves the quality of life of the community is an important goal that needs to be considered in the planning process and designing urban public spaces to overcome social threats such as conflicts and crime.

Information and communication technology should provide a sense of security for the community in the park. Even though the availability of information and communication technology through free *wi-fi* in the park is one of the attractions of the people using the park, there was a vulnerability to free internet access facilities in public spaces, including parks. Insecurity in accessing information using information technology should be a concern in providing information communication and technology (ICT) in the park. The existence of information and communication technology, according to Mouratidis [11], also shows the impact of the development of information and communication technology can reduce the urge of people to use the park, even though his research does not show a relationship with the perception of community security with park use. The research shows a shift in social activities that can change patterns of community interaction and the use of space in the future. Mouratidis [11] statement is different from Nouri et al. [12] which states that management in the public space needs to intervene with the provision of infrastructure in the form of ICT to increase the incentive for public visits to public spaces. According to Nouri et al. [12], the role of ICT needs to get the attention of planners and designers of public spaces so that the availability of public spaces in parks should create a sense of security for its users. ICT penetration in public open space management allows a new experience in experiencing hybrid space for park users [13], [14], [15], [16]. However, the previous research only explained the benefits and contributions of ICT to the existence of public space and has not been able to explain. The discussion has not shown the extent to which the encouragement of park use is based on security perceptions regarding the existence of ICT in the

management of urban public spaces, especially parks. Hence, the purpose of this research will elaborate on security perceptions of the urge of park utilization related to the existence of ICT.

## II. MATERIALS AND METHOD

The location of the park which is the study area is Kalbu Palem Park; this park is active and conducive in the middle of the location of residential settlements in Subdistrict 13 Sekeloa urban village, Coblong sub-district, Bandung city, West Java Province, Indonesia, which was inaugurated on January 31, 2018, with an area of 485 m<sup>2</sup>. From various spatial development policy directives in the Coblong sub-district, it is stated that this area requires intensive control regarding the use of existing land, especially for community settlements. Nevertheless, the Coblong sub-district has the potential to develop in other zones such as education, trade, public service facilities, and green open space.

### A. Quantitative methods as the main approach in research

Various studies related to the method used, mostly using quantitative methods with sample collection techniques that are tailored to the needs of research to be conducted [17], [18]. The quantitative approach will produce statistics through the use of large-scale survey research, using methods such as questionnaires and structured interviews [19]. According to Harrison et al [20], quantitative research is a method for testing certain theories by examining the relationships between variables accompanied by assumptions to prevent bias, control alternative explanations, and generalize and re-apply their findings. Although this research is a large scale, contact with the community is faster than qualitative research. Using both descriptive and inference statistical analysis also adds to the characteristic that this study uses quantitative methods as the main method [21].

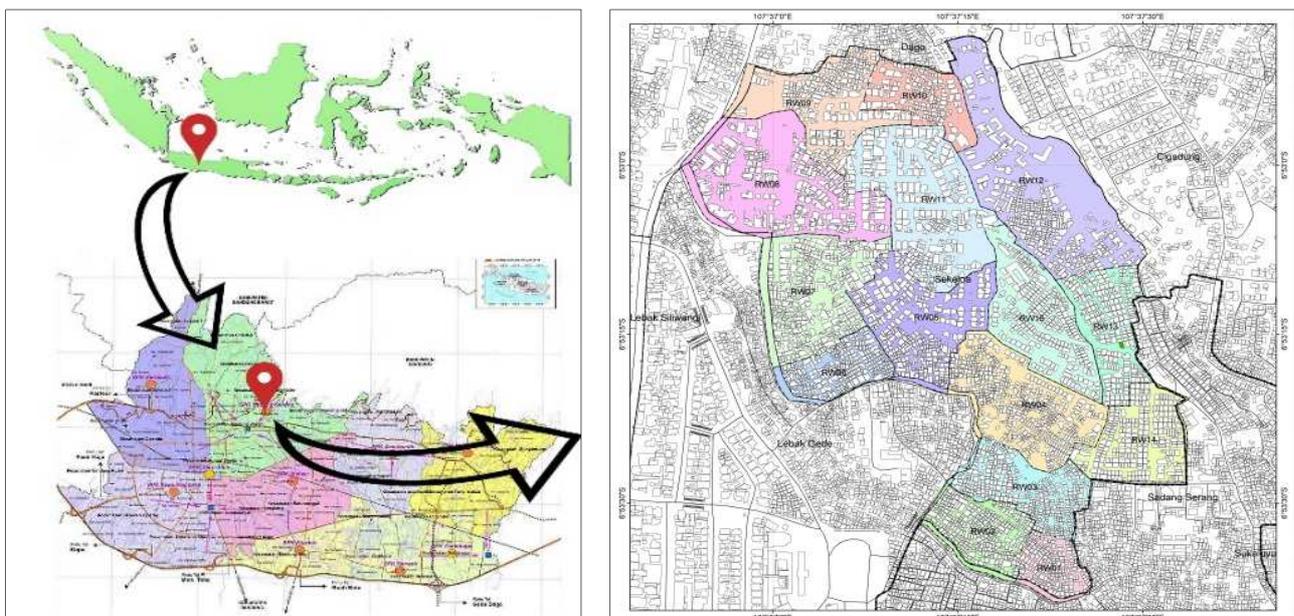


Fig. 1 Map of study location boundaries in Sekeloa urban village in Coblong sub-district, Bandung city, West Java province, Indonesia

For the use of the questionnaire, this study uses a closed-ended questionnaire. This is done to explore perceptions of park use and the impact caused by technology, for variables on filling the questionnaire using a Likert scale of 5 categories with a scale of 5 (highest) to scale 1 (lowest). This quantitative research is used because the research process carried out is deductive based on the synthesis of previously established theories. This research will later explain the causes of social phenomena through objective measurement and numerical analysis (statistics).

To find the relationship between variables and analysis of related factors, multiple regression analysis techniques were used. The data collection results on 411 respondents in 9 Hamlet (Hamlet 1 to 4 and Hamlet 11-15) in Sekeloa urban village. The data processing stage until the analysis stage of this research are:

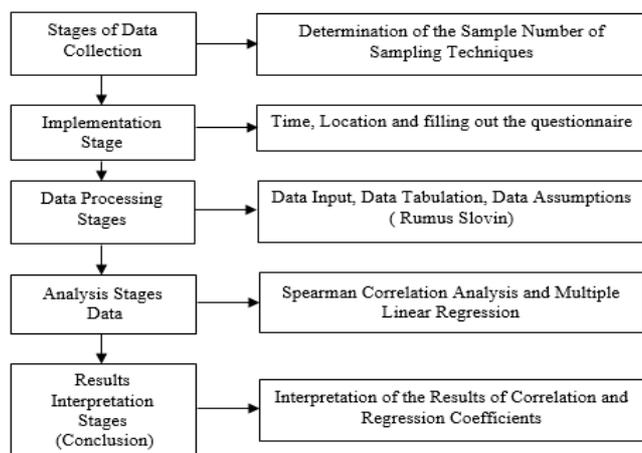


Fig. 2 Stages of data processing in research

Before the Spearman analysis, the first analysis was carried out a normality test to check the data distribution of the frequency and duration of park utilization, followed by the Spearman analysis stage. Correlation analysis to determine the relationship between the frequency and duration of park use by using the purposive sampling technique; sampling is done by directly visiting the homes of the people who can be found to fill out a questionnaire (if the household is willing to fill in) which then if they are willing to be asked. Whether the respondent has visited the park or not, based on the results interpretation guidelines put forward by Meloncon and Amant [22], as follows:

TABLE I  
GUIDELINES FOR INTERPRETATION OF CORRELATION COEFFICIENT

Correlation coefficient	Interpretation
0-0.25	very low relationship; very weak (very weak)
0,26– 0,50	low but definite (weak) relationship
0,51 – 0,75	significant relationship (strong enough)
0,76 – 0,99	high relationship; strong
1,00	very high relationship; very strong; reliable (very strong)

The second analysis uses multiple linear regression analysis by placing ICT use activities as independent

variables and encouraging garden use represented by frequency and encouragement to use parks [23]. The following are the independent and dependent variables that are the unit of analysis in this study.

TABLE II  
THE INDEPENDENT AND DEPENDENT VARIABLES ARE RELATED TO THE PARK UTILIZATION BASED ON SECURITY PERCEPTIONS RELATED TO THE EXISTENCE OF INFORMATION AND COMMUNICATION TECHNOLOGY

No	X (Independent variables)
1	Availability of ICT in the park
2	Availability of ICT outside the park
<b>Activities in the use of ICT that make me feel insecure in the park</b>	
3	a. Information
4	b. Socialization
5	c. Buy and sell
6	d. Others
<b>Obstacles that make me feel unsafe in using parks: related to the use of ICT in the park</b>	
7	a.Hacking (theft and misuse of data and information)
8	b.Security system that is not guaranteed (easy entry of viruses and so on)
9	c.Poor control and maintenance of ICT
10	d.Others
11	Duration (time) of the use ICT outside the park in a day (minutes)
12	Duration (time) of the use of ICT in the park in a day (minutes)
<b>Y (Dependent variables)</b>	
1	Frequency of park use
2	Duration of park use

### B. Multiple Linear Regression Analysis

The multiple regression analysis examines the relationship between the drive to park based on security perceptions related to the existence of information and communication technology. The sampling method used in this study is purposive sampling. This method was chosen by looking at the sample used in the user community around the park location. In this case, the population used is a limited population where not all populations within the service radius are sampled in the study. The purpose of the sample and population is as a source of data and as a tool to generalize the characteristics of relationships in proving hypotheses or propositions that represent populations. The questionnaire was converted into a Microsoft office excel file and performed using IBM Statistical Package for the Social Sciences (SPSS) version 22 software. Sampling time was conducted from January 2020 to March 2020.

The determination of frame samples using the Slovin formula:

$$n = \frac{N}{1+N \times e^2} \quad (1)$$

Information:

*n*: number of samples

*N*: Total population

*e*: error tolerance limit used (error tolerance 5%)

The Slovin formula is used when the unit knows the population in the study area of analysis is individuals in settlements around the park location [24]. For the location of Kalbu Palem Park, the population in Sekeloa was 25,699

people in 2018, with 411 questionnaire respondents distributed to 9 sub districts.

The analysis used after data retrieval through questionnaires is by using multiple linear regression analysis (multiple linear regression) in which there are simultaneous hypotheses (F test) and partial hypotheses (t-test). Multiple linear regression analysis is a method that functions to analyze the effect of a series of independent variables that number more than one on the dependent variable. The dependent variable (Y1) in this study was the frequency of visiting the park and the duration of being in the park (Y2). The independent variables related to ICT are the availability of ICT inside and outside the park, activities related to the existence of ICT, the constraints of using ICT, and the length of use ICT both inside and outside the park.

In the analysis of multiple linear regression, the amount of influence contributed by each independent variable to the dependent variable can also be analyzed by looking at the coefficient of determination (CD/R-square), both simultaneous CD and Partial CD. In the simultaneous hypothesis test (F-test), the test results are declared significant (reject H0) if the calculated F value is greater than the F table

value, or the obtained probability value (p-value) is smaller than  $\alpha$  (0.05).

Significant simultaneous hypothesis test results indicate that the independent variables simultaneously have a significant effect on the dependent variable. Likewise, with the partial hypothesis test (t-test), the results of the partial hypothesis testing are declared significant (reject H0) if the absolute value of t calculated is greater than the absolute value of t table, or if the obtained probability value (p-value) is smaller from  $\alpha$  (0.05). Significant partial hypothesis test results indicate that the independent variables tested partially have a significant effect on the dependent variable.

### III. RESULTS AND DISCUSSION

Based on table 3, most respondents use the park 3-4 times a week, where the conditions are evenly distributed for respondents in all sub-district. Based on table 4, it is known that the majority of respondents visited the park for 16-30 minutes each time, where the conditions were evenly distributed for the majority of respondents in all sub-districts.

TABLE III  
THE NUMBER OF RESPONDENTS BASED ON THE FREQUENCY OF PARK UTILIZATION PER SUB DISTRICT

Frequency of Using the Park	Sub District										Total
	1	2	3	4	11	12	13	14	15		
Once a month	0	1	1	0	0	1	1	0	0	4	
1-2 times a week	16	14	25	16	13	12	13	15	15	139	
3-4 times a week	25	21	27	25	21	24	19	21	23	206	
Almost everyday	8	6	10	7	6	7	7	6	5	62	

TABLE IV  
THE NUMBER OF RESPONDENTS BASED ON THE DURATION OF PARK UTILIZATION PER SUB-DISTRICT

Duration of visit in the park	Sub-district										Total
	1	2	3	4	11	12	13	14	15		
< 15 minute	5	4	5	5	4	4	6	7	7	47	
16-30 minute	20	18	23	19	17	18	14	12	12	153	
31-45 minute	13	13	20	12	9	13	10	8	5	103	
46-60 minute	7	4	12	7	7	6	5	10	12	70	
> 60	4	3	3	5	3	3	5	5	7	38	

Before conducting the first analysis of table 3 and table 4 using the Spearman correlation, the normality test was carried out with the results in table 5, which shows with a total of 400 respondents, a normality test between frequency and duration was carried out, the results obtained were, the significance value was 0.000 or below 0.5. It can be said that data can be continued at the next analysis stage using the Spearman correlation.

TABLE V  
DATA TEST OF NORMALITY

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Frequency	.289	400	.000	.711	400	.000
Duration	.293	400	.000	.815	400	.000

a. Lilliefors Significance Correction

The results of the Spearman correlation analysis of table 3 and table 4 in table 6 below show that the sig value is obtained. (2-tailed) of 0.349 (> 0.05), it can be concluded that

the frequency variable has no significant relationship with the duration variable. The correlation coefficient value is negative at -0.047. It can be concluded that the direction of the relationship between the two variables is not unidirectional. This means that if the frequency increases, the duration will decrease. The correlation coefficient value is negative at -0.047, so it can be concluded that the level of the relationship between the two variables (frequency and duration) has a strong enough relationship.

TABLE VI  
SPEARMAN CORRELATION TABLE BETWEEN THE FREQUENCY AND ENCOURAGEMENT OF PEOPLE USING PARKS

		Frequency	Duration
Spearman's rho	Frequency	1.000	
	Correlation Coefficient		-.047
	Sig. (2-tailed)		.349
Duration	N	400	400
	Correlation Coefficient	-.047	1.000
	Sig. (2-tailed)	.349	
	N	400	400

Based on Table 7, it is known that overall, the average respondent spent 68.99 minutes using information and communication technology outside the park in a day. Similarly, respondents in each sub-district spent between 60 and 75 minutes a day using information and communication technology outside the park, with the highest duration reaching sub-district 15 (74.72 minutes) and the lowest duration reached by sub-district 01 (60.94 minutes).

Based on Table 8, it is known that overall, the average respondent spent 16.89 minutes using information and communication technology in the park in a day. Similarly, respondents in each sub-district spent between 13 and 22 minutes a day using information and communication technology in the park, with the highest duration reaching sub-district 4 (21.81 minutes) and the lowest duration reached by sub-district 2 (13.02 minutes).

TABLE VII  
DURATION (MINUTES) USE OF ICT OUTSIDE THE PARK

	Average Per Sub District (minute)										Total
	1	2	3	4	11	12	13	14	15		
Duration (time) of the use of ICT in the park (minutes)	61	71	67	68	71	66	69	73	74	74	69

TABLE VIII  
DURATION (MINUTES) USE OF ICT INSIDE THE PARK

	Average Per Sub District (minute)										Total
	1	2	3	4	11	12	13	14	15		
Duration (time) of the use of ICT outside the park in a day (minutes)	18	13	15	22	18	16	19	16	16	16	17

TABLE IX  
THE IMPACT OF THE USE OF ICT (X) ON THE FREQUENCY OF PARK UTILIZATION (Y1)

	B	Beta	t-value	p-value	Corr	PCD
(Constant)	3,832		32.334	0,000		
Duration (time) of use of ICT in the park	0,008	0,111	2,280	0,023	0,108	0,19%
F-Stat (p-value)	0,000					
R-Square	0,19%					

Independent Variable: X  
Dependent variable: Y1  
Regression Method: Stepwise

Number of Variables X: 12  
Significant Variables: 1

TABLE X  
THE IMPACT OF THE USE OF ICT (X) ON DURATION OF VISIT IN THE PARK (Y2)

	B	Beta	t-value	p-value	Corr	PCD
(Constant)	4,026		20,468	0,000		
Duration (time) the use of ICT in the park in a day (minutes)	-0,013	-0,177	-3,72	0,039	-0,102	0,18%
F-Stat (p-value)	0,000					
R-Square	0,18%					

Independent Variable: X  
Dependent variable: Y2  
Regression Method: Stepwise

Number of Variables X3:12  
Significant Variables: 1

The results of this second analysis indicate that the variable duration of visits to parks is a variable that influences perceptions of security to increase community encouragement using parks related to the existence of ICT but has no relationship with the frequency of visits to parks. Therefore, efforts are needed to manage, regulate and inform the existence of public spaces within an urban area so that people know their location through social media or digital information in the form of bookmarks and urban design elements. The results of this second analysis also provide

The results of the second analysis using multiple linear regression analysis in table 9 show that from 12 variables, the use of ICT (X), which has a significant influence on the frequency of using the park (Y1), only one variable is the length of time the use of ICTs in the park, with the effect contributed by 0.18%. This means that an increase in ICT use in the park will further increase the frequency of visits to the park.

Based on Table 10, it is known that of the 12 variables of the use of ICT (X), which have a significant influence on the length of visits to the park (Y2), only one variable is the length of time the use of ICTs in the park, with the effect contributed by 0.19%. This means that an increase in ICT use in the park will further increase the length of visits to the park.

recommendations for the results of the first analysis in increasing the duration of visits to parks, although, in terms of frequency of visits to parks, efforts to increase the frequency of community encouragement to parks need to be researched further.

#### IV. CONCLUSION

This research will elaborate on security perceptions of the urge of park utilization related to the existence of ICT. This

study produces a view of the security perceptions of urban communities that explain the impact of the existence of ICT on the urge to use parks from previous studies that have not explained the impact. This research explains that based on the first result, the higher the frequency of visits to the park, the decreased the duration of park use. The existence of ICT in the second result shows that the frequency of visiting the park and the length of visit in the park that only the length of the utilization of ICT inside the park correlates with an increase in the frequency and length of visits in the park. This also means that security perceptions of ICT use and encouragement to use parks have a significant and direct correlation. The higher the utilization of ICT in the park, the higher the frequency and duration of visits to the park, but in this research, statement states that the utilization of ICT reduces the park utilization. This study also contributes to the presence of ICT in urban management, especially public space planning, especially parks, in providing an attraction for increasing the duration of visits to parks.

#### ACKNOWLEDGMENT

We thank the city government of Bandung and the Sekeloa Sub-District Office for permitting to survey and data in the form of information related to this research.

#### REFERENCES

- [1] R. C. De Leon and S. M. Kim, "Stakeholder perceptions and governance challenges in urban protected area management: The case of the Las Piñas – Parañaque Critical Habitat and Ecotourism Area, Philippines," *Land use policy*, vol. 63, no. April 2017, pp. 470–480, 2017, doi: 10.1016/j.landusepol.2017.02.011.
- [2] A. Hajzeri, "The management of urban parks and its contribution to social interactions," *Arboric. J.*, vol. 00, no. 00, pp. 1–9, 2020, doi: 10.1080/03071375.2020.1829373.
- [3] I. Matijosaitiene and A. Petriashvili, "Urban Planning and Design for Terrorism Resilient Cities," *J. Sustain. Archit. Civ. Eng.*, vol. 18, no. 1, pp. 27–38, 2017, doi: 10.5755/j01.sace.18.1.15443.
- [4] I. Anguelovski, J. J. T. Connolly, M. Garcia-Lamarca, H. Cole, and H. Pearsall, "New scholarly pathways on green gentrification: What does the urban 'green turn' mean and where is it going?," *Prog. Hum. Geogr.*, vol. 43, no. 6, pp. 1064–1086, 2019, doi: 10.1177/0309132518803799.
- [5] W. Klein, M. R. Dove, and A. J. Felson, "Engaging the unengaged: Understanding residents' perceptions of social access to urban public space," *Urban For. Urban Green.*, vol. 59, no. December 2020, p. 126991, 2021, doi: 10.1016/j.ufug.2021.126991.
- [6] J. W. Whiting, L. R. Larson, G. T. Green, and C. Kralowec, "Outdoor recreation motivation and site preferences across diverse racial/ethnic groups: A case study of Georgia state parks," *J. Outdoor Recreat. Tour.*, vol. 18, no. October 2015, pp. 10–21, 2017, doi: 10.1016/j.jort.2017.02.001.
- [7] M. Hobbs *et al.*, "Access and quality of parks and associations with obesity: A cross-sectional study," *SSM - Popul. Heal.*, vol. 3, no. July, pp. 722–729, 2017, doi: 10.1016/j.ssmph.2017.07.007.
- [8] F. Freitag, "Critical theme parks: Dismaland, Disney and the politics of theming," *Continuum (N. Y.)*, vol. 31, no. 6, pp. 923–932, 2017, doi: 10.1080/10304312.2017.1310180.
- [9] D. Mitchell, "People's Park again: on the end and ends of public space," *Environ. Plan. A*, vol. 49, no. 3, pp. 503–518, 2017, doi: 10.1177/0308518X15611557.
- [10] N. M. H. Rutha and S. S. Abbas, "The Role of Technology in Enhancing Place Attachment in Public Place," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 1094, no. 1, p. 012034, 2021, doi: 10.1088/1757-899x/1094/1/012034.
- [11] K. Mouratidis, "Built environment and social well-being: How does urban form affect social life and personal relationships?," *Cities*, vol. 74, no. October, pp. 7–20, 2018, doi: 10.1016/j.cities.2017.10.020.
- [12] Z. Nouri, M. Rafeian, and K. Ghasemi, "Using information and communication technologies to create learning urban public space. (Case study: Central part of Tehran, Iran)," *Habitat Int.*, vol. 87, no. April, pp. 91–98, 2019, doi: 10.1016/j.habitatint.2019.04.002.
- [13] R. Pierdicca, M. Paolanti, and E. Frontoni, "eTourism: ICT and its role for tourism management," *J. Hosp. Tour. Technol.*, vol. 10, no. 1, pp. 90–106, 2019, doi: 10.1108/JHTT-07-2017-0043.
- [14] I. Y. Jian, E. H. W. Chan, and T. Y. P. Yao, "ICT as a solution for the revitalization of public open space in private developments," *Built Environ. Proj. Asset Manag.*, 2020, doi: 10.1108/BEPAM-01-2020-0007.
- [15] C. Smaniotto *et al.*, "CyberParks – The Interface Between People, Places and Technology," 2019.
- [16] Z. Weinstein, "How to humanize technology in smart cities," *Int. J. E-Planning Res.*, vol. 9, no. 3, pp. 68–84, 2020, doi: 10.4018/IJEPR.2020070104.
- [17] S. A. Nitoslawski, N. J. Galle, C. K. van den Bosc, and J. W. N. Steenberg, "Smarter ecosystems for smarter cities? A review of trends, technologies, and turning points for smart urban forestry," *Sustain. Cities Soc.*, vol. 51, no. March, p. 101770, 2019, doi: 10.1016/j.scs.2019.101770.
- [18] G. Kothenz and T. Blaschke, "Urban parks: Visitors' perceptions versus spatial indicators," *Land use policy*, vol. 64, pp. 233–244, 2017, doi: 10.1016/j.landusepol.2017.02.012.
- [19] M. D. Fetters and J. F. Molina-Azorin, "The Journal of Mixed Methods Research Starts a New Decade: The Mixed Methods Research Integration Trilogy and Its Dimensions," *J. Mix. Methods Res.*, vol. 11, no. 3, pp. 291–307, 2017, doi: 10.1177/1558689817714066.
- [20] R. L. Harrison, T. M. Reilly, and J. W. Creswell, "Methodological Rigor in Mixed Methods: An Application in Management Studies," *J. Mix. Methods Res.*, vol. 14, no. 4, pp. 473–495, 2020, doi: 10.1177/1558689819900585.
- [21] B. E. Denham, *Categorical Statistics for Communication Research*. 2016.
- [22] L. Meloncon and K. St. Amant, "Empirical Research in Technical and Professional Communication: A 5-Year Examination of Research Methods and a Call for Research Sustainability," *J. Tech. Writ. Commun.*, vol. 49, no. 2, pp. 128–155, 2019, doi: 10.1177/0047281618764611.
- [23] R. Mafra, "Karakteristik Pengunjung Taman Indah Maskarebet Di Kota Palembang," *Arsir*, vol. 2, no. 1, p. 1, 2018, doi: 10.32502/arsir.v2i1.1234.
- [24] C. Lauer, E. Brumberger, and A. Beveridge, "Hand collecting and coding versus data-driven methods in technical and professional communication research," *IEEE Trans. Prof. Commun.*, vol. 61, no. 4, pp. 389–408, 2018, doi: 10.1109/TPC.2018.2870632.