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Regeneration of Urban Open Spaces along the Railway Track : A Case Study of Kotlakhpat, Lahore

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ABSTRACT

Railways are often considered unsafe areas for residential communities, especially in the absence of safety barriers. However, the unused spaces along railway tracks frequently attract visitors from nearby neighborhoods, who utilize these areas for interaction, play, relaxation, socializing, and enjoying nature. Despite their potential, these spaces are currently neglected by authorities, which negatively impacts the urban fabric. These underutilized areas can be transformed into healthy urban open spaces that contribute to community well-being and sustainable development. This study focuses on investigating the unused spaces along the railway track in Kot Lakhpat, Lahore, with the aim of regenerating these areas for the benefit of the community. A descriptive analysis approach is employed, incorporating qualitative assessments of the site and gathering opinions from various stakeholders, including architects, urban planners, and residents. The research methodology includes surveys, interviews, and site observations to identify key issues such as encroachments, environmental conditions, and safety concerns. The study compares expert opinions with the needs of users to develop a balanced design strategy. The findings from this detailed analysis recommend regeneration of unused spaces into healthy urban open spaces will benefit community in providing healthy clean environment as well as it will save the site from site abuse. (As discussed in the paper).

Introduction

Urban spaces are crucial in cities, influenced by cultural, social, economic, and environmental factors. One of the biggest challenges is the utilization of unused and underutilized urban spaces, which is directly related to sustainable city development. Urban development continuously reshapes city landscapes, often resulting in the emergence of unused spaces. Several factors contribute to the creation of these spaces, including rapid city growth, strategic population control, and the oversight of authorities. (Pagano & Bowman, 2000)

The regeneration of urban unused spaces is very important aspect of urban renewal projects and sustainable city growth. In numerous studies, these spaces are often referred to as "urban voids" due to their characteristic of being unused, thereby creating a void in cities or other areas. It is sometimes challenging to find different terminology that conveys the same concept, which can complicate the understanding of these spaces. Urban void is an all-encompassing term that refers to vacant lots, abandoned structures, and

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brownfields, among other underutilized, abandoned, or abused locations.(Aleha et al., 2023) Therefore, all spaces that have been neglected for several years can be categorized as urban void, vacant lands, or unused spaces, which negatively impact the aesthetic appearance of city. This research uses the terminology "unused spaces" or "urban unused spaces" and provides a concise overview of regenerating these areas as urban open spaces.

Different studies have revealed that there are very few open spaces in densely populated areas, where urbanization have a negative impact on residents's activities.(Akkerman & Cornfeld, 2009) The absence of open spaces in urban areas can negatively impact people's well-being. However, by enhancing public open spaces to encourage physical activity, they can be transformed into functional and beneficial components of the built environment (Reyes-Riveros, 2021). These types of unused or undefined spaces may be referred as leftover spaces in urban design theory. These spaces cannot be used effectively due to urbanization and considered as city's leftover spaces. (Aleha et al., 2023) . Lost spaces include sites such as abandoned railroads, relocated industrial zones, disused military or transportation facilities, vacant parking lots, and neglected estates. These also encompass scattered, underutilized spaces often found amidst commercial areas.

Literature Review

Potential of Unused Areas

Presence of unused spaces in cities is always been a question in maintaining city's fabric. But, transformation of such spaces as revitalization and regeneration projects, are becoming trend in improving city's fabric and controlling urban sprawl. It is evident from regeneration of unused spaces that transformation of such spaces benefit public as well as communities. However, the revitalization of unused areas is closely related to current issues of urbanism like urban sprawl. The developent of unused railway areas has the potential to dramatically reduce this phenomenon.(Kugl, 2022). Redevelopment of unused railway areas is not related to totally abandoned railways, but it is also related to the effective use of spaces available along the railway tracks. (The best-known examples of these approaches are High Line Park in New York)

Unused Railway Areas

Railways have always played a crucial role in the development of cities, making it essential to shift our focus towards utilizing these areas. Regenerating unused spaces along railway tracks into urban open spaces for public use can promote healthier lifestyles while positively managing urban sprawl. This approach fosters community well-being and optimizes the potential of neglected urban areas. A quality revitalization of such spaces is essential, as these spaces plays important in entire structure.

Railway Green Corridors

Revitalizing unused urban spaces, including abandoned railroads, has become a global trend aimed at reclaiming open areas. Transforming these spaces into greenways, linear parks, green belts, and trails provides countless opportunities for recreation and transportation. Converting railway tracks into parks is emerging as a popular solution for repurposing idle railroads. Cities are increasingly transforming these underused tracks into scenic linear parks, turning previously neglected spaces into vibrant community hubs. Often referred to as rail parks, these trails offer significant benefits, creating walkable and livable environments. They connect people to places, providing children with safer routes to school, adults with affordable options for exercise and commuting, neighborhoods with communal gathering areas, and businesses with improved accessibility for customers.

The railroad holds great importance for the people living beside the tracks. Railway corridors also provide economic opportunity for community. Local business is also brought to different areas by trail users. Railroads have consistently attracted the interest of property developers, as they offer direct benefits to nearby residents and tend to sell faster than other green spaces. A 2003 study on the renowned Monon Trail in Indianapolis—a 16-mile-long pathway often referred to as "The Lifeline of Indiana"—highlighted its growing importance as a vital resource for the surrounding community. Moreover, homes near theses corridors becoming high on prices due to economic importance. These rail roads also encourages surrounding community and inhabitants for physical activities.

The research is focusing on unused spaces available along the railway tracks and its potential to regenerate them for healthy urban open spaces. The regeneration of urban open spaces along the rail tracks depends upon the literature published on same strategies. In many studies it is shown clearly many unused railways areas have been regenerated for making such areas lively. Many case studies also shows that unused railways areas and abandoned railways lines can be transform creatively. For example, The Railway Cultural Park in Xiamen, China, stands out as one of the city's finest themed parks. It is built along a north-south stretch of the former Xiamen-Yingtan Railway, extending from Wenping Road to Heping Dock. This park's

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design celebrates its unique feature—the original railway bed—by blending it with stunning greenways, paved pathways, and artistic sculptures. After meticulous planning and design, the park opened to the public on August 1, 2011, offering a beautifully transformed space for visitors to enjoy.

Materials and Methods

This study adopted descriptive approach to achieve desired objectives. The study aims to theoretically analyses the unused spaces along the railway tracks and reuse of such spaces as urban open spaces to provide quality life to living community. Additionally, this paper is intended to provide design guideline for developing urban open spaces along railway tracks, following the guidelines published in research papers on same strategies. This study involves analysis of a case study. The study comprises of both qualitative and quantitative analysis of selected site utilizing research tool of survey, and field observation to collect data

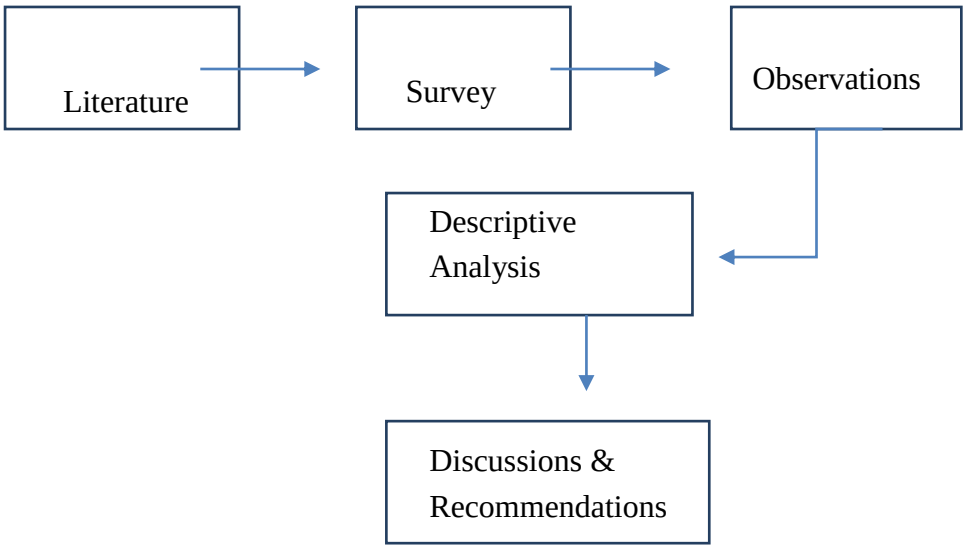

Figure 1. Framework of Research

Study Area

The selected railroad section, located on the northwest side of Lahore, has the potential to inspire many as a unique urban oasis. This stretch of railroad, divided into several sections, is ideal for the regeneration of healthy urban open spaces. Key benchmarks along this stretch include Walton Railway Station and Kotlakhpat Railway Station, as well as other disconnected sections shown in Figure 2. The selected site is 4.6km long patch, stretching through two vibrant Lahore neighbourhoods. We will concentrate on a specific area to assess the key attributes of high-quality urban open spaces, while addressing the challenges faced by local residents and nearby communities. A framework plan created for selected site is easily adaptable for other sections, as the entire rail track exhibits similar characteristics. Figure 2 shows the site map it contains more than one dead piece of land and situated in the old town kot Lakhpat (Lahore), having area of 952856 m^2 with a population of 53670 residents. (Venture, 2015).

Figure 2. Existing Site Map (*google maps*) (***Google Earth)***

Figure 2 is showing site map from Walton to Kotlakhpat. The map is showing all the details main roads, rail line and selected site, in figure blue shaded regions represent those areas which have transformation potential. The entire track from Walton to Kotlakhpat is divided in five chunks which can be easily converted into healthy open spaces. The selected chunk is located near Kotlakhpat railway station with an area of 60.82 kanals.

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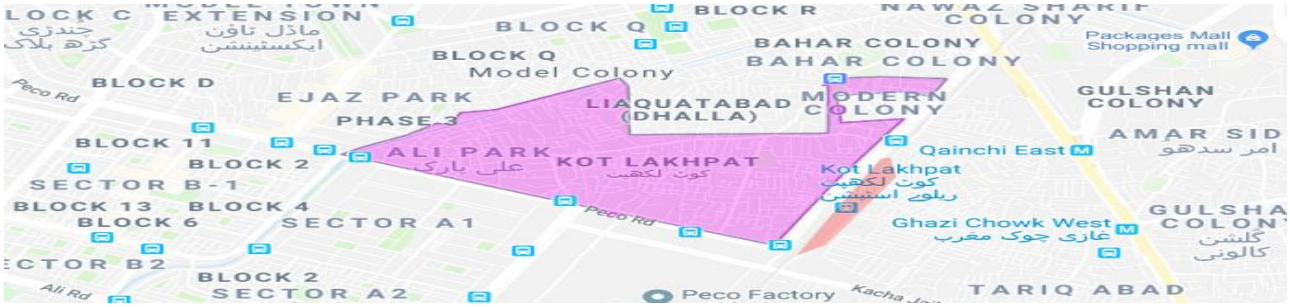

Figure. 3 pink shaded area is showing kotlakhpat area and the red shaded area is highlight research study site. (*Google maps*)

This selected area is predominantly a middle-income neighbourhood with a planned settlement. This is an old town characterized by its dense and compact layout, featuring low building massing, with the tallest buildings reaching three to four stories. Considering its location in the old town where almost all developments are limited to single or double story, any new development should be according to low-density profile of surroundings. The identified urban unused spaces create a gap between the railway community, indicating a clear opportunity for place-making. The study aims to develop a breathable, interactive space for the community, focusing on the revitalization of urban open spaces generated from targeted urban voids.

Figure 4. Research Site Map (*google maps*)

Site Assesment

After focusing on revitalization of urban spaces, it is clearly observed that these spaces become vital spaces where people love to go and interact together. These spaces will fulfill the requirement of urban open spaces and provides different activities as they are located on main road. So, the main source of attraction for people passing by these spaces, giving unlimited options to use such spaces, it will also increase environmental and economic benefits. (omnia Mamdouh Hashem, 2022)

Analysis

The findings reveal the public's perceptions of the political, social, ecological, and economic conditions of the selected site. Study also highlight that, despite facing economic challenges, the community within this urban space continues to prioritize its social values..(Aleha et al., 2023) From the perspective of urban open spaces, Kotlakhpat contains several important sites that indicate it is a government-owned area, which will be prioritized when considering environmental preservation shown in table 1.

Table 1. Important Areas of Kotlakpat

	Important Roads
I	Peco Road, Kotlakhpat Lahore
	Markets
1	Kamran wala bazar
II	Akbar shaheed bazar
	Mosque
1	Jaamia masjid Saabria
II	Jaamia masjid Saabria
	Imam Bargahs
I	Hazrat AbutTaalib darbar
II	Baba aslam shaheed
	Educational Institute
I	Fazal noor girls model high school Govt girls Middle high school
II	Imtiaz public high school

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Walk-through Survey

The major issues identified by walk-through survey mentioned in table 2, along with some recommended solutions.

ISSUES RELATED TO SITE	DOCUMENTRY SOURCE	DESCRIPTION	RECOMMENDED SOLUTION
Encroachments		The prolonged disuse of railway colony sites has led to their illegal occupation by nomads.	Pakistan railway has conducted anti encroachment operation in karachi to reclaim illgealy occupied lands.(Desk, 2024) This practice should be followed in other areas to prevent encroachments
Worst Sewerage System		The colony lacks an adequate sewerage system, leading to overflowing drains filled with trash, which creates a highly unhygienic environment for the community.	Real time controll system should be adopted to monitor the space regularly(Eulogi et al., 2022)
Polluted Environment		The area is cluttered with debris, and unwanted items are discarded on the site, resulting in an extremely unpleasant atmosphere.	To improve air quality, vegetation barriers should be provided which will naturally control air pollution. (Richard, 2020 It is recommended to plant different near traffic corridors or establish green belts to control pollution (Warren, 1973)
Site Abuse		It's evident that abandoned spaces often become hotspots for illicit activities and suffer from poor aesthetic quality, which is also the case with the railway colony.	Author emphasizes on collaborative measures, educated public, implementation of laws and security staff training will effectively control site abuse in railway colonies.(Grigore, 2017)
No Proper Security		The security fences are entirely broken, rendering the site unsafe for the surrounding community.	Integration of video survillaance is hightly effectively to control site breaches.(Shan, 2018) Installation of electronic fence is suggested for sfe management of areas have no boundary (Hao, Bai, & Yu, 2019).

Table 2: walk through survey showing physical condition of site

Site Issues

During walk-through survey some issues have been considered which are directly related to these vacant spaces.

Site Condition

It has been observed that unused spaces will easily turn into major areas for negative activities. The condition of kotlakpath railway colony' urban voids are on the same state. They are fill with trash and abandoned railway bogies and broken tracks and fences are also tossed on these sites see figure 4. It has affected the atmospheric quality of the site and destroyed the aesthetic quality as well.

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Figure 4: Existing Transparent Rails on Site (*Author's field work*)

Encroachments

Another issue related to vacant spaces is that people start to use it for small business and build properties without permission shown in figure 5. Same is the case with railway colony. Occupants have used these sites and now these are extremely crowded and unplanned.

Figure 5: Encroachment's and Debris on Site (*Author's field work*)

Noise and pollution

With no authority oversight in these areas, the arrival and departure of trains lead to an influx of automobiles, resulting in significant noise and pollution. Additionally, the area's direct exposure to the main road, coupled with heavy traffic, further exacerbates the noise levels.

Results and Discussion

Research Instrument and Tools

The research is based on observations and survey of different parks and open green spaces have been done near research site along with casual interviews with locals and residents to get maximum idea of daily outdoor activities and usage of open spaces to reutilize selected urban voids according to the need of living communities.

Surveys

To collect information and data of any selected site depends upon site survey and detailed site analysis. A survey is not just visiting site and collecting information through personal observation but it is actually based on talking to users and residents to get proper information. A questionnaire was designed, including different question about what type of activities users want in open spaces, their preferred open spaces, factors they like most about green areas to know about users' perception about selected spaces.

Findings from Survey

Data collection is done in three different ways through a time period of one month including user-reported data and expert-reported data and physical observation. The results concluded from entire data is compile in pie charts. In order to get valid results survey was conducted with almost 70 users (site users). The main objective of research survey was to get user perception about performance of space and quality according to users' need and wants with the space identified. Moreover, it was also necessary to know the experts (architects, urban planners, environmentalist) opinion regarding impact of regeneration of vacant spaces on quality of life shown in figure 6. In survey questionnaire participants' opinions were graded on scale of five 1 representing agree, 2-strongly agree, 3-neutral, 4-disagree and 5- strongly disagree. As a result of established research investigations, five performance levels were identified by descriptive analysis; the categorization of these performance levels is given in the Findings section and covered in the conclusion.

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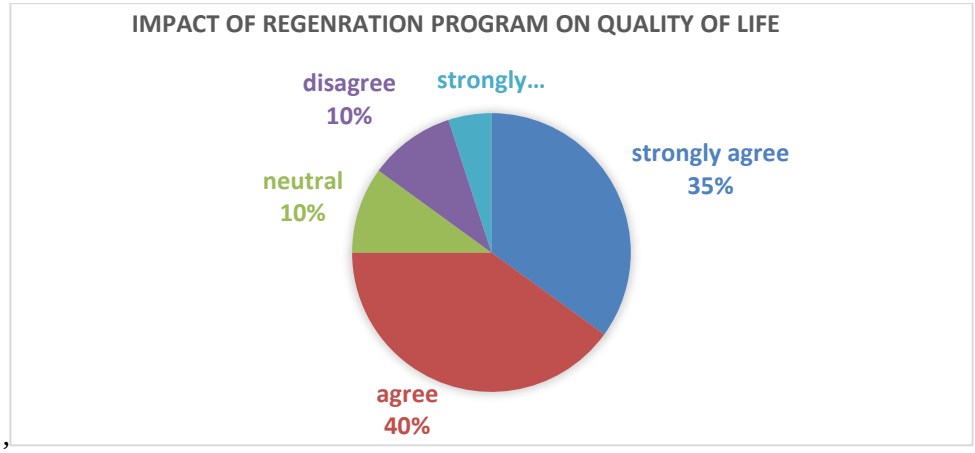

Figure 6. Pie chart showing the impact of regeneration program on quality of life

Expert Reported Data

A separate questionnaire survey was conducted among experts to gather professional insights from those actively working in the field, as they possess a deeper understanding of the needs and benefits associated with the utilization of unused spaces. The survey revealed that nearly all participants were architects and urban planners, which is valuable for gaining design-related perspectives. Participants expressed significant concern about the redevelopment of urban open spaces in the city, emphasizing the role these spaces play in controlling urban sprawl. Additionally, most participants agreed that the poor condition of existing spaces is primarily due to inadequate management, though some were neutral, indicating that other factors might also be involved. Several participants highlighted the social and environmental benefits of urban open spaces, particularly the enhancement of environmental quality through the creation of healthy public spaces.

User Reported Data

The detailed survey conducted among all participants (users) highlighted that now is the prime time to create urban open spaces for the well-being of the community and to manage the city's urban sprawl. The regeneration of these spaces will benefit everyone who uses them. The survey results provided a refined understanding of the key benefits and features of urban open spaces, which will be instrumental in the creation of public spaces. Additionally, Table 3 presents a comparison of site attributes as perceived by experts and users, highlighting users' preferences for urban open spaces and their desired features in these areas.

Table 3. Features of Urban Open Spaces

Features	Expert opinions	Users' Need
Walkways	High priority	High priority
Jogging track	High priority	High priority (with security needs)
Sitting furniture	Moderate priority	Needed (proper/ shaded sitting spaces)
Play area	High priority	High priority
Green area	High priority	High priority
security	High priority	Moderate priority
gazebos	important	neutral

Surveys results shows these features should be incorporated while regenerating urban spaces. but it is also necessary to incorporate experts' opinion as a core designer to develop a healthy and safe for public. Experts also emphasized on key features like, accessibility, safety, and maintenance which are considered as main features of any open space.

Conclusion

The research is highlighting key factors related to urban spaces according to users and surrounding communities' perception. This section is describing some key points which are based on the results derived from surveys, the interviews with professional have solved some design related issues and data derived from detail findings.

It is concluded from findings that there are significant challenges in the planning and maintenance of unused spaces in the selected area of Lahore. It is crucial to repurpose these leftover spaces to enhance the

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city's fabric. Additionally, the successful revitalization of these areas depends on the specific characteristics of the location and the needs of the local community. The study also reveals that it is a responsibility of government to develop healthy urban open spaces which are free from encroachments and solid waste (site issues discussed in walk-through survey) in densely populated areas as users are unaware of the need of urban open spaces. (Sutton, 2008) The community must strengthen its resilience to protect its best interests. The designer's role is to act as a facilitator, creating a functional, socio-cultural, and aesthetically pleasing environment by effectively utilizing urban voids. (Anum aleha, 2023) Moreover any intervention relies heavily on the community. As a result, every design relies heavily on their active participation. A participatory approach can be used to address most issues. Additionally, this strategy will enable selected space for long-term usage and add value in urban fabric.

Contribution to the Findings

The contribution of this study is made for the improved design of fruitful urban open spaces that play a vital role in raising the quality life style of community. Additionally, the findings helped to deepen the understanding and development of theories related to active use of urban spaces, aiming to improve the lives of those living in areas affected by poor planning and maintenance.

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