

Research Paper

Spatial footprint of low-cost and low-investment circular economies

A case ‘urban villages’ of Noida, National Capital Region of Delhi, India

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Abstract

The rapidly urbanizing world has remained divided between new-age formal leading urban economies and the smaller subsidiary, indigenous and traditional ones deeply embedded in urban informalities, which are low-cost and low-investment in nature and often practice circularity of trades. Informal sector is the backbone of a city's economy especially in the developing world, covering almost half of the urban employment. Most of the traditional and small-scale economic activities are rooted within urban villages, which were originally rural villages around which the planned city had been developed. These areas display intricate socio-economic interdependencies and exhibit building typologies and cultural heritage that foster co-existence of myriad traditional and current occupations.

This paper, through the case of urban villages in Noida, argues that these spatial units by virtue of their unique semi-urban character foster employment related to indigenous low-cost trades and crafts, in addition to being host to affordable real estate for mainstream economic activities. The study brings out inter-relationships of the morphology and economic systems in the urban villages, including the spatial grouping of similar activities that sustain circular economy and mutual symbiosis of trade; building typologies and street character that deploy physical adaptations for different set of income generating activities; distribution of commercial activities in fringe areas due to functional dependence on connectivity, and informal incubators of traditional craftworks in traditional housing typologies, like the courtyard houses etc. These circular economies and symbiotic trades are neither possible in organized development, nor have any authorizations to operate outside their informal physical domains. However, the spaces available for these activities are physically constraint, low quality, congested and lack basic infrastructure, and strategies to regenerate lay outside of formal building bylaws and regulatory framework of local governing bodies, which also presents challenges of formal funding mechanisms and private sector outreach for funds. This paper recommends an adaptive rethinking of informalities in urban realm to recognize and associate their spatial intricacies as an advantage for thriving low cost local and circular economic activities. This can be achieved through a cross-sectoral approach, where the informal physical spaces have flexibility to adapt to temporal economic shifts crucial to sustain the traditional low-cost economies. This would not only require a proactive and interactive governance involving communities, but also policy changes to accommodate informal spatial adaptations in building bylaws as a way forward to empower the traditional and low-cost circular economies, across the developing world.

Keywords

Urban Villages, Low-cost Circular Economies, Informal Economies, Adaptive spaces, Mixed land use, Economic Sustainability.

1. Introduction

The rapidly urbanizing world has remained divided between new-age formal leading urban economies and the smaller subsidiary, indigenous and traditional ones deeply embedded in urban informalities, which are low-cost and low-investment in nature and often practice circularity of trades. These small scale traditional economies, often go undocumented. Informal sector is the backbone of a city's economy especially in the developing world, covering almost half of the urban employment. Most of the traditional and small-scale economic activities are rooted within urban villages, which were originally rural village settlements around which the planned city had been developed. At present these areas display intricate socio-economic interdependencies and exhibit building typologies and cultural heritage that foster co-existence of myriad traditional and current occupations.

This paper, through the case of urban villages in Noida, argues that these spatial units by virtue of their unique semi-urban character foster employment related to indigenous low-cost trades and crafts, in addition to being host to affordable real estate for mainstream economic activities. The study brings out inter-relationships of the morphology and informal economic systems in the urban villages, including the spatial grouping of similar activities that sustain circular economy and mutual symbiosis of trade; building typologies and street character that deploy physical adaptations for different set of income generating activities; distribution of commercial activities in fringe areas due to functional dependence on connectivity, and informal incubators of traditional craftworks in traditional housing typologies, like the courtyard houses etc. These circular economies and symbiotic trades are neither possible in organized development, nor have any authorizations (by oversight) to operate in the planned development, outside the informal physical domains of urban villages. However, the spaces available for these activities are physically constraint, low quality, congested and lack basic infrastructure, and strategies to regenerate lay outside of formal building bylaws and regulatory framework of local governing bodies, which also presents challenges of formal funding mechanisms and private sector outreach for funds.

The methodology used for this research involves a mixed approach utilising GIS data, mapping, physical site surveys, visual documentations, ground testing and verifications. A detailed socio-economic profiling has been carried out for the urban villages in Noida and this research builds on the economic character profiling of two sample villages namely Ghijod and Hoshiyarpur. These two urban villages are located on main sector roads in proximity and mutually support each other. The analysis involves spatial and economic interdependencies at three distinct spatial levels a) neighbourhood/area level, b) street/connectivity corridor level and c) house or building level. The findings from these two villages are generally applicable to most other urban villages in Noida, and can be expanded to other cities in India and the developing world, and hence find relevance to establish the pattern of economic circularity embedded in the urban villages in general.

2. Linking Circular Economy to Socio-spatial Dimension

In creation of a better and more sustainable future, a world economy is needed that is sustainable, cleaner, and has more efficient production and consumption patterns. World Economic Forum defines circular economy as a system that is restorative or regenerative by intention, which shifts to renewable resources that harbours reuse, eliminates waste, and allows for superior products, systems and business models ending the linear flow of energy and resources (WEF, 2014). Keeping this fundamental view of circularity in the delivery of the UN Sustainable Development Goals, a unique opportunity presents itself to integrate

circular economy into existing urban agendas and scale up efforts towards circular economies especially in the developing countries (OECD, 2021). In India, there is a recent policy shift towards resource efficiency through circular economy; the Indian Resource Efficiency Strategy, 2019 brings focus on approaches such as recycling, reuse, repair and remanufacturing and their multidimensional benefits. However, most of the policy interventions have focused on end-of-life stage and recycling, the other stages such as extraction, manufacturing and usage have not been given due importance (NREP, 2019). Additionally, for transformation it is crucial that circular economy concept comes close to sustainable use of resources through social innovations rather than depending solely on technical solutions (Buhr, D. 2015). The material and energy flows are spatially distributed through open systems, across cities, regions and nations and closing certain material loops locally contributes in a positively at a spatial level. Although from futuristic perspective social innovations would mean focussing on newer challenges, it would also mean to bring back focus on community cohesions, collaborations, mutual dependence. Hence, the transformation ideology from a linear to a circular economy would require socio-economic restructuring of production and consumption patterns (Chaturvedi A., et. al, 2017).

The inherent social structures and economic interdependencies are intricately woven with the built environment in the Indian context; yet gap remains in linking resource efficiency policy to spatial distribution, layout and grouping of economic activities, that too in informal contexts of urban planning. The informal sector having been the subject to political and scientific discussions for decades, is still lacking a clear definition of the sector and is characterized by both subsistence activities and unofficial business activities (WBCSD, 2016). To identify and recognise these informal, low cost, self-driven activities and patterns, a deep-dive is required to study the low-cost low-investment activities that the cities harbour in the informal sector, similar to the Urban Villages in India, and link those to the socio-spatial dimension. The linking of circular economy to the socio-spatial dimension is key to support the local low-cost circular economies that thrive in such unregulated and sometimes uncontrolled setups.

3. ‘Urban Villages’ in India

‘Urban Villages’ nestled within a host city or urbanizing villages at the fringes, are unique planning zones exhibiting a morphological contradiction with the regular urban plans and local planning regimes, quite abruptly standing outside of a modern city’s urban character while inextricably linked to its economy, production and culture. These unique spatial units host a vast variety of informal functions of the city. Economically speaking, approximately 68% of the employed population of Asia-Pacific engaged in informal economy (ILO, 2018) and more than 90% of south Asia’s businesses in informal sector (UNICEF, 2021). In India, 83% of the employment share is in the unorganised sector and 92.4% informal workers are in the total economy. The local practices of low-income informal markets, especially in the emerging economies are mainly overlooked (Korsunova A., et. al. 2022).

For a foreseeable future, the informal sector will remain playing pivotal role in urban economics, however when it comes to their spatial distribution, organization groupings and adaptations, there is clear lack of research focus. The diverse multi-scale and multi -sectoral economies operate silently within the local semi-informal hubs benefiting from traditional crafts and knowledge, proximity to modern adaptations of trades, exploratory community arrangements, and their symbiotic interdependencies. These crafts and trades have found adaptations and inclusions of new age employment and entrepreneurship to cater to the changed and increased demands from the host city surrounding these urban villages. Informal markets are also places of intense social interaction, fostering cultures of different values and alternate relations. They are not only sites of the circulation of monetary values but also places where questions of resource

sustainability, cooperative decision making, and social cohesion come into play, issues that acquire critical importance in times of crisis (Mörtenböck P. et.al., 2015).

4. The Case of Urban Villages in Noida

NOIDA (New Okhla Industrial Development Authority) was carved in 1976 from the Braj Cultural Region, using the agricultural fields of 81 villages. The development authority planned and carved roads, provided services and serviced land was sold for industrial, residential, commercial and institutional purpose. The settlement area of the villages, generally known as the ‘aabadi areas’ were left untouched and remained untampered within their boundaries termed as the ‘Lal Dora’. As development densified around these, they came to be known as urban villages. Currently, Noida is a modern city in NCR, with wide roads and expressways bridging the catchment in the state of Uttar Pradesh to capital city of New Delhi. While it has been successful in supporting the industrial and commercial activities of NCR, in this entire process of growth and development, the role of urban villages in realizing this success is crucial. The structure map of urban villages in Noida shows an underlying grid, which provides silent and informal support to the deficits in growth, manpower to NCR in addition to the ‘not allowed’ land uses needed for its growth.

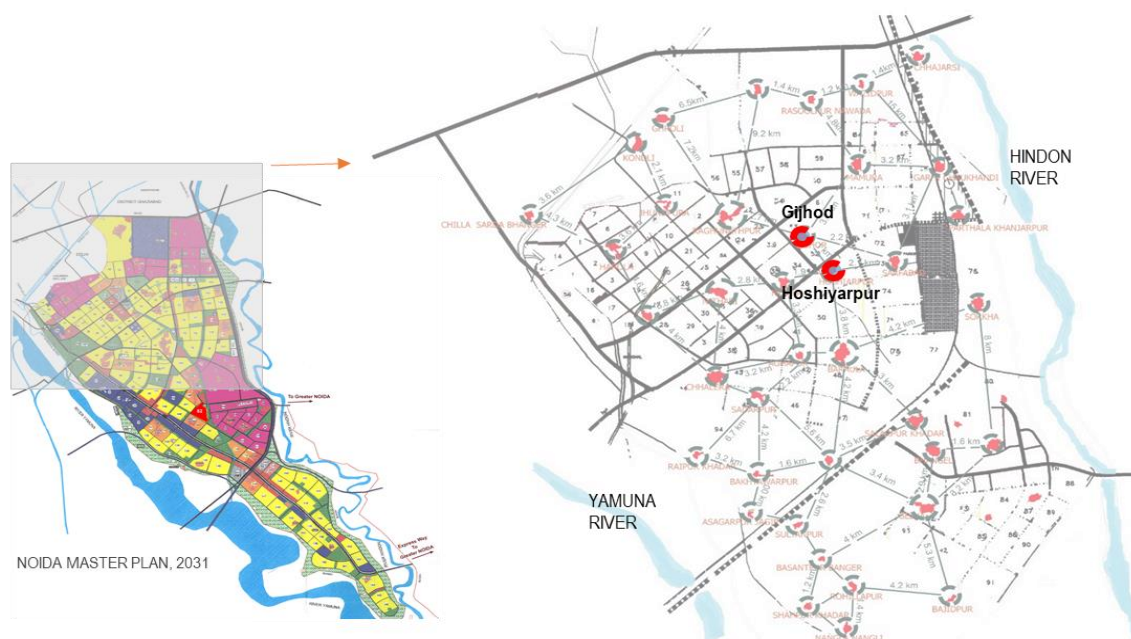


Figure 1. Distribution Pattern of Urban Villages in Noida. Source: UVCT

These urban villages are spread over a modern spatial grid that neither recognises their organic spatial character nor integrates their growth needs (Figure 1). The urban villages are almost equally spaced out at a walkable distance from each other, and exist adjoining almost every cluster of modern sectors. With the growth of population due to migrants, new settlers and population in need of affordable housing, these urban villages densified and grew out of the regime of Panchayati Raj (village status), and now are a “free” and “unregulated” part of the city, that provides supportive function to the region’s economy through myriad economic activities, types and choices of employment, local entrepreneurship, and low cost trades and functions. The dynamics of such economic activities and their relationship with the physical space at neighbourhood or area level, road or connectivity corridor level, and at the house or building level are evident. These spatial levels are also important to identify different adaptations and organic growth of economic functions that have allowed for symbiosis of trade and localised circularity of economy.

5. Spatial Dynamics of Circular Economies in Urban Villages of Noida

3.1. Mixed Land use and Socio-Economic Profile

The growth, interdependent economies and circularity in the economic structure are highlighted through the co-existing typologies of urbanization - the formal and the informal. With the help of a fine grain analysis of two selected urban villages, it is demonstrated how these are spatially structured between modern day sector roads, have grown organically under the pressures of urbanization while remaining outside the masterplan regulations and development controls. The internal road networks are irregular and they retain village character, and the economic activities present within each is dense and varied (Figure 2).



Figure 2. Land use, built form and economic activities in 2 urban Villages of Hoshiyarpur and Ghijod in Noida. Source: Authors.

Land ownerships in urban villages have divided and subdivided over time till the unit land parcel in informal dealings has become as small as 12 sqm (3m x 4m) room, as compared to the smallest plot size of 112-120 sqm in Noida. The ratio of the land parcel is thus 1:10 on land area and approx 1:20 in terms of land liquidity or cost of land. Urban village economics is thus a small denomination economics, almost as small as 1/20th of the lowest investable capacity in planned Noida. With small land parcels and no land use restrictions and affordability, it has welcomed the economics of housing migrant population, with mixed land uses and the freedom to practice their craft centric knowledge in conjunction with modern economies.

3.2. Spatial Groupings Based on Circularity of Economic Activities

The two studied urban villages, like most others in NOIDA have good accessibility as they are situated on main sector roads close to the new city centres and metro transport hubs. Those living on the fringe of urban villages and along main roads have used their small land holdings to form a chain of interdependent and connected economies, often utilizing each other for support to serve a bigger function. eg. a car service centre is replaced by a cluster of 5-8 shops with each catering to a specific job - denting, painting, shocker repair, general service, windshield, battery, electrician, car washing and so on, each housed in a separate unit, yet working in an interdependent fashion to give shape to a larger economic activity.



Figure 3. Spatial Groupings based on economic activities in Ghijod. Source: Authors.

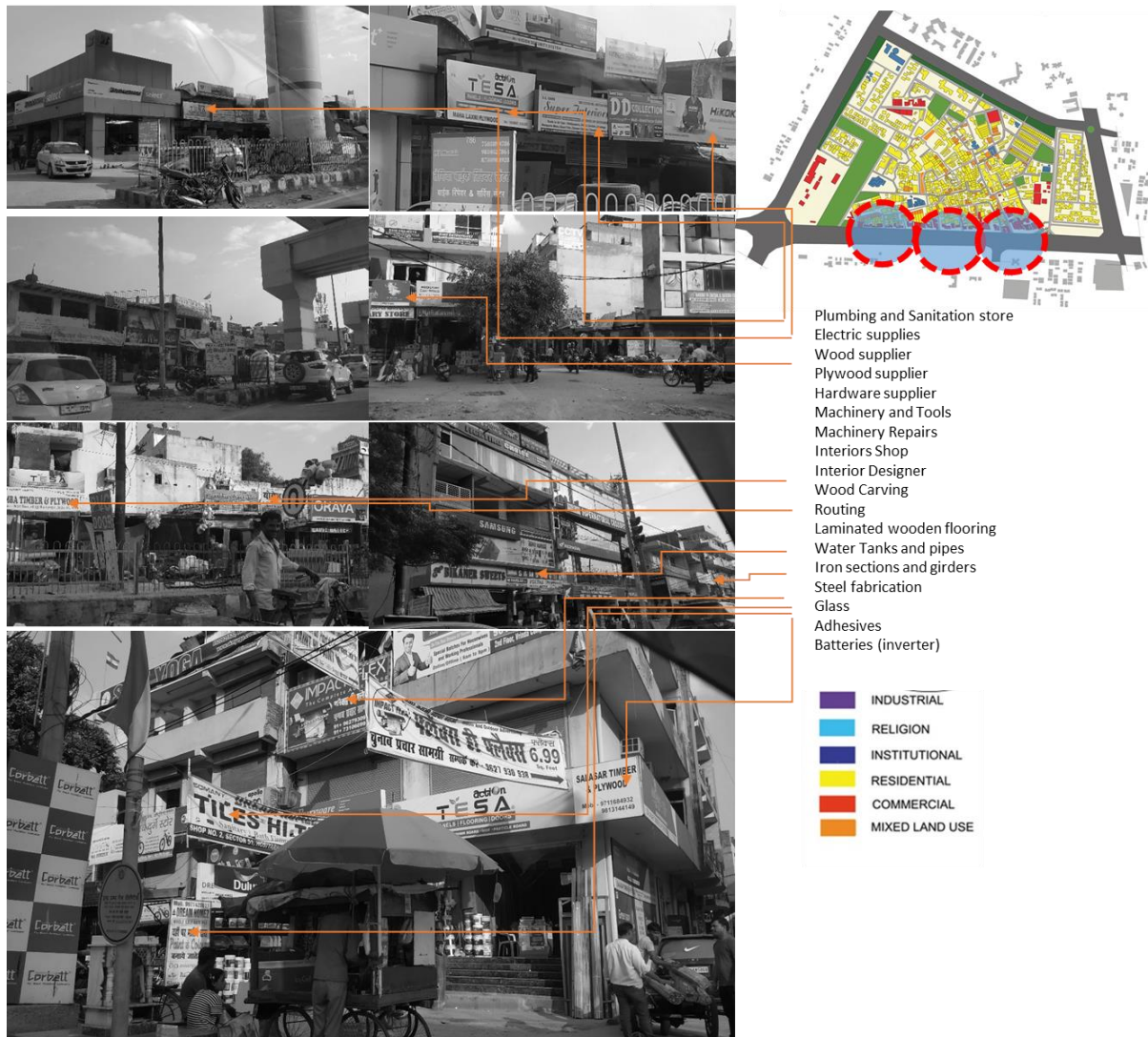


Figure 4. Spatial Groupings based on economic activities in Hoshiyarpur. Source: Authors.

A closer look at the nature and distribution of commerce on the fringes of the urban villages interacting with the new economic needs of the city explains the identification of needs by the new-city and the village-city economies. Coexisting and co-growing over the last over twenty years has led to the development of a mature market conditions, wherein the new-city economies and retail are using urban villages as the new address and benefitting from their enhanced spending capacity, while the village-city economies have matured to a state of better supplies and a trusted service commitment to the urban settlers.

In another example, a normal building material store like the Lowe's warehouse in the US, is divided into many independent small stores, each catering to a different set of materials e.g. electrical, light fittings, wires and pipes, plumbing fittings, tiles, sanitary pipes and water tanks, laminated wooden floorings, interior stores, framing, carpenter, carvers, wood suppliers etc. These shop markets in urban villages unite over common open and closing time and off days. They often recycle, reuse, remachine waste parts for cars and reused furniture wood for making new furniture, giving them an edge on “cost of job” economics.

3.3. Traditional Housing Typologies and Adaptations for Economic Activity

The urban villages of Noida provide residential accommodations for industrial, building, craftsmen, vendors, household working force etc. and supports the large work force of NCR. Left to the free will, they follow norms of road widths that are mutually acceptable and that which has fallen to the basic human anthropometry. Road widths vary from 8m at places to as less as 1.5m.

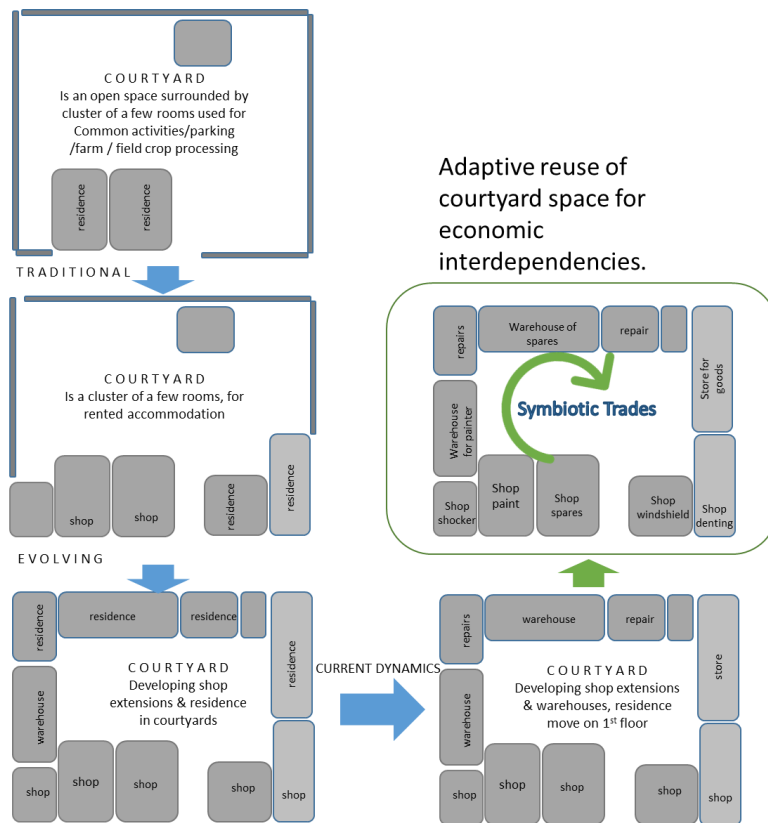


Figure 5. Evolving economic adaptations of House Courtyard. Source: Authors.

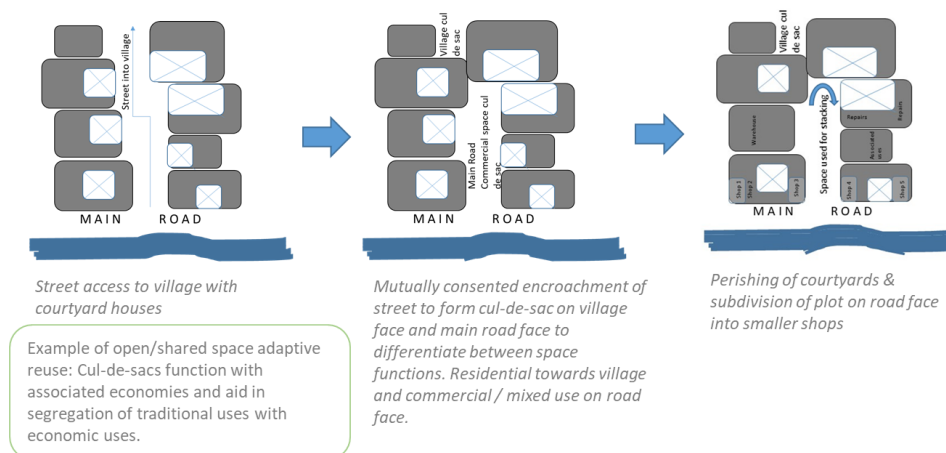


Figure 6. Spatial Groupings based on economic activities in Hoshiyarpur. Source: Authors.

Emerging from the native plate, they have unplanned roads, gated communities, clusters, community courtyards and cul de sacs, nothing is straight and grid is not perpendicular, but its a snug fit. The process of multiple and variable adaptations of the courtyard spaces of traditional houses are explained in Figure 5. These courtyard spaces are shared assets used for economic activities that are dependent on each other and serve multiple uses as well, during day and night. Such adaptive re-uses are key to the concept of circularity and sustainability. Similar spatial adaptations are demonstrated in the shared open spaces or common spaces and streets where by mutual understanding space is encroached for economic activity as explained in Figure 6. These spaces are used for street markets and retailing activities quite often. The street markets tend to work parallel to the formal economy, covering the district rather homogeneously, and creating well defined zones of influence that do not tend to overlap between them (Mora, 2003).

6. Identified Dimensions of Circular Economy in Urban Villages

Traditionally, sharing of space, resources and services was inbuilt in the social structure, where community level economic activities were intricately associated with the physical spaces. The current housing typologies and street character adapts differently to the newer economic activities. The economic activities in urban villages, for example, support the city's formal economy through low cost real estate provision and support functions. These include ATMs, banks, mobile stores, household goods retail chains, gyms, two wheeler electric bike showrooms and offices etc, which are not only low cost and low investment economic activities but also become magnets for other similar and symbiotic trades and activities to emerge. There is a prevalent spatial grouping in traditional crafts like artists, sculptors and similar trades being co-located, or in current set ups auto-parts and mechanic shops are colocated. Such spatial groupings exhibit material exchanges, recycling and circularity.

This is demonstrated with specific examples of the studied urban villages in Noida, which also demonstrate that the circular economy is manpower centric and not entirely machine dependent, and hence slow in pace. One such example is demonstrated in Figure 7 where circularity of activities in the automotive informal industry. Human discretion and hand craft comes to the rescue the optimal usage of material, before it gets discarded or is rendered useless, something that has skipped the agenda of fast moving economies and affinity for quick turnarounds.

Different dimensions of circularities have been identified for further expansion of research, which include Spatial circularity, that allows for multiplicity of use and of space, diurnal circularity, which points at use of a space for different uses at different times. These dimensions in combination with the nature of trade or activity provide a packaged environment for low-cost circular economies to flourish in Urban Villages.

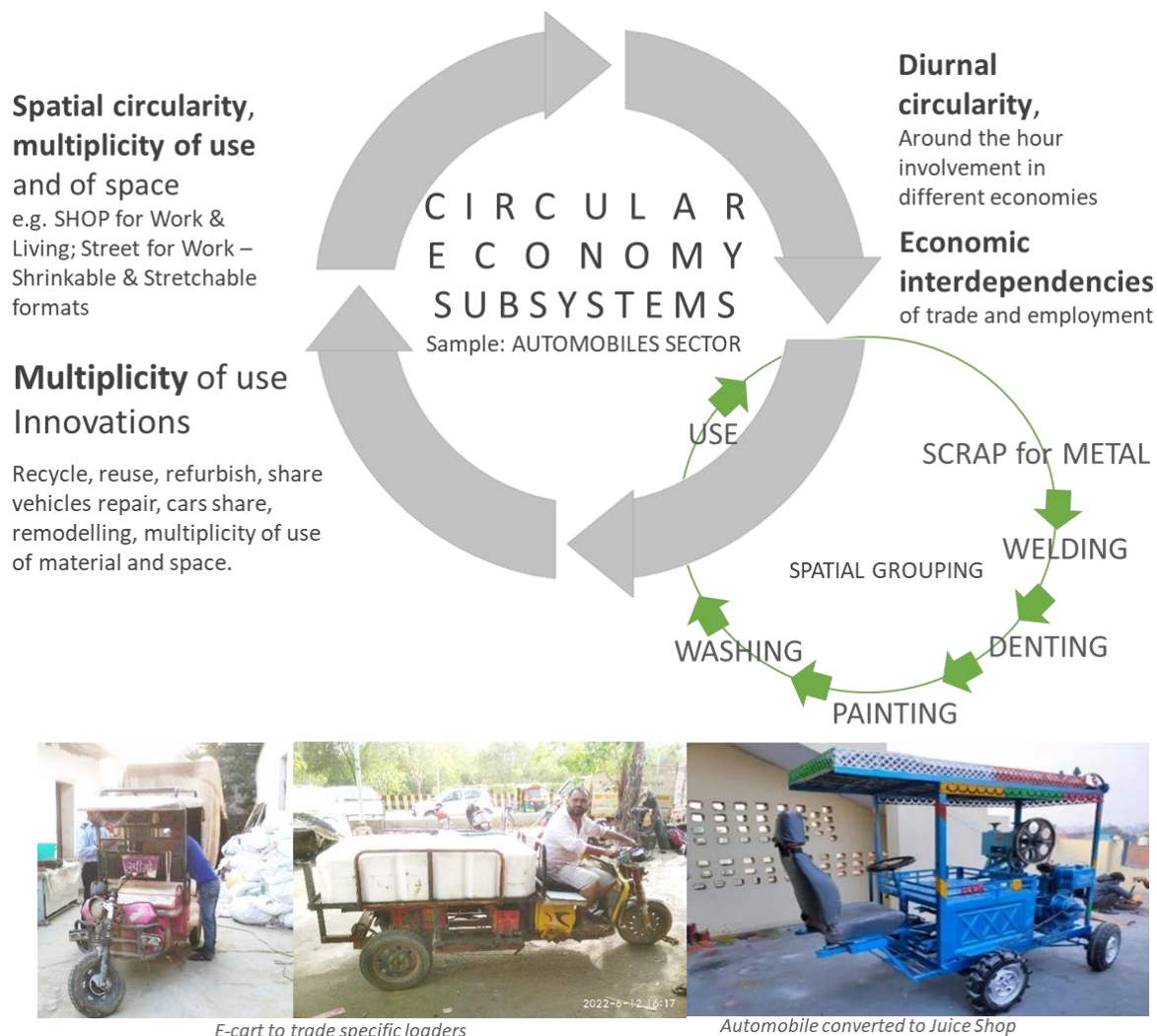


Figure 7. Circular Economy crafts and trades, A sample of automobiles sector. Source: Authors.

The study identified multiple spatial patterns of circular economy that harbours low cost and low investment economic hubs in urban villages. The spatial patterns and adaptive commercial usage support mutual symbiosis of trade and employment at different levels; at neighbourhood level: Spatial Clustering in Neighbourhoods for symbiotic trades and employment, at building/House/courtyard level: adaptive restructuring of built form for economic purposes and at the street level/ cul-de-sac/ Along transport Corridors: clustering of activities based on connectivity and accessibility.

7. Conclusions

Urban villages host indigenous, symbiotic low-cost trades and crafts that create local circular economies through morphological inter-relationships with economic systems, not possible in organized sector. Spatial grouping, physical adaptations; functional dependence, informal incubators, etc. require attention through adaptive cross-sectional rethinking, interactive governance, community's involvement, and policy shifts to empower them as units of informal, traditional and low-investment economies. It is crucial to recognise

that urban villages foster circular economies by way of spatial interlinkages which are currently ignored by the urban planning regulations.

At policy level, there is a need to balance out interventions that support informal economic activities and their spatial dynamism, while avoid over restriction. Overly restrictive policies towards street trade have proved unsustainable, creating corruption, illegality and ultimately mismanagement of streets and of traders, and adoption of an inclusive approach as a general principle desired. (Bénit-Gbaffou, 2015). There is also a need to highlight the importance of reimagining current approaches to managing neighbourhood economies being sensitive to the complex systems that spatial informalities generate (Charman, 2016).

This paper recommends an adaptive rethinking of informalities in urban realm to recognize and associate their spatial intricacies as an advantage for thriving low cost local and circular economic activities. This can be achieved through a cross-sectoral approach, where the informal physical spaces have flexibility to adapt to temporal economic shifts crucial to sustain the traditional low-cost economies. This would not only require a proactive and interactive governance involving communities, but also policy changes to accommodate informal spatial adaptations in building bylaws as a way forward to empower the traditional and low-cost circular economies, across the developing world.

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