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Synergistic Urban Improvement: Case Study of Hikifune Neighbourhood in Tokyo

Kalina Vankova¹, Hitoshi Nakamura², Gesa Witthöft³¹*MSc, Faculty for Architecture and Planning, Vienna University of Technology, Vienna, Austria*²*Prof. Dr., Department of Planning, Architecture and Environmental Systems, College of Systems Engineering and Science, Shibaura Institute of Technology, Saitama-shi, Saitama 337-8570, Japan*³*DI. Dr.-Ing., Sen. Sc., Department of Spatial Planning, Centre of Sociology, Vienna University of Technology, Vienna, Austria*

Abstract

This paper proposes the synergistic method as an alternative approach that embraces urban complexity and reverses it to a set of mutually reinforcing improvement strategies. After illustrating the general idea of synergistic improvement by examining the correlation among a number of urban issues, this paper uses the case study to explore this interconnectivity in closer detail. Hikifune in Tokyo was selected as a case study because of its distinct atmosphere and historical background, on the one hand, and fragility in terms of demographics, natural hazards and economics, on the other hand. Relevant literature, along with empirical and statistical data, is the primary method used in this research. Relying on the discovered findings, the conclusion returns the discussion to the necessity for a synergistic improvement.

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Keywords

Synergistic improvement; Disaster risk reduction; Demographics; Ineffectively used space; Untapped potential

1. Introduction

Given the socio-economic, demographic and environmental dynamics of the current era, communities in cities are progressively confronted with numerous challenges. Commonly, urban planning and architecture refer to such issues as isolated problems and provide only sectoral changes. However, all these matters are deeply interconnected and recurrently influence each other, while being habitually exacerbated by anthropological activities. As a result, they forge disaster chains with direct and/or indirect impacts on the urban environment and quality of life. This paper examines whether a synergistic approach could contribute to a paradigm shift towards a crosscutting urban development by relying on existing research. Because Hikifune neighbourhood in Tokyo is an area exposed to a unique combination of interdependent challenges, it was selected as the case study. The methodology and data collection draw on empirical evidence, research work and official statistics. After illustrating the general idea of synergistic improvement through correlation among a number of issues, the paper uses the case study to explore urban interconnectivity in closer detail. A concluding section returns the discussion to the necessity for synergistic

improvement by relying on the discovered findings.

2. Synergistic Improvement

2.1. Interconnected Urban Issues

Historically, cities have been places of intricate and dense relations between urban forms and social networks with natural forces and innovative practices constantly influencing each other. It is precisely this magnetic complexity of compact urban space with its endless possibilities that still attracts the rural population and gives rise to the megalopolis. Since industrialisation, the speed of urbanisation, population growth and technological progress has accelerated to unprecedented rates, resulting in exacerbation of many existing urban issues and emergence of new challenges. A vast amount of literature favours the thesis that the tools that urban planners, governments and public sectors have been using or have developed over the last two centuries are not only insufficient but also harmful to city sustainability. Sassen (2005) views uncovering urban interconnections as a way ‘towards understanding what our large cities are about today and in the near future, and what constitutes their complexity’. In this respect, the research proposes to explore whether synergistic outcomes could arise from observing the complexity of acute disadvantages, such as natural disasters, demographics and local potential, such as ineffectively used urban space, as opportunities to bring about urban improvement.

2.2. Natural Disasters

Commonly, in seismically active regions, earthquakes have major socio-economic and environmental impacts on densely urbanised areas. Strong ground motion often triggers further devastating disasters such as tsunamis or fire spread. Exposed to a collective risk, informal, densely built-up neighbourhoods of wooden buildings represent the most vulnerable areas. When poorly maintained or abandoned, they pose clear danger due to deteriorating construction and proximity to other houses of poor seismic and fireproof performance. Hirokawa and Osaragi (2015) state that ‘[c]ollapsed buildings typically have a higher probability of catching fire compared with buildings that have not collapsed’. Another example for collective damage is street blockage. Obstructed, narrow alleys block the way for emergency vehicles, complicate the evacuation process and become extremely dangerous zones due to concentrations of gas emissions, heat and falling objects. Finally, a highly urgent issue concerning areas exposed to cumulative damage risk is problematic evacuation. In many cases, existing evacuation zones are insufficient and inadequately located, whereas fire-prone sections along firebreak axes could easily provide a fire bridge to the adjoining neighbourhood.

Global climate change alters precipitation patterns in an unprecedented way, resulting in extreme weather conditions. Together with geological hazards, such as earthquakes and landslides, they form disaster chains that have increasingly negative impacts on people’s daily lives as well as urban development (Baodeng, 2016; Okazumi, 2013; Shaw, 2014; Wdowinski, 2011). Human activities such as urban sprawl (Suriya & Mudgal, 2011), reduction of infiltration capacity of catchments (Adebayo & Rabee, 2011) and flood resistance infrastructure (Liao, 2012) frequently reinforce impacts of weather events involving heavy precipitation in cities and erode their resilience to floods. Similar to areas prone to earthquake and fire spread, a critical issue in case of a flood emergency is safe evacuation that requires advance planning and technical expertise. Inadequate or delayed evacuation can expose inhabitants to secondary hazards such as power outages and damage to electrical, communications and transportation infrastructure, inability to access food and fresh water, particularly in high-rise apartments, and sewage-contaminated floodwater (Lane, Charles-Guzman, Wheeler, Abid, Graber & Matte 2013).

2.3. Demographics

Ageing population and shrinking households are listed as critical issues for a number of developed countries due to low fertility rates, increasing longevity and changing modes of social relations (Cohen, 2003; Baker, Baldwin, Donahue, Flynn, Herbert, La Jeunesse... Will, 2014; Feng, Liu, Guan & Mor, 2012). This phenomenon poses major policy challenges to countries with increasing proportions of elderly population in social, economic and political effects (Bloom, Canning & Fink, 2010; Muramatsu & Akiyama, 2011). However, demographic diversity and strong family and neighbourly relationships are traditional sources of support for liveable, prosperous and resilient communities (Muramatsu & Akiyama, 2011), whereas monotony and homogeneity bear grave consequences for the environment. Surveys such as those conducted by Uhlenberg (2000) emphasise beneficial outcomes of age integration in our societies. Besides the issue's social aspects, presence of varied demographic groups is highly correlated with disaster preparedness. Dense areas with population of mostly elderly people are much more vulnerable to natural hazards due to their impaired physical mobility, diminished sensory awareness, chronic health conditions or social and economic limitations (Aldrich, N; Muramatsu & Akiyama, 2011; Taira, 2008; Lane, Charles-Guzman, Wheeler, Abid, Graber & Matter, 2013). On the contrary, young adults possess stronger self-preservation instinct and tend to react more adequately in case of emergencies. Low household ratio is also linked to per capita expenditures and environmental impact. Informal settlements populated mostly by elderly couples have very low energy saving performance, high living expenses and ecological footprints. Aoshima (2016) claims that power usage increases with the decline of household members. '[E]lectricity consumption', the author goes on, 'of the 70 or older group totals [...] 1.6 times as high as for the 29 or younger group'.

2.4. Ineffectively Used Buildings and Open Space

Decades of functionalism, zoning policies and large-scale car-oriented development at the global scale have resulted in an unattractive public realm and an impaired ability to experience the city. 'The City at Eye Level' (2016) emphasises the significant role the ground floor plays in economic and social success of urbanities since 'it determines 90% of the building's contribution to the experience of the environment'. In this regard, numerous studies have concentrated on the possibilities for a paradigm shift towards human-oriented urban planning. The general conclusion they draw is that mixed-use urban landscapes and social inclusion are prerequisites for the prosperity of each neighbourhood. Mikelbank (2008) maintains that a 'city of strong neighbourhoods breeds a confidence among households, businesses, developers, and community leaders that spills over into the city's economy in general'. Jacobs (1992) famously advocates the necessity of diversity of uses and people as drivers of innovation and urban success and the failure faced by a community if that diversity is missing. Similarly, Florida's theory (2003) for the 'creative class' highlights the power of open and diverse places 'to attract greater numbers of talented and creative people—the sort of people who power innovation and growth'. The lack of such diversity, substantially enhanced by the presence of a passive ground floor and disproportionately large enterprises (Jacobs, 1992), is a two-sided problem. On the one hand, deteriorating and homogeneous living environments adversely affect quality of life and, as such, make the vicinity even less attractive for people of diverse age groups and social status. On the other hand, they majorly impact the physical and mental health of local residents (Krause, 1998), which sets a vicious cycle of social and economic stagnation.

In the context of today's urban density and scales, vacancies in metropolitan areas can be considered the equivalent of wastefulness and weak planning systems. Yet, abandoned properties of various functions are a commonplace phenomenon in socially and economically distressed neighbourhoods. They have a destructive effect on their surroundings, draining social and economic capital (Mikelbank, 2008). Their negative impact concentrates largely on the ground floor, which, as a result, becomes passive, unattractive and non-lucrative. When abandoned, buildings also become easy prey for burglars. Because of their poor maintenance, insufficient infrastructure and low hygienic conditions, they are hard to rent or sell. Moreover, in close proximity to other non-reinforced structures, they constitute areas that are most vulnerable to natural disasters.

Junkyards, vacant lots and underused and neglected open spaces represent another destructive category of land use

that grows in grey and/or marginal areas. Analogous to vacant buildings, their presence signals that the environment is too poor, with too little surrounding magnetism and too low land values to sustain other uses. Outdoor parking lots and depots, on the contrary, have the potential to be profitable enough to economically justify their place in diverse neighbourhoods (Jacobs, 1992). However, their dominant presence comes at the price of a number of quality of life and environmental issues. Existing large outdoor lots thin the city and harm the relationship between spatial forms and social interaction. Jacobs stated that '[t]he more downtown is broken up and interspersed with parking lots and garages, the duller and deader it becomes'. The glorification of the automobile, Livesey (2004) claims, has 'severely altered the traditional street that had been carefully scaled to the pedestrian and pre-industrial forms of transportation'. It is widely known that cars, together with their required infrastructure, are also conducive to reduced disaster resilience, to worsening air and noise pollution, to overloaded traffic systems and rising commuting times, to reduced physical movement and to growing expenses and environmental costs, irrespective of the cultural and social context.

2.5. Untapped Potential and Synergistic Improvement

Cities are complex adaptive systems that constantly evolve and recreate. To that effect, every urban area, regardless of its political, economic and social state of affairs, wields potential for successful development. Depending on the context of the place, its potential can vary greatly but the potential often lies in the combination of the interconnectivity of local issues and resources. Clearly, factors such as location, heritage, nature, urban milieu, technology, fiscal capacity, private–public partnerships, civic engagement initiatives, education and health care can be invaluable assets for facilitating urban progress. Yet, addressing problems directly, thus finding possibilities for action in a positive direction, can flip the vicious circle into a virtuous one. For example, acknowledging informal urbanism as an innovative resource and taking a fresh glance at human-oriented planning (Brillembourg et al., 2005), seismic and fireproof reinforcement of houses as glue for restoring community relations, abandoned buildings as an opportunity to introduce new uses and enhance the economic viability of a neighbourhood, underused vacant lots and infrastructure as a chance to reclaim the public realm for its inhabitants (Stahle, 2016) and build flood resilience, even a natural disaster as an occasion to rethink and improve the built environment (Sorensen & Daalsgard, 2012). Faehnlea and Tyrväinen (2013) underline the importance of collaboration, which serves not only planning and decision-making but also worthy of the stakeholders' effort. The resulting synergistic improvement among such mutually reinforcing practices possesses aptness for generating momentum with lasting urban improvement outcomes.

3. Case Study

3.1. Location and Historical Background

The name *Hikifune* is not an official postal address. Locals refer to the area of 2 Chome Higashimukōjima, 2 Chome Oshiage and 4 Chome Mukōjima, between the rivers Arakawa and Sumidagawa in Sumida ward, Tokyo, as the Hikifune Toko-Niyon district (in short, Hikifune). Even though the neighbourhood lies in three postal address units and consists of two neighbourhood associations, at a local cultural and social level, it functions as a whole. Moreover, cohesion of residents plays a crucial role in case of emergencies and the need for rapid evacuation. For these reasons this work refers to Hikifune as an entity. The key location of Hikifune station provides not only easy access to popular commuting and commercial destinations for residents in the surrounding area but also regional transit services connecting northern prefectures with southern parts of Tokyo city.

After being largely destroyed on three occasions during the twentieth century, most parts of central Tokyo were rebuilt according to new safety regulations (Nakamura, 2012). Sheltered from these destructive events, Hikifune, as part of the more conservative district east of Sumida River, has preserved its urban form without any effective subdivision control, following a plot-by-plot urban pattern until today. According to a report on the community-based

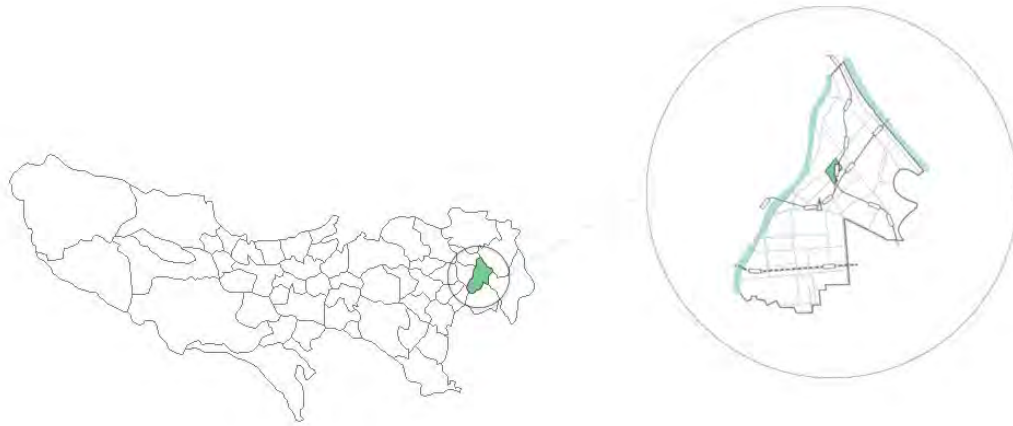


Figure 1. Location of Sumida ward in Tokyo prefecture and of Hikifune neighbourhood within Sumidaward

district plan (2012), since 2003, a large-scale redevelopment project is underway and many high-rise residential buildings and commercial facilities have been completed southeast of Hikifune station. Tokyo Skytree, the largest enterprise within Sumida ward, has a massive economic impact on the district. Apart from that, the currently running Tobuline Railway Renovation Project anticipates renewal and seismic reconstruction of the Tobu line, including Hikifune station, while the Sumida ward 2010 master plan suggests developing Hikifune neighbourhood as a local commercial high-rise centre connected to the already progressing Tokyo Skytree area and, further, with the Asakusa district.

3.2. Urban Morphology



Figure 2. Buildings elevation plan and ground floor functions plan

The neighbourhood shows characteristics of a *superblock* (Shelton, 2012), comprising high-rise buildings along wide streets and an interior of two-to-three-storey houses of an average 40-year lifespan lining the narrow alleys *roji*. Evacuation streets along the periphery combine cross-city traffic movement with commercial and disaster prevention functions, while the meandering network of *roji* between low-rise buildings maintains locals' circulation. The superblock is dissected by a passing through Hikifune station railway in two parts. Cars are rarely used within

the neighbourhood, and the majority of the local people prefer to walk or use bicycles, motorbikes or the train to reach their destinations. Their preferred routes are small and mid-width alleys. The superblock predisposes correlation among the buildings' functions, locations and height. Observed data suggests that most low-rise buildings within the interior serve an exclusively residential function, whereas mixed-use buildings with a shop or a service on the ground floor can be found in areas with frequent pedestrian circulation. According to Sumida Demographic Institute (2006), almost 70% of working residents are employed or self-employed in fine-grained establishments along these axes.

Shelton (2012) describes the Japanese urban space as an opposition of 'layers of [positive] insides and [conceptually empty] outsides'. Hikifune's densely built-up fabric consists of multi-layered private positive spaces (*uchi*) and a negative leftover (*soto*). Commonly, the narrowest alleys are, actually, overlapping semi-private spaces that provide needed access to *uchi*. Juxtaposition of 'separate but co-existing systems' is another phenomenon of the Japanese urban landscape (Shelton, 2012). Infrastructure, shrines, abundant vegetation, electric poles, along with people's presence, personal belongings, roller shutters, ground floor workshops, new and old, modern and traditional, 'participate equally [...] in the imagery of urban Japan' and 'result in an amorphous and more collage-like surface'. Most low-rise dwellings constituting Hikifune's interior are heirs of traditional Japanese townhouses. During the post-war period, these areas of urban vernacular began to rapidly disappear and are currently subject to intense large-scale redevelopment pressures. They are deep and narrow two-to-, occasionally, three-storey buildings with a shop space at the front, which makes the ground floor along the *roji* very versatile, thus establishing constant exchange between outside and inside, (semi-) public and private and contributing to the street's diversity. Due to limited space, the usual connection with nature takes place at a street level, as part of the (semi-) public realm.

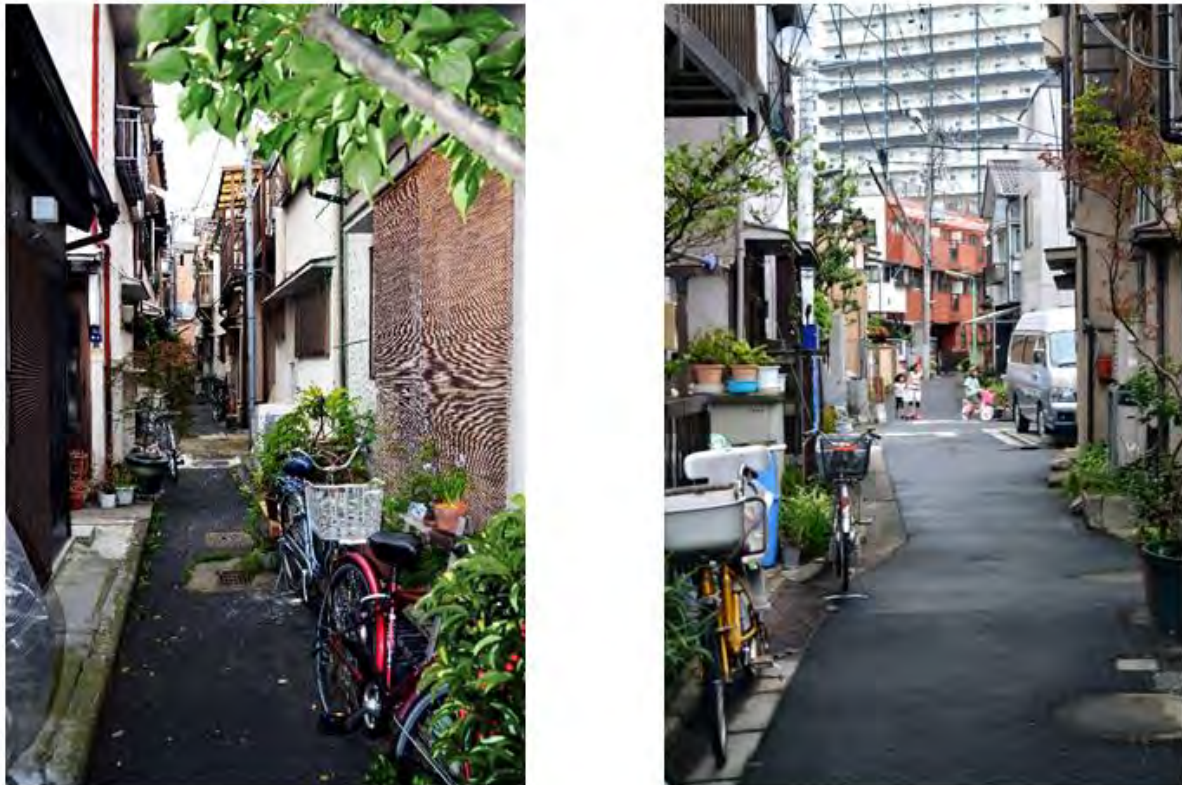


Figure 3. (a) Narrow alley. Photo by author. (b) Juxtaposition. Photo by author.

3.3. Issues

3.3.1. Natural Disasters

Nowadays, the possibility of fire spread in central Tokyo is very limited due to introduction of new fireproof materials and widening of streets. However, in densely built-up areas with wooden houses, it still tends to occur. Tokyo Metropolitan Government-based data (2010) indicates that being exposed to a collective risk of building collapse and fire spread, Hikifune is a priority development zone for Tokyo. Empirical evidence proves that the majority of wooden houses do not comply with current seismic standards and, consequently, would not survive a serious earthquake or fire spread. The most vulnerable areas are densely packed clusters including old, non-reinforced and vacant houses along the roji. Although in 2014, local governments were empowered through new ordinances to demolish the most dangerous buildings, Takamura (2015) claims that this measure is ‘for extreme cases’.



Figure 4. (a) Road width plan. (b) Vacant house. Photo by author.

Furthermore, studies indicate that Hikifune is located in an area of highest blockage probability for Tokyo, 20% (Hirokawa & Osaragi, 2016). Many alleys in the neighbourhood do not follow the Building Standard Law obligation for minimal road width of 4 m (Hasegawa, 2013). One of these alleys establishes an important connection between the public bath and the train station and is characterised by high levels of pedestrian and cyclist activity. However, roji, just like townhouses, present a significant part of Tokyo’s vernacular and should be regarded with considerable mindfulness to avoid gentrification’s negative impact. Moreover, locals fear that possible street widening ‘would increase automobile traffic passing through the district [...] induce illegal parking’ and reduce landowners’ plots (Nakamura, 2012).

In addition, the government’s official disaster prevention map illustrates only two temporary evacuation zones in case of earthquake or fire spread emergency. These spaces provide only a temporary solution, do not have the capacity to accommodate all residents and leave the southern part beyond Hikifunegawa Street completely isolated. The primary evacuation zone of Shirahigehigashi is located at a distance of more than 1.5 km along the

main evacuation roads; this is an unthinkable walking length for elderly residents.

Until 1975, economical ground water in Sumida ward was pumped for industrial uses, resulting in subsidence of lowlands' ground level by the maximum recorded depth of 4.5 m, as reported by the Arakawa-Karyu River Office. Moreover, extreme weather events are expected as a response to climate change. As a consequence, according to Arakawa-Karyu River Office estimations, areas around the Arakawa River face large-scale flooding due to breaches of levees.

Examination of topographic maps illustrates that Hikifune's territory is relatively flat, located at approximately 0 m sea level and at a substantial distance from the riverbank. Hence, there is minor danger for potentially strong debris flow or immediate construction damage. The main hazard is long-term isolation. An official flood hazard map predicts that, in case of a levee breach, the water level of Hikifune neighbourhood would reach 3 m above ground level, equivalent to houses' first floors. As a consequence, as largely two-storey structures, wooden houses in Hikifune are potentially hazardous. Currently, local people would evacuate to surrounding high-rise buildings, which provide only temporary shelter in common areas around elevators and staircases and cannot serve long-term evacuation purposes.



Figure 5. (a) High-risk buildings plan. (b) Evacuation zones plan.

3.3.2. Demographics

Data from the Sumida Demographic Institute suggests that Hikifune is an area of increased concentration of two-person households of elderly couples comprising 34.4% of its population in 2010. Far behind that are three-member and single households at 20% and 17.6%, respectively. A predominantly ageing population, disaster vulnerability and lack of opportunities for employment and social interactions are major reasons young people prefer more popular districts with higher concentrations of economic and commercial activity. In addition, employees' gender distribution statistics indicate that less than 40% of the workforce in Hikifune is comprised of women.

The neighbourhood's density reaches its highest numbers in peripheral areas with more than 300 p/ha, whereas the core lies between 100 and 200 p/ha (Hikifune Toko-Niyon district machizukuri council, 2012). The reason for this contrast is not only condominiums' higher capacity but also that the interior consists largely of houses with two-person households. This proves that there is socio-spatial interdependence among age, density and real estate type, resulting in demographic segregation. The periphery of high-rise buildings preferred by young families surrounds the interior of two-storey wooden houses of low household ratio and high average age. Moreover, conflicts of interest between newcomers and original inhabitants are common in homogeneous neighbourhoods with rules and community connections established decades ago (Taira, 2008). Local elderly residents are also less interested in

retrofitting their homes and participating in hazard mitigation activities than their younger neighbours.

3.3.3. Ineffectively Used Buildings and Open Space

Empirical evidence reveals that high-rise buildings along the periphery accommodate parking lots or, rarely, shops on the ground floor. Indeed, these towering structures have disaster prevention roles such as functioning as firewalls and isolating the core from loud, wide streets; nonetheless, they spread over large areas creating a monotonous environment and have a negative effect on social interactions at street level. The introvert ground floor spreads over the interior as well. In many cases, the traditional shop has been replaced by more passive functions: garage, storage, residence or vacancy. Currently, parking lots cover around 36,000m² of the neighbourhood's area, with approximately 200 houses with garages. As a result, exchange at street level between inside and outside, and private and public, has been replaced by a more passive environment. Observations show that even in the most vibrant areas, facades of many workshops, services or restaurants are largely closed or poorly maintained, having a rather unwelcoming character. A principal condition for a successful restaurant or service is the attractiveness of its surroundings. For this reason, even places with a good concept, active ground floor and creative design in Hikifune are not achieving their intended success. The residents' high average age is a further reason for non-prosperous ground floors. On the one hand, owners have no physical or economic ability to run, promote and invest in their businesses. On the other hand, potential customers are elderly people leading modest lives. Hikifune's overall passive and often poorly maintained environment at street level proves one of the main factors for the neighbourhood's economic and demographic stagnation.



Figure 6. (a) Ineffectively used buildings and open spaces plan. (b) House with a passive ground floor. Photo by author. (c) Chopstick shop next to the car-parts factory. Photo by author.

Unquestionably, the presence of vacant buildings has an additional negative impact on Hikifune's demographic and economic decline. According to empirical data, when ageing residents pass away or move to nursing homes, their houses remain unoccupied because younger generations prefer to live in new districts instead of staying in their inherited homes. With their increasing number, the neighbourhood is becoming even less popular. '[G]iven the traditional concept of property', 'the closed nature of the Japanese community' (Takamura, 2015) and land fragmentation into many small individual plots with complicated ownership relations, direct interventions are extremely problematic. In this regard, Sorensen (2007) maintains that 'property ownership rights create a vast constituency with strong reasons to try to prevent changes that counter their perceived self-interest'.

Examination of the area indicates that the largest ineffectively used areas are situated around the railroad. An important part of the railway network, the open space surrounding the train station is unattractive and serves solely as a transit zone for locals between their homes and the station. At its very end, occupying the corner of

Hikifunegawa Street and the railway, lies a large, usually empty parking lot. Other ineffectively used areas are predominantly open-air parking lots and a few vacant lots spread throughout the neighbourhood. Through their lack of sufficient greenery and good tree canopy, these spaces are raising the environmental impact of the area along with its unattractiveness. A survey (Hikifune Toko-Niyon district machizukuri council, 2012) revealed that 54% of the residents are not satisfied with the greenery of public areas, whose maintenance is the responsibility of the municipality, or the Tobu Railway Corporation in the area in front of the train station.

3.4. Untapped Potential

3.4.1. Walkability, Location, Public Space

Hikifune's greatest resource is its human-scale environment. Schulz (2012) highlights the value of roji 'enclosed spaces [...] separated from Tokyo's modernity in both geographical and cultural terms and contributing 'to the formation of an inverse urban tissue of the global city', while Sorensen (2009) sees these spaces as 'a powerful constraint to large-scale redevelopment in Japanese cities'. In today's rapidly growing metropolitan regions, increasingly gentrified and strapped for space, walkability has become a luxury and an urgent issue for *big* cities. Stahle (2016) recognises the rising significance of walking in the social, economic and ecological performance of the public realm, affecting the demand for housing and offices. Moreover, the vibrant small-scale urban tissue is crucial for integrated, inclusive communities. Hikifune's maze of narrow alleys provides great space for children to play and neighbours to talk and could be considered 'the main living-room of the neighbourhood' (Hein, 2001). According to statistical data from the Japan Real Estate Institute (2016), living in a condominium is neither cheaper nor more convenient than living in a detached house. The total floor area of a two-storey house is commonly 100m² in comparison to the normal condominium apartment of around 50–80m².

Hikifune's central location ensures regional accessibility, along with proximity to quality parks and water bodies as well as to commercial and cultural hubs. If recognised as a shared community recourse, Hikifune train station is likely to affirm collective memory by transforming the infrastructure node into a place of social, economic and historical importance and by providing a safe evacuation zone with capacity to temporarily accommodate local residents. An opportunity to realise this concept is collaboration with Tobu Railway Corporation on the Tobuline Railway Renovation Project. In addition, if pocket parks replace present vacant lots and parking lots, they could meet locals' needs for greenery and open space activities. All these considerations are vital for the choice of home, especially for the young generation.

3.4.2. Machizukuri Council

The *machizukuri* (meaning *town-making, community improvement*) council is a popular community association in Japan, performing overall coordination between residents and the local government (LG) and drawing up the community improvement plan. After a powerful legislative enactment wave in the 1990s and subsequent decentralisation of city planning in Japan, '[m]achizukuri groups today enjoy much greater legitimacy and ability to influence local governance processes' (Sorensen & Funck, 2007). Takamura (2015) argues that community-based organisations 'can break the social-psychological barriers that prevent transactions in vacant housing'. Being an established mediator among civil society, LG and external organisations, empowered to leverage key resources and supported by technology, the machizukuri council wields potential to manage meaningful, effective collaboration towards execution of synergistic improvement policies.

In Hikifune, the Hikifune Toko-Niyon district machizukuri council was established in 2009 in collaboration with two neighbourhood associations, the Sumida ward LG and some experts. Although the council drafted a community-based district plan in 2012 through active two-year discussions, its activities after 2012 have been stagnant, mainly because of lack of motivation among local staff members and lack of funding to obtain expert support. Due to the complex interdependence of all issues and multi-layered ownership relations, successful imple-

mentation of new strategies for urban improvement in Hikifune requires a participatory planning process to make the best use of the existing machizukuri council.

3.4.3. Architectural Legacy, Resilient Design and Community-Based Activities

Vernacular architecture manifests local identity and must be considered when putting new strategies into practice. Instead of a setback, Hikifune's unique landscape could serve as a powerful resource. If renovated and repurposed, vacant properties could increase the area's effectiveness, safety and livelihood as well as provide a whole new range of activities. The process could reinforce locals' awareness of local hazards and thus endorse recognition of buildings and infrastructure safety and maintenance. This in turn could accelerate the synergy effect, and people would start upgrading their homes by noticing improvements in their community. Promoting the image of a safe area of rich historical and architectural legacy would likely attract young people and investors and contribute to asserting identity through renovating the built environment. Renovation, therefore, is the necessary step towards disaster risk reduction and community integration. Moreover, houses of longer life and resilient design would reduce construction site disadvantages, demolition, rebuilding, maintenance and energy consumption costs, and, eventually, become a smart investment.

The most significant renovation project in Hikifune is transformation of a former vacant house into Fujinoki community space. Through collaboration among the local machizukuri council, a non-government organisation and various experts, it was completed in 2013. The two main purposes of the new space are 'enlightenment and dissemination of earthquake resistant and fireproof renovation and reconstruction' and 'promotion of exchange between people'. Daily, a wide range of community-based activities takes place in the Fujinoki community space, including residents of all ages. The project provides evidence that renovation and ground floor activation are powerful tools for reinforcing urban synergy.

If Hikifune's currently ineffectively used space at ground level is activated (rented out or used privately), the neighbourhood would provide a variety of new employment, entertainment and commercial opportunities for local and external users, thus becoming effective economic pools of use and contributing to the public realm's diversity. And reciprocally, such metamorphosis will attract young entrepreneurs on the one hand and new customers on the other. Furthermore, introduction of a new regulation for emergency evacuation of the newly activated spaces could support efforts for building flood resilience.

3.4.4. Synergistic Improvement

This chapter introduced the set of intertwined issues and untapped opportunities within the case study of Hikifune neighbourhood. A proposal based on this interconnectivity suggests a synergistic improvement incorporating the following interventions:

- Establish coordination and funding mechanisms for holistic and comprehensive collaboration; develop criteria for evaluating changes; affirm long-term commitment for ensuring the plan's feasibility; shape wider awareness of the issues confronted and local potential
- Enhance earthquake and fire spread resilience of buildings and open space through retrofitting/rebuilding, widening the narrowest roji and ensuring safe evacuation
- Enhance flood resilience through introduction of a new land use regulation and effective evacuation measures
- Demographic diversification; female and elderly labour force participation; strengthen family and neighbourly bonds
- Provide flexible employment opportunities through ground floor activation and repurposing vacant and/or hazardous buildings

- Affirm local identity through participation and place-making strategies; highlight values and celebrate them as a historic legacy; design high quality public spaces
- Expand the synergistic improvement concept to the surroundings.

4. Conclusion

The objective of this paper was to express the necessity of a holistic approach when developing strategies for improvement in urban areas confronted by multiple challenges. After analysing synergistic improvement, first as a general concept and then, relying on the case study of Hikifune, clearly its successful implementation lies in understanding that urban space is a complex system of ceaselessly, mutually reinforcing positive and negative elements that should be observed as an entity requiring comprehensive and resilient planning. This research drew the conclusion that recognising the interconnection between local issues and assets lays the foundation for converting them into successful synergy.

This paper provides only an overall framework for implementation of the synergistic improvement method due to its limitations. Reasonable directions for future studies include identifying the skill set needed for ensuring policies' success and clarifying the execution process within a diverse team. Much research also remains to be done on operating methods of introducing new strategies with respect to the local context. Finally, this work leaves open the questions of how and where to implement this approach in the future and prospects to stimulate further thinking on issues of global urban challenges.

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