TRANSIT-ORIENTED MORPHOLOGIES AND FORMS OF URBAN LIFE

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Abstract

Cities are facing the challenges of climate change as they become more car-dependent and less compact. Tackling these challenges, transit-oriented development has become one of the key concepts of urban design in engaging with opportunities for transforming the car-dependent city. Such transformational change demands exploring capacities for future cities, which are geared to understanding the ways in which transit-oriented developments work at different scales within a city. The main challenge here is to understand how the synergies play out at different scales in relation to the transit-oriented problems and opportunities. Thus, this research aims to enrich an understanding of how urbanity emerges in relation to overlapping connections between socio-spatial networks within transit-oriented developments. In effect, the analysis of spatial structures in a city needs to be conjoined with the ways through which everyday urban life takes place.

The study adopts a conceptual model of density, mix, and access, in which the permeability and pedestrian flows throughout the city are integrated with pools of use and different levels of concentration. The study documents the urban morphology associated with a transit-oriented development in the city of Tehran city, and explores the capacities within this transit pocket. Hence, through a series of mappings, the study will explore different morphological patterns as well as everyday street life within public spaces of transit-oriented development.

Introduction

Cities are facing the challenges of climate change as they become more car-dependent and less compact. At the neighbourhood scale, this has resulted in fewer areas where street life intensity can benefit from possible transformational change. In this sense, existing and possible key public transit nodes are the spaces with great potentiality for urban intensification, which is known as transit-oriented development. While the importance of transit pockets is well established in the fields of urban design (Calthorpe, 1993; Duany & Plater-Zyberk, 1991) and transport planning (Cervero, 1998; Dittmar & Potichia, 2004; Mees, 2010; Newman & Kenworthy, 2015), the empirical evidence so far has been generally limited to the western context, and the applied methodologies are less tested in cities of the developing world. In this way, Tehran metropolitan city has been considered as a critical case in the context of developing countries due to the challenges of car-dependency, carbon emission, rapid urban growth, everyday urban life, and struggle for transit-oriented development (Atash, 2007; Bayat, 2010; Madanipour, 1998; Peimani & Kamalipour, 2016), which opens up spaces of possibility for broadly-applicable proposals for redevelopment. Such a case study has the potential to challenge, confirm, or extend the theoretical propositions made in the literature in order to make them more rigorous and generalizable to other similar cases in the context of the developing world. Hence, this study seeks to understand the relationships between urban morphologies and everyday public life and explores the embodied capacities within a key transit pocket.

Urban Morphology and Transit-Oriented Urbanism

Discussions of urban morphology have been central to most of the urban studies linking urban form with city life during the last decades. Playing a critical role in shaping city environments, urban morphology deals with the spatial configuration, entities, components, connections, and interactions, generally through the instruments of design and planning codes.

To understand how the city works, Jane Jacobs (1961) called for the articulation of the morphological elements such as mix of primary functions, aged buildings, short blocks, and concentration as key conditions for urban diversity. As there is a loose relationship between land use and urban form, building use has been considered as a key element in analysing urban morphology. This links to Conzen's call for land use as a basic measure of town plan analysis (Moudon, 1994). More recently, Yu and Nes (2013a) suggest the combination of different ranges of density, land use mix, and network configuration as the morphological parameters of built environment that mediate forms of urban life. Urban morphology

in its broad explanation involves the articulation of both urban form and structure (Marshall & Caliskan, 2011). Drawing on Moudon (1997), urban morphology has been applied with different purposes in terms of explanatory/descriptive, prescriptive, and critical assessment intentions. Similarly, Marshall and Caliskan (2011) address urban morphology in terms of explanatory/investigative and evaluative/diagnostic means, and adopt several methods for identifying elements, types, and patterns of urban form applied as design units for further design interventions.

In order to better understand the conception of urban morphology as well as interpreting the relationship between morphology and design, Marshall and Caliskan (2011) present a joint framework through integrating urban morphology and design practice. To them, this framework has a capacity to inform a better quality of urban design in certain ways. A better understanding of how different morphological factors link together may inform the ways in which urban intensity emerges in different urban environments. However, such an understanding does not tend to suggest any 'causal' relationship between urban morphology and street life intensity.

The literature has seen the call for connecting the mix of use, building age, and lot size to urban diversity for over 50 years. More recently, there is an increasing interest from researchers in public health and city planning who attempt to outline functional mix as a key condition to the walkability and physical activity behaviours (Cervero & Kockelman, 1997; Frank, Schmid, Sallis, Chapman, & Saelens, 2005). To achieve high levels of transit ridership in transit-oriented developments, functional mix needs to be enhanced where no single land use dominates the precincts surrounding transit nodes that may otherwise create exclusionary areas (Cervero, 1998; P. Newman & Kenworthy, 1999). Jacobs (1961) argues that a diversity of functions and different forms of co-functioning between them is seminal to understand how urban environments work. She furthers her discussions by criticising the mono-functional zones and the damages made to the city by the modernist planning. The diversity of building age with different grain sizes that produce both high-rent and low-rent conditions in urban areas need to be explored to better understand city's economic and social life. In effect, any understanding of mix is highly reliant on the ways in which mix changes across different scales. It is not just the functional mix that matters in urban thinking, but also formal and social differences need to be studied at different scales to address the question of how the city as an assemblage of differences works (De Landa, 2006; Deleuze & Guattari, 1987; Dovey, 2010). Such an understanding opens up a multi-scalar theoretical approach in studying cities that resists any reduction to a single scale and measures of any kind (Kamalipour & Peimani, 2015). This study attempts to address the complexity and multiplicity of urban mix in the transit-oriented pockets by understanding the key parameters of functional and formal diversities and the embodied synergies and interrelations between them.

Urban density has been largely addressed in urban theory and practice, yet poor understanding and confusion about this concept has led to various applications of the concept (Dovey & Pafka, 2014; Nes, Pont, & Mashhoodi, 2012). As a multivariate and multi-scalar assemblage, density contributes to the qualitative characteristics of cities (Dovey & Pafka, 2014). Pont and Haupt (2010) define density as certain entities per unit area in terms of dwellings, people, and floor space. There is also a broad distinction between perceived density and measured density (Pont & Haupt, 2010, p. 79) where the former depends mainly on individual and experiential factors including the qualitative value and the latter has a more quantitative nature. Jacobs (1961) outlines density as a critical condition coexisting with mixed-use, fine-grain development, and permeability for urban diversity. She claims that residential densities of around 250 dwellings per hectare encourage high levels of urban life and walkable access to mix. Jacobs (1961) further argues that low-rise dense urban morphologies sustain greater diversity compared to the modernist high-rise typologies. Hence, she points out the high coverage ratio of 60 to 80 percent without height to measure building density, whereas for Dovey and Pafka (2014) coverage cannot control density without variable of height and floor space index (FSI).

Pont and Haupt (2010) create a spacematrix to define density as a multi-scale and multivariate concept in relation to urban form. A spacematrix represents density through a three variant diagram by using interrelated measures of site coverage, floor space index, and network density (Pont & Haupt, 2010). As part of their study, they suggest other co-dependent variables of open space ratio (OSR, spaciousness) and levels that are derived from the

basic measures (Nes et al., 2012). Whilst density indicators such as floor space index (FSI), open space ratio (OSR), and ground space index (GSI) can express housing typologies in residential projects, these indexes are not able to predict diverse mix and urbanity (Van Den Hoek, 2008). For Shelton, Karakiewicz, and Kvan (2011) floor area or/and mass of people do not guarantee urban vitality. Hence, it is critical not to be limited to the quantity of people, buildings or open space per given area and judge about the liveliness and functionality of place. It would be better to refer to the condition of intensity, which involves interactions of people in terms of transactions and activities to generate positive synergies (Shelton et al., 2011). In an urban design context, density differs entirely from intensity where neither of them can necessarily stand in for the other. Intensity refers to an emergent effect, which arises from alliances and interactions between individual actions (De Landa, 2006; Marshall, 2009). Intensity is more a synergistic effect that cannot be reduced to its components (Dovey & Pafka, 2014). Similarly, it is about an unquantifiable effect of the encounters, connections, interactions, that emerges between differences –practices, people and buildings (Dovey & Symons, 2014). It has been largely argued that dense and compact development is a precondition for transit-oriented urbanism and economic growth (Cervero, 1998; Dittmar & Potichia, 2004; Newman & Kenworthy, 1999). In this sense, increasing the density of such morphologies requires a multiscalar understanding of the capacities for transformational change and for intensified urban development.

Accessibility answers the key question of how people can potentially or do navigate the urban movement network. Since urban morphology mediates different flows and movements, it is critical to understand the spatial structure of networks. This claim parallels what Hillier (1996; 1984) calls "movement economies" in which the visibility and nature of spatial relations condition movements with the latter generating socio-economic activities. The correlation between spatial configuration of street networks and urban movements contributes to socio-economic initiatives in the development of cities. Marshall (2005) outlines permeability as the degree to which a particular urban area is 'permeated' by publicly accessible space. This concept refers to the ease of pedestrian movement within the urban fabric and ensures that pedestrians have multiple route choices between any two locations. For Jacobs (1961) access is more about the permeability of short urban blocks, which encourages walkable access to diverse attractions. She furthers her discussions by introducing the phrase of 'pools of use', which refers to the functions accessible within a walkable catchment of a specific location measured by time or distance. In this sense, there is a mutual relationship between pools of use and pedestrian flows. To address the question of how transit-oriented assemblages work in any district requires an understanding of the capacity of networks to enable access to and between different functions in order to offer the possibilities for random and face-to-face encounters. In this way, for such encounters, access networks cannot incorporate cul-de-sacs, but instead walkable public pathways, which is also dense enough to sustain clusters of urban attractions within walking distances.

The key relationships between urban morphology and transport systems have long intrigued academics and practitioners, yet a great number of attempts have primarily focused on developments around transit nodes over the last decades. As a leading urban design and planning movement, new urbanism is concerned primarily with the relationships between urban form and lived experiences in cities. As the principle promoters of this movement, Duany and Plater-Zyberk (1991) introduce the idea of Traditional Neighbourhood Development (TND), which characterises their ideal alternative in terms of compact streets, public spaces and buildings, and mix of activities within walkable distances. Drawing on Jacobs' (1961) concept of walkability, Duany and Plater-Zyberk (1991) promote a network connectivity oriented towards pedestrian-based design rather than motorised forms of travel. The primary principles of TND are applied in TODs, through which Calthorpe (1993) proposes strategies for creating livable and walkable communities. For him, transit-oriented projects are functionally diverse and pedestrian-friendly developments within a 'comfortable walking distance' (average 600 meters) of a transit node and a core business area. In this context, as a proponent of 'New Urbanism', he infers the underlying concept of 'pedestrian pockets', which involve the moderate to dense, mixed-use neighbourhoods to support transit within walkable catchment. This model includes both theoretical and practical insights, which can be applied to form a network at regional scale, for the creation of new towns as well as redevelopment projects (Calthorpe, 1993). Hence, the key premise

here is, however, how to cluster the development of urban growth areas to limit urban sprawl while reducing travel demand.

Cervero (1998) extends the discussion of transit-oriented urbanism by suggesting the idea of 'transit metropolis'. For him, the transit metropolis is where the built environment and transit systems coherently co-exist, improve, and reinforce each other across a metropolitan scale. He argues that a transit metropolis is a paradigm for achieving sustainable regional development, where mixed-use and compact urban morphologies suit effectively to the transit system. Hence, an effective transport metropolis supports high levels of mobility at the regional scale. As a result, it gives rise to the broader objectives such as social inclusiveness, walkability, urban vitality, and increasing the choices of how and where people travel and live (Cervero, 1998). In another study, the concept of TOD refers to concentrating a mix of pedestrian-friendly and moderately dense development around transit nodes to encourage active transport modes versus car use (Cervero, 2009). Moreover, as a promising model, TOD promotes sustainability through creating vibrant, mixed-use, and walkable neighbourhoods along transit corridors (Cervero, 2009; Renne, 2009)

Newman and Kenworthy (1999) draw attention to the importance of urban form to understand transport patterns and to reinforce the relationship between various transit modes and population densities in terms of metropolitan, outer- and inner-area, and central city. They suggest that planning for TOD should encompass key factors including proximity of the dense mix to transit stations, social mix, inclusiveness for a balanced transit system and a human-scale development forced by reducing excessive parking and auto-mode network. Otherwise, transit patterns lead to a more car-based development despite including increased density. While, Newman and Kenworthy (1989) put emphasis on population density as an important parameter for modal share and travel distances, they promote to a lesser degree other aspects of density in favour of a low auto-dependent city. Yet, in their argument, 'transit-oriented villages' are recognised as a critical approach to create dense and mixed use nodes linked to the whole city network by effective transit systems. In this vein, effective transit development is likely to encourage integration and constrain car-dependency. An effective transit-oriented development should involve intensive centralised land-use, the more infrastructure orientation for active transport modes, limited high-speed network, and better public transport performance (Newman & Kenworthy, 1989).

Transit Morphologies in a Case Study

The research presented here focuses on a case study in Tehran's district of Navab in investigating how transit-oriented developments work in the city. Navab lies in proximity to the major public transport node (Navab station) in the central to the western parts of the city. The study area for analysis includes a 100-hectare district surrounding the Navab metro station (Figure 1). The metro network was extended through Navab in 1999, and is approximately located in the western part of the city metro network. The subject area is roughly divided in half by Navab Highway (Figure 2), a main arterial road, which was constructed by extending the former Navab Street in late 1994. The widened road has played a key role in facilitating the north-south connection of the city during the last decades. The study area sits close to the surrounding neighbourhoods with residential, commerce, industrial, cultural, political and military functions, most of which operate at the city scale.

Until the late 1850s, a large part of the study area was outside the city boundary. Since then, a part of the area has gradually been allocated for residential development. In the 1920s, morphological transformation of the neighbourhood paralleled the rapid growth of the city, which followed modernist planning ideas. The construction of large roundabouts together with a network of wide straight boulevards was authorized by the Street Widening Act of 1933 (Mazumdar, 2000). The municipality of Tehran aimed to connect Navab Street to the major arterials and airports at the city scale, which meant extending the street by cutting through the old fine-grain urban morphology of the neighbourhood (Madanipour, 1998). To secure this costly plan financially, the municipality issued a bond in late 1994, which comprised commercial, retail, and office developments. This was nearly coincident with the 1993 plan through which the municipality of Tehran offered considerably higher built densities applying bonus zoning (Madanipour, 2006). A part of these was achieved by allowing developers to build high-rise buildings by merely paying the construction fees (a policy best known as selling density) to the municipality without considering the consequent

impacts on the adjacent urban environments (Madanipour, 2006). In the late 1990s, the major part of the scheme was implemented replacing a large number of decayed and dense dwellings with new housing developments (Madanipour, 1998).

Figure 1. Case study area in Tehran

Figure 2. Navab Highway

This research applies mapping as a tool to understand spatial properties such as building footprints, mix of functions, grain sizes, building heights, and street network, while also capturing the social patterns across different places. To better understand how different functions unfold in each case study, a simple, yet innovative framework has been applied in which a vast range of attractions as generators of synergies are categorised into three main groups of work, live, and visit and possible forms of mixed conditions – the work/visit/live triangle (Van Den Hoek, 2008; Yu & Nes, 2013b). This mixed-use triangle entails primary colours, mixed colours, and the mix of three main functions. Through this mapping index, dwellings are where people live (red), industries and offices are where people work (blue), and parks, theatres, shops, and mosques are public amenities that people visit (yellow). However, four other mixed conditions also exist: workshops are primarily places where products are produced and sold (green), schools and offices are publicly accessible amenities (green); dwellings are mixed with retail (orange) or with business (purple). This approach enables us to explore the mixed conditions and co-functioning between different attractions horizontally and vertically in different buildings in order to better understand where the urban synergies and connections are generated between different functions.

As shown in Figure 3, the study area is predominantly residential on the smaller streets with different levels of functional mix on the major streets. Office, hospital, local firm, bank, school, workshop, automobile gallery, and car-care service centres are among the primary uses that attract people from outside or inside the area to Navab. The pool of users drawn to this area varies from affluent consumers to those who come to work in private enterprises as working class and middle class people. The primary uses generate and maintain ancillary functions such as restaurants, small neighbourhood retail shops, and temporary food stalls along some of the main streets, which fairly add up to the vitality of the area (Figure 4). Along the mixed-use main streets, there is also a high level of vertical mix as illustrated in Figure 3. Clustered around the main transit station are the mixed areas of visit, work, and live functions, which mediate a greater street life intensity. Prior to the development of Navab, the old urban fabric was served with a variety of uses and activities, which have since become mostly residential areas with a few modern high-rise mixed buildings. Blocks adjacent to the current highway largely accommodate housing strips together with a few local shops and mixed use areas emerge along the modern edge where the highway meets the minor streets.

Grain size is mapped applying an exponential scale: 0–300 sqm, 301–400 sqm, 401–500 sqm, 501–1000 sqm, 1001-5000 and >5000 sqm. The map of lot size (Figure 3) provides an indication of how this neighbourhood is characterised by a fine-grain urban morphology. Lot size is generally small across the neighbourhood, with a few exceptions of larger grains occupied by new developments along

Figure 3. Urban morphology and functional mix of Navab

the highway. Prior to the densification project, lot sizes along the former Navab Street were typically small. The modernist redevelopment process rapidly changed the formal mix of the old dense edge along the street. Since then, new buildings have been housed on large lots with uniform facades, which lack specific character or any distinct formal features (Figure 6). In contrast, a mix of old and new buildings occupy the small-grain urban morphology, in the areas to the rear of the modern edge (Figure 5), which has emerged and been sustained over many generations.

slabs, and towers. Some blocks still accommodate old low-rise courtyard houses, while others have changed to row houses over time ranging from medium to high built densities. Clustered adjacent to the new highway, are the slab blocks together with the towers on each side, which are loosely linked to the surrounding urban environments. The percentage of gross coverage across the site area is 41% with a higher net coverage of 57%, which to a certain degree, follows the regulated lot coverage in Tehran's master plan of 1970. Due to this planning regulation, the residential blocks across Navab with row housings generally include 60% of lot coverage, and 40% of yard.

The recent redevelopments in the site area transformed the local access network and replaced the former Navab Street with the highway, which incorporates 12 lanes of fast moving car traffic. This process was followed by cutting through the old dense morphology of the study area (Madanipour, 1998). As a result, most of the street networks to the Navab Highway are blocked by large impermeable blocks, which make the local travels longer. The pedestrian network is generally disconnected along

Figure 4. A building accomodates a vertical mix

Figure 5. Buildings of different ages in small lots

Figure 6. Large-grain developments along the Navab Hwy

the Navab Highway by the dedicated lane or bus rapid transit network. The access is rarely facilitated by the pedestrian bridges, showing that the vehicular traffic is privileged over pedestrian traffic. This condition results in many informal crossings along this axis. Pedestrian flows are not entirely continuous along the pathways of the densified edge due to the impact of limited width, stairs and slopes, and areas with no designated crossings. Most of the local streets of Navab carry a heavy vehicular traffic during the peak hours. The intersections within the local network are generally choked with heavy traffic. Residents of the study area often face difficulties in backing their vehicles into the traffic jam. For this reason, many people prefer motorcycles to other modes of transport during peak hours.

A broad range of stationary actions and different users can be plotted in a map to envision how different public spaces are characterised by the emergent behaviours throughout the day (Gehl & Svarre, 2013). To offer an indication of how everyday life plays out in public spaces, patterns of public activities are mapped in the study area. In this way, different dots have been coded by activity type and the number of users engaged in them. Activities mapped in this study incorporate sitting, standing, street performing, informal trading, and playing across different public spaces.

Along shopping strips of Navab, informal traders emerge extoling their goods in a loud voice to attract pedestrians' attentions. Flows of people (especially women) are attracted to the street traders as they inspect their products and initiate short conversations with the strangers or negotiate a lower price with the vendors. Adjacent to the transport station, informal traders can be seen more often down the sidewalks, because of the larger number of potential

customers. They generally stand on the stairs selling their products, as people enter the metro station, or display their goods on the stairs, where they are more visible for the people passing by. The street trading along the shopping strip mostly attracts females in groups standing and talking to each other. However, informal trading in Navab is predominantly a male business.

A broad array of shop-window products encroaching upon the public spaces make some backstreets of Navab resemble exhibitions. Most customers are women who may stop by to check out the quality of the goods offered by shop owners. Such a neighbourhood shop becomes a place for social encounters where people appropriate space for their needs and exchange information. Apart from advertising their products, male shop owners stand or sit at their shop fronts observing passers-by. A similar scene exists along old residential blocks where the building inhabitants sit at their doorsteps talking to their neighbours or playing with their peers during the afternoon peak.

As is evident in Figure 7, most of the everyday public life flows on the main streets. The commercial office towers close to the metro station attract a large number of people during the peak hours when vehicular traffic congestion builds up and pedestrians generally cluster around transit nodes and corridors. Street life volume as well as diversity of public activities rise significantly during midday and evening peaks throughout these areas. Some people sit and observe, while others purchase goods from

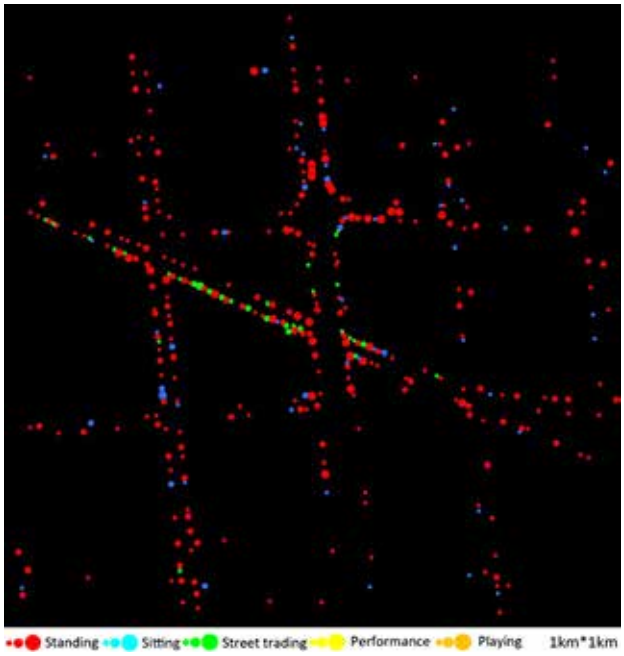

Figure 7. A mix of public actions within public spaces

the vendors or walk to the shopping centres. Children on their way home from school come to the areas close to the transit nodes where a mix of attractions exist, and spend a short time buying snacks and gathering with their peers. By contrast, the newly developed high-rise edge of Navab Highway follows a completely different pattern where a low range of public activities was observed along sidewalks of this edge. As is evident in the map of urban life, there is a clear distinction between the old mixed urban morphology and the modern redeveloped section along the Navab Highway. Most of the local streets

Figure 8. Different patterns of street life in the same location (source left: map.tehran.ir; source right: author)

leading to the highway are turned into dead-ends or blocked by concrete barriers to block vehicular access. As a result, such areas are appropriated for parking functions, which do not contribute to the same vitality of street life as they are not mixed with a wide range of everyday activities and a pool of users.

There is negligible use of public space for performance or play throughout the area. Close to the schools and other crowded nodes, retail shops and informal traders start their trading to offer goods and services to the crowds of people. Informal trading is nearly concentrated along Azarbaijan Street where sidewalks are filled with miscellany of vendors and people standing in groups. Figure 8 illustrates how the morning and evening patterns of street life vary largely as public spaces are appropriated by the street traders in the evening peak. This can partly relate to the possibility of official control during the working hours.

Conclusion

The case study of Navab shows how different public spaces around transit nodes are characterised by a mix of functions, building heights, lot sizes and access networks. Each of these mixes are hard to define, as they are subject to change at different scales. Hence, each of these concepts needs to be codified through exploring associated factors that facilitate their emergence. What also matters are the synergies between various types of mix and their inherent relationships. Urban intensity in this sense refers to a synergistic effect that emerges from connections between different parts of the city including buildings, people, flows, practices, and spaces. As Wood and Dovey (2014) argue, these relationships are not causal yet reciprocal - forms of synergy where each of the mixes is geared to another.

The study here used urban mapping as a spatial knowledge to unravel the ways in which different connections are embedded in transit-oriented morphologies and underlie the working of different public spaces. The analysis of the mix indicates that several parts of the study area have the capacity to change from being mono-functional to mixed-use. A comparison between the maps of functional mix and public activities shows that there is a negligible use of public space for the stationary activities in most of the mono-functional areas. Hence, these areas have the capacity to accommodate more stationary activities. This can be limited to a functional change of the ground floor where most of the fine-grained plots are likely to encourage diversity of ownerships and functions. Meanwhile, this change can be accompanied by subdividing large plots to provide the possibility of functional mix at micro scale, which is fundamental for street life vitality.

The results of the analysis show that the process of densification relies on understanding the existing and possible interrelations at different scales. Hence, the areas with a higher capacity for densification mostly comprise low-density developments. Specifying the space of possibility in this case contributes to street life intensity along transit corridors by increasing building heights and dwellings per hectare and providing the possibility of functional mix on the ground floor. Furthermore, the findings of the study also indicate that areas with a low level of density around key transit nodes and corridors have a capacity to benefit from a densification process to sustain urban intensity. While density is a necessary condition for street life vitality, it is not sufficient, as evidenced within areas of high density, which do not benefit from high levels of urban intensity. This links to the idea that urban intensity does not simply increase with the building densities, yet is a synergistic effect of a larger assemblage (Dovey & Pafka, 2014).

The analyses of everyday public life and pedestrian flows indicate that the emergence of temporary activities is geared to the areas with high levels of pedestrian flows. Temporary activities take place in the areas where the boundaries are blurred between the spaces of retail and pedestrian flows (Stevens, 2007). Appropriation of public spaces for enabling temporary practices lies on the extent to which urban environments are loosely regulated (Bishop & Williams, 2012). In a sense, public spaces are the stages on which a multiplicity of appropriations plays out in order to lend themselves to different forms of temporary activities.

While the study is exploratory in nature, it opens up some areas of research that are beyond the issues addressed above. The subject of an ongoing research by the author is to understand how different modes of transport, whether formal or informal, compete within such a transit-oriented morphology. In this way, catchments of different transport modes need to be analysed. The ways in which the case study connects to the other transit-based developments

along with additional connections at different scales can be further studied. Further studies can focus more on social networks and their impacts on public activities and street life vitality.

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