Transmogrifying Banes to Boons: Reviving the Interstitial Spaces of Kozhikode City Neighborhood

Over the years, Indian cities have grown at a tremendous growth rate of 140%, as per an NSSO study. As new physical and social infrastructures are developed to manage the growing population of the city, vacant spaces get created. Derelict, unmaintained places, termed "Interstitial Spaces," are woven into the city's fabric. These locations are a blight on the city since they are exploited for illegal activities and as dumping grounds. This raises social, environmental, and security concerns for the population. The research paper focuses on the revival of interstitial spaces in Kozhikode City, Kerala. The paper defines the interstitial spaces in the planned city domain and classifies them based on the typology and value associated with them. The methodology followed for the study includes the identification of spaces with the use of remote sensing data and primary survey data with GIS as a tool application. The solutions to the spaces are taken up by the community itself through one-on-one interviews with the concerned population. The social and economic evaluation of the spaces are done to determine the value that the space holds for the community. The classification of the spaces helps to determine the best possible solutions for the space. These solutions are categorized as strategic, creative, and tactical based on the level of involvement of the community and the finances needed for the same. The management of the spaces is planned to incorporate the changing aspirations of the community with the help of ICT application. This transmogrification of spaces from being a bane to a boon to society ensures that the voids are accepted and appreciated by the community. The solutions enrich the liveability factor of the area. This also ensures that there is efficient management of the space resource, which is a limited resource within the concrete fabric of the city. The study has centered on and highlights the importance of local area-level planning for efficient and effective management of city resources.

Keywords: *Interstitial Spaces, Space Resource Optimisation, City Resource Management, Community Participation*

Introduction

City planning generally results in three levels of spaces, figural, open, or deprived. As Tier I and II cities grow in a haphazard manner accommodating the demands of the growing and immigrating population, the planning is done concerning figural spaces. The physical and social infrastructure developed often creates voids within the city. Traditional city planning has always been concerned and focused on the planned rigid structure of the city. With this often the spaces falling in the voids of the rigidity are neglected and forgotten (Bishop 2012). Within this ‘tight planned space utilization’, the opportunities for diverse activities and possibilities lie with the ‘loose unplanned void spaces’ (Franck 2006). (Figure 1)

Figure 1. *Issues regarding Interstitial Spaces*

Source: Google Images

According to UN-Habitat (2015), 'public spaces' are the areas between buildings that include roadways, open green spaces, and institutions like libraries, community centers, and markets. All these spaces contribute as factors of enhancement of liveability, well-being, and social cohesion within the city (Wahba 2020). Interstitial spaces arise as negative perspective features when cities grow and develop. These areas can contribute to urban blight, crime, and environmental risks, thus compromising the city's overall livability and sustainability. (Marcotullio 2013)These spaces have rather adverse effects on the city factors like liveability, social cohesion, safety, inclusivity, etc. These spaces are seen as areas of waste, and landmarks for unconstitutional and illegal activities, hampering the image that the city holds with its population and visitors (Omar Nermeen Ali 2019). Existing outside the city's administrative control, these spaces lack legality in their purpose and often act as barriers to movements. By diminishing foliage cover and increasing heat absorption, spaces such as vacant lots and abandoned buildings contribute to the urban heat island effect. These areas trap heat, raising temperatures and influencing the surrounding climate. (Santamouris 2014) As the space resource crunch is being experienced by urban planners everywhere, the need has been shifted to redeveloping and revitalizing these hidden space resource gems. This would entail focusing the formal master plans to accommodate the interstitial space resources of temporary usage planning to curb the economic, environmental, and social setbacks they would result in.

This paper aims to identify and optimize interstitial spaces in a selected neighborhood in Kozhikode City Region for financial and social benefits to the

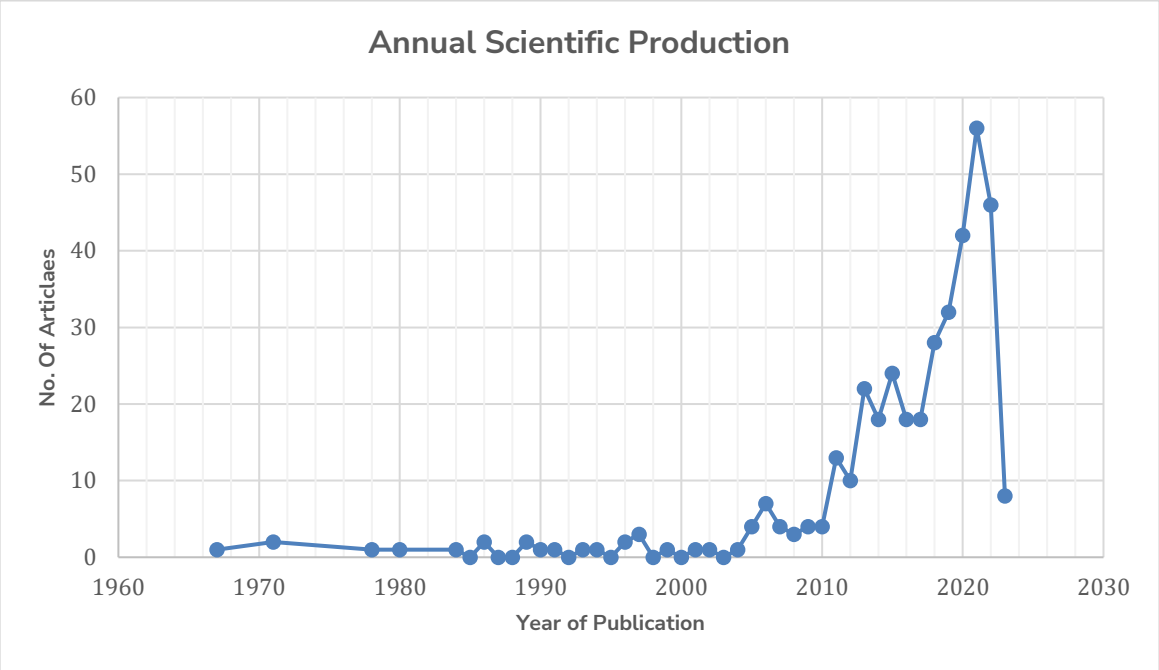
community. The first half of the paper would focus on the identification and classification of the interstitial space in the selected neighborhood. The second half of the paper would focus on planning and designing proposals for the identified spaces and also formulate an operation and maintenance mechanism for the future of the spaces.

Interstitial Spaces

The unplanned spaces can be seen throughout the urban fabric in terms of underpasses, vacant land parcels, alleyways, and pocket parks which we have long been trained to turn a blind eye to. These are usually the spaces existing within the voids of the planned urban fabric and yet the planning, boundaries, and extent of these spaces are not formally acknowledged in any city-level or neighborhood-level planning. To analyze the topic's significance and history of it in the academic sphere, a bibliometric analysis was performed. The database was identified from the Scopus database using keywords like "interstitial spaces", "urban voids", "forgotten spaces", "leftover spaces" etc. Around 300 publications were taken into consideration for the same. The analysis was done using the software 'Biblioshiny and R-studio'. It was found the topic has been in the research domain world since 1967 and has been a spike topic in the last three years (Graph 1).

The voids were identified in 1967 as transitional zones between the "regions of law, custom, convention, and ceremony" by Victor Turner, (Turner V. 1967). Researcher Trancik described them as "lost spaces", the areas with no observable bounds and provide no benefit to users, seeing them as unwanted urban zones with little morphological definition (Trancik 1984). Cybriwsky (1999) described the spaces as "planned wasteland", the unutilized zones inside the urban built mass. Doron (Doron 2000) classified these areas as "dead spaces" that exist without adequate boundaries and utilization, the unplanned solitary zone inside the hectic urban fabric. Abraham and Ariela (2010) described "urban voids" as underutilized areas on the perimeter of concrete formal spaces. Wall E. described "interstitial spaces" as the "tiny, irregular spaces that exist between, beneath, and above massive infrastructure formations" (Wall E 2011). Due to the absence of optimal utilization and aesthetic appeal, such areas, according to Sousa (Sousa 2009), are evocative of economic, social, and environmental conflicts. However, all have regarded these locations as regions of opportunity for the city and its residents.

Graph 1. *Annual Scientific Production*



Source: Bibliometric Analysis done by Author

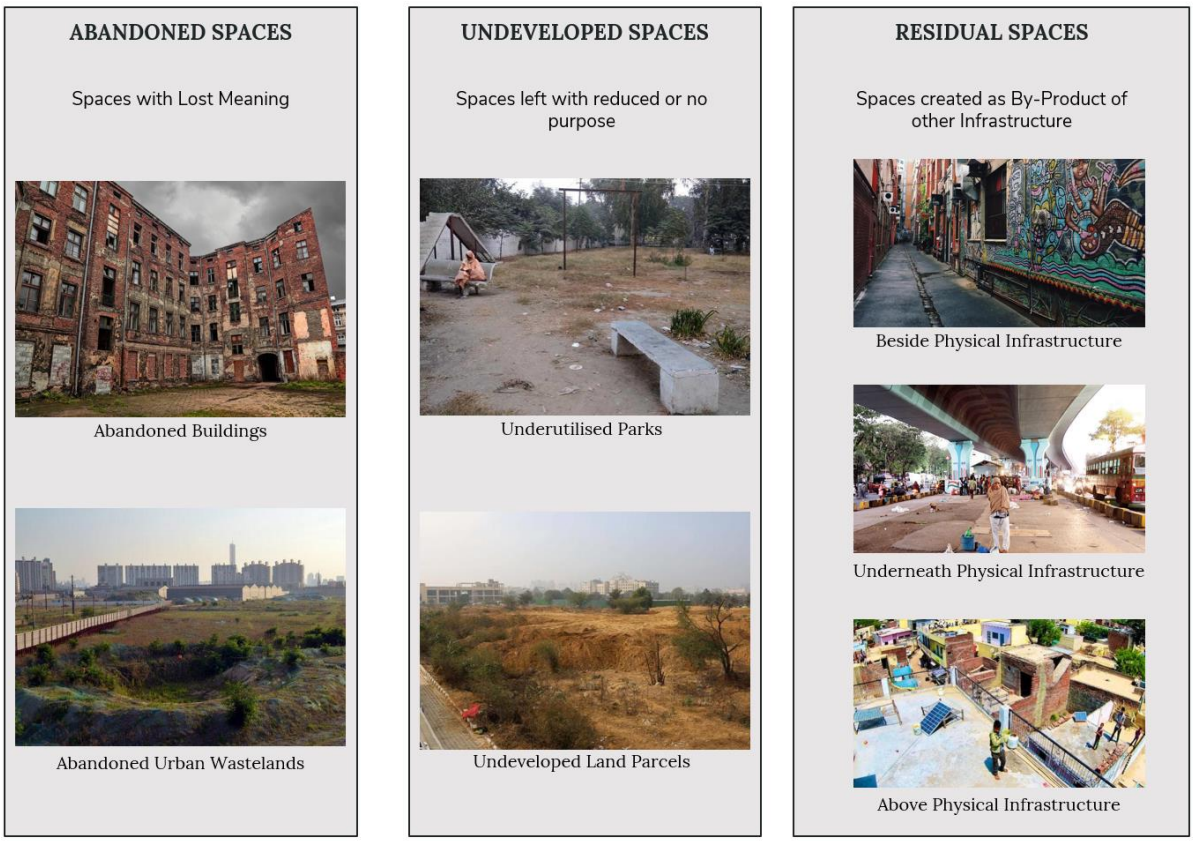
Though given several titles throughout history, as demonstrated by the above paragraph, the fundamental notion of interstitial spaces stays the same. Figure 2 illustrates the numerous nomenclatures for interstitial spaces used throughout history. Interstitial spaces are the spaces that exist between the city's prominent planned regions but are typically underutilized and underutilized for a variety of reasons such as ownership issues, irregular shape, and size, lack of utility, and pollution.

Figure 2. *Word Cloud Representation*

Source: Author

These spaces can be further classified as per their typology as Abandoned, Undeveloped, and Residual spaces. Abandoned spaces would comprise space resources that have lost their meaning and purpose within the urban fabric. These would include spaces such as abandoned buildings, railway lines, wastelands, etc. Undeveloped spaces are the ones that are left with reduced or no purpose due to the lacunae of keeping up with the upgradation requirements by the community. These would also include spaces that have the infrastructure but are not being utilized by the community due to various reasons. The spaces normally found under this category in the cityscape are underutilized parks and undeveloped land parcels. The residual spaces are the ones that are created underneath, above, or beside the infrastructure as a by-product of development. Figure 03 illustrates the different classifications of interstitial spaces as per their typologies with certain examples.

Figure 3. *Classification of Interstitial Spaces as per Typology*

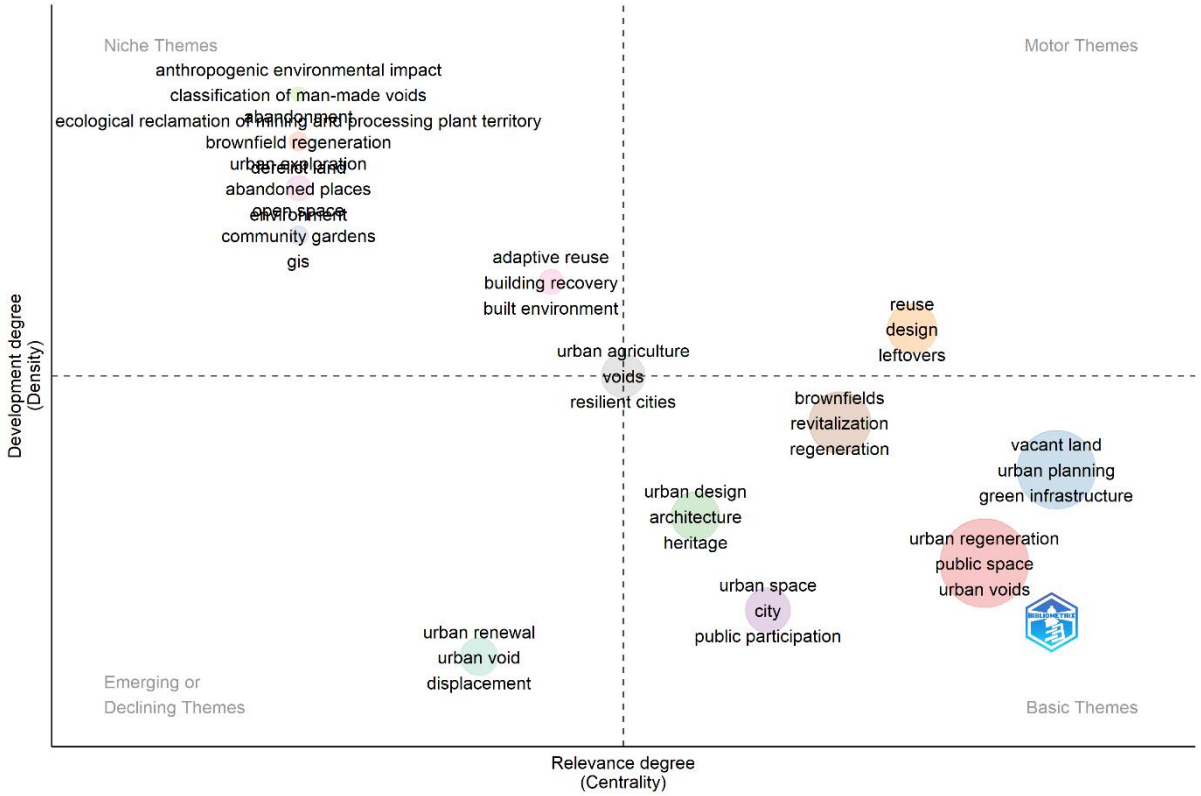


Source: Author

Over the past years, the spaces have been analyzed by various authors and dealt with under the umbrella of various themes. (Graph 2) Basic themes of intervention, as observed through bibliometric analysis, including urban regeneration, revitalization, heritage management, green infrastructure planning, etc. The more niche themes of intervention include ecological reclamation, urban exploration, adaptive reuse, etc. This indicates that the

interstitial spaces have been long seen as the potential present within the city for social, economic, ecological, and environmental upgradations.

Graph 2. *Thematic Map depicting the themes explored related to interstitial spaces*

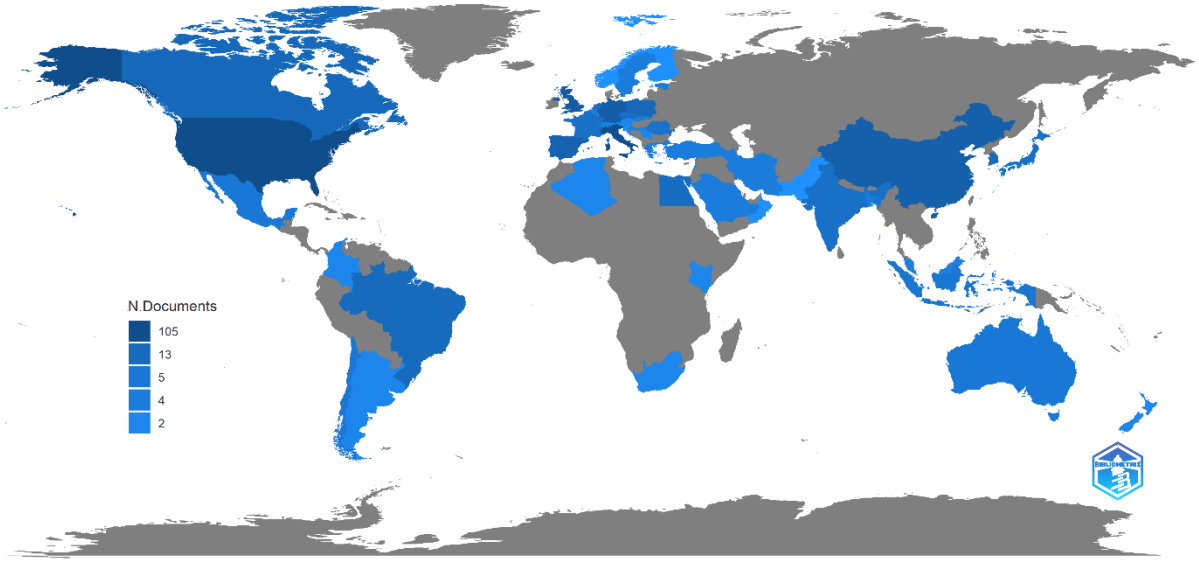


Source: Bibliometric Analysis done by Author

Kozhikode, Kerala, India

India's urbanization rate has been projected at the 50.9% by 2047. Despite being behind in terms of its development, Indian cities have been termed as the points of growth for the nation in terms of sustainable and holistic progress (Department of Economic and Social Affairs 2019). As per NSSO, Indian cities have seen a growth projection of 140% in the past few decades highlighting the trend to increase more in the coming future. As the cities have grown, the core of the cities has seen a rapid concentration of built mass. Within the built mass, many structures, areas, and amenities have seen a rise and fall in their utilization. Often these spaces are neglected within the city domain. In the research domain, the study on interstitial spaces within the Indian context as compared to international is less as can be seen in Figure 4. Recently, efforts have been taken by the community, urban designers, and urban planners to identify and revive such spaces in the cities. Figure 5 depicts the various examples across the nation wherein the efforts to revive the spaces have been taken up successfully.

Figure 4. *Country-wise scientific production*



Source: Bibliometric Analysis done by Author

Figure 5. *National Level Examples for Revival of Interstitial Spaces*

Anand Rao Flyover, Bangalore, India

Art Trail, Bhubaneswar, Odisha, India

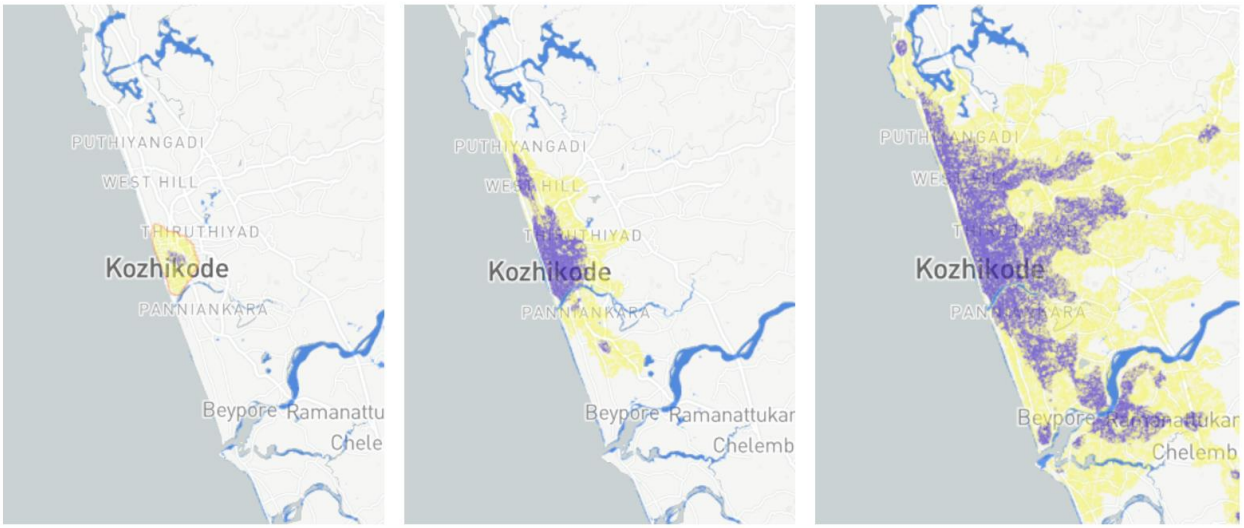
Lakshmi Mills Urban Centre, Coimbatore, Tamil Nadu, India

Anasagar Lakefront, Ajmer, Rajasthan, India

Source: Google Images

The focus of such interventions has now been shifted towards the Tier II cities of India. Tier II cities have tremendous opportunities in terms of physical and economic growth. The spaces exhibit the potential of being utilized for enhancing the liveability and economics of the city. For the research concerned, the Tier II city of Kerala, Kozhikode (Calicut) has been selected. The city has seen a growth rate of urban extent at 18% since 1991. Figure 6 shows the urban extent throughout the years 1991, 2001, and 2014.

Figure 6. *Urban Sprawl of Kozhikode*



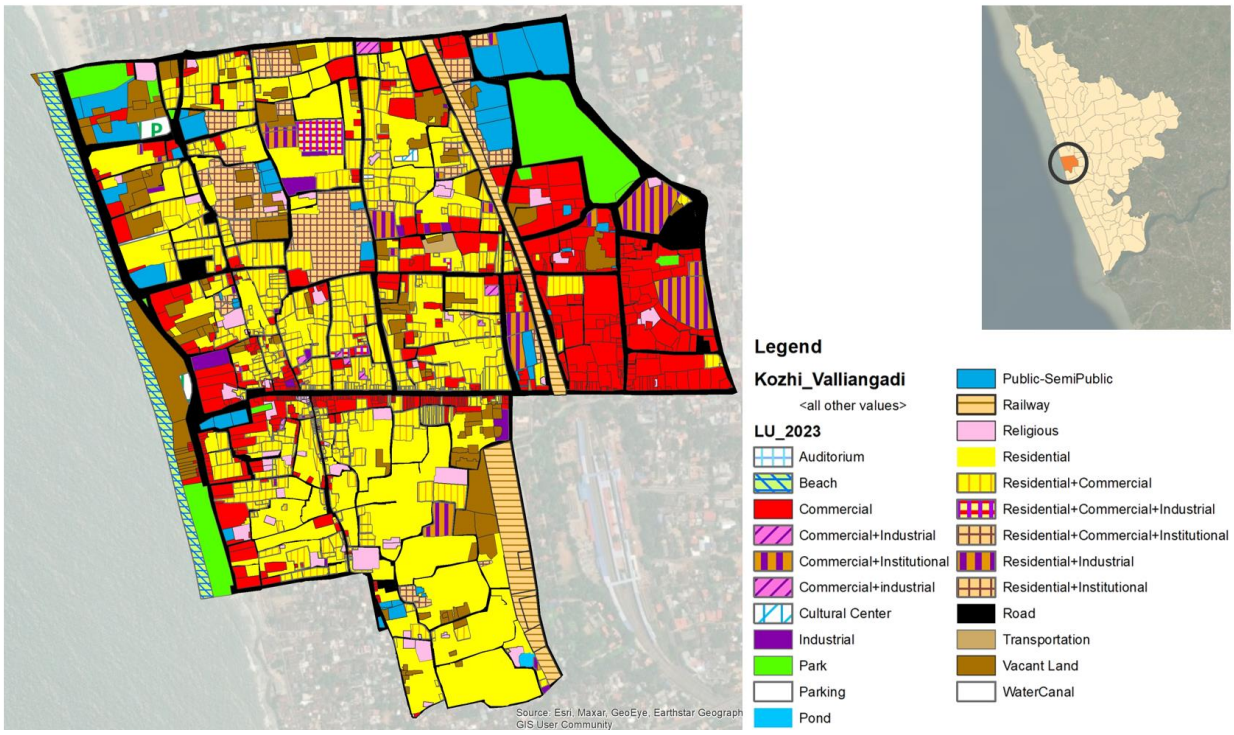
Source: Atlas of Urban Expansion, UN-Habitat

The city has a plethora of interstitial spaces within its core and various neighborhoods. The reconnaissance survey exhibited that a lot of spaces have been considered neglected, abandoned, and underutilized by the community. Figure 7 depicts various abandoned spaces identified through the preliminary survey. The city municipal corporation also has been working to revive historic landmarks like temple ponds, canals, public plazas, etc. Revenue generation and efficient resource utilization has been kept as the focal point for the annual budget of 2023-24 by the Kozhikode Municipal Corporation. Few spaces such as abandoned factory areas have been picked up by various architectural firms over the years to be revived and reused. It has been proposed to use the spaces beneath the flyover for purposes such as parking and commercial area already witnessed in city landmark areas such as near Paragon Restaurant. This strongly holds the reason to select Kozhikode as the study city with the core center area as the area in focus. The city core area, known by its ward name Valliyangadi has been chosen for the research study. (Map 1)

Figure 7. *Interstitial Spaces of Kozhikode as Identified through Reconnaissance Survey*

Source: Author

Map 1. *Location and Land Use Map of Valliangadi, Kozhikode*



Source: Author

Research Design

As the literature for the topic is explored and the site for the study is decided, we formulate the questions to be answered through this research study. The major question would be regarding the optimization of identified interstitial space for the social and economic benefits of the community. The next question would be on the perception of these spaces by the community and the aspirations of the community associated with the spaces. This paper aims to identify and optimize interstitial spaces in a selected neighborhood in Kozhikode City Region for financial and social benefits to the community. The objectives to complete the research would be as discussed below:

- To identify the interstitial space in the selected neighborhood
    - This would entail identifying the interstitial spaces within the neighborhood using Remote Sensing applications, GIS, Secondary data collected, and a Primary survey.
- To classify the spaces as per typology and social and economic value associated with the space.
    - As the spaces are identified, they would be classified as per typology into categories of Abandoned, Undeveloped and Residual Spaces as has already been discussed in the literature study. With the help of a primary survey and parameters in consideration, the spaces would be classified as areas of high or low, social as well as economic value. This would highlight the potential that the space holds in terms of community interaction and economy. It projects the space's degree of social engagement, cultural activities, and economic opportunities. (J 2010)
- To optimize the space resource for social and economic benefits.
    - Under this, proposals would be given to ensure that the space resources are fully utilised ensuring social and economic benefits for the community.
- To design a mechanism ensuring the engagement of the community in the management of such spaces.
    - Under this, the action plan would be to devise an operation and management plan ensuring that the community is at its core of engagement assuring to have a holistic, sustainable, and inclusive development.

Methodology

As the objectives for the study are defined, all objectives are broken down to the level of tasks to be achieved. Each task is then further analyzed for the data required and the source of the data. The data sources are primarily academic studies done by students, municipal corporations, google open database, Landsat 8 satellite images, reconnaissance surveys, and primary

surveys. Table 1 depicts the tasks enlisted, the data required for each task, and the data source.

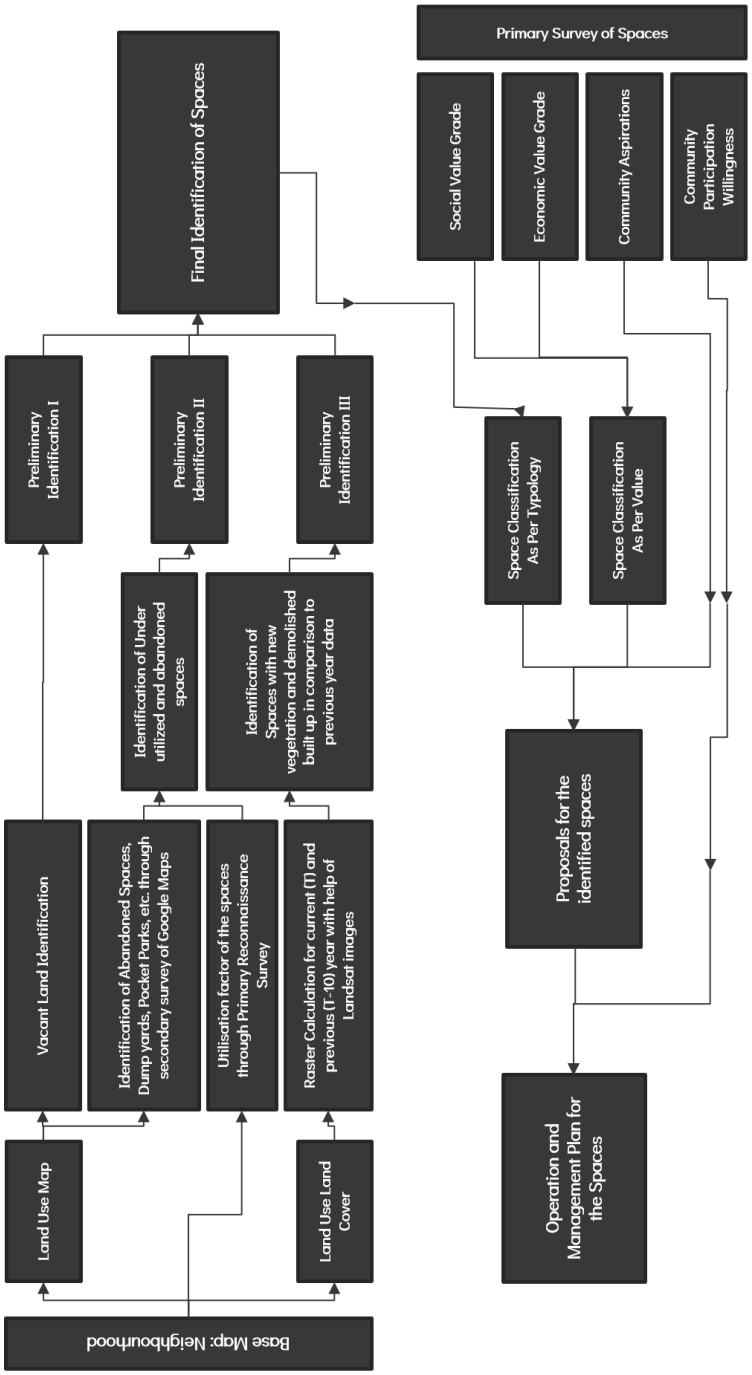
Table 1. *Data Checklist*

TASK	DATA REQUIRED	SOURCE
Land Use Mapping	GIS based Land Use Map.	Municipal Corporation, Study done by M.Plan Students.
Identification of Abandoned Spaces, Dump yards, Pocket Parks, etc.	Google Map for secondary survey.	Google Map Open Database.
Identification of spaces with new vegetation and demolished built up in comparison to previous year data	Landsat 8 image data for 2013 and 2023.	Landsat 8 Database through USGS Earth Explorer.
Identification of Under utilized and abandoned spaces.	Utilisation factor associated with the space . (0 – No Utilisation, 0.5 – Partial Utilisation, 1 – Full Utilisation)	Primary Reconnaissance Survey.
Social Value Grade	Community Rating and assessment of space for social value evaluation.	Primary Survey.
Economic Value Grade	Community Rating and assessment of space for economic value evaluation.	Primary Survey.
Community Aspirations	Aspiration associated with the space to determine the optimised solutions for the space.	Primary Survey.
Community Participation Willingness	Willingness of the community to participate in the design, operation and management of the space.	Primary Survey.

Source: Author

As the GIS-based land base map, Landsat 8 images are acquired and a primary reconnaissance survey is done, remote sensing and GIS application can be done to identify the spaces in the neighborhood. The land use map is used to identify vacant land parcels. The data is also used to determine the ownership details of the land. This is needed as the scope of the project restricts itself from using private land for the research. The abandoned spaces are identified through a secondary search using the Google map database. With the land use land cover raster calculations, the vacant and abandoned parcels of land are identified. (Figure 9) During the reconnaissance survey, these spaces get verified and also a utilization factor associated with the space is recorded, the utilization factor would be at the values of ‘0 for not utilized’, ‘0.5 for partially utilized spaces’, and ‘1 for spaces with full utilization’. After all the parcels are identified, the final list of identified spaces is made. The identified list of spaces is then classified based on the typology and value through the data collected through the primary survey done for the spaces. The primary survey has been designed to evaluate the social value grade, economic value grade, community aspirations, and community participation willingness. Further taking into consideration the classification of space and community aspirations, the proposals are suggested for the spaces for their optimization. The operation and management plan for the space is based on the proposals taken up and community participation willingness. (Figure 8)

Figure 8. *Methodology*

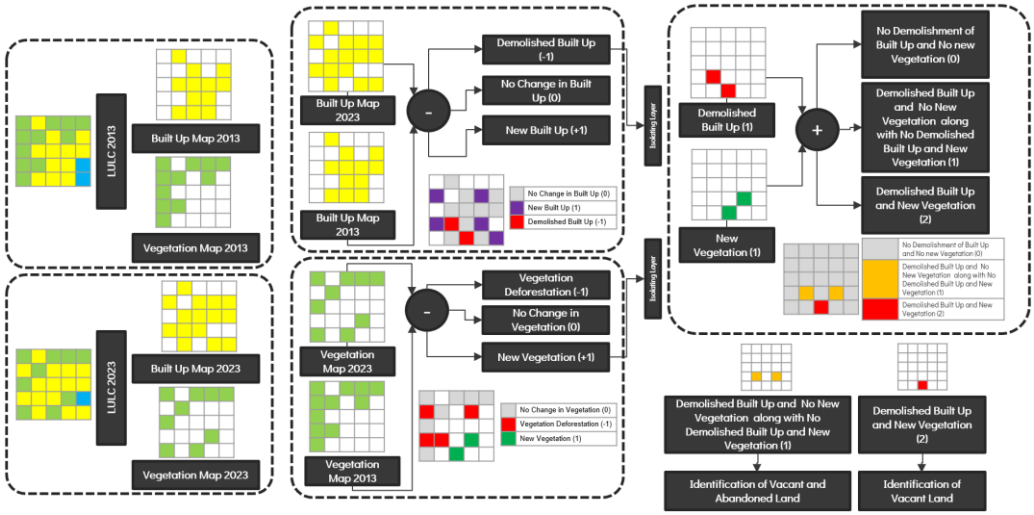


Source: Author

The Landsat 8 satellite images are acquired for the study area for the years 2013 and 2023 to assess the decadal difference. Before the images are used for LULC map generation, the images are pre-processed to remove any atmospheric or radiometric distortion. This is done by using geometric correction, radiometric calibration, and atmospheric correction. Supervised

image classification is done in ArcGIS to create the final LULC map. The LULC 2013 and LULC 2023 are further taken up for raster calculations as has been detailed with illustration in Figure 9. Table 2 displays the question mentioned in the primary questionnaire of the spaces, as well as the response form for the same. The spaces are further taken up with a primary survey with an average of 12 sample sizes per space. The sample population has been selected through random sampling.

Figure 9. *LULC Raster Calculations*



Source: Author

Table 2. *Survey Questionnaire*

Question	Responses				
Name and Location	Place Code for the space				
Accessibility	Within 400m of public transport	400-800m of public transport	Upto 1.2km of public transport	More than 1.2km of public transport	
Intent of Usage of Space	Formal Usage Assigned	Informal Usage associated	Neglected Space used as dumpyard or unplanned parking	Used for unconstitutional activities	No Usage Associated
User Perception of Space	One word assessment of how the space is perceived by the respondent.				
Frequency of Usage	Daily	Few times in a week	Few times in a month	Rarely in a Year	Never
User Experience	5	4	3	2	1
Land Use Type	Commercial, Mixed Use	Public-Semi Public, Institutional, Recreational, Religious	Residential	Vacant Land	
Nearby Land Use	Commercial, Mixed Use	Public-Semi Public, Institutional, Recreational, Religious	Residential	Vacant Land	
Property Value	Above 6,500 Rs/sq. ft.	5,500-6,500 Rs/sq. ft.	4,500-5,500 Rs/sq. ft.	4,500 Rs/sq. ft. or less	
Economic Use potential as per community survey	5	4	3	2	1
Impact of spaces on image of the city	Yes	No	Maybe		
Willingness to plan and design such spaces	Yes	No	Maybe		
Willingness to operate and manage such spaces	Yes	No	Maybe		
Any other remarks or suggestions for such spaces	Short answer type remark or suggestion regarding design and management of such spaces				

Source: Author

The social and economic value of the space has been discussed as per Table 3 with the assigned weightage. The various parameters for the evaluation of both criteria have been chosen as per the local context and as per the discussions with local experts including urban planners, community members, and representatives from municipal corporations. For the evaluation of the social value of the space, the key indicators are accessibility, safety, aesthetics, inclusivity, activities held in the space, and environmental viability of the space. (Elif Kutay Karacor 2016) (Tiesdell 2003) (D 1981) (Kuo F E 2001)For

the evaluation of economic value for the space, land use type, spatial context of the site, property value of the site, frequency of usage, and economic potential of the space. (Brown Gregory 2007) (Willemen 2010) (Katerina 2022) (Troy Austin 2008) The weights for different factors for the social and economic evaluation has been finalized based on the expert survey taken comprising local planners, community members, and municipal corporation members with the help of AHP method and Saaty's scale. (Table 3)

Table 3. *Social and Economic Value Grading*

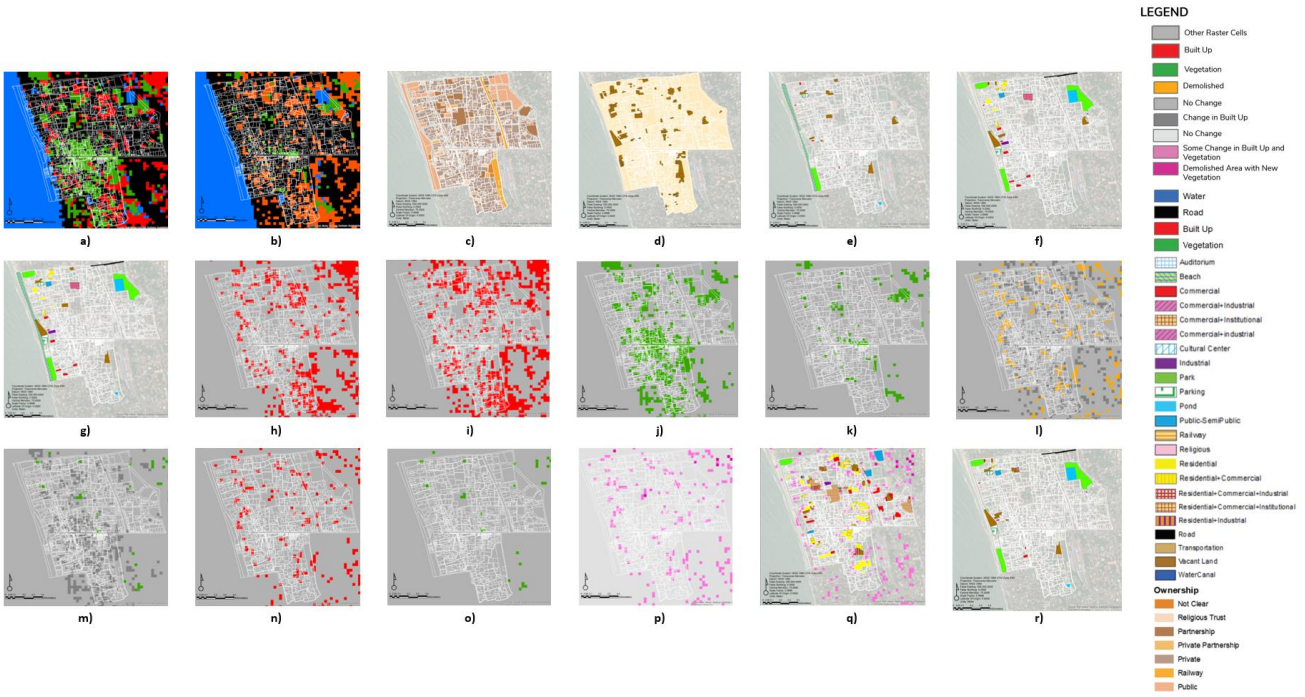
	Factors		5	4	3	2	1
SOCIAL VALUE GRADE	Accessibility	0.48	-	Within 400m of public transport	400-800m of public transport	Upto 1.2km of public transport	More than 1.2km of public transport
	Frequency of Usage	0.28	Daily	Few times in a week	Few times in a month	Rarely in a Year	Never
	Intent of Usage	0.17	Formal Usage Assigned	Informal Usage associated	Neglected Space used as dumpyard or unplanned parking	Used for unconstitutional activities	No Usage Associated
	User Experience	0.07	5	4	3	2	1
ECONOMIC VALUE GRADE	Land Use Type	0.43	Commercial, Mixed Use	Public-SemiPublic, Institutional, Recreational, Religious	Residential	Vacant Land	No land use
	Nearby Land Use	0.25	Commercial, Mixed Use	Public-SemiPublic, Institutional, Recreational, Religious	Residential	Vacant Land	No land use
	Property Value	0.15	-	Above 6,500 Rs/sq.ft.	5,500-6,500 Rs/sq.ft.	4,500-5,500 Rs/sq.ft.	4,500 Rs/sq.ft. or less
	Frequency of Usage	0.10	Daily	Few times in a week	Few times in a month	Rarely in a Year	Never
	Economic Use potential	0.05	5	4	3	2	1

Source: Consolidation of various papers, Author

Results

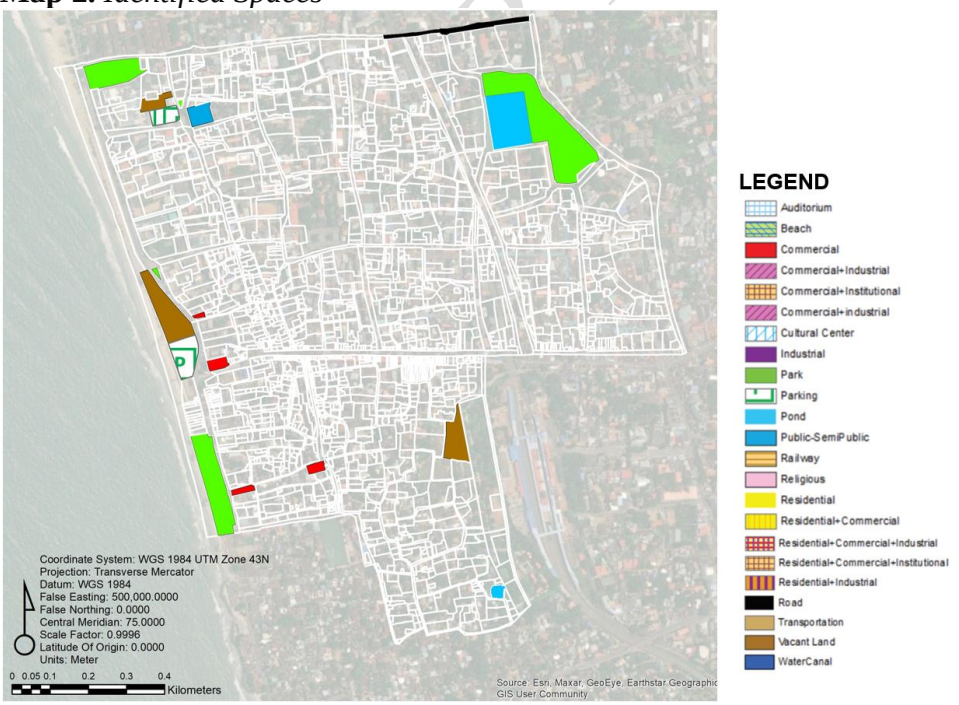
For the area in consideration, the land use map has been shown as Map 1. The identification is done with the methodology mentioned in Figure 8, also using the raster calculations as mentioned in Figure 9. The following maps were generated as shown in Figure 10. Finally, identified spaces for the area comprised 6.74% of the total area of the neighborhood which signifies that a lot of space resource is not being utilized to their fullest capacity and can be optimized for better space resource management. Map 2 shows the identified spaces and Figure 11 gives a first glance into the identified spaces.

Figure 10. *Maps generated for Identification of spaces*



Source: Author

Map 2. *Identified Spaces*



Source: Author

Figure 11. *Glance of Identified Spaces*

Source: Author

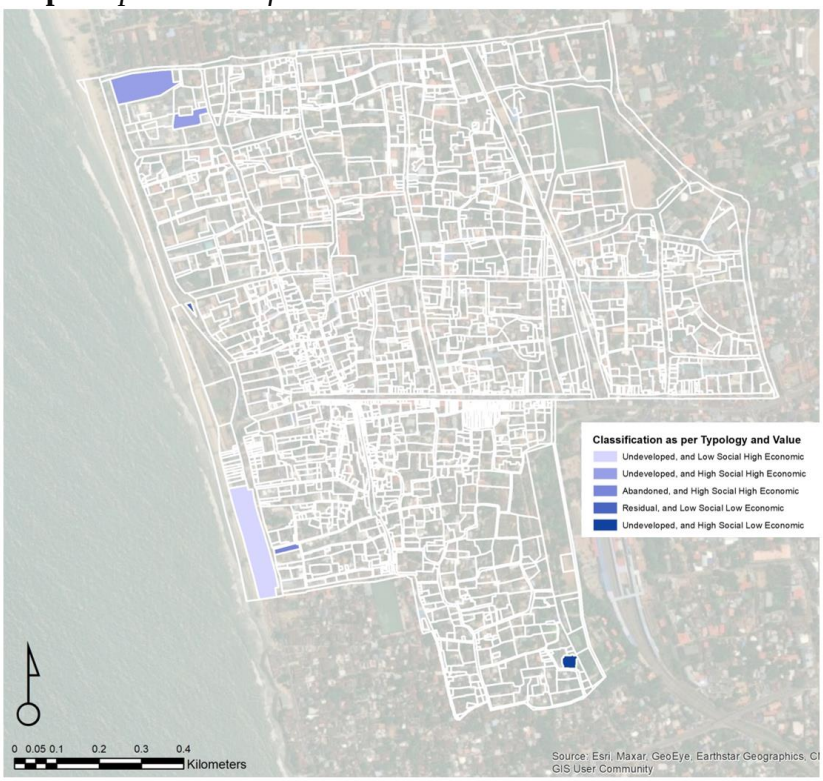
For the research study in focus, the spaces have been narrowed down to codes 1, 4, 5, 10, 11, and 17. The survey questionnaire, as discussed earlier in Table 2, was used to evaluate the social and economic value of the finalized spaces (Table 4). The final classification of the space has been done as shown in Map.

Table 4. *Social and Economic Value of Spaces*

PlaceCode			1	2	3	4	5	6
Survey Count			11	15	9	9	11	13
SOCIAL VALUE GRADE	Accessibility	0.3	3	3	3	4	1	4
	Frequency of Usage	0.25	4	4	0	0	1	4
	Intent of Usage	0.2	5	4	3	1	2	5
	User Experience	0.25	4	4	2	0	1	2
	Final Score		3.90	3.70	2.00	1.40	1.20	3.70
	Final Score Normalized	Normalised by 5	0.78	0.74	0.40	0.28	0.24	0.74
	Social Value		High	High	Low	Low	Low	High
ECONOMIC VALUE GRADE	Land Use Type	0.25	4	4	5	4	1	4
	Nearby Land Use	0.15	3	5	5	5	4	5
	Property Value	0.25	1	3	3	4	2	4
	Frequency of Usage	0.2	2	2	1	1	1	2
	Economic Use potential	0.15	1	4	4	1	2	4
	Final Score		2.25	3.55	3.6	3.5	1.95	3.75
	Final Score Normalized	Normalised by 5	0.45	0.71	0.72	0.70	0.39	0.75
	Economic Value		Low	High	High	High	Low	High
Classification As per Value			Undeveloped	Undeveloped	Abandoned	Residual	Undeveloped	Undeveloped
Classification As per Typology			High Social Low Economic	High Social High Economic	Low Social High Economic	Low Social High Economic	Low Social Low Economic	High Social High Economic

Source: Author

Map 3. *Space Classification*



Source: Author

The ideas put forward for the spaces have been defined in light of the primary survey that was done for the spaces, and the potential the space contains in terms of economic and social value.

1. The pond area, (placecode:01), is classified as an undeveloped space with high social and low economic value. It has been proposed to be developed with a tactical solution setup. It has been proposed as a community pond front area with the landscaping of the space along with the inclusion of some sitting spaces using recycled materials. The estimated cost of the project is projected at Rs.1.30 Lakh with a yearly maintenance cost of Rs.1 Lakh. Since this space is mainly under the Mosque committee and would be used by the immediate neighbors only, there will be no revenue generation plan for the same. The funding for the project can be taken from the Mosque committee and the Municipal Corporation and the audit of the area would be with both parties.
2. The beachside area, (placecode:04) is classified as undeveloped space with high social and high economic value. It has been proposed to be developed with strategic and creative solution criteria. The space has been divided into two sections, a private shack area, and an open to public beach. The four private shacks, (Rs. 3,00,000/piece), would be installed in the area which can be booked through an application by the public for private beach experience at a rate of Rs. 500/hour. The second space would be open to a public beach. The beach would have to be cleaned for public usage initially at Rs. 30 thousand only. The total investment cost amounts to Rs. 12.03 Lakhs. The yearly revenue projection for the space has been calculated at Rs. 20.20 Lakh

approximately considering only 60% occupancy at all the facilities. The yearly operation and maintenance cost has been projected at Rs. 1.20 Lakhs. The same would be funded by KTIL, KIIFB, and State Government.

3. The abandoned factory space near the beachside area, (placecode:05) is classified as an abandoned space with low social and high economic value. It has been proposed to be developed with a strategic intervention. The space would be developed as a souvenir shop and café area. It would cater to the footfall coming from the beach area. The construction would be done in 400sq.m. at a rate of Rs.18,000/sq.m. with the rest of the site area landscaped. The estimated cost of the project has been projected at Rs. 74 Lakhs. The facility would be rented at thirty thousand rupees per month, marking the yearly revenue at Rs. 3.60 Lakhs. The yearly operation and maintenance cost of the space has been estimated at Rs. 65 Thousand. The funding of the same would be taken from KTIL and KIIFB.
4. The pocket park near Seagull Hotel, (placecode:10) is currently being maintained by the hotel administration but is in rather dilapidated condition. It is classified as residual space with low social and high economic value. The space has been proposed to be developed with tactical solutions. The residual pocket park would be cleaned and landscaped with the inclusion of sitting spaces made of recycled material and a digital hoarding for advertisement purposes. The estimated project cost for the space is at Rs. 1.27 Lakhs with advertisement rental projection at Rs. 1.20 Lakhs yearly. The operation and maintenance cost of the space would be Rs. 65 thousand annually. The funding of the project can be assisted by Seagull Hotel Administration.
5. The vacant land, (placecode:11) is classified as undeveloped space with low social and low economic value. Developing the space as a strategic yet creative solution intervention has been proposed. The proposal is to convert vacant land into a community garden and event space area. The area would be installed with five food kiosks with a sitting facility at Rs. 1.50 Lakh/Kiosk. There would be a dedicated area of 1,000 sq.m. for a community vertical garden. This would be operated and managed entirely by the community members. There would be a small stage area available within the open sitting as a stage for community-level events to be organized. The total projected cost for the space development is at Rs. 38 Lakhs approximately with operation and maintenance costs at Rs. 1.20 Lakhs yearly. The kiosks would be rented on an hourly basis at the rate of Rs. 100/hr with the facility operational for twenty-two days a month and twelve hours a day. The projected revenue generation from this model at 60% occupancy with space being rented at Rs. 5,000/day would be approximately Rs. 6.79 Lakh per year. The funding for the project would be taken through KIIFB, KTIL, and Municipal Corporation with regular audits by the corporation to ensure its optimized functioning.
6. The Maidan Ground, (placecode:17) has long been utilized as a fairground by the community. The space though utilized lacks upgraded facilities which restrict its utilization for specific events only. It is classified as an undeveloped space with high social and high economic value. The space would need to be intervened with strategic interventions to ensure optimization. The space would have a constructed building serving areas like administration, green rooms, resting rooms, storage facilities, pantry rooms, etc. constructed in 500sq.m. There will also be an introduction of an application to track the activities and events being held on the ground. The total cost for the project is estimated at Rs. 104 Lakhs. The yearly revenue

plan is estimated at Rs. 52 Lakh. The revenue plan is based on the assumption that the ground is rented at Rs. 15,000/day along with Rs. 2,500/day charges for cleaning and maintenance of the area for an average of ten days a month. The operation and maintenance cost will be estimated at Rs. 5 Lakh annually. The funding for the project would be taken from the existing Maidan Ground Authority, Municipal Corporation, KTIL, and KIIFB. Regular audits for the space would be done by the Municipal Corporation for its financial and operational status compilation. (Table 5)

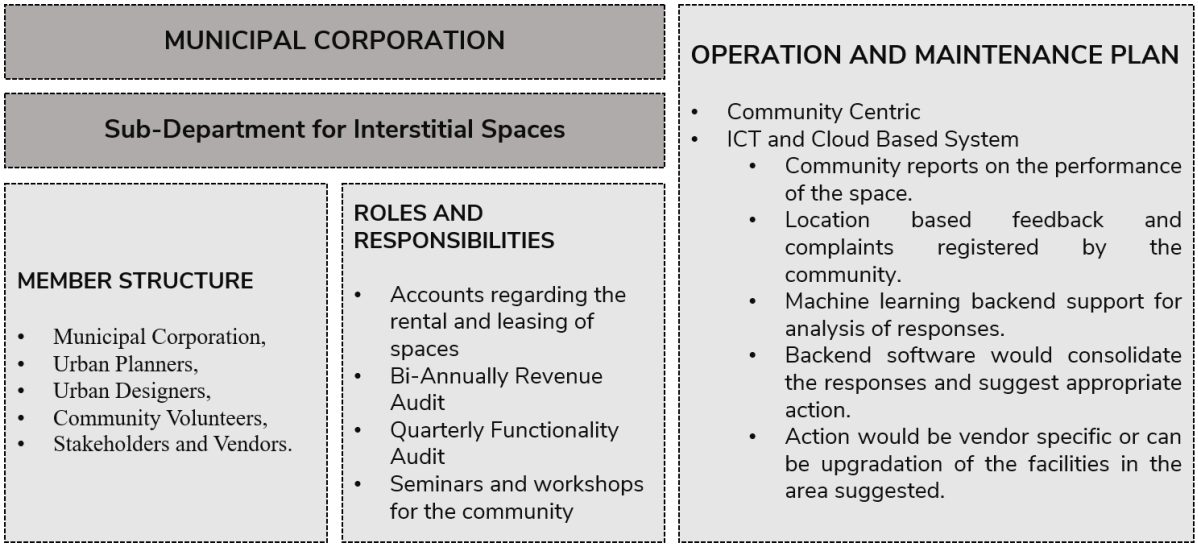
Table 5. Proposals for the Spaces

Placecode	Current Scenario	Classification	Solution Criteria	Proposal	Investment Cost	Yearly O&M Cost	Yearly Revenue	Funding
1	Pond	Undeveloped space with High Social and Low Economic Value	Tactical	Pond Front Community area	1.30 Lakhs	1 Lakh	-	Mosque Committee Municipal Corporation
4	Beach Side area	Undeveloped space with High Social and High Economic Value	Strategic and Creative	Private shack area, and Open to public beach	12.03 Lakhs	1.20 Lakhs	20.20 Lakhs	KTIL KIIFB State Government
5	Abandoned factory near beachside area	Abandoned space with Low Social and High Economic Value	Strategic	Café and Souvenir Shop	74 Lakhs	65 Thousand	3.60 Lakhs	KTIL KIIFB
10	Pocket park near Seagull Hotel	Residual space with Low Social and High Economic Value	Tactical	Sitting space using recycled materials with advertising space	1.27 Lakhs	65 Thousand	1.20 Lakhs	Seagull Hotel Administration Municipal Corporation
11	Vacant Land	Undeveloped space with High Social and High Economic Value	Strategic and Creative	Community Kitchen and Event Space	38 Lakhs	12 Lakhs	6.79 Lakhs	KTIL KIIFB
17	Maidan Ground	Undeveloped space with High Social and High Economic Value	Strategic	Upgradation of facilities for storage room and green room facilities	104 Lakhs	5 Lakhs	52.05 Lakhs	Maidan Ground Authority Municipal Corporation KTIL KIIFB

Source: Author

The operation and maintenance of the space would be community-centric. The proposal would have a mobile application that would allow the community to report on the performance of the space. The cloud-based system along with machine learning software would gather the responses over time and suggest the appropriate action for the designated vendor or committee. A special sub-head under the Municipal Corporation would be established namely, the Department of Interstitial Spaces. The department would be responsible to conduct an audit of the spaces, holding booking records and revenue records for the spaces, and ensuring that the space is optimized at all instances for its utilization. The committee would also be responsible for organizing seminars and workshops for the community to ensure awareness regarding such spaces and ensure community participation at all vertical and horizontal levels. The committee would consist of representatives from the municipal corporation, urban planners, urban designers, community volunteers, stakeholders, and vendors with businesses associated with the projects. (Figure 12)

Figure 12. *Operation and Management Plan*



Source: Author

Conclusion and Discussions

The existence of such interstitial space woven into the city fabric was emphasized in the research study. Even with a neighborhood area of 145.76 sq km, interstitial spaces account for around 6.5% of it. With the rising scarcity of space resources in cities and towns, these spaces reflect as boons for society's use. It was discovered in the study area that all of these areas were not being used to their full potential. With the interventions planned for the spaces, these places will be used in the way that the community envisions. The neglected locations in the neighborhood become social and income generation sites, adding to social cohesiveness, security, and livability considerations for the entire region. These places must be planned for at the master plan level rather than as individual project interventions. The management of the space through ICT and AI/ML applications along with the community inputs ensures community participation in the whole process. The study further focuses on the need to create an identification and optimization framework for such places. To achieve global application, the framework must be universal in character. The research study can be expanded to include framework creation and implementation.

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