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RESEARCH ARTICLE

Hierarchy of User's Need for Spatial Organisation in Public Open Spaces

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ABSTRACT

The research aims to identify the hierarchy of users' need for spatial organization in public open spaces of New Delhi by quantifying user preferences to produce a perceptual estimation in conclusion. The research will generate a better understanding of the effective utilization of spatial organization in public open spaces by incorporating the user's perception. The study acquires a qualitative method comprising content analysis as a line of inquiry. Interviews with users from different demographic profiles were conducted in public open spaces in New Delhi. The designed interview questions are based on the hierarchy of needs in which interviewees were asked to answer which attribute of the spatial organization they prefer above others. To analyze the user preferences, 12 interviews were conducted at three distinctive sites in New Delhi. The study concludes that; 'Accessibility and Linkages' and 'Security' are the imminent attributes considered as a basic need for spatial organization in public open spaces of New Delhi, followed by 'Facilities,' 'Uses and Activities,' and 'Microclimate'.

Keywords: Hierarchy of user's needs, Public open space, Spatial organization, User preferences.

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1. Introduction

Public open spaces are vital to cities as they help improve a city's livability, environmental quality, and sustainability (Praliya & Garg, 2019). The city's image and quality of public life are distinctly linked with its public open spaces (Kaplan, 2001). These spaces help improve the city's social aspect, eventually reducing people's mental stress and aggressive conduct (Ulrich, 1981). A suitable public open space enhances people's satisfaction, experience, and perception of environment quality (Peter *et al*., 2010) by providing spaces for activities, relaxation, meditation, social interaction, etc., (Gehl, 1996, 2006; Stephen *et al*., 1992). The designing of public open space involves various elements; among them, spatial organization plays an imminent role (Shafique & Majid, 2020). Therefore, this research investigates the user's preference for spatial organization attributes in public open spaces. Spatial organization stimulates spatial setting, including ordering several elements, like furniture, urban elements, access, etc., in the space (Norberg-Schulz, 1980). It is an act of positioning and developing the spaces incorporating certain norms to attain determined objectives (Ching, 2007). Sartre (1956) elaborated on how people comprehend spatial organization. The individual in place distinguishes space from their perception and evolves this perception from one space to the entire spatial organization. This process generates the 'sense of space' for the user (Sartre, 1956). This certainty causes the users to recognize the space with other spaces around. Therefore, the space could be perceived within the spatial organization of it as harmony for the people (Ebrahimi, 2013). Thus, through sensing and experiencing the elements and patterns of the space, a space can be perfectly perceived. However, spatial organization is delineated as a process of perception in which all the space's pattern and usage is recognized (Ebrahimi, 2013). The spatial organization of public open space has been broadly divided into four significant attributes, including Accessibility and Linkages, Uses and Activities, Facilities (amenities and safety), and Microclimate (landscape and comfort) (Shafique & Majid, 2020). Moreover, 'Accessibility and Linkages' comprises entry/exit to the space, pathway

connection, parking space, and accessibility (Shafique & Majid, 2020). Whereas 'Facilities' includes urban elements, maintenance and security elements (Shafique & Majid, 2020). Besides this, Uses and Activities cover variety and flexibility in activities; conversely, 'Microclimate' consists of landscape elements and comfort (Shafique & Majid, 2020). Despite immense significance, several issues were identified by the authors in the context of public open spaces in India. According to Vanka (2014), the Indian public open spaces are serving recreation to only selected users. However, most of the part of the population are unable to perceive interest. Praliya and Garg (2019) asserted that research all around the world had been accomplished on quality factors of successful public spaces, as numerous projects were held to stimulate the quality of public open spaces in developed countries, while Indian public open spaces are still struggling to get revived as there is no endeavour being done for uplifting public open spaces. Besides this, a weak connection between users and the design offered has been observed in Indian public open spaces (Praliya & Garg, 2019).

Concerning such issues, Studer (1970) defined 'human need' as the most imminent design factor and asserted that ineffectiveness could be observed when 'human needs' are not integrated. To better understand the built environment, the user's needs must be thoroughly investigated (Gifford, 2002) (Rapoport, 2005). Spaces remain left over when they fail to meet the user's needs (Rapoport, 2005). Moreover, the user's need plays an essential role in public open spaces as it defines the utilization of space preferred by people, ultimately resulting in effective design (Carr, 1992). Public open spaces should be used more when unable to accommodate user's needs (Carr, 1992). To determine what motivates individuals, Maslow (1968) presented a theory of the hierarchy of human needs and its significance in daily life. The hierarchy of needs has been categorized into five levels of motivations: physiological needs, safety needs, belongingness and love needs, esteem needs, and self-actualization (Maslow, 1968). His theory examines how an individual's outlook is encouraged by people who want to meet suitable human needs in diverse communities and individuals in society (Maslow, 1968). Thus, this research investigates the hierarchy of users' need for spatial organization in public open spaces as users' motivation in public open spaces is more significant than what is often perceived. The proper approach to achieve it in design can assist in attaining better public open spaces. The information investigated in this research could be used as a basis by the designers, architects, and planners for designing public open spaces in New Delhi. The research findings will also describe the user's problems that need to be rectified.

2. Methods

The research design is based on an on-site study using interviews to obtain the data, which is analyzed through content analysis. The interviews are used as a qualitative method to obtain more evidence concerning their hierarchy of needs and preferences for spatial organization in public open spaces. The three public open spaces that are part of the district centres of South Delhi are selected as the study area, including Saket, Nehru Place, and New Friends Colony. All three sites are from different contexts to get users from diverse demographic profiles.

2.1. Data Collected

The study employs interviews, which are qualitative methods for a better understanding of individuals, thoughts, experiences, wants, etc. Interviews involve extracting information already known to the interviewer and what he/she wants to explore. The researcher can ask what she/he wants to know and what she/he knows but wants to confirm through respondents (Rosenberg, 2006). Therefore, this increases the suitability of the interview in the research, and the researcher's extra efforts are required to get exact expressions from individuals. Among various types of interviews, the structured interview is found more appropriate for the framed objectives of this research. The research objective requires in-depth information regarding the hierarchy of needs and their preferences in public open spaces, which need proper categorization; therefore, this structured interview is more beneficial. In the case of a structured interview, the interviewer can crosscheck the collected data while conducting the interview, which enhances the validity of the answers and the respondent's elaborated answers to enhance the accuracy of the results (Creswell, 2013).

2.2. The Selection of Interviewees

Unlike quantitative analysis, qualitative sample size does not require statistical calculation (Fielding & Fielding, 2008). Moreover, Dunn (2000) asserts that a sample size for interviews is reasonable as far as the examination standard is sufficient. Thus, twelve interviews were conducted with people visiting public open spaces of varied ages and genders to get responses from users of different demography. The interviewee selection was made on the spot, considering that the samples should have an equal number of male/female and age groups. While selecting the interviewee, it has been made sure that the

interviewee has enough time and is willing to answer the questions, as it has been assumed that the whole interview would take 20–30 minutes.

2.3. Data Analysis

For analysing interviews, content analysis has been done to examine the information received from the respondents about their hierarchy of needs and people's preferences. The researcher cautiously extracted the results from respondents' answer scripts to compare their issues and opinions. Further, the research has adopted conceptual content analysis as interviewing questions directly investigating the user's preferences in public open spaces. In this type of analysis, a selected term is considered and involves quantifying and counting its 'frequency of mention.' The main goal is to examine the occurrence of the selected word in the data.

Moreover, it is a procedure for extracting the information and context from the script (Ruhl, 2004). Codes are singled out and attached with attributes of spatial organization in public open spaces. According to Ryan and Bernard (2003), identifying codes/subjects and sub-codes is the initial stage in analyzing texts. While this research requires inspection of its text on needs from least to most, preferred features/activities, etc., for that reason, words are coded using the descriptive coding method as it allocates the nouns, for instance, "parking" and "sitting" (Miles *et al*., 2013). Although respondents would mention words with different meanings, to overcome that, recurrent expressions are recognized and coded to themes like "sit-outs," "benches," "sitting areas," etc. However, only those words are selected under codes whose frequency of mention is more than four times. According to Creswell (2005), only those words should be taken as codes for an analysis whose occurrence is more than four times as it confirms the authenticity of that word in the respective field. Besides this, interview questions are already designed for five different levels of needs; thus, the needs mentioned by respondents in each question will be directly placed into the different levels of needs.

3. Results and Discussion

The collected sample contains an equal number of males and females, i.e., six from each gender in Table I. In addition, three samples from each age group were collected. First, manual coding of significant words was done, and then preferred features were extracted from the interviewees' responses and put in their respective codes. The results were then analyzed using a univariate instrument, i.e., by means and mode. In addition, 'mode' was used to categorize the attributes into five different levels of need, as shown in Fig. 1. While 'mean' is used to examine the order of necessity of need within the same level, which further explains which attribute is most needed in that level of need mentioned in Fig. 2. The attribute with mean value and mode "1" is considered a basic need, while attributes with value "5" are considered the highest-level need.

3.1. Basic Level Need

As per Maslow's (1970) hierarchy of needs, physiological needs (food, water, shelter, etc.) are considered the basic need, which is placed at the bottom of the hierarchy pyramid. According to the findings in the context of public open space, 'Easy entry/exit', 'Enough parking space'; 'Security surveillance', 'Sitting areas' and 'Street lights' are the highest frequency of mentioned need they want in public open space. However, out of these attributes, 'Sitting area' has the lowest mean of (M = 1.08), which means that it is the most basic need preferred by users in public open space, followed by 'Street lights' (M = 1.33), 'Security surveillance' (M = 1.50), 'Enough parking space' (M = 1.58) and 'Easy entry/exit' (M = 1.75). The findings state that apart from 'Functionality' and 'Accessibility', 'Security surveillance' has a maximum frequency of being mentioned as one of the vital basic needs. It includes 'Street lights,' 'Cameras,' 'Security checks,' 'Police both,' etc., in public open spaces. However, out of five different levels of needs, 'Safety need' is placed on the second level from the bottom in Maslow's (1970) hierarchy of needs. According to the interview findings, it has been found that

TABLE I: Demographic Profile of Interviewees

Experiment	Demographic profile of interviewees	Frequency
Gender	Male	6
	Female	6
Age distribution	0–18	3
	18–30	3
	31–50	3
	More than 50	3

Fig. 1. Hierarchy of needs in public open space of New Delhi using mode.

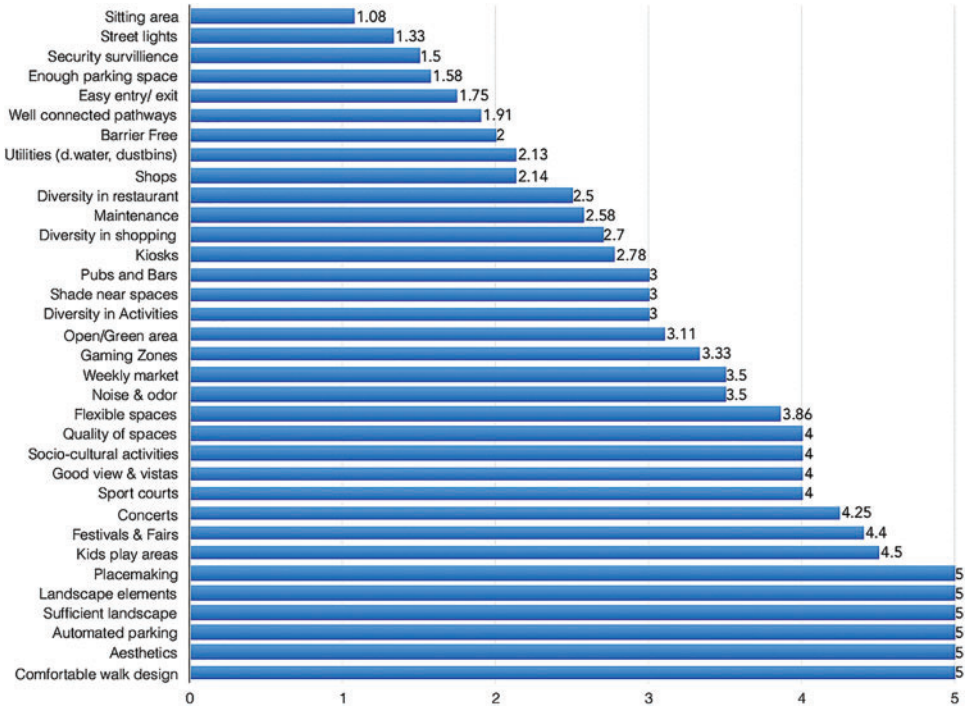

Fig. 2. Hierarchy of needs in public open space of New Delhi using mean.

'Security surveillance' is among the three most basic needs in public open spaces mentioned in Fig. 2. It has been defined that safety needs occur when physiological needs (functionality and accessibility) are gratified (Maslow, 1970). However, in the case of public open space in New Delhi, 'Security surveillance' plays a significant role as a basic need. Responses specified 'Sitting spaces' as part of physiological needs, which must be in public open space. Several interviewees have mentioned that one cannot stand for longer durations as it is essential to rest to rejuvenate themselves.

Further, during the interviews, it has been reported that the primary reason for 'Security surveillance', including 'Street lights', 'Security cameras', 'Police booths', etc., as a basic need is due to the unwanted beggars which mainly creates vandalism and theft. This makes public open spaces intolerant and sometimes detrimental, eventually restricting the user from visiting public open spaces. After 'Security surveillance', 'Parking space' and 'Easy entry/exit' are the basic needs of users in public

open spaces. While interviewing, it was found that the vital reason for 'Parking space' and 'easy in entry/exit' as a basic need is due to the limited parking spaces and encroachment by taxis/three-wheelers/rickshawala on entrance and exit, which ultimately consumes lots of time. To recapitulate from the results of people's experiences, it can be concluded that 'Sitting areas', 'Street lights', 'Security surveillance,' 'Easy entry/exit' and 'Enough parking space' are the significant attributes of basic needs in public open space of New Delhi which must be provided. Additionally, issues like vandalism, theft, encroachments, and dark areas should be eliminated to make public open spaces more inviting.

3.2. Second Level Need

Through the interviews, it has been found that predominantly when the public is satisfied with the basic needs such as 'Sitting areas,' 'Street lights,' 'Security surveillance,' 'Easy entry/exit,' and 'Enough parking space,' then they need 'Shops'; 'Utilities like washrooms, Dustbins, Drinking water facility, first aid, etc.,'; Barrier-free; Diversity in restaurants and Well-connected pathways as their second level need in public open spaces of New Delhi mention in Fig. 1. While interviewing, it has been found that well-connected pathways are the most needed feature of second-level need followed by 'Barrier-free,' 'Utilities, Shops,' and 'Diversity in restaurants.' Considering Maslow's (1970) hierarchy of needs, after physiological needs, 'Security' and 'Uses and Activities' are considered second and third-level needs, respectively. However, in this research, ' Security need' has slipped into a basic need. Moreover, attributes of 'Uses and Activities' and 'Functionality' such as Well-connected pathways (M = 1.91), Barrier-free (M = 2.0); 'Utilities' (M = 2.13); 'Users prefer shops' (M = 2.14) and Diversity in restaurants (M = 2.5) as their second level need mentioned in Fig. 2. The finding elucidates that the second level of need is an amalgamation of 'Uses and Activities', 'Street furniture', and 'Functionality'. However, functionality features like 'Well-connected pathways' and 'Street furniture' attributes such as utilities should be in the basic need category per Maslow's (1970) hierarchy of needs. The interviewees identified 'Well-connected pathways' as the most needed attribute of the second level need of public open spaces in New Delhi, followed by Barrier-free, 'Utilities,' 'Shops' and 'Diversity in restaurants.' It has been introduced by various interviewees that broken tiles on pathways and water logging make it difficult to walk/jog or to reach every place with barrier-free movement in public open spaces.

On the other hand, respondents stressed the availability of 'Shops' and 'Utilities' like drinking water, dustbins, washrooms, etc., as they are the essential features they mostly prefer to find; however, they often need to be addressed in public open spaces. Likewise, for 'Shops' and 'Diversity in Restaurants,' users feel that their existence is essential for them as these attributes are why they prefer to visit a place. In other words, their decisions lay on the availability of shops and Diversity in restaurants. To summarise the findings of user experiences, it can be drawn that 'Well-connected pathways,' 'Barrier-free,' 'Utilities, Shops,' and 'Diversity in restaurants' are the vital factors of second-level needs in public open spaces of New Delhi which ought to be provided. In parallel with them, issues like water logging, broken pathways, etc., should be removed to make public open spaces more accessible to all age groups.

3.3. Third Level Need

After gratifying both basic needs, a social need for 'Belonging and Love' emerges. This need is related to the social side of feelings, human interaction, exchange of affection, etc. (Maslow, 1970). As per the user's preferences mentioned in Fig. 2, 'Maintenance' (M = 2.58); 'Diversity in shopping' (M = 2.7); 'Kiosks' (M = 2.78), 'Pubs and bars' (M = 3.0), 'Shades near space' (M = 3.0), 'Diversity in activities' (M = 3.0), 'Open/green spaces' (M = 3.11), 'Gaming zone' (M = 3.33) and 'Weekly markets' (M = 3.5) are their third level of need in public open spaces in New Delhi. Among all nine attributes, 'Maintenance' is the most preferred need while 'Weekly market' is the least needed at this level.

During interviews, it has been found that respondents asserted the need for maintenance in public open spaces of New Delhi due to water-logging, open drains, presence of stray animals, irregular cleaning, etc., which makes it filthy and restricts the public from using it. After maintenance, respondents specified 'Diversity in shopping and activities,' 'Kiosks,' 'Weekly markets,' and 'Gaming zones' as their third-level needs. Through interviews, it has been found that users prefer to have variety in shopping areas and activities as it gives users options to participate in the activities and engages them, which further captivates them to stay for a longer duration in public open spaces. Users related the third level of need by activities with recreational aspects as this gives them options to rejuvenate by interacting with others or sometimes through experiencing other's activities. The findings of the interviews are related to the social side of feelings, human interaction, exchange of affection, etc., which is like Maslow's 1970 third level of need in the hierarchy of needs. Moreover, through interviews, it has been found that users in New Delhi are fascinated by temporary shops, kiosks, weekly markets, or cultural activities, as almost every interviewee mentioned their needs. Apart from that, a few groups like young people and teenagers are primarily attracted by temporary kiosks selling cheap items like fashion jewelry, electronics, junk food, books, etc. Besides this, users, especially teenagers, prefer open gaming

zones. In addition, the need for 'Open/green spaces' is also mentioned by several users. Teenagers and young users want open spaces for playing and group activities, while adults and old age users need open/green spaces for exercise, yoga (meditation), or relaxation.

Furthermore, during interviews, it has been found that 'Pubs and Bars' are also crucial for users, as men, primarily adults and young, look for 'Pubs and Bars' to spend the evening with friends. Further, due to the extreme temperature of New Delhi, 'Shade in spaces' like near sit-outs, pathways, etc., are important for users, which falls under their third level of need. Thus, it can be deduced that 'Maintenance,' 'Diversity in shopping,' 'Kiosks,' 'Pubs and bars,' 'Shades near space,' 'Diversity in activities,' 'Open/green spaces,' 'Gaming zone' and 'Weekly markets' are the third level of need in public open spaces of New Delhi which is more inclined towards the recreation side of users wants.

3.4. Fourth Level Need

After satisfying all three levels of needs, the 'need for self-esteem' emerges, which is mainly ego-driven (Maslow, 1968). Through the interview's findings, it can be clearly seen that at this level, the user's needs are the combination of 'Uses and Activities' and 'Microclimate' illustrated in Fig. 2. The research findings state that 'Noise and Odour' (M = 3.5), 'Flexible sitting spaces' (M = 3.86), 'Quality of space' (M = 4), 'Socio-cultural activities' (M = 4), 'Good views and vistas' (M = 4), 'Sports courts' (M = 4), 'Concerts' (M = 4.24), 'Festivals and Fairs' (M = 4.4) and 'Kids play areas' (M = 4.5) are the required needs of users in public open spaces.

In the interview findings, it was observed that the problem of 'Noise and odour' is quite common in public open spaces in New Delhi due to non-maintenance. Users and endeavours often avoid this by spending time in a place with good wind flow to escape the heat and spaces free from noise and odour in order to feel pleasure and comfortable in place. Four respondents stated that sitting in a public open space sometimes becomes unbearable because of foul smells and near traffic noise. Moreover, almost everyone has asserted the need for 'Flexible sitting and high-quality spaces' at this level. However, it has been specified that this is quite hard to find in public open spaces in New Delhi. Users referred to 'Flexible sitting spaces' as a place that can be used by two/or three people in groups and can be utilized for several purposes. For instance, circular stepped sitting can be used for just sitting/resting and sometimes can be used for some cultural activities. In addition, users delineated flexible sitting spaces as personalization of the space. Apart from this, the respondents stated that a variety of sitting spaces gives them the option to stay in a place for a longer duration. Besides this, one of the pressing needs users want at the level is 'quality of space' and 'Good views and vistas.' The users related this need with the visually pleasing spaces that provide ease and comfort. Through interviews, it has been found that users prefer different materials in public open spaces like wood, stone, engineered wood fibre, solid rubber surfacing, etc., sitting amalgamated with greenery and water bodies, different types of lighting, lamp posts, etc. Likewise, users specified the need for 'Socio-cultural activities,' 'Concerts,' and 'Fairs and festivals.'

According to the interview results, users look for different types of socio-cultural activities like street play, group dance, exercise (yoga), shows, concerts, weekly markets, etc., which are exciting and captivate users in public open spaces. Activities like 'Fairs and festivals' and 'Concerts' are unpredictable and changeable as per seasons and festivals, creating a sense of surprise and sometimes interest in users' minds whenever they visit a place. Further, 'Kids' play area' is also mentioned by four respondents, as families prefer those places where facilities for kids, like their gaming areas, play areas, etc., are present so that their children can enjoy engaging in physical activities as well as learn social bonding by interacting with other children. To conclude the results of user preferences, it can be outlined that 'Noise and Odour,' 'Flexible sitting spaces,' 'Quality of space,' 'Socio-cultural activities,' 'Good views and vistas,' 'Sports courts,' 'Concerts,' 'Festivals and Fairs' and 'Kids play areas' are the features which are preferred by users at the fourth level of need in public open spaces of New Delhi. Moreover, it can be analyzed that this level of need is related to the cultural activity areas that promote socialization and unity between people and give them spaces to be seen as equal in society.

3.5. Fifth Level Need

According to the interview results, it can be analyzed that all the features mentioned by the users are the factors of 'landscape' and 'comfort,' which are collectively related to the 'Microclimate' attribute of spatial organization in public open spaces. The findings stated that 'Placemaking' (M = 5), 'Landscape elements' (M = 5), 'Landscape areas' (M = 5), 'Automated parking' (M = 5), 'Aesthetics' (M = 5), 'Comfortable walk' (M = 5) are the highest need which users want in public open spaces mentioned in Fig. 2. The 11 respondents mentioned that they sought comfortable space if the above needs were gratified. All 12 interviewees stated that aesthetically 'Sound spaces,' 'Lighting fixtures,' and 'Beautiful landscape design,' including water bodies, statues, installations, chamfered tree design, public art, selfie clicking booths, etc., are delightful which attract them a lot. Moreover, users often visit places with

these features without any purpose or just for relaxing as they find these elements mesmerizing and pleasing.

Besides this, five interviewees, including teenagers and young people, asserted the need for 'Place-making.' According to them, placemaking activities and events related to community, art, and culture are the most enjoyable as they allow interaction with different people and do something good for their community. For instance, activities like dance events, group exercise/yoga events, painting street events, etc., are prevalent and compelling for teenagers and adults. Further, users also look for sensory design and automated parking, relieving them from long waiting hours while parking and entry-exit. Moreover, eight respondents stated that 'Saket Mall' is the most preferred in New Delhi. As per the interviewees, 'Saket Mall' contains 'Comfortable spaces,' 'Beautiful landscape features,' 'Aesthetics,' 'Diversity in activities,' 'an ample number of Sitting areas,' 'Automated parking,' 'Security surveillance,' etc. This means that users feel satisfied as all the different levels of needs are achieved here. Furthermore, to summarise from the results of people's experiences, it can be concluded that 'Placemaking,' 'Landscape elements,' 'Landscape areas,' 'Automated parking,' 'Aesthetics,' and 'Comfortable walking' are the needs which users wish to experience in public open space for their utmost experience.

4. Conclusion

The study concludes that 'Accessibility,' 'Street furniture,' and 'Security' are the imminent attributes that are considered as a basic need in public open spaces of New Delhi. At this level, users preferred 'Sitting areas,' 'Street lights,' 'Security surveillance,' 'Easy entry/exit,' and 'Parking space.' When users are gratified, then users need for the second level of need emerges. The research concludes that users prefer extended attributes of 'Accessibility' and 'Street furniture,' including 'shops,' 'Utilities,' 'Diversity in restaurants,' 'Well-connected pathways,' and 'Barrier-free' as part of second-level needs in public open spaces of New Delhi. These two basic needs, in short, are related to 'Accessibility,' 'Street furniture' and 'Security.' Therefore, these elements of the spatial organization should be considered vital.

Besides this, the research concludes that 'Uses and activities' and 'Maintenance' are the third level of need, which includes 'Diversity in shopping,' 'Diversity in activities,' 'Open/green spaces,' 'Gaming zones,' 'Weekly markets,' 'Kiosks,' 'Pubs and bars,' 'Shades near spaces' and 'Maintenance.' This need is related to the social side of feelings, human interaction, exchange of affection, etc. Further, on the fourth level, needs become ego-driven, which could be achieved through providing spaces for socializing, comfort, and developing a sense of place in the user's mind. In conclusion, 'Uses and activities' and 'Landscape' combine to form the fourth level of need. This level includes 'Noise and Odour,' 'Flexible sitting spaces,' 'Quality of space,' 'Socio-cultural activities,' 'Good views and vistas,' 'Sports courts,' 'Concerts,' 'Festivals and Fairs,' and 'Kids play areas' are the required needs of users in public open spaces. Ultimately, the highest level of need outlines self-actualization, which varies from person to person. The study concludes that this level of need is more related to the quality and aesthetics of the place, which is majorly affected by the comfort and landscape of the place. Thus, to make Indian public open spaces more suitable, designers, architects, and planners should incorporate the listed hierarchy of needs.

Conflict of Interest

The authors declare that they do not have any conflict of interest.

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