Planning for Urban Quality in Station Area Development, Bijwasan, New Delhi

Chhavi Arya, Peter Zeile, Prerna Sudan

(Indian Institute of Technology Roorkee,247667, Roorkee, India & Karlsruher Institut für Technologie, Stadtquartiersplanung STQP, Englerstraße 11, 76131, Karlsruhe, Germany, chhaviarya.cca@gmail.com)
(Dr.-Ing. Peter Zeile, Karlsruher Institut für Technologie, Stadtquartiersplanung STQP, Englerstraße 11, 76131, Karlsruhe, Germany, peter.zeile@kit.edu)
(Dr. Prerna Sudan, Raj Rishi Autonomous College, 301001, Alwar, Rajasthan, Indian)

1 ABSTRACT

Transport nodes play an important role in the urban functions of the city. In the present context when cities continue to sprawl outskirts or expand in the sky, coupled with problems of urbanization, such as congestion and degeneration of city cores, station areas become an oppurtunity district for a transformative land use planning. The european cities tapped this potential by planning the renaissance of the station buildings and the surrounding area as a part of infrastructure augmentation exercise back in the 20th century. This not only led to the revitalisation of the cities through strategic real estate projects but also reinfornced the urban and transport functions of the railway station. The paper in this regard aims to explore the planning discisions and spatial efforts taken in the creation of successful urban spaces around railway stations in Europe. The policy of Redevelopment of Railway Stations in India which aims to create world class railway stations by improving the consumer facilities and the commercial viability provides a pretext for the study conducted. It takes into consideration a new typology of development in India, i.e. the modernization of railway stations and the urban planning that should complement such an infrastructure development. The objective of study is thus, to understand the challenges, oppurtunities and prerequisites to inform the planning process of such a developement. The study proceeds by analysing the urban spatial grids around the selected casestudies and thus draws conclusions for the site of Bijwasan Railway Station Redeveopment in New Delhi, India. It aims to highlight the importance of creating a place out of a transport node in the urban dyanamics of city.

Keywords: urban quality, good urban space, station area planning, railway stations, infrastructure

2 INTRODUCTION

The redevelopment of railway stations gained impetus in the end of 20th century, with many European cities planning the renaissance of the station buildings and the surrounding area, as a part of infrastructure augmentation exercise. Along with this new development came the opportunity to revitalize the cities by planning strategic real estate projects in the station areas, and hence, reinforcing the urban and transport functions of the stations (Bertolini, 1996). The paper in this regard tries to find solutions to integrate the station nodes with urban places, in the context of India.

Railway stations are seen as the face and symbol of the city. Milano Central (Milan), Gare du Nord (Paris) or Chhatrapati Shivaji Terminus (Mumbai) are major place making elements in the city and tend to become the identity because of the massive number of passengers they cater to- 320,000, 700,000 and 636,000 respectively (ItaliaRail, n.d.; Lemmin-Woolfrey, 2015; Mehta, 2013). The importance of railway station thus, expands from merely being a mobility service to a gathering node and hence, an engine of economic development (Bertolini, 1996).

The policy of Redevelopment of Railway Stations in India, introduced in 2016, keeps this importance as the crucial point of the proposed development. It focuses on improving in station facilities and generating the non-tariff revenue through land use development like retail, office space, restaurants and hospitality through a Public- Private Partnership model (Ernst & Young, 2016). This will not only lead to infrastructure and transit ridership improvement, but also towards regeneration of the surrounding urban areas.

This phenomenon, however, makes such projects a complex one with the project acting as a growth pole for the development proliferating around (Pol, 2005). An integrated development of the transport node and urban place is envisioned but becomes a fragile urban planning exercise in this regard (Trip, 2007). While the redevelopment can lead to the regeneration of the city cores or the influence areas, it is vital to plan for such a development, understand its challenges and potentials, to follow a strategic growth trajectory.

This thus, becomes the focus of the research. It is a single site-oriented study, which focusses on the station area development for Bijwasan, a railway station located in New Delhi, which is set for redevelopment under the policy.

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As per the Project Information Memorandum, the passengers handled by the station in a day equated to around 47,500 in 2015 and is projected to be approximately 70,400 in 2025 and 127,300 in 2050 (Ernst & Young, 2016). The other successful stations in Europe like Euro-Lille and Part Dieu, Lyon in France which went through a redevelopment and station area planning have 58,000 and 90,000 daily passenger riders, respectively while Berlin Suedkreuz is expected to have 89,000 passengers once completed (Loukaitou-Sideris, et al., 2017).

The prevailing site context promise to elevate the station as a premier multi modal transit hub in the region, the first of its kind in India. At the same time, availability of significant masses of underdeveloped land offers a potential for development in the station area.

However, the planning and development of Bijwasan and its adjacent areas also have some challenges. Institutional/ organizational challenges include the various governance tiers involved as stakeholders and the division of discision making involved. Some challenges being perceptual involve how to shift the car dependency and modal split. Other challenges are physical, which include how to integrate a modern built fabric with the existing one and avoid the barrier effect. Lastly, a few are strategy oriented and financial: How to attract investors, developers and how to implement a Public Private Partnership Model?

Nevertheless, planning for station area development is not a new phenomenon in the European Cities and thus, has created a great pool of knowledge to extract lessons applicable in the Indian context.

3 RESEARCH STRATEGY

The research is centered arrount the key questions of station area planning and its different approaches in practice and in theory between different countries and regions. More precisely, it focusses on two research problems, what makes station area a good urban space? And how to plan the neighbourhood of the railway station based on the principles of a good urban space?

While this research explores issues and opportunities that impact the transit station and regional development in India, it is also required to identify and evaluate contextual issues which may be specific to a circumstance. The research program will, in part, use a comparative case study approach to assist in the understanding of ‘in practice’ railway station and local land use planning, for example, Euro-Lille (France) and Utrecht (Netherlands).

To understand the stations and adjacent local, state and territory government perspectives and decision-making on railway stations and regional land use planning relationships, process, and outcomes, the data is also collected through interviews with stakeholders.

The aim is to provide an explanation that how some redevelopment efforts turned out to be successful places. ‘Good Urban Space’ in the study is taken to mean as an urban setting with vibrant environment related in part to the influence of the urban grid configuration on movement (Hillier, 1996). The analysis relates it to the level of pedestrian movement found in and around the terminus, for creating it a significant pedestrian ‘place’ in the city. The understanding of ‘place’ is further refined by Hillier's concept of a ‘live center’, where the urban grid is intensified and its effect on movement subsequently influences the intensification of activities (Hillier, 2000). The analysis is concerned with assessing spatial factors that promote good levels of pedestrian movement or rather ‘natural movement’ (Hillier, 1993). Observation data will be used couple with Space syntax methods, set of computer techniques developed at the Bartlett School of Architecture, University College London, to understand the spatial effect of their current urban settings.

4 BIJWASAN-STATION REDEVELOPMENT EFFORTS

Bijwasan is an existing station on Delhi-Rewari line of Indian Railways network in the National Capital Region of Delhi near Dwarka. The need for redevelopment of Bijwasan arose as the existing five major terminals of Delhi, i.e., New Delhi Railway Station, Old Delhi Railway Station, Hazrat Nizamuddin Railway Station, Delhi Sarai Rohilla and Anand Vihar station, have already reached their saturation for train handling and passenger management due to infrastructure constraints. The impetus is further given to the project due to the favourable site location, excellent connectivity and the prospect to develop Dwarka as a sub-smart city. A Special Purpose Company (SPC) named as ‘Indian Railway Stations Development Corporation Limited’ (IRSDC) was incorporated in 2012 with permission to commence the business, specifically for

development/redevelopment of stations. It was assigned eight railway stations all over India with Bijwasan being one of them.

The Project Site is in South-West of Delhi, within Planning Zone (Division) 'K-II' of the National Capital Territory, as per the Delhi Development Authority. It lies in close of proximity to Sector-21 Metro Station (served by Airport express and Blue Line metro lines) on the West and a proposed ISBT coming up in Dwarka. It is also in the proximity to India Gandhi International Airport in the East.

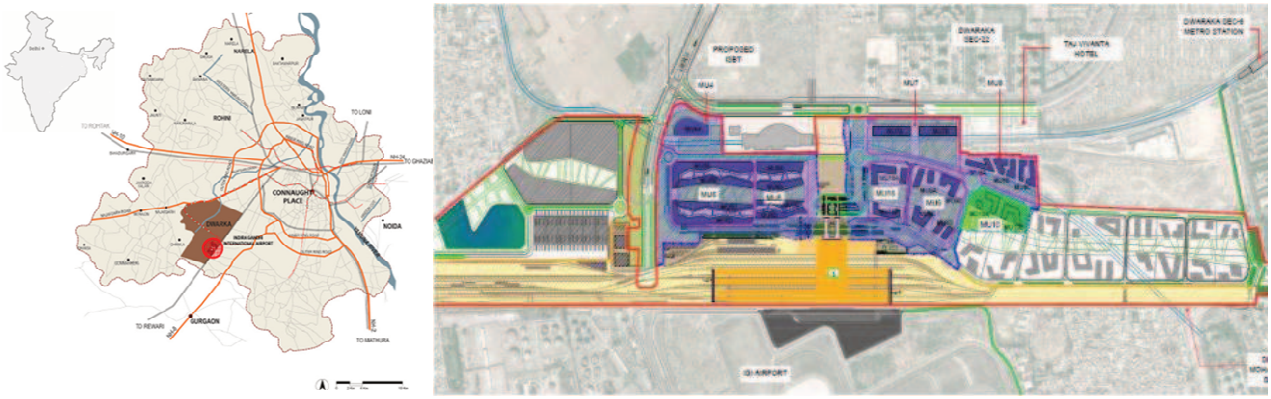

Fig. 1: Location of Bijwasan in Dwarka, New Delhi; Fig. 2: Masterplan for Bijwasan Station Area Redevelopment. Source: PIM, Bijwasan, IRSDC

The master plan prepared for the identified area of redevelopment of 146 Ha includes offices, retail and hospitality planned in the area along with provisions to make it a Transport Central Square. The developer shall develop the entire project including the station redevelopment and commercial development on preferably Develop, build, fiance, Operate and Transfer (DBFOT) format. The developer shall be responsible for station facility operations during development/redevelopment and for a fixed period post construction, after which the station operations shall revert to Indian Railways. The commercial area is envisaged to be operated by the developer for a concession period of 45 years (including construction period).

4.1 Site Context

Being on the suburbs of Delhi and Gurgaon, it places the site at an important level regionally. Delhi, being the capital city, yields the site a political and locational advantage, while Gurgaon growing at a rapid pace and being the face of development in the region makes Dwarka the next pocket of probable growth. It is approximately 12 kms from Gurgaon Cyber hub, which houses major Information Technology (IT) companies and attracts a huge workforce. It is approx. 17 kilometers from Connaught Place which the central business district of Bew Delhi.The site is proximate to Sports facilities and Guru Gobind Singh Indraprastha University and is adjacent to the planned Convention Center. The site is also 3.5 kilometers away from the upcoming Diplomatic Enclave in Sector 24, Dwarka.

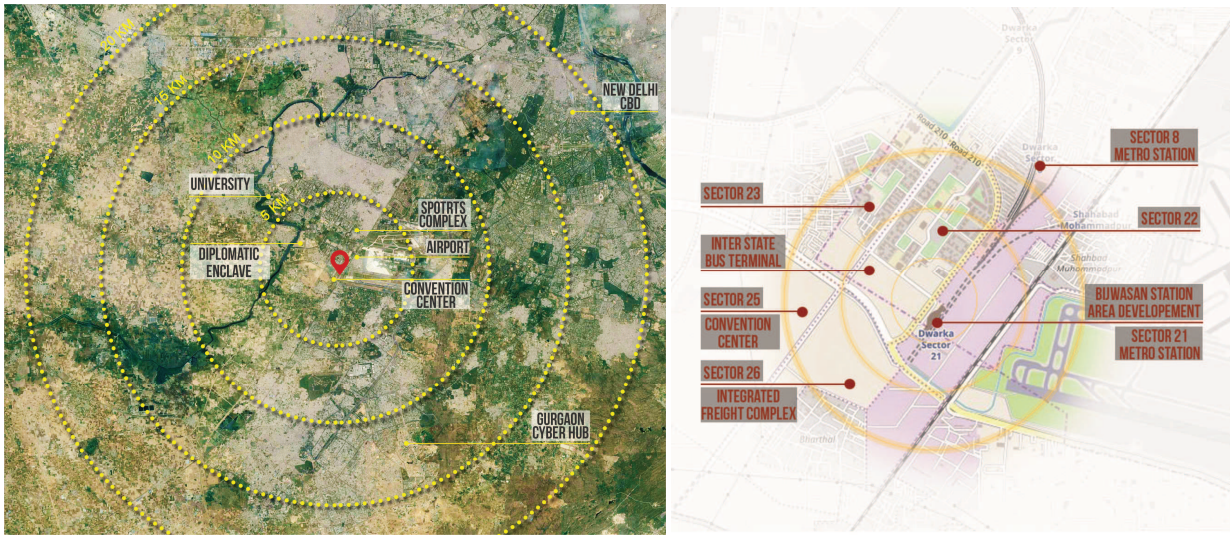

Fig. 3: Regional Context of the Study Area; Fig. 4: Local Context of the Study Area.

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The study area in the local context of within 1500 meters contains the 'planned development' zone as per the Zonal Developement Plan (K-II) 2021. The adjacent sectors include sector 22, 23, 25 and 26. The area can be accessed by two metro stations of Sector 8 and Sector 21. The master planning of Bijwasan Railway Station Redevelopment spans across sector 21 and 26. The remaining part of sector 26 is planned to be an Integrated Fright Complex and the adjacent sector 25 will be locating the upcoming International Convention Center. The major residential pockets remain in Sector 22 and Sector 23 which are planned sectors and Pochanpur colony in the North which is an already built up area.

4.2 Existing Conditions

The existing streets and block analysis shows the mix of planned regular sized blocks along with large irregular shaped blocks. There are blocks in the North West which show irregularity because of numerous small streets cutting through them which also create discontinuous connections. The existing built form analysis show that the North west becomes a medium density residential area with a need for potential reurbanization. There is a need for architectural improvements at major roads.

The 3-5 stories built up currently is the highest with 54 % followed by above 7 stories built up at 32%, 5-7 stories at 10% and low density residential at 4%. However, most of the medium density is present in Pochanpur village which is also identified for reurbanisation.

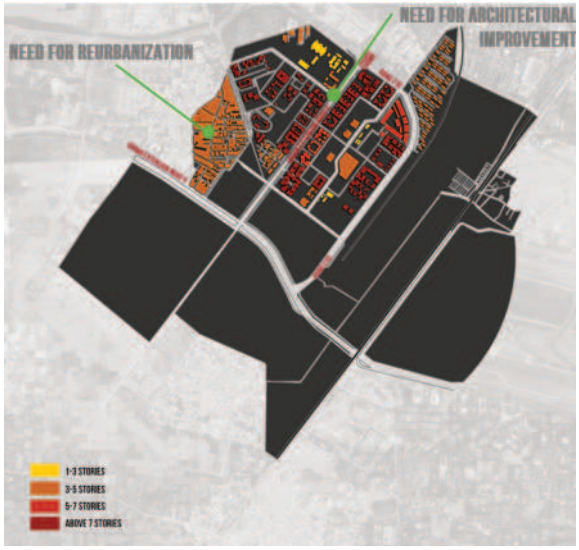
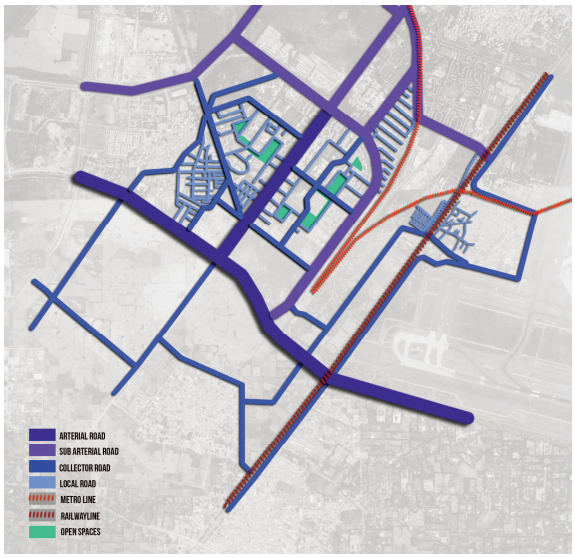


Fig. 5: Street Block Analysis of the Study Area; Fig. 6: Built form Analysis of the Study Area.



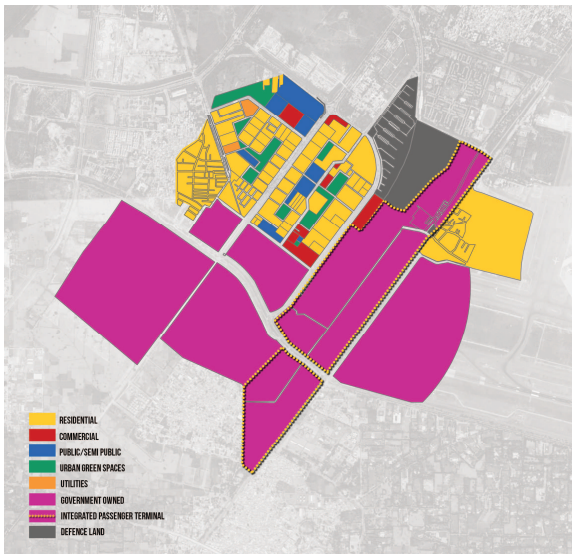


Fig. 7: Streets and Open Space Network of the Study Area; Fig. 8: Land Use Analysis of the Study Area.

Although the area is accessible by vehicular roads but there is serious absence of pedestrian and bike connections. This gives an idea of the high car dependency in the region which can be a threat to the future

development. There is also a disconnected system of green open spaces. The newly planned areas show regularity in street distribution but the already built up zones show a high number of disconnected connections. The land use distribution shows the high percentage (59%) of government owned land followed by residential at 24%. Although, the percentage of commercial land use seems under developed at the moment at just 2%.

5 STATION AREA PLANNING IN EUROPE

Bijwasan Station Area Redevelopment is an anchor project for the government, new of its kind. Though the project only focusses on the in-station facilities and improvements, its vital to look at its affect on the urban scale. Europe, having started with this development in 1980s, with the coming of high speed train, sets many parameters to to be studied. The casestudies were chosen keeping in mind:

- The Redevelopment efforts had the term 'Station Area Planning' and took into regard that the development focused beyond the terminus area.
- There was an availability of significant areas of developable land around the stations.
- The areas were redeveloped to handle a comparable size of daily transit riders.

Based on this, two casestudies were chosen to be studied in detail- Lille in France and Utrecht in Netherlands. While Euralille in Lille was one of the first projects to be implemented in this regard, Utrecht is a very recent development. Both the cases show the regeneration of the terminus areas over the years and transformation of the transport nodes to vibrant urban places. The following table gives a comparison of the casestudies with Bijwasan.

	Lille, France	Utrecht, Netherlands	Bijwasan, New Delhi
Area of Development	222 acres (Euralille 1) +150 acres	225 acres	360 acres
Daily Transit Users	1,20,000	2,85,000	1,38,000 (projected)
Land Uses	Retail, office, Hospitality, Residential, Government offices	Retail, Hospitality, Civic	Office, Retail, Hospitality
Year of Development	(Euralille-1)1986-1994	2006-2016 (Vision document till 2030)	2016 -
Stakeholders Involved	Euralille-Metropole (City), SNCF(Primary Rail Operators), OMA &Rem Koolhas (architects) and Société publique locale (PPP)	Klepierre (City), NS(Primary Rail Operators) ProRail(part of NS) and Jaarbeurs.	Indian Rail Station Development Corporation (RLDA+ IRCON), PPP with private company.(Not yet selected)

Table 1: Comparitive Analysis of the Casestudies and Study Area

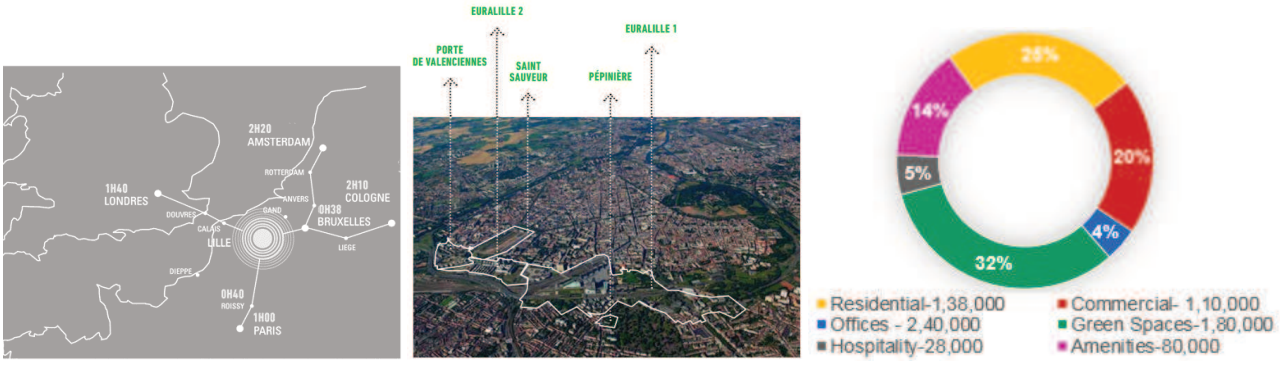


Fig. 9: Location of Lille at Important Crossborders (Source: Eidlin, 2015); Fig. 10: Location of Euralille 1 Project (Source: SPL, France; Fig. 11: Land Use Breakup of Euralille 1 in sq.m

5.1 Lille, France

Lille is one of the largest cities in north of France, sitting at the border of Belgium and Netherlands. When France, Belgium, the Netherlands, and Germany originally decided to jointly develop the North

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European Train a Grande Vitesse (TGV) network in 1987, the city considered the high speed train as an oppurtunity for catalising growth (Jong). The new station was soon located near the historic center at the cleared up military lands. This resulted in the Euralille Project. The new Lille Europe station was located only 400 metres from the current station, and the station area was transformed completely, to make optimal use of this opportunity. Architect Rem Koolhaas was assigned to design an urban plan for the station and the station area of 222 acres who envisioned to create new urban space in the station area.

5.2 Utrecht, Netherlands

Utrecht is the fourth largest city in the mid-western part of the Netherlands. Due to its central location, it serves as an importtransport hub for both, road and rail. The masterplan to renovate the station area was introduced in 2006 and the construction was almost complete between 2008 to 2016 (Loukaitou-Sideris, Peters, Colton, & Eidlin, 2017). Working on a clear vision of "connect, restore and give identity to the area", the masterplan was aimed at creating a mixed use area that would connect the historic city centre to the neighbourhood of Lombok with many Turkish and Moroccon immigrants which otherwise, were segregated by the rail tracks.

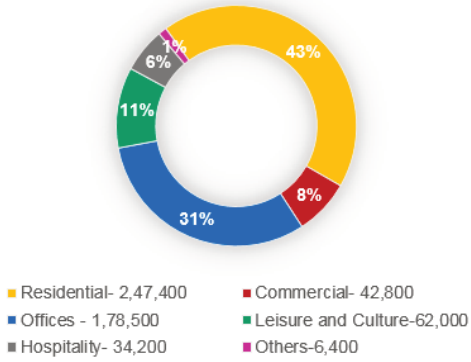


Fig. 12: Location of Utrecht (Source: Ditewig,2003); Fig. 13: Vision of the Project (Source: CU2030); Fig. 14: Land Use Breakup of Utrecht Centraal Station Area in sq.m

The planning process was divided into two sets of investigation- to make a plan and to execute a plan. Other important feature of the masterplan was the three elements- Rasterkaart, Programmakaart and Openbare Ruimtekaart. A clear zoning of public and private building zones and their interactions was planned through 'Rasterkart'. The intended land uses along with the scale of development was specified in 'Programmakaart' and the open space network, allocation of public spaces was defined in the 'Openbare Ruimtekaart'.

6 CONFIGURATIONAL ANALYSIS OF THE STATION AREAS

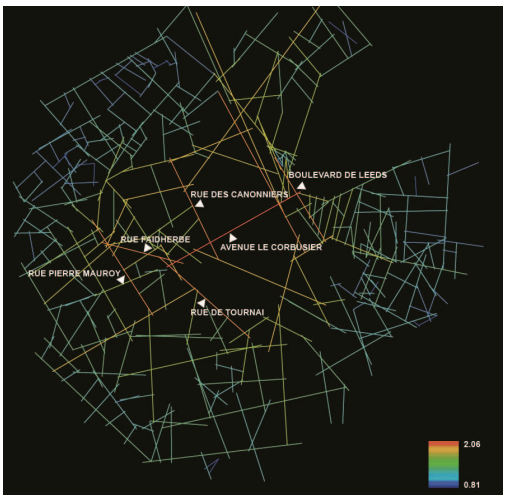
Using Hillier's configurational analysis, the study focussed on finding how well the station area embeds in the surrounding spatial network. The objective is to distinguish the consistencies found in the spatial characteristics that relate to vibrant as well as blighted urban conditions in the station areas and hence affect the pedestrian movements. According to Hillier, the way in which the urban grids evolve is accounted for to a great extent by the fundamental mechanism of natural movement, which is the proportion of movement determined by the architecture of the grids itself (Hillier, 1993). A dynamic relation between the evolving urban grid, its natural movement patterns and the developing pattern of land use develops over time. Spaces that become the busy focuses of urban life are most likely to be accessible for both to-movement and through-movement. Through the 'movement economy' process, land use and building density, which follow scales of movement in the grid, adapt to and multiply the movement economy effects, creating vital environments of mixed urban activities (Hillier, 1996). Based on this proposition, the pattern of spatial grid configuration can then be used to explain the current urban condition of the selcted casestudies, as well as the potential of the Bijwasan Redevelopment project.

For this purpose of analysis, axial models are studied in which lines are coloured in accordance with their integration values, with the intention of giving an immediate and intuitive illustration of the urban spatial patterns. The Axial map covers the whole area and depicts longest and fewest straight lines in the urban grid. The axial analysis, the syntactic measure shows the global spatial structure from red for the 'shallowest'

or most integrated lines through the spectrum to blue for the 'deepest' or most segregated lines in the area. The modelling area was chosen as a 15 minute walking radius or 1.5 kilometers approximately.

6.1 Lille Station Area

The axial analysis of Lille station area and its catchment is shown in the fig.15, Focussing on the immediate surroundings, the station is located next to the most integrated line in the system, Avenue De Corbusier. The other important integrators, which further strengthen this line from all around are Boulevard De Leeds, Rue des Canonniers, Rue Faidherbe, Rue Pierre Mauroy and Rue de Tournai. All these integrators however, run towards the station building, they do not continue the other side of the tracks. Hence, we see a comapritively weaker link on the North East, because of no linkages. Converging it with the planning area of Euralille I, it can be commented that the masterplanning did create areas which were well connected and hence may attract increased pedestrian activity, land use and thus, vibrancy.



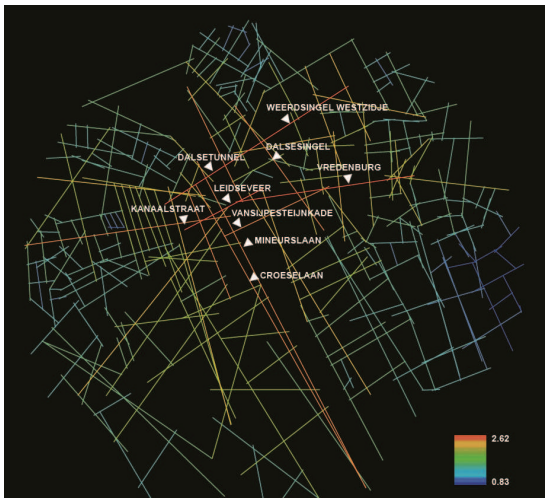


Fig. 15: Axial Analysis of Euralille 1; Fig. 16: Axial Analysis of Utrecht Centraal

6.2 Utrecht Station Area

The fig.16 shows the axial analysis done for the area around Utrecht Centraal. The station is adjacent to the integrated core formed by Leidseveer, Vredenburg and Vansijpesteijnkade. An important fact that comes to fore is that all these three integrators have bike and pedestrian pathways and hence become important pedestrian collectors. The vision of the master plan is seen coming to reality with the sides of track, i.e. the old city center and Lombok neighbourhood getting connected by another integrator, the Dalsetunnel. It can be observed that the integrators are much more widespread in the case of Utrecht Centraal Station area and hence there are very less 'deep spaces'.

Although both the casestudies have a difference in the number of integrators, typology of formation of integrated core and urban enclaves, both showcase that station building lies adjacent to major integrators. The areas around the station building not only have the absoulute absence of disconnected axial lines and deep spaces, they area rather a part of an itegrated system.

6.3 Bijwasan Station Area

The configurational analysis of the underdeveloped area of Bijwasan Station is useful to plan for integrated cores as per the casestudies. In the present scenario, it can be observed that in the South West, the lines are sparser and form a linear core which does not construct sub areas. There's a phenomenon of 'Line Integration' which is a characteristic of less developed urban structures. In the North and North east, the lines are denser which create identifiable sub areas. The residential pockets in the area come out as the most segregated spaces. However, Pochanpur village is shows higher amounts of integration, another characteristic of a spatial structure of village.

At this stage of development, one can observe a disconnected structure of urban grid with most lines being least connected.

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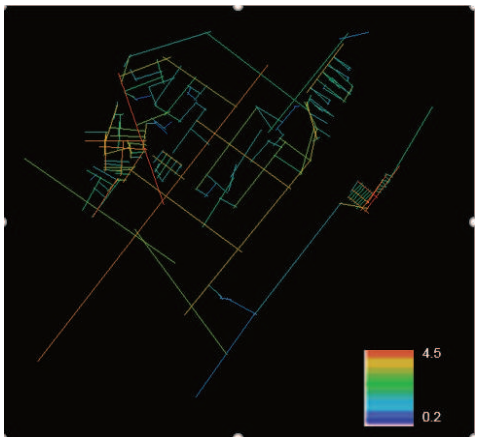

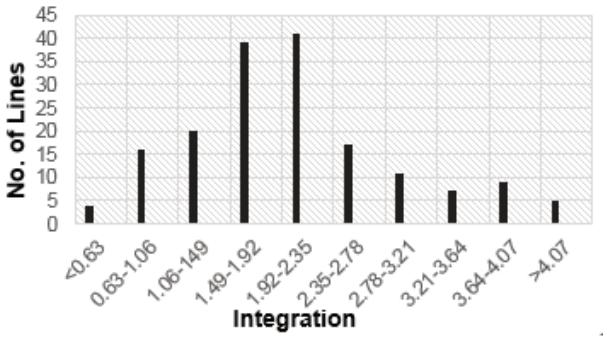

Fig. 17: Axial Analysis of the Study Area; Fig. 18: Histogram showing No. of Axial Lines vs Integration Values

7 CONCLUSION

The subject of the study is taking into consideration a new typology of development in India, i.e. the modernization of railway stations and the urban planning that should complement such an infrastructure development. While the site context holds a high potential for the success of the planned redevelopement, a few aspects on the urban spatial context were found missing. As observed in the two casestudies, the city was a stakeholder along with the Transport Undertaking and private companies, which is not there in the case of Bijwasan, owing to a lack of integrated approach due to institutional segregation. While the planned 360 acres lie in the Railway land, the nearby areas are a municipal land, both being dealt by separate departments. Although a challenge, it is also prerequisite for the project, as noted by the interviewees.

The configurational analysis clearly shows the importance of integrators for a vibrant environment and increased pedestrian activity. The site, which has a surrounding rural context, will have a changed face after completion. Introducing pedestrian connections is not only important for the spatial integration in the urban grid, it is also important to prevent social segregation which might follow due to stark built environments. Any intervention must aim at inclusivity of these communities.

The presence of public land uses in the walkable radius is an oppurtunity for the project and developing pedestrian and bike connection can stitch these spaces along with the adjacent station areas to produce a wider catchment zone and integrated core.

The succcess of Bijwasan Railway Station as a tranport hub is envisioned, however, creating an urban space will add value to the development and can become a torchbearer for other such infrastructure augmentation projects.

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