

A pre- and post-2003 survey of road infrastructure development and people in Danang, Vietnam

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Abstract—This study showed the transformation of urban landscape and people's socioeconomic conditions after the development of Nguyen Tat Thanh Road in Danang, Vietnam. The road was newly developed along the coastal lines of Danang Bay in 2003, linking downtown Danang with the western part of the city. To better know the relationship between new road and urban change in developing countries, we conducted in-depth interviews of 400 property owners living in one of the following sites: 1) an area directly abutting on the new road, 2) an area abutting on an existing road but is away from the new road, and 3) an area inside an urban block which is disconnected from all types of vehicular roads. The results reported that road development took place along with a sizable number of urban changes over time, including housing types, building densities and uses, income level and the type of occupation. The changes were stronger in the area abutting the new road—where relatively well-off migrants settled down and capitalized on land rents by accommodating a variety of retail uses—compared to other areas away from the road. However, the area inside the block also experienced small-scaled, parcel-level adaptive reuse of the built environment by the original residents who maintained the livable environment of the residential neighborhood.

Keywords—road infrastructure, migration, urban landscape, urban development

I. Introduction

It is well known that investments in a city's infrastructure act as catalysts for regional development and growth (Kelly, 1994; Cervero, 2009; Neuman and Smith, 2010; Cervero and Kang, 2011; Padeiro, 2013; Kwon et al., 2014)

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Among the studies, Polzin (1999) largely classified various effects of transportation infrastructure on the surrounding areas into direct, indirect, and secondary effects. The direct impacts are those that lead to further urban development and investment in the built environment motivated by improved accessibility and service of an area. The indirect impacts involve incremental, catalytic influences of new infrastructure that are mediated by policy change and community responses. The secondary impacts include more subtle but fundamental change in individuals' behavior and social perception about an area affected by new infrastructure.

Danang is a good test bed for investigating the effects of infrastructure within the context of emerging property markets in Asia. The city has experienced rapid urbanization, causing a heterogeneous mix of original residents, newly migrating rural populations, and urban populations from nearby cities and districts. Parcel-level redevelopment and renovation activities took place frequently, along with remarkable occupational change of the community and emerging commercial ventures in response to the catalytic effects of road infrastructure.

Under conditions in developing countries, this research posed the following hypotheses. First, the development of a major transport corridor, such as Nguyen Tat Thanh Road in Danang, seemed to have attracted an influx of new communities from outside into the nearby area. The migrants might have played a major role in the redevelopment of urban space in the neighborhood. Second, an area away from the new road is likely to experience minimal change in the built environment compared to an area abutting on the new road. The inner part of the blocks, for example, is likely to accommodate far fewer number of migrants because little policy incentive or zoning deregulation was introduced to the area with the opening of the new road. Additionally, the original residents remaining in the inner-part of the block might be less willing to leverage the opportunities associated with the road.

II. Research Methods

A. The Study Area

Danang is a mid-sized city with a population of about 992,000 in 2013. The city is located in the central part of Vietnam and its geographical location serves as a gateway for Southeast Asian countries to South China Sea. From a historical perspective, the city emerged as one of the major urban places in Indochina around the time French troops were stationed there in 1858. Under the French influence, modern



Figure 1. Map of Danang.

infrastructure came to be engraved on the surface of the city around the late nineteenth and the early twentieth century.

After the establishment of the Socialist Republic of Vietnam in 1976, Danang experienced many changes. Among them, the economic reform of 1986—called Doi Moi—had a substantial impact on the growth of the city. With the enactment of the Law on Foreign Investment in the late 1980s and the Law on Private Enterprises in the 1990s, the city emerged as the largest city in the country’s central region, which is comparable to Hai Phong and Can Tho. Additionally, the city’s urbanized territory has increased substantially over the years, from 6.5% in 1975 to 11.3% in 2003, and then to 17.9% in 2009 (Linh et al., 2012). The physical development of the urban area was followed by large-scale expansion of road infrastructure. For instance, Nguyen Tat Thanh Road was one of the major public investments in the city. The four-lane road with a width of 40 m was constructed along the Danang Bay, connecting downtown area and Danang Port with other regions to the west(Figure 1).

B. Methods

In the study, a neighborhood called Thanh Khe District was chosen for empirical investigation. The neighborhood is located between the Danang Airport to the south and Nguyen Tat Thanh Road to the north. And, the study area was subdivided into three areas for survey purposes. First, Group A was an area directly abutting on Nguyen Tat Thanh Road to the north, including Ton That Dam, Ha Khe, and Yen Khe. Second, Group B was a local community center adjacent to Tran Cao Van Road with a width of 10 m but was away from Nguyen Tat Thanh Road. The presence of Tran Cao Van Road dates back to the early nineteenth century, forming one of the earliest east-west transport corridors in the city and is now sprinkled with a variety of retail shops. Third, Group C was an area that was not directly connected to any kind of vehicular roads and was located in the landlocked site. The above sites had no monumental public space, like a large public park or an urban square.

TABLE I. SURVEY CONTENTS

	Category	Details
Pre-2003	Social / Economic Characteristics	Property ownership Occupation Income Place of employment Mode of transportation Household business
	Architecture	Building type and location Building use 1 st (Ground) floor use
Post-2003 (based on 2014 survey)	Social / Economic Characteristics	Property ownership Occupation Income Place of employment Mode of transportation Changes to household business Scope of activity
	Architecture	Building type and location Building use 1 st (Ground) floor use Physical transformation Change of property value
General Background	Basic Information	Gender, age, level of education Size of a family, birthplace
	Building Location	Place of response Address of current residence

A preliminary field survey was conducted between February 25 and March 5, 2014 by the authors, assisted by local people. Then, more thorough investigation took place between July 10 and 20, 2014. During the survey, we chose 400 interviewees who owned at least one property within Groups A, B, or C. The survey questionnaires involving pre-2003 and post-2003 socioeconomic conditions and the built environment characteristics were shown in TABLE I.

III. Results

A. Overall Changes after Development of the Road

The study area has experienced a substantial change in the built environment characteristics over the years. Generally, the heights and the footprints of the buildings became greater since the opening of Nguyen Tat Thanh Road. Although super-sized development rarely occurred, the average number of total building floors increased—at least moderately—from 1.5 floors prior to 2003 to 1.9 floors in 2014(Figure 2). The difference became more significant when the interviewees were divided into original residents and newly-migrated populations. Over the years, the average number of total building floors owned by original residents increased by 0.2 floors, whereas migrants reported an increase of 0.7 floors in

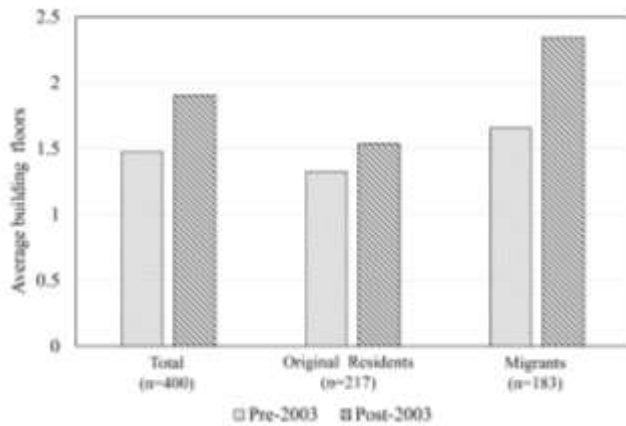


Figure 2. Change in building floors of the study area (average).

2014 compared to the buildings that they owned before 2003. This might be explained by the high proportion of migrants who decided to build a multi-story, mixed-use building in the study area after relocation.

Before 2003, 31.8% (n=127) of the total interviewees owned and lived in a tubehouse. The rate increased by 12.2% in 2014, amounting to a total of 44% (n=176; Figure 3). The percentage of the migrants’ tubehouse ownership was far higher than original residents. For instance, about 35.5% of the migrants (n=65) used to live in a tubehouse before 2003; this increased to 56.2% (n=103) in 2014. This largely reflected the pattern of housing choice among the people who recently migrated into the study area.

The development of tubehouses has occurred intensively in the area along with the dramatic change in the building uses over the years. Before 2003, the neighborhood remained a residential district with serene living environment for a rather closed community. About 66.5% of the total interviewees (n=266) said that they owned a building with residential units only. Whereas some neighborhood retails were located along the perimeter of the blocks, no more than 1% of the

interviewees owned a retail or commercial-only building in the area. However, the characteristics have changed substantially over the last ten years. For example, the percentage of the buildings used only for residential purposes decreased from 66.5% to 39.5% (n=158). On the other hand, the percentage of mixed-use buildings increased from 32.5% (n=130) to 51.3% (n=205), and that of commercial-only buildings also increased from 1.0% (n=4) to 9.3% (n=37).

One of the most immediate impacts of the spread of mixed-use tubehouses was capital accumulation through investment in the built environment. On average, the annual personal income had increased from 3,964 USD to 7,341 USD (by 85.2%) and the annual household income had increased from 8,625 USD to 13,083 USD (by 51.7%, Figure 4). This was largely due to the rise of the property owners’ monthly income generated from increased rentable floor areas. Especially, the upsurge of the income was remarkable among migrants. Between 2002 and 2014, for example, the original residents’ personal income increased from 1,875 USD to 2,767 USD on average, which was relatively modest compared to the doubling of migrants’ income from 6,807 USD to 13,564 USD.

B. Physical Urban Development and Residents’ Social and Economic Differences by Proximity to the Nguyen Tat Thanh Road

The research further investigated changes in the built environment and building uses by proximity to Nguyen Tat Thanh Road. Group A represented the nearest area from the road, followed by Group B and Group C. The heights of the built environment—measured by the average number of building floors owned by the interviewees—showed moderate variations by groups. In 2014, the average number of building floors in Group A were 2.4, which was slightly higher than 1.7 in Group B and 1.3 in Group C. Although some places in

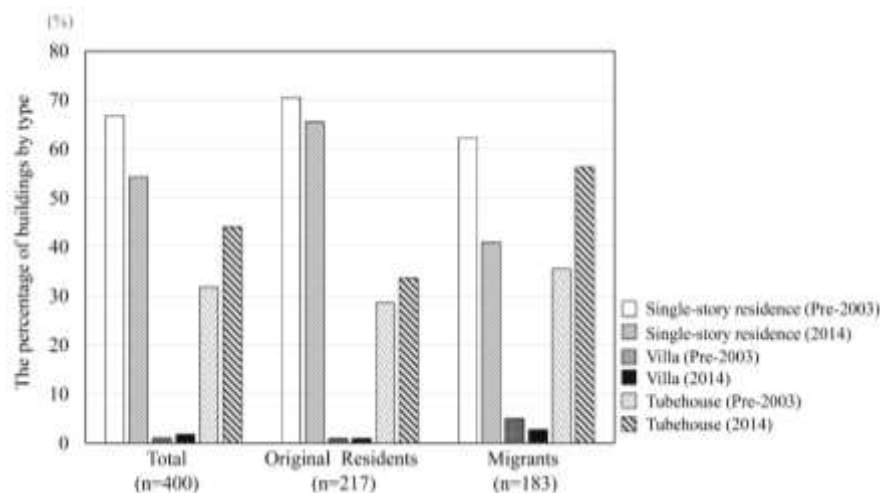


Figure 3. Change in building type of the study area.

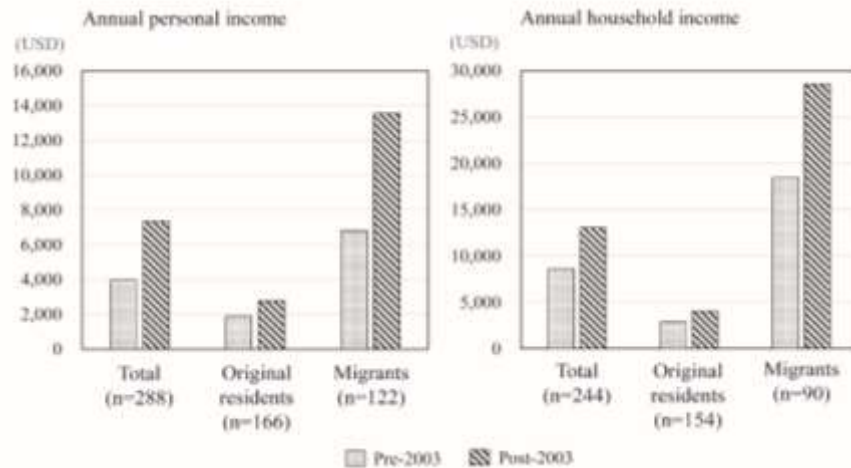


Figure 4. Annual income level between 2002 and 2014.

Group A were spiked with relatively high buildings like a seven-story hotel, the study area presented a surprisingly flat urban landscape with minor spatial variations in building height compared to other Asian cities. This might be explained through several reasons. A cultural factor might be associated with the property owners' preference to a specific type of housing, e.g., a low-rise villa and a mid-rise tubehouse.

The bigness of the parcels and building footprints in Group A was closely related to the accelerated diversification of non-residential uses. For instance, in 2014, buildings in Group A had a wide range of commercial and retail uses, such as restaurants (n=24), retail shops (n=22), hotels/motels (n=16), offices (n=10), and cafes (n=9). A heterogeneous mixture of a luxury hotel, backpackers' lodging, a large-sized wedding banquet hall, a travel agency, a communication company, an automobile repair shop, and a foreign language institution became increasingly common in the area. In Group B, retail was a representative use (n=65), like a discount store and a bike shop, followed by restaurants (n=7), handicraft production (n=7), and cafes (n=6). The diversification of building uses in Groups A and B was strongly associated with the physical remaking of the built environment, including renovation of building floors, interior walls, exterior materials, parking space, and extra stairs.

With the development of Nguyen Tat Thanh Road, a large number of migrants settled down in all of the three groups. Among a total of 400 survey participants, 183 (45.6%) were those who newly settled down in the study area after 2003. Among them, the percentage of migrants who settled down in Group A was the highest at about 63.4% (n=116). The percentage of those who migrated to Group B was 21.9% (n=40) and 12.2% (n=22) in Group C. Diversification of building uses in Group A, as noted above, was at least partly attributable to the venturing behavior of the migrants.

On the other hand, an increase in the non-residential use in Groups B largely resulted from hodgepodge redevelopment and informal renovation of the built environment by original residents as well as by migrants.

In Group C, non-residential use by migrants was far less frequent than Groups A and B. Despite the opening of Nguyen Tat Thanh Road, an intricate web of communities and its affordable living environment—though the urban space was very small—was left intact. The area had been predominantly occupied by informal settlements until recently. Some houses continued to deteriorate with little property investment, remaining in slum condition until the late 1990s. However, in the 2000s, its informal urban space, such as underutilized living space on the first floor and empty open spaces at a number of different scales, began to be modified by original residents. They were mostly landlords, often who commuted to nearby workplaces, and were well aware of the greater value of their properties associated with the opening of the road in 2003. However, instead of selling their land for short-term profit, the residents adaptively reused their in-situ commodities for multiple uses at an affordable cost.

In the study area, streets and sidewalks were frequently used as part of privatized territory, which is often referred to as “pseudo-public” space in Vietnam (Drummond, 2000). Our observations showed that significantly different levels of privatization occurred depending on different locations. In Group A, streets were commonly used as a room for extended operation of private enterprises, such as large restaurants, hotels/motels, and street vendors. For instance, the manager of a restaurant abutting on Nguyen Tat Thanh Road placed large tables, chairs, and flowerpots on the sidewalk, sometimes blocking half of the width of a walkable path, to accommodate a large number of peak-time eaters. Also, illegal parking of motorbikes and automobiles was a major source of nuisance. Temporary parking often took place along the roads or on the outer side of the sidewalks.

In Group B, private utilization of public space took place in a similar manner with Group A. However, very personalized activities were also frequently observed in the area. For instance, there was a retail owner who placed an outdoor table in front of his restaurant to attract hungry customers. However, compared to the above restaurant manager who served customers only, the owner and his family

members in Group B often ate their meals on the table, sometimes sharing the space with other customers, making conversations with them, and in general used the space for off-time relaxation and leisure activities. Some internal streets in Group B were packed with motorbikes.

In Group C, the use of vehicles was very limited due to the narrow width of the alleys (= about 1.5~2 m). A highly intricate, intimate atmosphere of the district was formed, with a large number of people informally sitting in front of their houses and talking to their neighbors across the alley. Many awnings and shades were installed to host social interactions and personal activities like having meals and taking a nap. Switching of the users as well as the uses of the public space was frequently observed in Group C, compared to Groups A and B.

iv. Discussion

The development of Nguyen Tat Thanh Road had significant impacts on the transformation of community characteristics in Thanh Khe District. Especially, a sizable number of migrants who attempted to expand their retail network away from the original place or to initiate a new business like lodging, dining, manufacturing, motorbike repairing, and language tutoring have settled down in the area. Especially, the long, narrow parcel pattern of the neighborhood provided a desirable condition for the development of a multi-story, mixed-use building called the tubehouse.

Increases in the number of migrants with entrepreneurship did not replace most of the original residents, nor did it fundamentally change the livable environment of the neighborhood. A large number of tubehouses with commercial and retail uses in the area were also adaptively modified to serve as residential space for the family members of a property owner or young employees who could not afford to own their own houses. With minimal merging of parcels for large-sized development and a high proportion of remaining original residents, the inner part of the blocks away from the new road was perceived as an attractive residential area with serene, intimate living environment. The area was increasingly surrounded by amenity places, affordable restaurants, and cafes with the opening of the new road.

Despite greatly improved road conditions, little improvement was made with the amenity of sidewalks and street furniture in Nguyen Tat Thanh Road. The construction of the road was largely financed through foreign investment. Long-term maintenance and adjustment of the road environment, if not incorporated into the original financing plan, could be neglected due to the limited resources of the public sector. Therefore, urban policies promoting the provision of additional parking space and maintaining the quality of the privately used public space need to be implemented in the near future.

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References

- [1] Certero, R. (2009). Transport infrastructure and global competitiveness: Balancing mobility and livability. *The ANNALS of the American Academy of Political and Social Science*, 626(1), 210-225.
- [2] Certero, R., & Kang, C. D. (2011). Bus rapid transit impacts on land uses and land values in Seoul, Korea. *Transport Policy*, 18(1), 102-116.
- [3] Drummond, L. B. (2000). Street scenes: practices of public and private space in urban Vietnam. *Urban Studies*, 37(12), 2377-2391.
- [4] Kang, C. D., & Certero, R. (2009). From elevated freeway to urban greenway: land value impacts of the CGC project in Seoul, Korea. *Urban Studies*, 46(13), 2771-2794.
- [5] Kelly, E. D. (1994). The transportation land-use link. *Journal of Planning Literature*, 9(2), 128-145.
- [6] Kim, A. M. (2012). The mixed-use sidewalk: Vending and property rights in public space. *Journal of the American Planning Association*, 78(3), 225-238.
- [7] Kwon, Y., Kim, S., & Jeon, B. (2014). Unraveling the factors determining the redevelopment of Seoul's historic hanoks. *Habitat International*, 41, 280-289.
- [8] Linh, N. H. K., Erasmi, S., & Kappas, M. (2012). Quantifying land use/cover change and landscape fragmentation in Danang city, Vietnam: 1979-2009. *ISPRS-International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 1, 501-506.
- [9] Neuman, M., & Smith, S. (2010). City planning and infrastructure: Once and future partners. *Journal of Planning History*, 9(1), 21-42.
- [10] Padeiro, M. (2013). Transport infrastructures and employment growth in the Paris metropolitan margins. *Journal of Transport Geography*, 31, 44-53.
- [11] Polzin, S. E. (1999). Transportation/land-use relationship: Public transit's impact on land use. *Journal of Urban Planning and Development*, 125(4), 135-151.
- [12] World Bank. (2011). Vietnam Urbanization Review : Technical Assistance Report. World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/2826> License: Creative Commons Attribution CC BY 3.0.

About Author



In our paper, based on datasets from in-depth interviews conducted in Danang, Vietnam in 2014, we found that Thanh khe district – study area - experiences significant urban change due to the new road development, especially in an area directly abutting on the new road. A small-scaled, parcel-level urban change was also significant in an area inside the block. This explains the new road development is closely related to the socio-economic and urban landscape change in the site.