

Rapid Assessment Tool for traditional Indian Neighbourhoods: a Case Study of Alwar Walled City in Rajasthan



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ABSTRACT

The formal urban planning framework for modern Indian cities is not enough for its historical cities which are usually characterised by multi-functional spaces, heterogeneous societies, compact urban form and diverse economic linkages. The study establishes the need of a microlevel assessment of old neighbourhoods for community-based urban regeneration. The historic walled city of Alwar in Rajasthan in India is selected as the case study where traditional lifestyle still prevails. A comprehensive methodology helps devising a Neighbourhood Vitality Tool for rapid assessment of identified Neighbourhood Planning Units (NPU) with the help of vitality scores. GIS assisted analysis further helps in organising the spatial and factual data of each NPU in the form of an illustrative chart to help support local decision making. The proposed Rapid Assessment Tool for the historic neighbourhoods identifies their core urban issues as well as their underlying potential using simple colour coded matrix. The primary surveys for Alwar form the main inputs for the analysis and brings forth the challenges of vacant and dilapidated housing, traffic congestion and gentrification in the core city area. Such an indicator based assessment supported by visualization may help in quickly identifying the interventions at neighbourhood level and evaluate them for effective implementation.

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1. Introduction

Urban forms are result of urban experiences which may seem abstract but are the key to human settlements, their culture, and society. An urban space is not formed by its physical components alone but it is an amalgamation of several personal and impersonal processes which are socio-economic, environmental, political and legal (Lynch & Rodwin, 1958; Tonkiss, 2013). These material organisations of urban space are crucial to producing socio-economic arrangements within a community. The idea of urban inter-connectedness overpowers the traditional definition of cities as discrete spatial and functional units.

All urban occupations are temporary and urban context changes more quickly than urban form. Even an organic pattern depicts an

Abbreviations: AMC, Alwar Municipal Corporation; Avg, average; BPL, Below Poverty Line; C.L., Confidence Level; HH, household; NCR, National Capital Region; NDC, New Deal for Communities; NBH, Neighbourhood; NPU, Neighbourhood Planning Unit; OBC, Other Backward Classes; SC, Scheduled Caste; SD, standard deviation; ST, Scheduled Tribe; UIT, Urban Improvement Trust; ULB, Urban Local Body.

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arrangement and organization of urban space relevant to human settlements and an urban context (Batty & Longley, 1994; Tonkiss, 2013). There are several non-physical economic, social and political processes which are physically manifested in the built up environment (Jenks & Jenks, 2009). Lynch (1981) defined urban form from perspective of narrow fixity as a spatial pattern of large, inert and permanent physical objects in the city (Lynch & Rodwin, 1958) while Tonkiss (2013) redefined it from broad non-fixity point of view which is not limited to fixed elements of urban morphologies but is more dynamic concept (Tonkiss, 2013).

Technically, the organic and semi-planned development was socially and economically planned through a more complex process resulting in an intricate urban fabric (Batty & Longley, 1994; Tonkiss, 2013). Shlomo Angel in her book *Planet of Cities* (2012) explained the need for contextual prescriptions and not universal application based prescriptions for cities. The presumption that American and European prescriptions for cities are transferable to other developing countries often leads to absurd results (Angel, 2012).

Every historic city has a unique urban fabric, social composition, economic diversification, historical legacy, political constructs and local aspirations. Though these old cities are often stigmatised by negative connotations such as poverty, backwardness, congestion

and pollution but underlying their traditional planning principles lay a sustainable urban fabric which has sustained for several centuries. Hence, the approach of revitalising older communities has to vary not only for developed and developing countries but also for each city.

Currently, India's is focusing on the urbanization imperative and the Smart City concept is gaining ground rapidly. The urbanization agenda is in two parts viz. Atal Mission for Rejuvenation and Urban Transformation (AMRUT) mission focusing on the urban rejuvenation of 500 Indian cities and Smart Cities Mission focusing on area-based development, Greenfield development and pan-city development of 100 eligible Indian cities (Ministry of Urban Development (MoUD), 2015). However, the underlying potential of old settlements goes missing and their importance is not yet realised beyond the prospects of tourism. The traditional Indian cities are characterised by multiple uses of spaces, fluidity of movement (Narayanan, 2014), compact and dense settlements, social interactions, natural drainage and water management planning and diversification of economic linkages (Dhingra, 2014; Dhingra & Chattopadhyay, 2015) but the existing urban planning framework is probably not enough for its historical cities and needs a socially inclusive visioning of community-based approach for sustainable urban regeneration (Deakin, 2011). The new approach needs to be people-centred and should adopt place-based vision of urban regeneration (Deakin, 2009).

In such a case, micro-level planning becomes a crucial aspect of urban development. Though the term micro-planning is used contextually but broadly it means to realise the macro level national plans at local level. In essence, the term micro-planning implies multi-level and decentralised planning approach to the overall development of a country (Shah, 2013) which automatically ensures its applicability at local level harnessing its unique character and potential under financial constraints (Freiler, 2004).

The given study is an honest attempt to develop a micro level mechanism to harness the underlying potential of traditional neighbourhoods of the historic Indian city of Alwar based on community based partnership (Deakin, 2009). A 'Neighbourhood Vitality Tool' is developed to translate the subjective perceptions of the local community into vitality indices and a colour coded matrix (advantage of visualization in quick assessment). This integrated framework for old settlements is proposed to act as a Rapid Assessment Tool for other old Indian cities and assist urban planning authorities and local bodies in decision-making. Such an indicator based assessment may not only help to identify the interventions needed at neighbourhood level but may also evaluate these interventions, further strengthening the in-built feedback in the system.

2. Literature Review

2.1. Concept of Liveability and Quality of Life

There is a pragmatic discourse from static to a dynamic process of issues identification and assessing community's needs. It is a well-accepted realisation that the urbanization growth rate can't be the criteria for development and progress arising from an economic structure (Tavakoli & Akbar, 2012). Several efforts at an international and national level to rank cities by various socio-economic parameters help not only in measurement but also in the assessment of a region's baseline scenario and its future needs and prospects. The two most common concepts which are explored by the scholars, as well as the government bodies, are the concept of 'Liveability' and 'Quality of Life'.

Broadly, liveability refers to the conditions which are suitable for human living and quality of life refers to the general well-being of communities. Conceptually, liveability refers to the state of the

living environment which must offer an acceptable quality of life to the inhabitants of a particular locality (Salvesen & Renski, 2003). It is a subjective notion with its application varying for different economic, social, cultural and local influences, thereby governing the inhabitant's impression and perception about liveability. In India, the concept differs slightly from the concept of developed countries. Urban & Regional Planners, however, focus more on community quality of life and social well-being, rather than the more emotional and psychological indicators commonly used in the healthcare and other professions (CH2M Hill, 2011). A successful city needs to balance social, economic and environmental needs of its people and respond to all the domains of urban life. A list to illustrate few community liveability factors and their associated quality of life benefits are given in Table 1.

Among several attempts to measure liveability include Liveability Index system that monitors quality of life for a given environment using carefully selected social, economic and environmental index (Umesh et al., 2014), the World Bank's Annual World Development Indicators Series (since 1960) which monitors the achievement towards international development goals (Wong, 2015), the Asian Development Bank's Cities Data Book to manage the urban sector in Asia (Wong, 2015), Mercer's Quality of Living survey, International Living Quality of Life Index, Australian Unity Well-Being Index etc (Cities Alliance, UNEP and ICLEI, 2007). In India, the Confederation of Indian Industry (CII) prepared Liveability Index 2010 for Indian cities. However, the latest proposal to develop a City Prosperity Index (CPI) by the UN-Habitat (2013) comes with a strong assertion of the vitality and transformative dynamics of cities and thus their importance as the world moves into the urban age (Wong, 2015). These inspirational qualities, in many ways, resemble the underpinning rationale of the Human Development Index to shift the focus of development economics from national income accounting to people centred policies. By putting prosperity within a 'people-centred' agenda, UN-Habitat advocates its own approach by defining a prosperous city as the one that possesses essential qualities such as productivity, infrastructure, quality of life, equity and environmental sustainability.

2.2. Neighbourhood Level Interventions

Freiler has well pointed out that neighbourhoods are the prime places from where a strong, vibrant and competitive city starts to flourish (Freiler, 2004). Neighbourhood Planning Units (NPU) are the places where people live, grow and carry out their everyday practices and essentially create and form communities. Local residents share common experiences in terms of availability and quality of infrastructure, housing, jobs, schools, businesses and social services (Wilson, 2009). They not only act as one of the most promising units for a pragmatic intervention of their intended domain but also directly root themselves with the people they serve for achieving long-term sustainability. As a result, local programs usually have an added advantage in producing their intended results (Freiler, 2004), helping to analyse how much distressed they are, what forms of distress they are in, decide the priorities for the community, allocate best possible resources and investments in the right direction, monitor their timely progress and distinguish between effective from ineffective interventions. Hence, it is important to adopt area based approach for neighbourhoods integrating their social, environmental, cultural, community and economy dimensions to achieve socially inclusive urban development of the city by applying interconnected principles of distinctiveness, sociability, people-friendly, sustainable and high-quality design. (Deakin, 2009, 2012).

The concept of quality of life and livability for a neighbourhood can be further brought down to the concept of vitality which ensure a strong and vibrant community. UNESCO characterises Vital Com-

Table 1
Liveability and Quality of Life.

	Liveability Factors	Quality of Life Benefits
Economic Development	Availability of Jobs and Employment generation	Disposable income and more leisure time
Housing	Affordability, location, diverse housing typologies	Shelter, safety and security
Environmental quality	Air and water quality, aesthetics, noise levels, greenhouse gases emissions, open spaces	Physical and mental health, security from natural hazards
Community Development	Cohesive communities, historic and cultural resources, educational and health opportunities	Sense of belonging and place, communal harmony and resilience, social capital and upward mobility
Transportation and mobility	Availability and accessibility to multi modal options, high connectivity, pedestrian friendly streetscape	Independence of movement, reasonable and reliable travel times, physical and mental health
Equity	Equitable distribution of amenities and resources	Sense of social justice and exposure to diverse ideas

Source: adapted from (CH2M Hill, 2011)

Table 2
Neighbourhood Level Interventions in West Europe.

Grands Projects de Ville (GPV)	Kvarterløft ('neighbourhood uplift') program	New Deal for Communities (NDC)	Soziale Stadt ('Social City')
1981 – response to urban rioting Common Features	1994- for social regeneration – initial list of 500 problem estates expectation of resident involvement – cultural influence of the national context basic institutional structure for running these local neighbourhood programs involve some form of partnership between key public agencies as stakeholders in neighbourhoods common aim of solving urban social problems utilising an area based policy Resident and tenant participation. aim of building citizen capacity at the neighbourhood level offers a complement to 'traditional' forms of representative democracy and governmental methods of action	1960s and 1970s – urban policy due to social unrest	'national German urban policy' – creating and sustaining diversity
Selection of Neighborhoods Ad-hoc based on factors thought to be relevant by the local and central state. The préfet de région (state representative authority in the region) selects the areas for intervention and mayors decide which neighbourhoods within their commune will benefit from contrats de ville.	explicit bidding 500 disadvantaged areas and included both quantitative, socio-economic indicators, as well as qualitative assessments of each proposal. It considered not just social exclusion or racial tensions, but positive factors, such as social networks, the quality of the built environment or of open spaces	Central government with Index of Multiple Deprivation established most disadvantaged local authority areas Local authorities co-ordinated single bid for central government to choose the NDC areas attempt to relate intervention to a wider problem diagnosis like unemployment, crime, education, health and housing and the physical environment	Relatively open based on 'well known areas' that exhibit social problems based on intuitive knowledge of local authorities in almost 160 cities. Improvement of run-down housing areas, social needs of families & local employment strategies at neighbourhood level is focused.
Approach to Residents' Participation Agencies of the state & local elected councillors followed participation mechanisms which were ad hoc. Specific aims, means and results rather than coherent framework was chosen and combined actions with an immediate impact on people's daily lives with more long-term sustainable objectives.	Traditional Danish 'consensus-oriented' decision-making model with citizen participation created sustainable neighbourhoods (institutions and social policy). Residents and stakeholders participation, practical participation through public meetings, workshops and working groups from the early stages of the policy, setting priorities for projects to answer specific needs, through design, implementation & project management were some of its unique points.	Key role in urban regeneration programs at local level urban regeneration partnerships – 'community-led' regeneration partnerships run by boards & Housing Action Trusts that combine the executive and steering group function. Local residents constituted a majority on 24 out of 39 boards	Urban development assistance with active urban policy. Mixture of top-down and bottom-up networks with lack of authority to make decisions locally, depriving grassroots organisations of possibilities to act quickly and hindered activate-participation.

munities with strong, active and inclusive relationships between residents, private sector, public sector and civil society organisations that work to foster individual and collective well-being. Vital communities are able to cultivate and marshal their inter-relationships to create, adapt and thrive in the changing world and thus improve the well-being of citizens (Scott, 2010). Some of the neighbourhood level programs in West European Countries are given in Table 2.

In the USA, studies indicate that the convention is to identify and analyse neighbourhood change using income poverty as the base. Lucy and Phillips (2000) suggested two sets of indicators viz. general indicators such as income, age, race and ethnicity and project focussed indicators such as crime and railway stations (Carter,

2003; Lucy & Phillips, 2000). In a British context, Townsend (David McLennan et al., 2011) gave indicators for material and social deprivation such as dietary, clothing, housing, environment and employment. In Canada, Neighbourhood Designation Indicators have been devised which are classified into primary and supporting indicators such as housing, unemployment, demolitions, and population. However, in an Indian context, till now there are no such documented neighbourhood level initiatives to assess and improve their local condition. Most of the secondary data is available for entire city or region in the form of Census Reports and National Sample Surveys published by the Government of India.

In India, there are numerous traditional neighbourhoods in historic cities which portray traditional urban planning principles and

rich heritage values. There may be several non-tangible elements of urban heritage such as customs and beliefs, which play a role in the articulation of urban space and the built environment. Such an asset is not only limited to cultural perspectives but could become an economic asset with good potential of tourism and promotion of corporate enterprises. Old neighbourhoods in India do not follow Perry's 1990s definition which was used to model typical residential development in the metropolitan area. Clarence Perry conceived neighbourhoods as islands locked amidst a burgeoning sea of vehicular traffic, a dangerous obstacle which prevented children and adults from safely walking to nearby playgrounds and amenities.

Indigenously, the traditional Indian neighbourhoods are called 'mohallas' or "paras" or "peths" varying with their region. Literally, the concept of Mahalla in Arabic is old neighbourhood which is primarily self-governed by its local people. In India, the term "mohalla" is a geographical region in town which was inhabited by a common community living in an integrated cluster of houses. These clusters were based on community's territorial, professional, family and ethnic relationship. In terms of its social function, they act as a traditional self-governing small community which organises community's way of life (Cieslewska, 2010) and their nomenclature is usually indigenous. Nevertheless, the main role of an Indian mohalla was to maintain its traditional social and cultural values intact. The old and historic neighbourhoods exhibit a compact urban form and high social cohesion among its local community (Dhingra & Chattopadhyay, 2015). Importance was extensively given to pedestrians and local climatic conditions which enhance not only the walkability but also the energy efficiency in these old settlements. Squares and junctions played a very crucial role as meeting places for community discussions and public participation. Hence, a mechanism to assess the neighbourhoods' vitality, especially for old settlements, is devised using inputs from primary surveys conducted for Alwar walled city in Rajasthan in India in 2014.

3. Macro-level Characterization of Alwar city

Alwar walled city is selected as a representative case study of an Indian historic town which is the gateway to the colourful state of Rajasthan. Geographically, the city is at 27.57°N; 76.6°E with an average elevation of 271 m bordered by Aravalli ranges on its west. The total urbanised area is about $58.07 \times 106 \text{ m}^2$, out of which total developed area is $40.70 \times 106 \text{ m}^2$ with a total population of 381,400 (Census, 2011; Town Planning Department, 2011). The city lies within National Capital Region (NCR) of Government of India and a traditional way of life is still prevalent in old settlements portraying a rich tangible and intangible heritage of the city (Dhingra, 2014; Lall, 2001). The walled city of Alwar was laid out in 17th century A.D. based on ancient town planning principles as a gated community with intricate and compact urban fabric. The surrounding contiguous development of the city is contrastingly less dense and well planned. The central core of the city has a lot of traditional economic activities such as wholesale businesses, textiles, jewellery, handicrafts and art industries. The historic neighbourhoods portray rich Rajputana style of architectural elements such as screens (Jalis), balconies (Jharokhas), brackets and traditional courtyard planning which are unique to its old city area (Dhingra & Chattopadhyay, 2015). Alwar as an important magnetic center in NCR raises the concern how the old city area will be treated with the current government's wave of Smart Cities Mission in India. This study is an attempt to explore the issues at the micro level for the old city area and potential lying within the community to make them socially and environmentally sustainable.

However, there are various physical and social transformations in the city which have taken place in its past due to its political, social and economic restructuring. These transformations have resulted in an entirely new character to the present day urban fabric in the city. The 1947 partition of India and 1970s industrialization stressed enormously on its existing infrastructure and basic services (Dhingra, 2014). A haphazard and incongruent urban development is clearly visible in the city leading to degraded urban quality of life. This, in turn, has affected the residential culture of the old city. The rich and better off classes have moved to new developing areas leaving behind socially backward and under-privileged classes in their old neighbourhoods (Dhingra, 2014). Most of the old families with joint family structure follow a trend of shifting towards nuclear families, leading to change in their housing needs and style.

In order to understand and analyse various layers of development in the city and its historic urban landscape, six urban core elements which comprise its physical, socio-economic and cultural fabric were identified. These identified urban core elements are old neighbourhoods, commercial areas or market stretches, urban corridors, historical landmarks, green open spaces and intangible heritage components. The figure-ground analysis in Fig. 1 reveals an organic urban pattern with a random street network at the local level and a strong sense of visual linkage to its old monuments and Aravalli Hills. Large number of squares (chowks) exists but are not utilised properly and lack a vibrant public life. Most of them still have old religious buildings, schools, trees and wells. As per the Master Plan-2031, net residential density for the city was 20,500 persons per square kilometre but the old residential areas had residential density more than 30,000 persons per square kilometre in 2011. The poverty level in the city was recorded around 35% according to the income poverty survey conducted by Alwar Municipal Council (AMC) in 1994. A majority of the poor reside in the old city area, covering an approximate area of 4 sq. km and having the highest density in the city (Lall, 2001).

4. Methodology

For the purpose of the study, a detailed and comprehensive methodology is adopted integrating macro and micro level analysis. The surveys were carried out in the year 2014 at three levels viz. reconnaissance surveys, primary surveys and secondary surveys. Soft boundary delineation was systematically done on ARC-GIS 10.1 version to choose detailed study area geographically by overlapping various layers of its historical and new development. Detailed administrative map of the city was used to indicate micro level details of its wards and neighbourhoods. The delineated soft boundary is approximately 3.80 sq.km and comprises around 66 mapped old neighbourhoods indigenously known as *mohallas* with 20 important streets, 26 historically significant landmarks, 17 crucial market areas called *bazaars* and around 18 intangible heritage components such as local handicrafts and traditional artwork.

Reconnaissance surveys helped to identify the attributes of the core urban elements within delineated area such as streets, commercial areas (bazaars), old neighbourhoods (mohallas), squares (chowks) and open spaces. Total 210 sample size is chosen for primary surveys based on Eqs. (1) and (2); out of which 160 sample households and 50 shopkeepers were surveyed in detail. Secondary data was collected from Census department, Statistical Department, Urban Improvement Trust, and Alwar Municipal Corporation. Interviews of various government officials and old natives of the city were also conducted. The data collected is a mix of quantitative and qualitative data as shown in questionnaire attached in Supplementary material.



Fig. 1. Compact Neighborhoods of Alwar walled city.

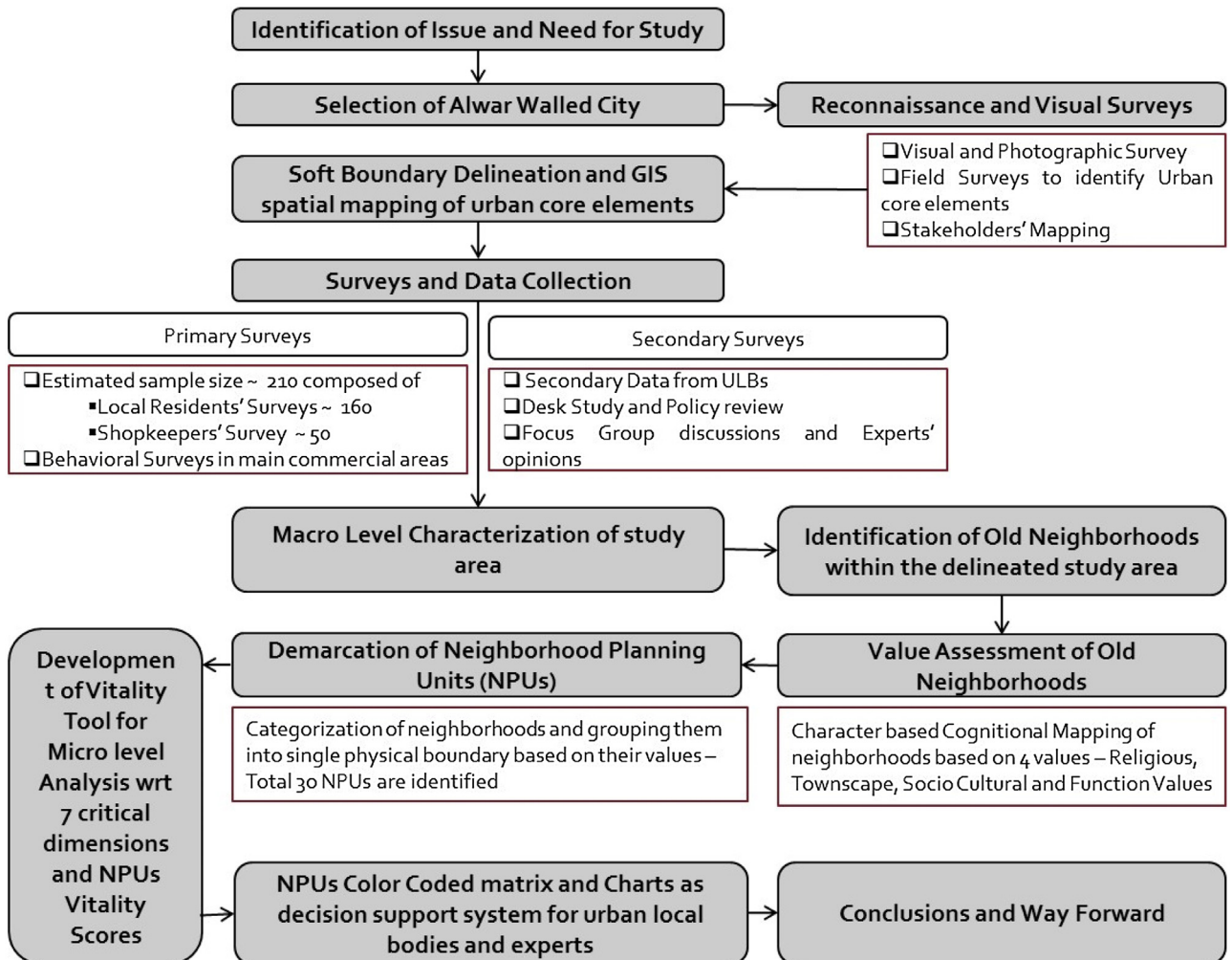


Fig. 2. Methodological Approach.

The methodology adopted for detailed micro-level analysis begins by mapping of old neighbourhoods on ARC-GIS 10.1 version using primary data as shown in Fig. 2. In order to devise a micro-level planning tool for historic city core of Alwar walled city, the old neighbourhoods have been grouped together into a manageable number of Neighbourhood Planning Units (NPU). The inputs from households are mapped to assist cognitional mapping on GIS and so old neighbourhoods have been merged together to formulate 30 NPUs based on their significance mapping.

For the purpose of sample size calculation, the confidence interval is assumed to be 90% (z value = 1.645) and margin of error 'm' to be 20%. Sample size is calculated using

$$n = \frac{z^2 \times p(1-p)}{m^2} \quad (1)$$

where

n = required sample

z = value of confidence level C.L. (for 90% it is 1.645)

p = estimated prevalence of variable of interest (assumed to be 30%)

m = margin of error (assumed to be 20%)

Correction for finite population is done using Eq. (2):

$$\text{corrected } n = \frac{n}{1 + \frac{(n-1)}{POPLn}} \quad (2)$$

where

POPLn = ward wise population as per 2011 census.

A Neighbourhood Vitality Tool is developed characterising each NPU based on seven dimensions identified from exhaustive literature study. These aspects are demography, social, economic, physical, heritage, environmental and crime (Colantonio et al., 2009; Dobilas & Battye, 2005; Meagher, 2008). Due to limitations of data availability at the neighbourhood level in the Indian context and high reliance on primary data collected during surveys, different indicators are chosen to characterise micro level discrete information about these NPUs. Observational Variables Classification is based upon objective and subjective assessment of following primary survey elements:

- a The level of satisfaction and opinion of local residents about their present living conditions with respect to social, environmental, crime, heritage, and physical dimensions.
- b Actual neighbourhood conditions and activities inferred from the primary surveys with respect to demography, economic, physical and environment dimensions.
- c Perceptions and preferences stated by residents and non-residents for all the dimensions.

The primary data is fed into the vitality tool and a colour coded matrix is generated. The spatial and factual data is further organised in the form of an illustrative chart to help support local decision making and objective development process in other historical cities. The micro level data analysis has utilised the nearest proxies to measure the vitality scores with the help of the available data. This analysis is represented in a colour coded matrix showing a gradation from poor to excellent condition for each dimension. Also, colored maps on GIS and compiled format depicting overall NPUs character are produced to support decision makers in identifying the present condition of these units, prioritise development tasks, allocate funds and resources and monitor the entire system using feedback loops. The detailed methodology for formulation of NPUs and Vitality Tool is discussed in subsequent sections.

5. Formulation of Neighborhood Planning Units

In order to assess a prominent heritage resource of national and international importance, a system of values has already been defined under various international charters. However, the old neighbourhoods within a historic core have rarely been touched upon in any revitalization project in terms of its importance and significance, especially in India. In order to categorize the neighbourhoods in the historic walled city of Alwar, a larger physical boundary is needed which can merge all these old neighbourhoods of a common significance as a single planning unit. The four values which are used in the context of the study area are Religious Value, Townscape Value, Socio-Cultural Value and Use Value. The mapping of values and significance is done with the help of Cognitional Mapping and Reconnaissance Surveys.

Old neighbourhoods with main religious places or having high spiritual importance are assigned high religious values. Only those locations, which people have preferred to make religious offerings at least once a week, are considered for this classification. Neighbourhoods with rich architectural styles and significant urban-scape are considered to have high townscape significance. Beautiful facades of old palatial houses (Havelis) and other buildings are typical characteristics of these neighbourhoods. Neighbourhoods with high socio-cultural values have grown over the years and have a special cultural and traditional significance. The stories of their evolution display more of associational and emotional attachment in the hearts of local residents. As Alwar is a bustling trade and commercial center for its nearby region, many old markets (bazaars) have horizontal as well as vertical economic linkages. These areas are bustling with diverse economic activities which are extremely important and have high use value. The classification of old neighbourhoods among these four values is done using a binary scale with darker areas showing high value and lighter areas showing low values as shown in Fig. 3.

In order to make micro level planning for old neighbourhoods more reasonable, scientific and objective process, the concept of NPUs is applied in Indian Context for the purpose of the study. Identified neighbourhoods represent traditional constructs of the image of a neighbourhood in the minds of local residents. These identified and mapped neighbourhoods are clubbed together to form a more rational physical boundary for these old neighbourhoods. The four values are further used to make an Overall Significance Map to delineate the NPUs with common characteristics. The number of NPUs is restricted to 30 to make the analysis of these micro-level planning districts easier and precise (Fig. 4). Questionnaire based primary household surveys were conducted for each of these neighbourhood planning units to assimilate and mark as much information possible for each NPU. A detailed list of neighbourhoods comprising within an NPU is shown below in Table 3.

6. Development of Neighbourhood Vitality Tool

Beyond the basic subjective ideas about the neighbourhood quality of life which revolves around the structure of the neighbourhood and the lifestyle of its residents, it can be further narrowed down to the concept of Neighborhood Vitality. The overall purpose of preparing the tool is to identify the attributes that are important in defining neighbourhood vitality, to determine the best indicators and proxies for measuring those attributes of vitality and to populate the tool with the most current data available as far as possible within given limited resources. It is important to have integrated values imbining environmental, social, economic as well as cultural contexts to building environment to reflect the individual identity of each city (Choi & Ahnb, 2013). Indicators or variables under various dimensions are useful in assessing the vitality of a neigh-

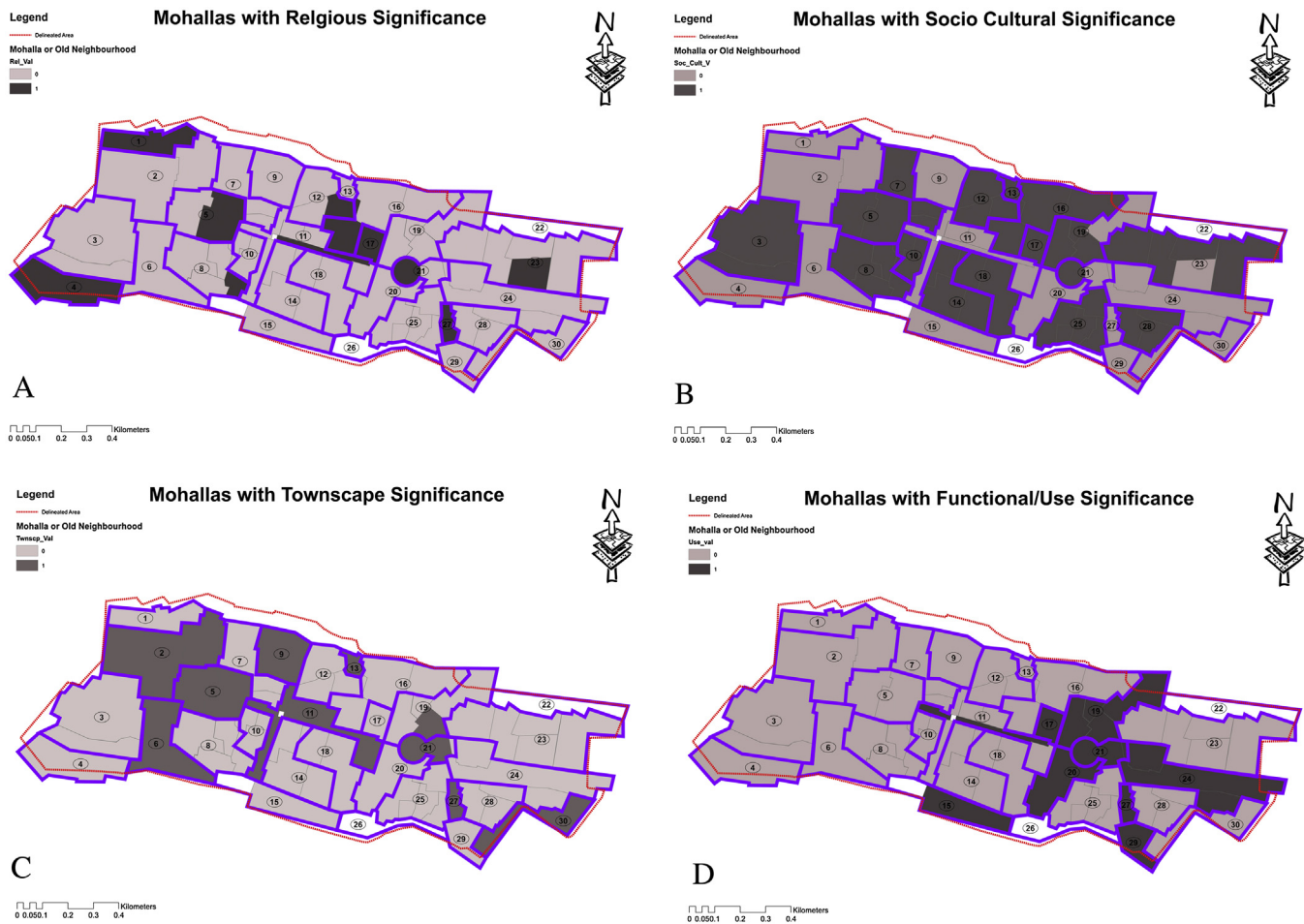


Fig. 3. Significance Mapping of old Neighbourhoods.

bourhood and an index based analysis is the desired outcome. Due to the constraints of authentically detailed data at a Neighborhood level in Indian cities, the observational variables are used to assess and analyse the characteristics of an NPU. It is realised that tailored neighbourhood efforts are required than one size fits all approach for its old neighbourhoods.

The neighbourhood indicators can further serve as an important research tool which can quantitatively examine the nature of deprivation or problematic spatial area as well as the potential means of tackling these problems. Such a micro level tool is expected to help decision makers in forming informed decisions and setting priorities for investment in regeneration at the neighbourhood level. The developed NPU Vitality tool has used seven dimensions which are graphically shown in Fig. 5.

Demographic and economic dimensions are derived from the factual information provided by the households. Heritage, environment, physical, social and crime dimension are calculated with the help of perceptual primary data. The perceptions and judgment of local residents for each aspect under all identified dimensions are measured at three point scale i.e. pleasant with the highest factor weight of 3, satisfactory with factor weight of 2 and unpleasant with lowest factor weight of 1. The formula being used to derive the Vitality scores for each NPU is as given in Eq. (3). To compare all NPUs, the average value for all 30 NPUs is used as reference value for each dimension and its deviation from average value is marked either as most potential areas or most problematic areas. The vital areas and the areas on the verge of decline are shown in

colour coded matrix as well as on GIS maps to represent the NPUs baseline situation. The colour coded matrix is shown in Table 4.

$$\text{Vitality Score} = \sum (\text{Factor Weight} \times \text{Normalised Value from Primary Surveys}) \quad (3)$$

7. Micro-level Analysis

The neighbourhood vitality tool developed for the micro level analysis of identified NPUs of the historic walled city of Alwar helps in their cognitional and perpetual mapping. The seven dimensions viz. Demography, Social, Economic, Physical, Environmental, Crime, and Heritage are discussed in this section with the help of vitality scores, matrices, and spatial maps. (Colantonio et al., 2009; Dobilas & Battye, 2005; Meagher, 2008).

7.1. Demographics Dimension

The first aspect of analysis is local demography of the study area which is primarily based on the factual data about various existing ethnic classes collected during the surveys. The demographic analysis of the study area shows that 45% of the total sample is General Category, 27% belong to Scheduled Caste (SC) category, 21% belong to Other Backward Class (OBC) and rest is Scheduled Tribes (ST). Socially, these communities are heterogeneous and diverse mix. However, the walled city is dominated by Hindu population. Most of the Muslims occupied areas before the partition of India has been taken over by Hindus almost completely.

NPUs 12 and 22 have important mosques in the city where most of the Muslim community goes for prayers. Around 39% respon-

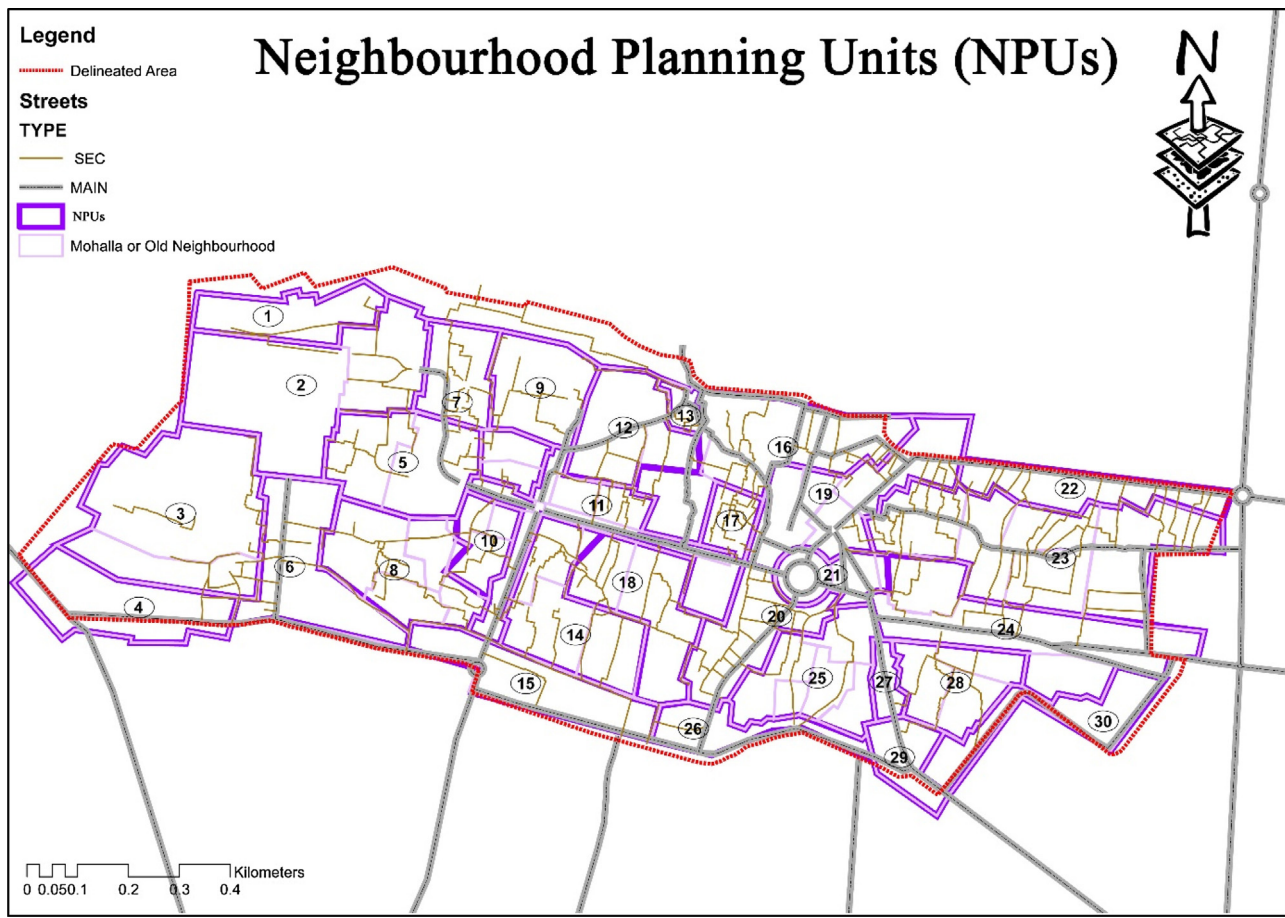


Fig. 4. Identified Neighbourhood Planning Units.

dents have migrated from small towns and villages within Alwar district. Migration is prominent in NPUs 4, 9, 19, 23, 24 and 28 where a change in housing is clearly evident due to rental housing as one of the sources of income. Number of work opportunities is the prime reason of this rural to urban shift. Alwar is an important district headquarters, the hub of important educational institutions and is proposed to have a Medi City. This has invited students and job seekers from nearby areas for education. Partition has also brought many Punjabi Refugees from west Punjab region who still live in the old city area. This challenge of accommodating the migrated population is quite daunting.

In Fig. 6, the red area shows less than average total migration and is socially stable. The yellow area has an average level of total migration which is mostly commercial. The green areas show above average migration pattern and depict a completely changed character in terms of local population.

7.2. Social Dimension

Social dimension in general concerns how communities and societies live with each other to achieve the objectives of development (Colantonio et al., 2009). However, because of the dearth of data availability at the micro level some key indicators were chosen such as the accessibility to social services & infrastructure and the socio-economic compatibility among the neighbors. Vitality Score Matrix in Table 4 shows the average social infrastructure score and socio-economic compatibility score for all the NPUs are 2.04 and 1.97 respectively. NPUs 3, 4, 13, 16 and 19 have significantly below average social infrastructure score and lies within the red region (Fig. 7(a)) inviting attention to improving schools,

health care facilities, and government buildings. However, during the surveys, it is found that the existing educational and health care facilities are within walkable range of these neighbourhoods. The central problem lies with their old structures and services.

With social and economic transformations, the issue of incompatibility is reported by some inhabitants. There is some level of difference in income, education, occupation, and lifestyle between the inhabitants and may undergo gentrification in the long run if not addressed today. These neighbourhoods with significantly below average scores are present in NPUs 5, 8, 10, 14, 18, 25 and 26 (Fig. 7(b)). However, NPUs 7, 13, 16, 19, 21 and 22 shows significantly above average socio-economic compatibility scores and lies within the dark green region (Fig. 7(b)).

7.3. Economic Dimension

The third aspect is an economic dimension which is of utmost importance to understand the current status, income-expenditure pattern and local occupational characteristics. Around 56% of the respondents have either applied for Below Poverty Line (BPL) card (as per Indian government, possession of this card provides access to food grains and cooking fuel at subsidized rates) or already have it. Fig. 8(a) shows that above average BPLs occupied areas are NPUs 4, 7, 10, 19 and 25. NPU 4 faces rural to urban migration pattern and has mostly ST and OBC class. NPUs 7 and 10 are important old residential enclaves. The main source of income is home-based cottage industries such as making Rajasthani Lac bangles and a significant number of informal jobs including hawkers and street side vendors.

NPU 19 comprising of the clock tower, vegetable market and bangles market is the primary commercial hub of the city and is a

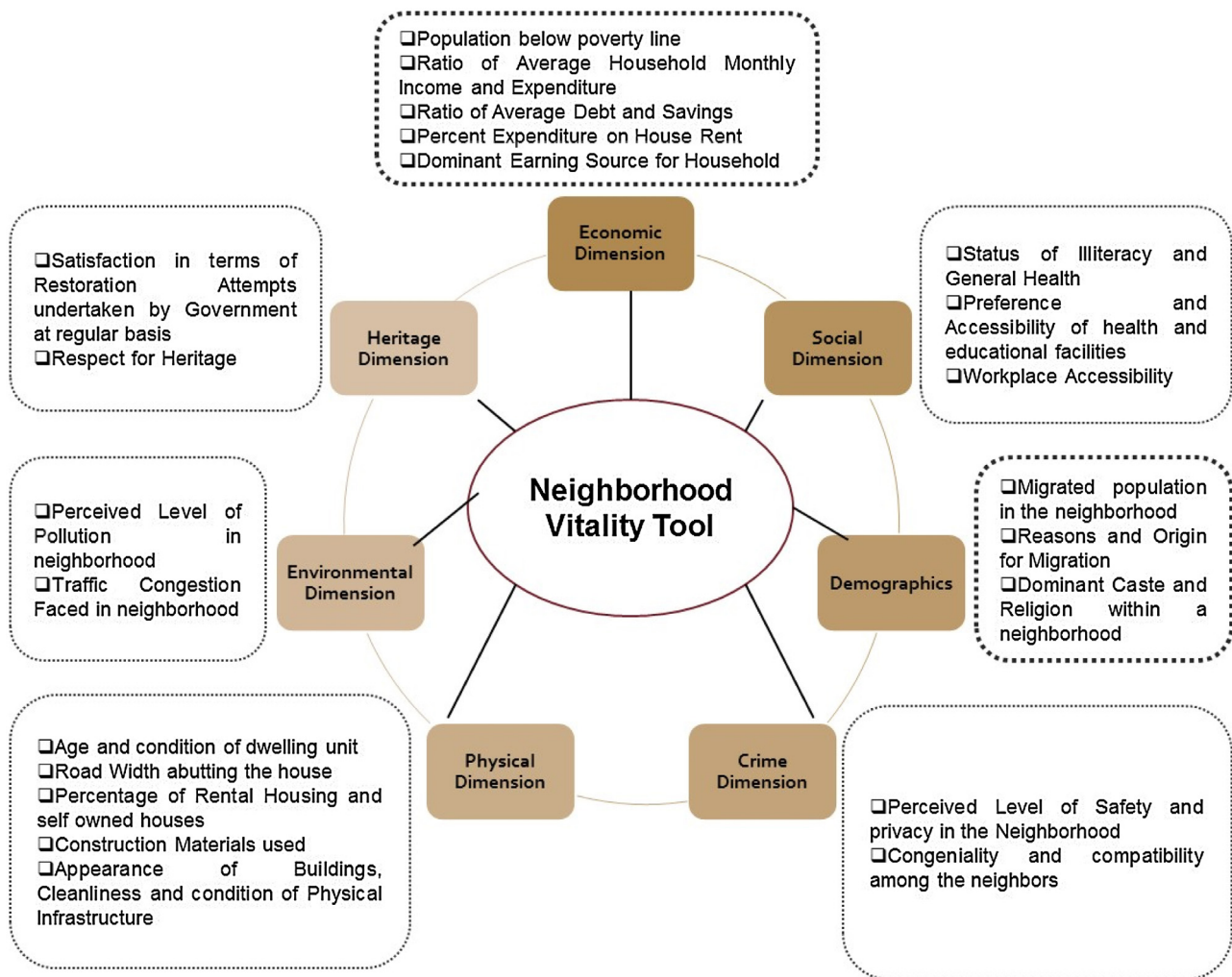


Fig. 5. Neighbourhood Vitality Tool.

repository of several crafts, homemade goods and accessories, retail stores, central vegetable market, pickle market and famous milk cake market of the town. NPU 25 is an old neighbourhood which is specifically dominated by people in primary activities and animal husbandry. Fig. 8 gives a snapshot of the economic condition of all the NPUs with near average values marked as yellow, above average as light green and below average as orange. Significantly below average areas are shown in red colour. These are critically poor dominated areas. Significantly above average areas are shown in dark green denoting a better economic condition of local residents.

Average median household monthly income is found to be in between USD 220 to USD 250 (INR 15,000) with maximum income earned by respondents in NPU 15 thriving on hospitality, service, and commercial sector. Fig. 8(b) shows that the minimum median income is found to be in NPUs 1, 8, 22 and 29. Debt to Savings ratio is considered to be an important aspect to see the economic status of the residents. Fig. 8(c) shows that NPUs 3, 4, 8, 10, 12, 13, 14, 15, 16, 17 and 19 has more debts than their savings. Most of the debts are accounted for social and religious ceremonies followed by household and medical expenses. Around 48% indebtedness is because of social ceremonies and proceedings such as marriages, religion, pilgrimage, funerals and rest 48% is because of household and medical expenses on poor income families.

Median income to median expenditure ratio is highest for NPUs 2, 11, 20 and 25. NPU 25 has already shown most of the BPLs (Fig. 8(e)) which might lead to taking over by high-income people

and result in gentrification in the long run. Most of the areas have low values for this ratio also indicating the implicit difference in lifestyle and living conditions between two surrounding NPUs. The fraction of rental housing observed in Fig. 8(f) gives an impression of changing socio-economic characteristics of its inhabitants. The highest number of rental housing is found in NPUs 4, 6, 9, 12, 13, 14, 15, 17 and 18. These areas are important choices for migrated population.

Median rent for a month is about USD 15 (INR 1000). Most of the people are shopkeepers who work in rented space. Areas which are close to the commercial center are found to be higher in rent. NPUs 1, 7, 22 and 29 shows a high amount of income spent on house rent. The issue of affordable housing can be raised from these values. However, most of the NPUs have fairly below average amount of rent paid in percent of their total Income.

Each NPU shows different occupation characteristics of its inhabitants. The major economic activities are categorized into big business or wholesale, primary activities, light and small scale industries, service based, government staff, cottage industries, and informal jobs. Table 5 shows matrix with green colour showing a high number of people in particular economic activity. Such information at the local level can help urban local bodies target each area for right kind of intervention required.

Fig. 9(a) show that the dominant income source in the historic city is wholesale business (~24%) followed by the cottage and traditional industries (~21%) and informal activities (~15%). Around

Table 4
Vitality Scores Matrix.

Neighbourhood Planning Units (NPU)	Crime Dimension			Environment Dimension		Physical Dimension				Heritage Dimension		Social Dimension	
	Safety	Privacy	Congeniality	Traffic Congestion	Pollution	Appearance Of Buildings	Cleanliness	Physical Infrastructure	Housing	Restoration Attempts	Respect For Heritage	Social Infrastructure	Community's Socio-Economic Compatibility
1	2.12	2.12	3.54	2.12	2.00	2.12	2.00	2.21	2.12	2.21	2.85	2.21	2.12
2	3.00	2.18	2.67	2.22	2.22	1.94	2.22	2.00	2.18	2.00	3.33	2.18	1.46
3	2.34	2.17	3.22	2.23	2.17	2.18	1.71	1.64	1.64	1.64	3.59	1.79	1.19
4	2.22	2.22	2.00	2.03	2.20	2.24	1.41	1.51	1.71	1.64	2.86	1.79	1.58
5	1.00	2.00	3.54	2.00	2.00	2.12	2.12	2.00	2.12	2.00	3.00	2.00	1.00
6	3.13	2.00	2.00	1.79	1.79	2.24	1.79	2.00	2.00	3.58	1.79	2.00	2.24
7	2.99	2.11	2.79	2.21	2.23	2.23	2.23	2.21	2.11	2.21	3.57	1.97	3.55
8	2.12	2.16	3.58	2.12	2.16	1.79	2.16	1.79	1.79	2.12	2.83	2.24	1.00
9	1.90	2.21	2.85	2.21	2.00	2.12	2.21	2.00	2.21	2.00	2.00	2.21	1.90
10	2.55	2.12	2.85	2.23	2.21	1.79	2.21	2.00	2.12	2.12	2.12	2.12	1.00
11	3.27	2.00	2.00	1.40	1.30	2.14	2.20	2.20	1.89	2.23	2.75	2.23	1.48
12	2.86	2.00	2.85	2.21	2.21	2.21	2.21	2.12	2.20	2.14	2.14	2.21	2.83
13	2.67	2.00	2.67	1.94	1.94	2.18	2.22	1.94	2.00	2.21	2.12	1.00	3.67
14	3.00	2.18	3.33	1.94	2.18	1.94	2.22	2.22	2.00	2.22	3.33	2.18	1.00
15	3.02	2.21	2.00	1.00	1.00	2.21	2.21	2.21	2.21	2.12	2.12	2.21	2.24
16	2.24	2.24	3.13	1.79	2.24	1.79	2.24	1.79	3.33	1.79	3.58	1.79	3.00
17	1.94	1.94	2.00	1.00	1.00	1.94	1.94	1.58	2.24	2.12	2.61	1.94	2.21
18	2.00	2.00	2.00	2.00	1.00	2.00	2.00	1.00	2.00	1.00	3.00	2.00	1.00
19	2.54	2.17	3.13	1.86	2.24	2.12	2.21	1.18	2.24	2.22	3.46	1.79	3.60
20	2.85	2.00	2.85	1.58	2.12	2.21	2.12	1.00	1.00	2.12	3.54	2.21	1.58
21	1.90	2.21	2.85	2.21	2.00	2.12	2.21	1.58	2.12	2.21	2.86	2.21	3.13
22	2.24	2.00	3.13	2.24	2.00	2.24	2.24	1.00	1.79	1.00	3.13	2.24	2.94
23	2.55	2.21	2.85	2.23	2.21	2.12	1.58	1.58	2.12	1.58	3.48	1.89	2.69
24	2.75	2.00	3.40	1.37	2.23	2.20	1.67	1.32	1.67	1.32	3.46	2.00	1.21
25	2.62	2.10	2.67	2.22	2.22	2.22	2.23	1.58	1.71	2.22	3.40	2.22	1.00
26	2.12	2.12	3.54	1.79	1.79	2.12	2.00	2.24	1.79	2.00	3.00	2.00	1.00
27	2.24	1.58	2.00	1.79	1.00	2.24	2.24	2.21	2.24	2.22	3.46	2.24	1.94
28	2.94	2.16	2.55	2.12	2.24	2.24	2.24	1.37	1.37	1.37	3.74	2.12	2.24
29	2.24	1.94	2.00	1.79	1.00	2.24	2.21	2.21	2.24	2.22	2.86	2.24	1.58
30	2.24	2.24	3.13	1.79	2.24	1.79	2.24	2.21	2.24	2.24	3.58	2.00	1.79
Average (Avg)	2.45	2.09	2.77	1.91	1.90	2.10	2.08	1.80	2.01	2.00	2.98	2.04	1.97
Standard Deviation (S.D.)	0.49	0.14	0.55	0.35	0.46	0.15	0.23	0.41	0.38	0.47	0.57	0.25	0.87
	=<1.96	=<1.95	=<2.22	=<1.56	=<1.44	=<1.95	=<1.85	=<1.39	=<1.63	=<1.53	=<2.41	=<1.79	=<1.10
	1.96 – 2.45	1.95 – 2.09	2.22 – 2.77	1.56 – 1.91	1.44 – 1.90	1.95 – 2.10	1.85 – 2.08	1.39 – 1.80	1.63 – 2.01	1.53 – 2.00	2.41 – 2.98	1.79 – 2.04	1.10 – 1.97
	2.45 – 2.55	2.09 – 2.19	2.77 – 2.87	1.91 – 2.01	1.90 – 2.00	2.10 – 2.20	2.08 – 2.18	1.80 – 1.90	2.01 – 2.11	2.00 – 2.10	2.98 – 3.08	2.04 – 2.14	1.97 – 2.07
	2.55 – 2.94	2.19 – 2.23	2.87 – 3.32	2.01 – 2.26	2.00 – 2.36	2.20 – 2.25	2.18 – 2.31	1.90 – 2.21	2.11 – 2.39	2.10 – 2.47	3.08 – 3.55	2.14 – 2.29	2.07 – 2.84
	>=2.94	>=2.23	>=3.32	>=2.26	>=2.36	>=2.25	>=2.31	>=2.21	>=2.39	>=2.47	>=3.55	>=2.14	>=2.84

> (Avg + 1*S.D)	Significantly Above Average
Between Avg and (Avg + 1*S.D)	Above Average
Between Avg and (Avg + 0.1)	Near Average
< (Avg – 1*S.D)	Below Average
Between Avg and (Avg - 2*S.D)	Significantly Below Average

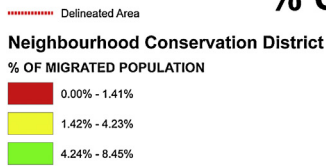
51% of its inhabitants work in city core area and 29% have home-based commercial activities only implying mixed land use activities in the old city area. (Fig. 9(b)).

7.4. Physical Dimension

Housing and infrastructure are one of the prime challenges faced by the world (KPMG, 2010; Taipale, 2012). The physical dimension

considers vacant housing, dilapidated housing stock, the condition of physical infrastructure and overall cleanliness. Vitality Score Matrix in Table 4 shows the average appearance score is 2.10, the cleanliness score is 2.08, physical infrastructure score is 1.80 and the housing score is 2.01. Fig. 10(a) shows that NPUs 2, 8, 10, 14, 16, 17 and 30 have significantly below average scores in terms visual appearance of surrounding buildings. Most of these areas are oldest settlements where ample vacant and dilapidated housing stock is

Legend



% of Total Migrated Population Identified

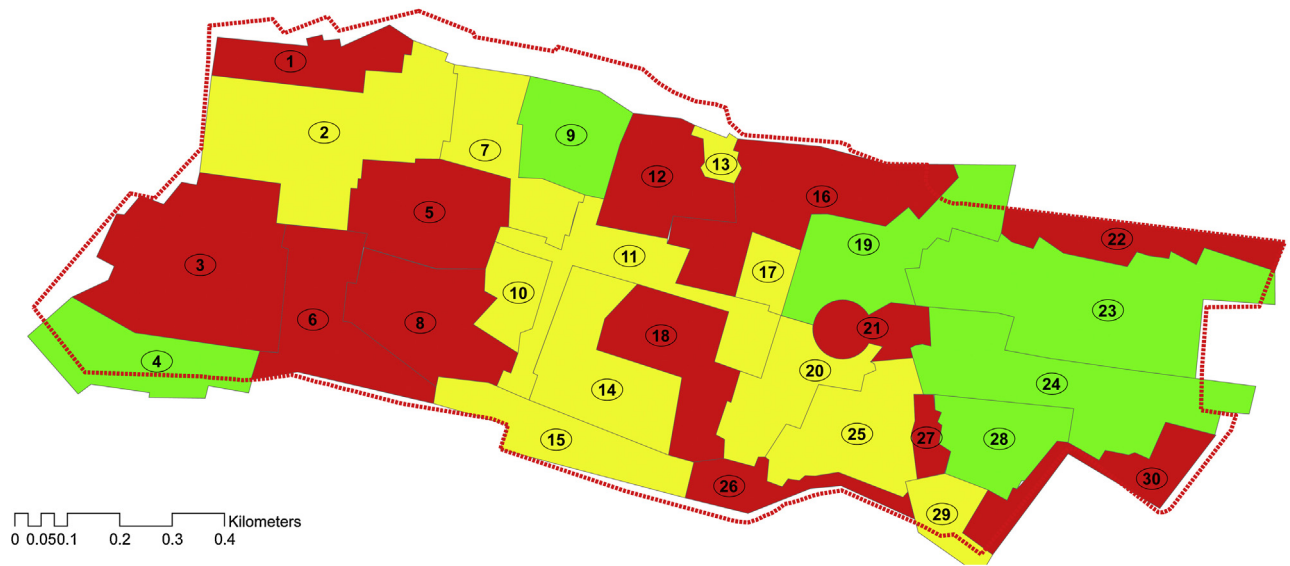
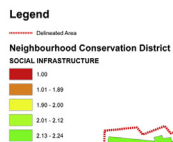
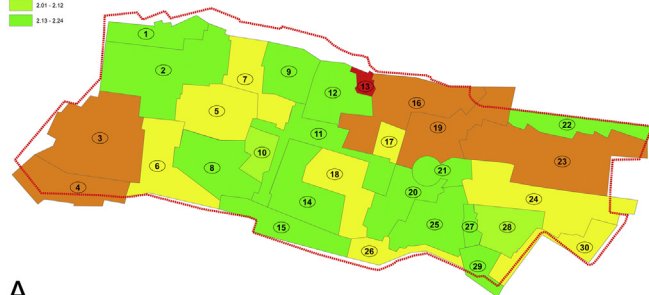


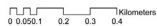
Fig. 6. Migrated Population Percentage.



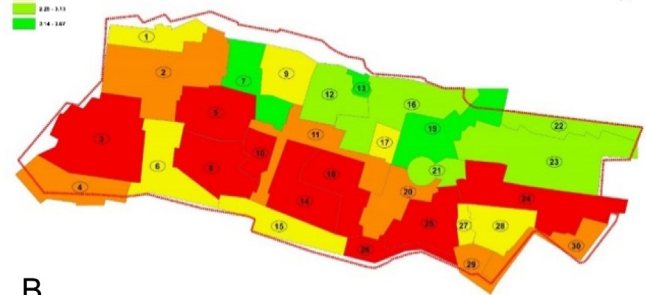
Social Infrastructure Score



A



Socio Economic Compatibility Score



B

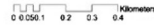


Fig. 7. Social Characteristics.

present. Buildings stay in neglected state due to lack of funds and multi-furcated ownership issues. The main issue is the structural safety of people still staying in these old buildings and to bring the vacant properties to the housing market.

NPUs 3, 4, 6, 23 and 24 have significantly below average cleanliness scores and some of these consist of notified slums where storm water drainage, solid waste management, and sewage disposal is a major issue. NPU 24 is also an important food-grain market serving a larger region around the city as (Fig. 10(b)). There are some areas where physical infrastructure in terms of water supply, sewage,

and solid waste disposal and drainage has become major problems. Some of these areas were moats outside the old walls of the city which are low lying and face water logging problems during monsoons. The physical infrastructure scores mapped in Fig. 10(c) show that 18, 19, 20, 22, 24 and 28 have significantly below average scores and need improvement in public service delivery. However, NPUs 24 and 26 have significantly above average physical infrastructure scores.

Due to migration from rural to urban areas and partition of India, the housing problems are mostly experienced in and around the

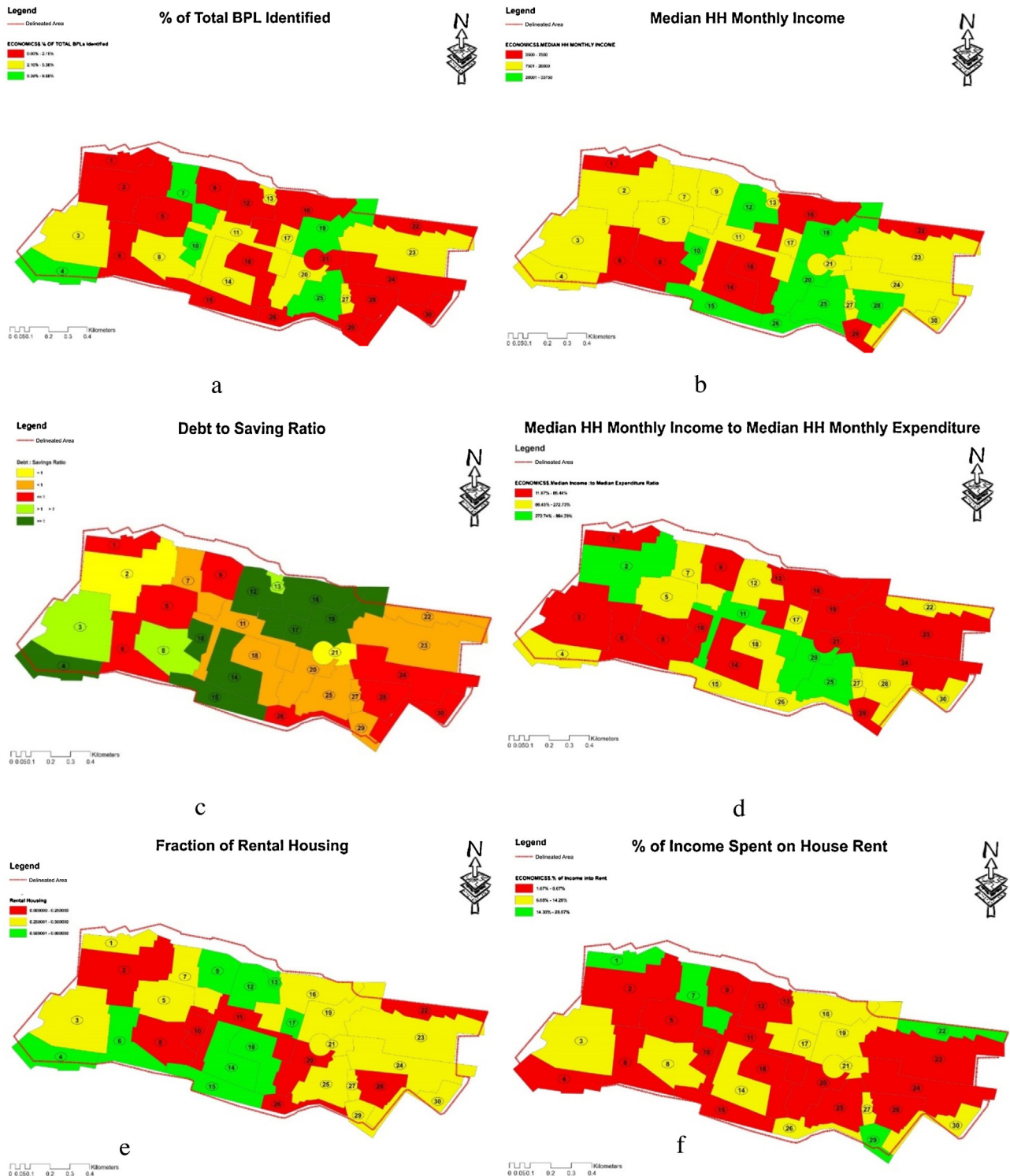


Fig. 8. Economic Characteristics.

main markets. Soft renewal approaches whereby some incentives or loans are provided to inhabitants to extend or repair their houses is very important in old city areas. Building bylaws prepared by UIT are not applicable to these areas and some strict regulations dealing with additions and modifications to existing structures need to be formulated. Around 50% buildings are found to be very old and need some sort of structural repairs. Housing scores are significant below average in NPU 20 and 28 and are significantly above average in NPU 16.

Most of the houses are still inhabited by owners themselves. However, a certain percentage of houses showed vacant properties where owner's details are unknown and they are lying abandoned and vacant (Fig. 10(d)). Around 22% buildings are found to be in a state of dilapidation and may either demolition or retrofitting as per their case. Around 32% are in bad state and needs some repair initiative under soft renewal programs. Several houses have been reported to be transformed, extended or modified. These houses are in fairly average and good condition. Lack of finances

Table 5
Occupational Characteristics.

NPU	Big business/ Managerial/ Wholesale - Trade	Primary Activities / Livestock/ Mining etc,	Light and Small Industries	Service based	Government / Retired Officials/ Armed forces etc	Cottage/ Traditional/ Handicrafts based	Informal job/Hawkers etc
1	8%	0%	0%	0%	17%	0%	0%
2	3%	5%	0%	5%	0%	3%	4%
3	3%	5%	0%	5%	0%	11%	4%
4	0%	18%	6%	0%	0%	0%	17%
5	3%	0%	0%	5%	0%	0%	0%
6	0%	0%	0%	5%	0%	0%	0%
7	8%	9%	6%	5%	67%	11%	0%
8	0%	14%	6%	5%	0%	0%	4%
9	3%	0%	0%	5%	17%	3%	0%
10	0%	0%	0%	0%	0%	14%	13%
11	3%	5%	0%	0%	0%	3%	4%
12	0%	0%	12%	0%	0%	11%	8%
13	3%	9%	0%	0%	0%	3%	0%
14	0%	0%	12%	5%	0%	0%	4%
15	5%	0%	6%	0%	0%	0%	0%
16	3%	0%	0%	0%	0%	6%	8%
17	0%	0%	0%	0%	0%	9%	4%
18	3%	5%	0%	10%	0%	0%	0%
19	8%	0%	0%	0%	0%	14%	0%
20	3%	5%	0%	5%	0%	0%	4%
21	8%	0%	0%	10%	0%	0%	4%
22	10%	0%	0%	10%	0%	3%	0%
23	3%	5%	0%	0%	0%	9%	0%
24	8%	9%	0%	20%	0%	0%	4%
25	5%	5%	12%	0%	0%	0%	4%
26	5%	0%	6%	0%	0%	0%	0%
27	3%	0%	12%	0%	0%	0%	4%
28	0%	9%	0%	0%	0%	0%	8%
29	5%	0%	12%	5%	0%	0%	0%
30	5%	0%	12%	0%	0%	0%	0%

Between Avg and (Avg + 1. S.D)		Above Historic Area Average
Between Avg and (Avg + 0.1)		Near Historic Area Average
Between Avg and (Avg - 1. S.D)		Significantly Below Historic Area Average

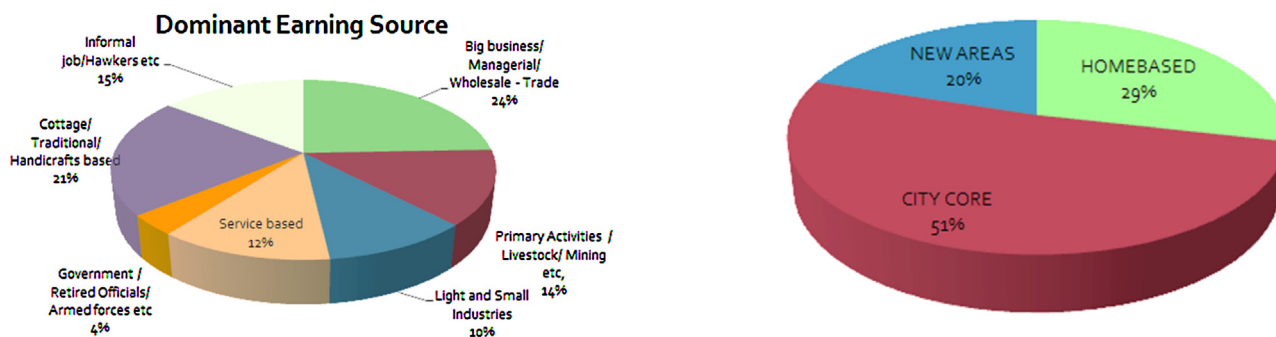


Fig. 9. Workplace Characteristics.

is the most obvious response from people for lack of repair and neglect for the buildings. Other reasons are indifference between landlords and tenants, desire to shift to some other location and apprehension of subdivisions due to its multi-faceted ownership issues. Most of these old houses use traditional architectural styles such as stone slabs and lime mortar for roofing, stone for walls, tiles, mud and stone for flooring and courtyard planning style in hot and dry climate. The houses in slums and informal settlements have mud walls and asbestos roofs. Physical Infrastructure has the low-

est average score amongst all the computed averages and points towards great concern of the issue.

7.5. Crime Dimension

The degree of safety and privacy experienced by households is an important criterion for the quality of life of any neighbourhood's residents because of social and cultural requirements (Dobilas & Battye, 2005). Research in the USA and the UK showed that crime and lack of personal safety are the key factors in determining neigh-

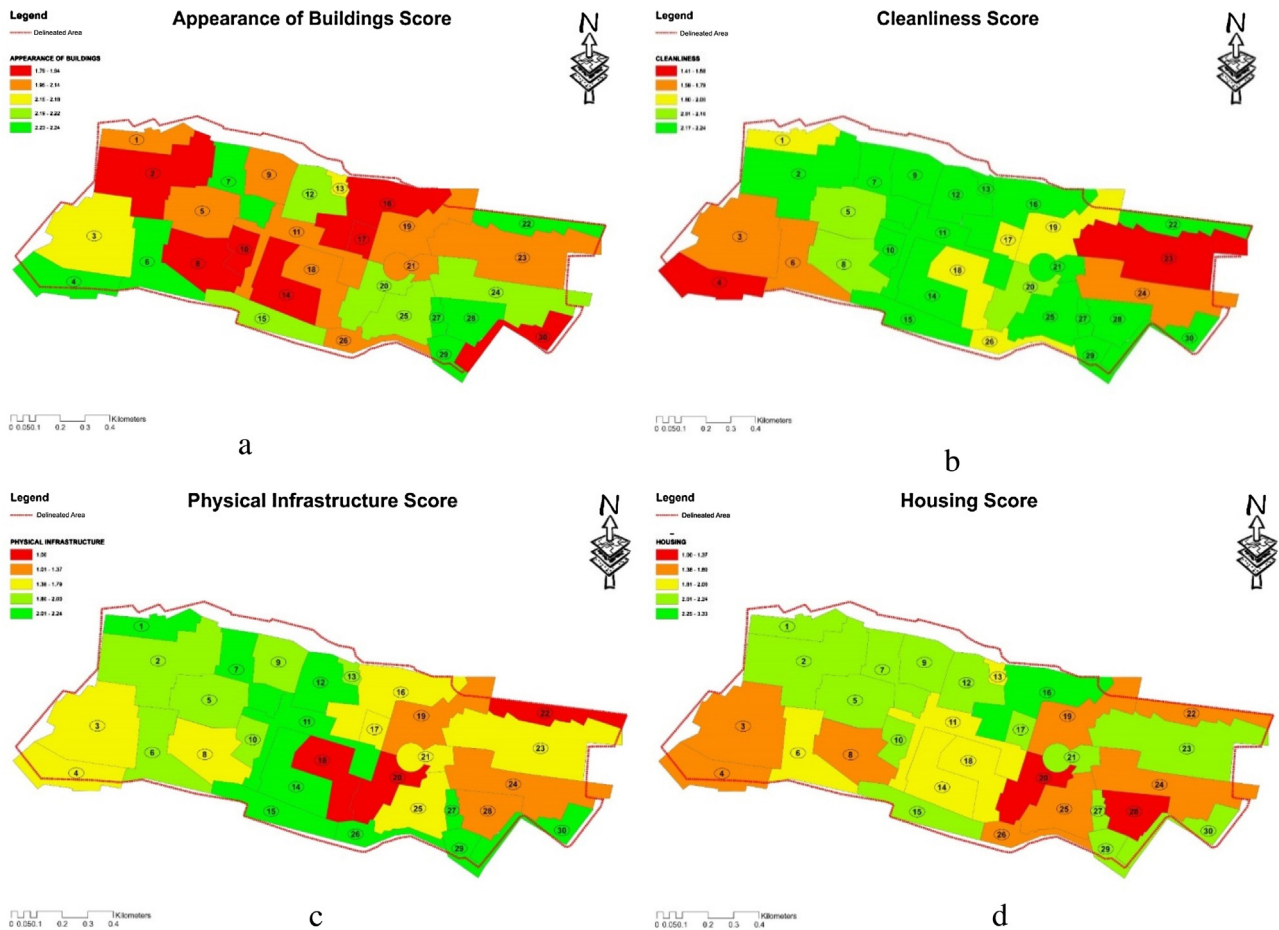


Fig. 10. Physical Dimension.

bourhood satisfaction and crime had a disproportionately high effect in poorer neighbourhoods (as cited in [Dobilas & Batty, 2005](#)). NPUs 5, 9, 17 and 21 have significantly below average safety scores while NPUs 2, 6, 7, 11, 14, 15 and 28 have significantly above-average safety scores. The worst scoring neighbourhoods lie within Jagan Nath Temple complex and Purana Katla area which is witnessing a severe change in its social composition. [Table 4](#) shows that the average safety score is 2.45. Areas with government offices with high public movement and important commercial centers show average or above average sense of safety reported. ([Fig. 11\(a\)](#)). This accounts for the natural surveillance mechanism present in the old cities where the mixed land use pattern contributes to eyes on streets.

NPU 27 which is Church road area shows lowest privacy score owing to its highly commercial nature. [Table 4](#) shows that most of the NPUs have near average privacy score ranging between 2.09 and 2.19. NPUs 5, 6, 11, 12, 13, 17, 18, 20, 22, 24 and 28 are found to be mostly residential and also maintains the character of old neighbourhood lifestyle. Also, due to abrupt changes in the social mix of inhabitants in the old city area, significantly below average congeniality scores are observed in NPUs 4, 6, 11, 15, 17, 18, 27 and 29 as shown in [Fig. 11\(c\)](#). These are mostly important markets where busy commercial activities take place whole day. NPUs 1, 5, 8, 14, 24 and 26 have significantly above average congeniality scores with an average value ranging between 2.77 and 2.87. NPUs 2 and 13 are important heritage precincts and it is proposed to shift the present public offices at City Palace complex to newly built Mini Secretariat near Bhawani Top circle under the proposed Conservation and Restoration Plan (Town Planning Department, 2011).

7.6. Environmental Dimension

The majority of the old Indian cities are witnessing the pressure of traffic congestion and increasing levels of air and noise pollution. This makes the environmental dimension extremely important. Main urban corridors and streets where the vehicular movement has caused serious troubles to inhabitants show the highest level of traffic congestion and pollution scores. A detailed transportation and circulation plan is already proposed under Master plan 2031 (Town Planning Department, 2011). Some streets are also demarcated for complete pedestrianization. However, non-stringent laws and relaxed attitude of traffic police create further implementation challenges.

[Fig. 12\(a\)](#) shows that NPUs 11, 15, 17 and 24 have significantly below average traffic score and indicates the need for effective traffic management and public transportation to tackle the huge influx of two wheelers and four wheelers on the narrow streets. Two parking areas are also identified in NPUs 19 and 21 but on-street parking is the most common amongst the public leading to less effective road width for public movement. The pollution score in [Fig. 12\(b\)](#) shows the most affected areas are NPUs 11, 15, 17, 18, 19, 21, 27 and 29 which are central commercial and public areas. The average traffic score and pollution score are 1.91 and 1.90 respectively which are quite a lower value in comparison to other computed average scores.

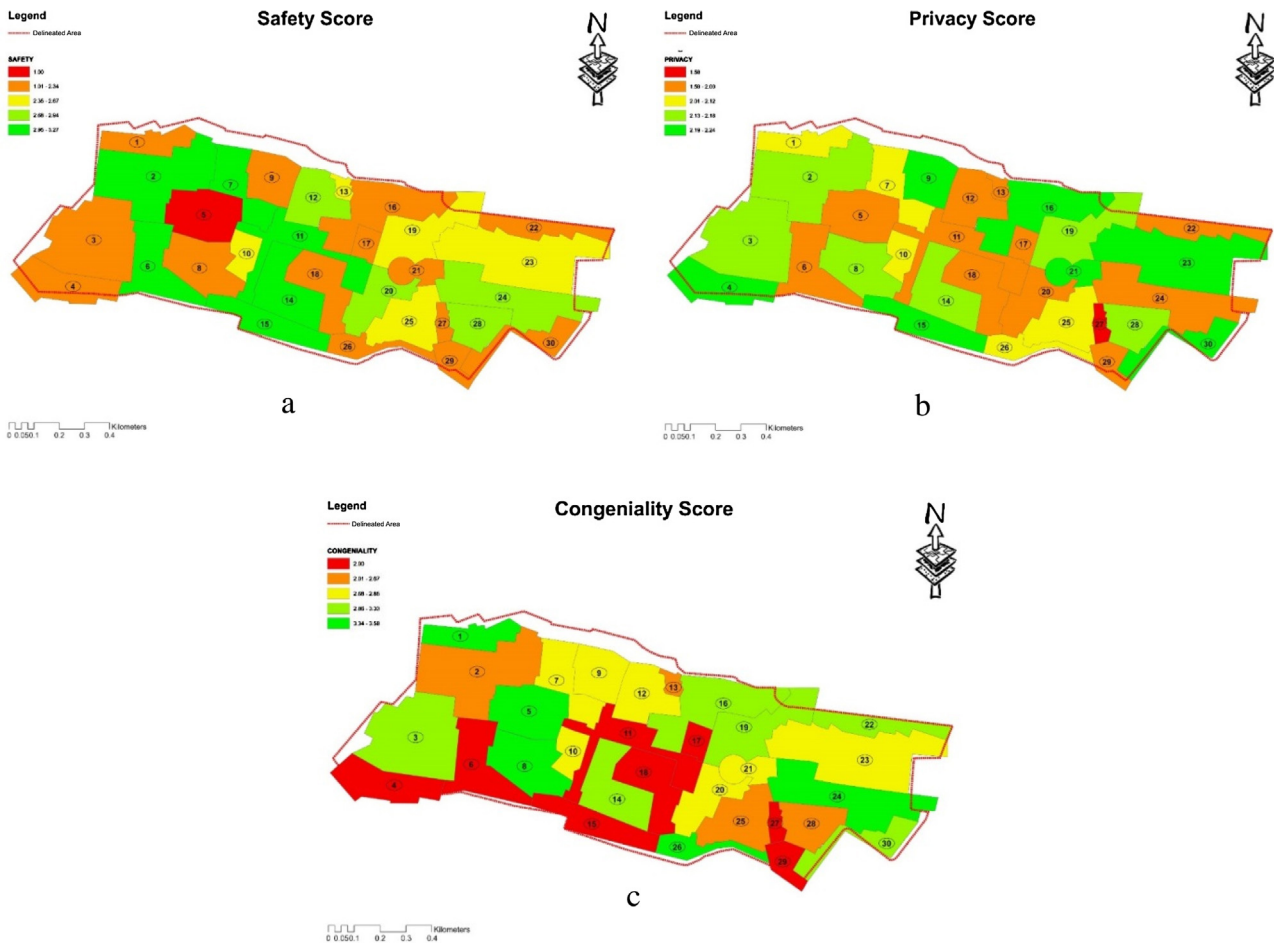


Fig. 11. Crime Dimension.

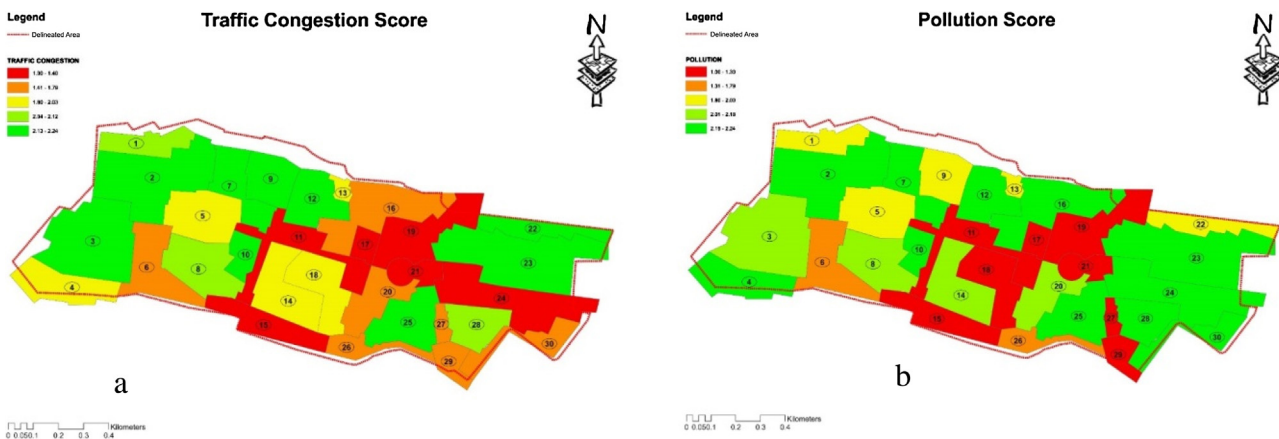


Fig. 12. Environmental Dimension.

7.7. Heritage Dimension

Alwar is an important town since its ancient times. Its challenged historical and political transformations have made old buildings in the state of deterioration, neglect, modification and evacuation. Throughout the old city, old structures are prominently seen which may not have high architectural merit but have significant townscape value. The unique construction technology is conducive to hot and dry climate and traditional lifestyle of people. Most of the inhabitants are found to have high regards for heritage

of the region. However, a low level of reverence for old buildings is predominantly observed among the new migrants and young generation. Heritage awareness and promotion can help improve the value and respect for old monuments, buildings, squares (chowks), wells and trees in old neighbourhoods. (Fig. 13). Table 4 shows that NPUs 3, 7, 16, 28 and 30 have significantly above average score for respect for heritage and NPUs 5, 9, 10, 12, 13 and 15 have significantly below average score for respect for heritage. NPU 6 only has significantly above average score for restoration attempts. However, most of the NPUs have above average scores and shows a

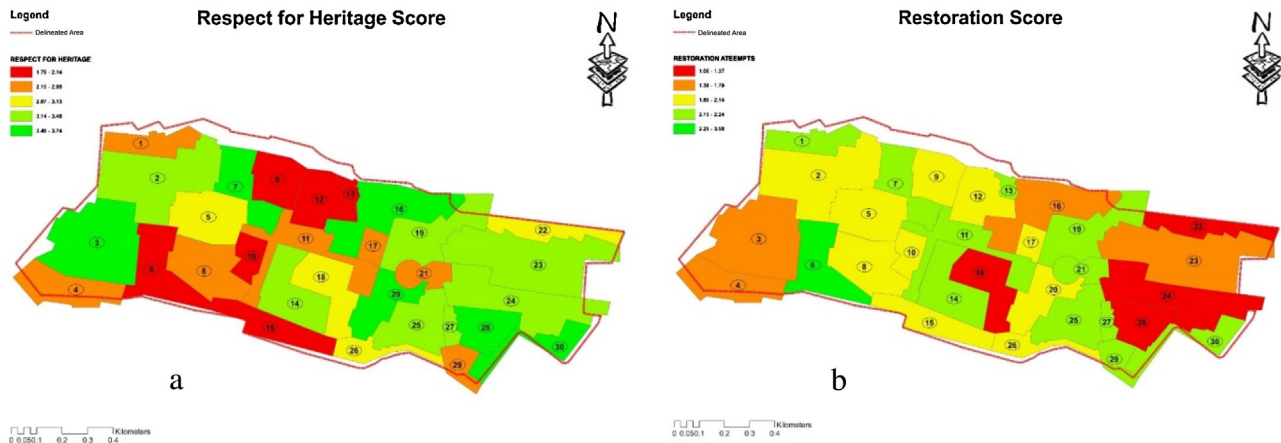


Fig. 13. Heritage Dimension.

Table 3
Composition of Neighbourhood Planning Units.

NPU	Comprising Neighborhoods
1	Above Sagar, Mansha Mata Marg
2	Inside Hajuri Gate, City Palace Complex
3	Ladia, Kumhaar Pari, Khatik Pari, Bisarti Para
4	Around Karni Mata Marg
5	Purana Katla, Holy Upper, Near Jagan Nath Temple
6	City Palace Road, Kachhari Road
7	Hajuri Gate, Harijan Basti, Kumhaar Pari, Chela Pari, Beech ka mohalla, Hajari ka mohalla, Tiwari ka kuan
8	Harbas ka Mohalla, Toli ka kuan, Behind Ashoka Cinema, Mata wali Gali
9	Munshi Bagh
10	Chakla Bundi, Sakka pari, Tiwari ka Mohalla
11	Malakhera Bazaar, Bajaja Bazaar, Sarafa Bazaar, Munshi Bazaar, Malan ki Gali, Bichoo wali Gali
12	Dhobi Para, Halwayi para
13	Meena Pari, Around Delhi Gate
14	Khapta Pari, Nayak Pari, Dhobi Para
15	Bapu Bazaar, Bus Stand Road
16	Hindu Para, Daudpuria
17	Around Ganesh Market
18	Bhikam Sayeed Mohalla, Bhairu Baux Mohalla, Hakim ji ki Gali etc
19	Sabji Mandi, Ghanta Ghar, Choori Market
20	Veer Chowk, Tilak Market
21	Hope Circus, Hanuman Burj
22	Mahatama Gandhi Road, Swarg Road
23	Padav ki chakki, Darukutta mohalla, Bilochi ka kuan, Khadana Mohalla
24	Kedal Ganj, Bhatariyo ki gali, Patase wali Gali
25	Civil Lines, Kallu para, Lohiya pari, Parishad ke peeche, Dhobi wali Gali,
26	Opposite Gopal Cinema, Aate wali Gali
27	Church Road
28	Jatti ki Bagichi, Marethiya Baas
29	Manni ka Bar
30	Around Company Bagh Bypass Road

positive side to the government efforts to maintain rich tangible and intangible heritage of the city.

8. Applicability of Neighbourhood Vitality Tool

The proposed neighbourhood vitality tool not only helps in understanding the character of each NPU but it also identifies the extent and severity of a problem at the micro level. For example, physical vitality scores with respect to the appearance of build-

ings and traffic congestion scores show the problematic red areas spatially and in tabular format, to prioritise the focus of decision makers and urban professionals to the central issue. The proposed Rapid Assessment Tool that involves local community at neighbourhood level may help to identify the key challenges and potential; to help plan interventions in a more pragmatic approach; to evaluate and monitor the progress in the long run and to act as an essential decision support mechanism for urban local bodies.

For instance, based on the micro-level analysis of the Neighbourhood Vitality Scores of NPUs lying within the delineated study area, following six sub-concepts are proposed for the old walled city of Alwar. The key issues are identified by their low scores and accordingly few proposals have been suggested. The nature of these proposals is very sketchy and intends to highlight the application of tool in a pragmatic manner.

- **Green and public corridors** to be developed at three levels – squares with the potential to add dynamism to the streets of old city, squares with potential to demonstrate active public life through wide urban design principles and development of parks and gardens for children as well as adults.
- **Traffic management scheme** to regulate the vehicular entry of different levels of users within the old city area; demarcate appropriate parking areas and adopting appropriate policy level interventions for Pedestrian Only Shopping Streets (POSS).
- **Soft urban renewal program** to adopt housing rehabilitation and repair incentives.
- **Vacant housing program** to establish a neighbourhood stabilization program and adopt vacant to value principle for the efficient housing market.
- **Creative economic growth** to harness the tourism potential of Alwar city and boost its local economy and artisans' craft through public markets and vending zones.
- **Social community programs** to improve the social wellbeing of people and create awareness about heritage and government efforts at the neighbourhood level.

Further, a micro-level analysis at spatial level is integrated with the factual attributes of these neighbourhood planning units (NPUs) and an illustrative NPU chart is prepared as shown in Fig. 14 for NPU 9 comprising of Munshi Bagh residential area. The chart represents entire information about the unit which can act as an important decision making and monitoring tool for urban local bodies and urban planners. Opportunities in terms of Pedestrian Only Shop-

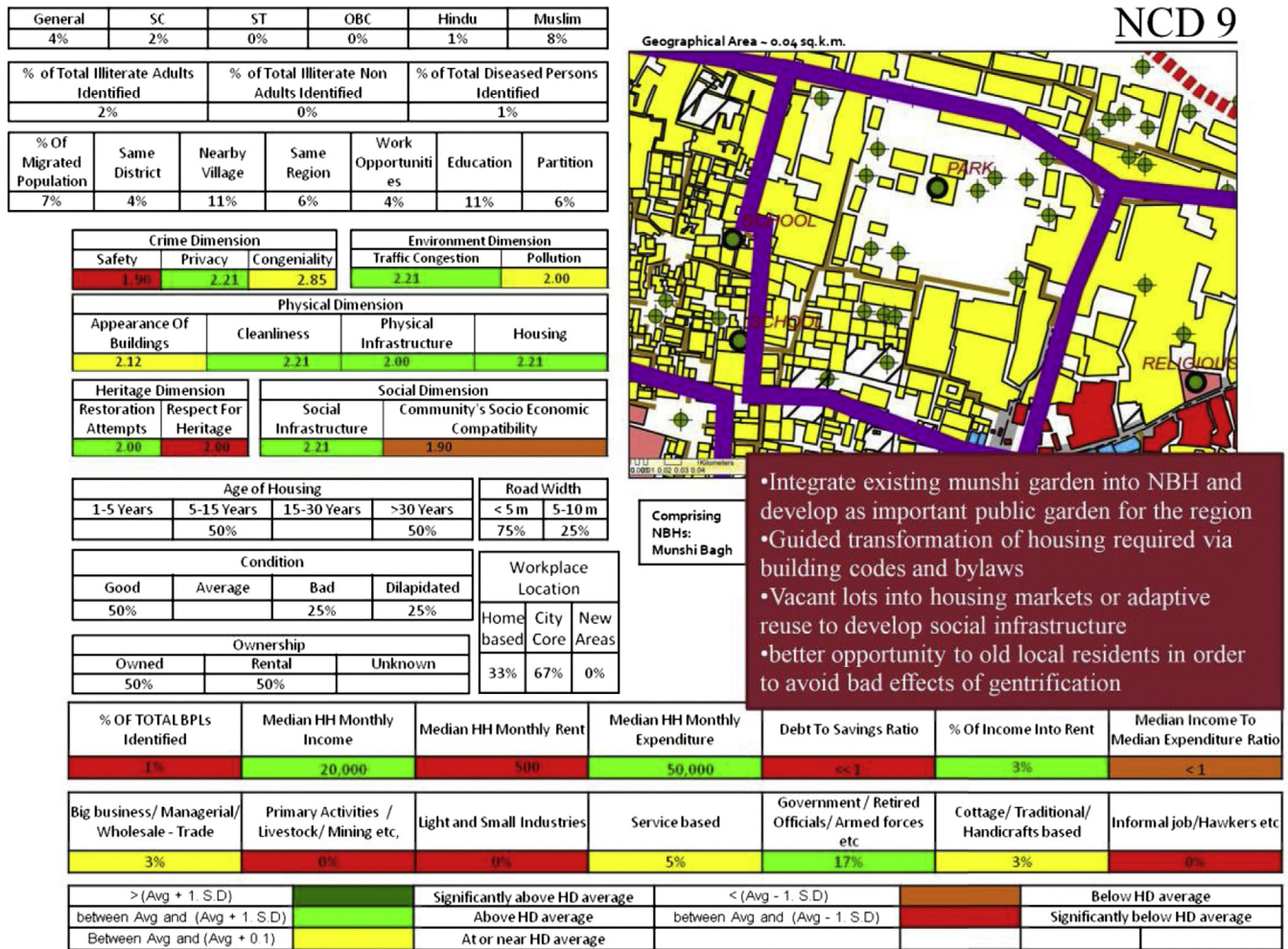


Fig. 14. Illustrative NPU Chart.

ping Streets and weekend tourism center can thrive sustainable creative economic growth of the local community.

9. Key Findings

The micro level analysis is using Neighborhood Vitality Tool which is tested for the historic walled city of Alwar in Rajasthan, India. The old neighbourhoods (mohallas) of Alwar demonstrate traditional Rajputana architecture with unique and vernacular town planning scheme. After the partition of India in 1947 and post-1970s industrialization, the city has undergone many political and economic restructuring leading to social and physical transformations which have been discussed in detail. The settlements are compactly arranged with narrow streets and squares (chowks) serving as the common public spaces for local communities, thus enhancing walkability and social cohesion among its inhabitants. The city still follows the traditional residential culture of Mohallas and bazaars. Most of them have courtyard type of planning keeping the rooms cooler in hot and arid climate.

The analysis shows that a diverse mix of community resides in the old city area. The area had experienced migration from rural areas for better work opportunities and higher education. The changing social structure of the community has further led to many physical and economic changes. Although, the existing educational and health care facilities are located within walkable range but they have old and dilapidated structures. The socio-economic

compatibility between old and new gentry is reported to be low. The majority of the local residents are poor with around 56% of the respondents below the poverty line. The dominant occupation observed is a wholesale trade (~24%) followed by traditional household industries (~21%) and informal activities (~15%). The concept of living and work at one place is predominantly resulting in 29% respondents involved in home-based enterprises and 51% having jobs within walkable range. Mixed land use with commercial activities on ground floors and residential on top floors is also very prominent leading to high safety scores.

Physically, around 22% structures are found to be dilapidated and need some form of retrofitting. Vacant and deteriorated housing stock is another significant challenge in the old city area. Many houses have traditional architectural style and exhibit vernacular building techniques which are conducive to hot and arid climate of the region. However, there are abrupt and incongruent construction activities and housing transformation taking place in the absence of proper development control regulations and building bylaws. Traffic congestion and parking issues are quite pressing and need active attention of the local government.

10. Conclusions

There are several urban processes existing in an urban setting which manifests a built environment. These processes are socio-economic, environmental, political, legal and cultural, and hence,

lead to the transformation of human settlements over time and space which are unique and invariably interesting in terms of its socio-economic and physical characteristics. The historic cities have many users over time and thus are the outcome of the more complex phenomenon. These old cities which are majorly facing cryptic challenges of urbanization demand a unique approach of revitalising old communities. The approach needs to be case specific, holistic and socially sustainable.

Over a passage of time, the notion of the livable city has seen a shift from economic dimension only to people-centred approach. However, the concept of vital communities as stated by UNESCO is found to be more suitable for older settlements. In order to develop these historic areas, it becomes important to assess their baseline situation and develop a decision support mechanism to help decision makers. Based on exhaustive literature studies, a comprehensive methodology is used to develop Neighborhood Vitality Tool. The tool is expected to act as a rapid assessment mechanism incorporating the spatial and factual data about each Neighbourhood Planning Unit. The seven dimensions which form integral pillars of the proposed tool are demography, social, economic, physical, crime, environmental and heritage. The indicators have been chosen on the basis of literature review and data availability at the micro level in the Indian context.

The case of the traditional walled city of Alwar in Rajasthan state in India is selected. Alwar is more than 200 years old and has a rich cultural and heritage significance. The old neighbourhoods of the walled city area still portray rich tangible and intangible heritage but are in distress due to rapid and haphazard urban development. The urban morphology of historic city area is organic with twisting narrow streets plugging in the integrated clusters of old neighbourhoods. The houses portray traditional building elements such as Jharokhas (balconies) and Jalis (screens) with courtyard type layout. The houses are multifunctional and mixed residential land use is predominant. This further helps in keeping low levels of crime due to natural surveillance owing to its social system.

The methodology for micro level analysis adopts GIS technology for mapping the core urban elements and their attributes based on reconnaissance surveys, primary surveys and secondary data collected. A soft boundary which is 3.80 square kilometers is delineated based on various layers of the historical development of the city. The identified 66 historic neighbourhoods are further clubbed together into 30 Neighborhood Planning Units (NPU) based on their religious, socio-cultural, townscape and functional significance and a Neighbourhood Vitality Tool is developed to score and rate these NPUs against seven dimensions to ensure an inclusive and objective development process. The vitality scores are represented in colour-coded matrix as well as GIS maps to assist in identification of problem areas.

In case of Alwar, the Table 4 shows red colored cells as the problem areas and dark green colored cells as the potential areas, on the basis of the derived vitality scores of NPUs. Some of the critical areas for intervention are traffic congestion on narrow streets, low socio-economic compatibility amongst old and new residents, vacant and dilapidated housing stock, lack of respect for its old heritage among youth and new gentry, and provision of basic services to its residents. Some of the potential areas which can further act as opportunities for the old neighbourhoods are above average safety and congeniality scores and presence of old communities. The vitality score matrix gives a fair picture of the ground condition of all the old neighbourhoods at micro-level. The vitality scores along with the factual information of the NPUs are further compiled in the form of NPU charts which may act as a concise decision support mechanism for ULBs and planners to prioritise and monitor development action plans for other culturally rich old cities

in developing countries like India. The neighbourhood assessment process ranges from surveys, data collection, analysis, and proposals have tried to place historical significance as well as conflicts, local and regional economy, entire cityscape and people at the focal point.

The proposed approach attempts to consider all the important aspects of vital communities and identify best proxy indicators for neighbourhood level assessment. The local citizen participation and their opinions are crucial for micro-level planning and hence, primary surveys have played most important role in the approach. However, such projects need a secure and concrete urban framework whereby fiscal plan to mobilize maximum private capital through heritage commercialization, urban regeneration companies and vacant housing markets, practical time frame in terms of three phased overlapping process and a citizens' led process through NPUs renewal offices, awareness programs and campaigns can make it more acceptable emotionally and practically at same time. Such an approach can help in sustaining the historical and cultural identity at the heart of old cities in the long run.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.scs.2016.06.015>.

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