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Mobility is in the eye of the beholder: A comparison of travel patterns and urban spatial use between migrants and the original residents of Danang, Vietnam

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ABSTRACT

The development of an arterial road named the Nguyen Tat Thanh Road along the Danang Bay in Vietnam shows how changes in mobility can influence the transformation of the urban landscape in a formerly residential neighborhood. The road opened along the coastal lines of the city in 2003. In this study, approximately 460 residents, including migrants who moved to the area after the road development and the original residents who live near the road, were interviewed. The survey was designed to identify the travel routes, mode of transportation, and location of jobs, shopping, leisure, education, and religious activities of residents before and after the road development. The research found that the original residents endured longer commutes than the migrants, which was associated with a greater dispersion of jobs after the road development. Compared to the original residents, migrants often lived in a newly available parcel close to the new road and formed a mixed-use community with a good jobs-housing balance. However, migrants traveled farther to non-job-related destinations. For the use of urban space, the original residents attempted to improve the quality of their daily lives through small-scale transformations of privately owned outdoor spaces, which were often shared by their neighbors and other family members. Migrants largely contributed to the formation of commercialized streets that were scattered with fairly large accommodations and high-end residential buildings.

1. Introduction

One of the key principles for planning transportation infrastructure is striking a balance between mobility and livability (Cervero, 2009; Deshkar, Hayashia, & Mori, 2011; Kim, Lee, & Choi, 2015). Good mobility denotes improvements in vehicular speed and movement capacity in an urban area. The definition of livability varies according to previous studies (Balsas, 2004; McCann, 2007; Smith, Nelischer, & Perkins, 1997; Van Kamp, Leidelmeijer, Marsman, & De Hollander, 2003; Wang, Su, Chen, Chen, & Liang, 2011), but generally means the quality of an economically vibrant neighborhood that is composed of a safe environment, convenient neighborhood places, a well-serviced infrastructure, and availability of employment opportunities for job seekers (Wang et al., 2011).

Not all road development projects have achieved this balance. For example, many theorists have criticized contemporary cities as being heavily skewed in favor of high-speed mobility (Neuman & Smith, 2010; Vilhelmson, 2007). In recent decades, cities in Asia have been no exception (Lee, Won, & Kim, 2015). In Vietnam, which has seen an average economic growth of 6.1%[1] for the last 10 years, approximately 80% of the total capital investments in the transportation infrastructure have been used for building high-speed vehicular roads (World Bank, 2011). This was criticized for further promoting overly ambitious investment in the expansion of road infrastructure and inattentive layout of the road to the spatial demand of affected communities (Huynh, 2015).

Despite the criticism, road development frequently serves as an essential policy vehicle that boosts the local economy and improves labor mobility in a former neighborhood. In Vietnam, as elsewhere, the presence of new roads or railways often acts as a catalyst for short- and long-term economic growth. During this process, in-migration of newcomers and out-migration of traditional communities commonly take

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[1] From 2006 to 2015. Retrieved from http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?page=1.

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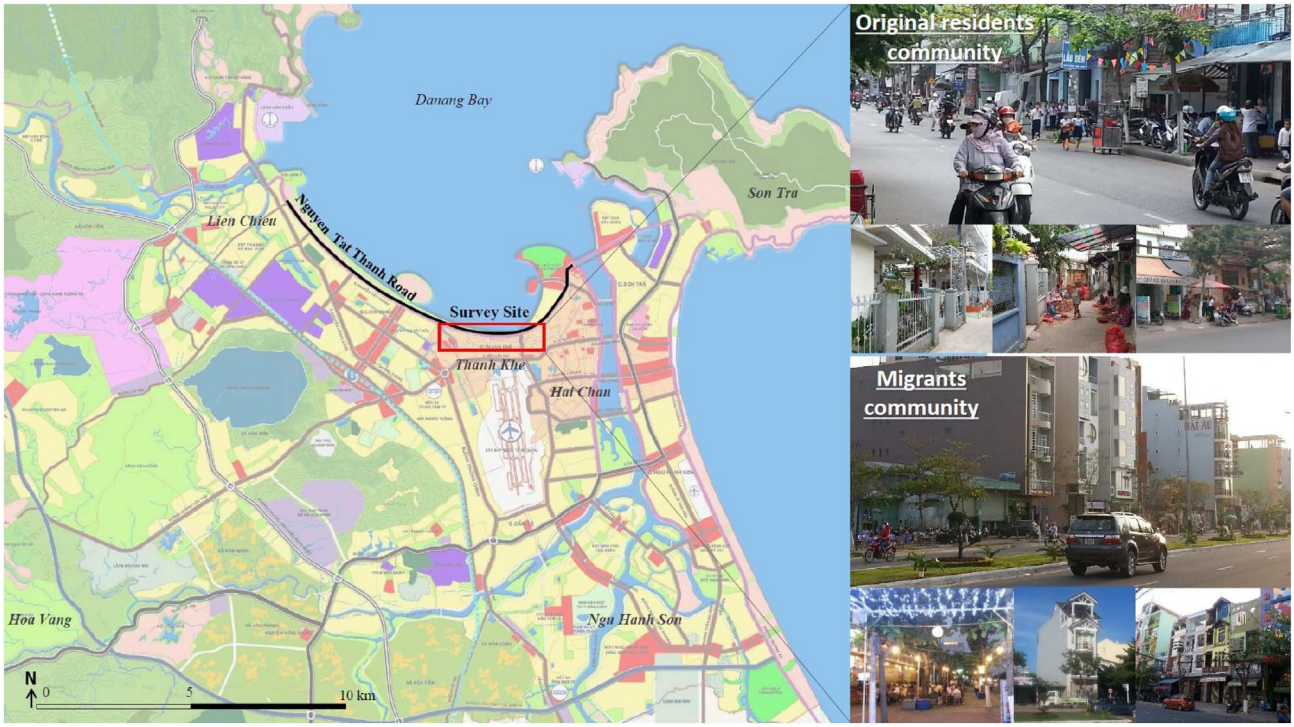

Fig. 1. Masterplan of Danang and the study area. (Modified based on the Masterplan of Danang city (2030–2050) by the authors).

place (Issah, Khan, & Sasaki, 2005). This is because road development is not only associated with greater mobility in and around a city but also provides a number of developable lands for housing and retail, which attracts a group of opportunistic migrants seeking a chance to start a new business or achieve home ownership in the new location. In this study, the city of Danang, Vietnam was chosen to investigate the changes in the community characteristics of migrants and the original residents. The Thanh Khe District, among others, was formerly a residential neighborhood in the city that was intersected by a new arterial road named the Nguyen Tat Thanh Road in 2003 (Fig. 1). The road connects downtown Danang with the western area of the city and is part of the East-West Economic Corridor (EWEC) that crosses the Indochinese Peninsula from the Danang Port in Vietnam to Mawlamyine in Myanmar. The development of the road has caused multiple redevelopment activities in Danang Bay, introducing a variety of commercial locations and tourism venues, such as high-end hotels, inexpensive accommodations, restaurants, bars, cafes, and massage shops of a range of sizes. Additionally, small-scale food retail stores, snack bars, and karaoke locations were established along the road, providing the neighborhood with a variety of choices for eating, drinking, entertainment, and purchasing daily products. However, the road development was also associated with assorted negative impacts on residents. For example, the width of the six-lane road and its sidewalk was designed at 40 m, cutting off one edge of the intimate residential area. The remaining area of the cut-off parcels was often merged and sold to new property investors, which forced the original landowners, whose livelihoods were dependent on fishing or selling daily goods near the bay area, to move away from their workplace. Additionally, noise and air pollution from increased traffic along the road raised public health concerns. An increasing number of motorbikes occupied the busy crossroads and made the street environment less walking-friendly and more prone to traffic accidents.

According to previous studies on Danang, such as that of Won, Cho, and Kim (2015), road development in the city had not only affected the form, density, or use of nearby buildings or the occupation, income levels, or hometown of the post-development community members. Among the forces that are involved socioeconomic change, an inflow of migrants and their families was one of the major factors. Migrants who were relatively affluent were aware of the economic benefits associated with a neighborhood that has greatly improved mobility and accessibility. During the migration process, migrants preferred to purchase a newly subdivided parcel that was directly adjacent to the new road and then build a large, mixed-use tube house building to increase their profits from property development.

In a few studies, some of the factors affecting mobility were related to lifestyle including household incomes (Krisjane, Berzins, Ivlevs, & Bauls, 2012; Marquet & Miralles-Guasch, 2015; Punpuing & Ross, 2001) or strong government policies (Cervero & Duncan, 2006; Lau & Chiu, 2013; Lin, Allan, & Cui, 2015), rather than the availability of the built environment such as road construction. What we have noticed in Thanh Khe district, however, is that socio-economic changes and the transformation of urban spatial use after the relocation is quite strongly associated with the road development. Because the residents used the new road according to their own practical purposes and were also affected by the newly available road infrastructure. Previous studies indicated that the development of the transportation infrastructure not only stimulated the influx of the population, but also affected the quality of life by spurring active utilization of urban spaces associated with an increase in commercial and non-commercial activities (Cervero, 2009; Kelly, 1994; Neuman & Smith, 2010; Polzin, 1999; Sullivan & Lovell, 2006). However, detailed social surveys that examine the relationship between road development and neighborhood change in terms of mobility appeared to be very limited until now, especially within the urban context of developing countries. Against this background, the following hypotheses were proposed in this study.

Hypothesis 1. While the opening of an arterial road greatly improved mobility in a formerly residential neighborhood, the effects have been perceived differently between the original residents and migrants. In a city with a limited road infrastructure, a new road often allows for rapid vehicular movement at peak hours and the associated dispersion of urban uses. Greater mobility and reduced travel time to distant locations may lead to the dispersion of jobs and other important places to visit. Since the purpose, method, and frequency of daily

Table 1
Effects of road development and comparative aspects between original residents and migrants based on changes in mobility. (The effects of road development are from the theory asserted by Polzin (1999) and edited by the authors).

Type	Effect of road development	Comparative aspects between original residents and migrants
Differences in mobility	• Shorter travel time • Decentralization of employment • Diversity of movement routes	a) Job distribution, commuting frequency, commuting modes of transportation, commuting distance, type of vehicles owned b) Places for shopping, leisure, education, and religious activities, frequency of travel, mode of transportation
Differences in use of space	• Land (re)development • Increase of commercial facilities	c) Location for (re)development, plots, architectural characteristics, building use, parking lots, relationship with sidewalks, urban spatial characteristics d) Type and size of commercial facilities, use of sidewalk, target population and function, management methods, marketplace creation

travel may differ substantially between the original residents and migrants, the benefits of improved mobility may also vary based on the residents' travel patterns.

Hypothesis 2. In a residential neighborhood affected by the opening of the new road, the manner in which buildings and public spaces are used would be different based on the job-related and non-job-related travel patterns of the residents. The use of the ground floor and outdoor public spaces will be adaptively converted to the type of social activities that occur in the neighborhood. The building size and spatial use could differ in areas where residents work in their own buildings and hence have shorter job-related commutes. In neighborhoods where non-job-related travel occurs more often, safety and privacy will be an important aspect of social life.

2. Research methodology

In this study, approximately 460 residents residing near the Nguyen Tat Thanh Road in Danang were interviewed to examine the hypotheses. Among them, 400 residents were interviewed between July 10 and 20, 2014, by the researchers with assistance from 10 university students and Nguyen Thi Ngoc Ly, an instructor in the Department of Tourism Management at Danang University. Then, between August 11 and 20, 2015, 60 additional residents were interviewed with the help of 6 university students from the Danang University of Science and Technology. The interviewees were selected from building owners aged 30 or over living near the road. Among the residents, only those interviewees who were able to explain their socioeconomic conditions and changes in their daily travel pattern before and after the road development were selected. The interview was composed of two sections. The first section involved a description of the physical attributes of the buildings that they owned before and after the road development, such as the size, number of rooms, and use. Additionally, multiple socioeconomic characteristics of the residents, such as the type of jobs or businesses, income, age, gender, education level, and number of family members were identified. The second section concerned the daily movement patterns of the residents. The interviewees were asked to mark the location and address of their home and major sites for work, shopping, leisure, education, and religious activities before and after the road development. Then, the interviewees drew a map of their travel routes on a piece of paper prepared by the researchers and explained their mode of transportation and typical travel time from their home to the destinations. For residents who preferred to provide an oral explanation, we recorded the conversation and drew the routes based on the information that they provided. In addition to interviewing the residents, we consulted with Professor Tran Duc Quang and Dr. Nguyen Anh Tuan at the Danang University of Science and Technology and asked how the road development may have influenced the movement patterns and living environments of the residents.

To understand the social meaning of road development, we applied the mobility theory proposed by Polzin (1999) to analyze the survey results (Table 1). Here, mobility-related changes, such as the degree of reduction in travel time, decentralization of employment sites, and diversity of travel routes were carefully analyzed. The type of travel was divided into two groups: job-related and non-job-related. The following items were investigated for job-related travel: a) job distribution, commuting frequency, commuting modes of transportation, route characteristics, commuting distance,[2] and type of vehicles the interviewees owned. The following items were examined for non-job-related travel: b) places for shopping, leisure, education, religious activities, frequency of travel, and mode of transportation. Additionally, the use of private and public spaces in the neighborhood was visually surveyed by the researchers during site visits. To identify the use of private spaces, the following items were observed and investigated: c) the location of interviewee-owned building parcels, architectural characteristics, building uses, spatial characteristics of the outdoor space and parking lots, and type of social activities available. For public spaces, such as streets and alleys, the following items were surveyed: d) the type and size of commercial facilities, use of sidewalks, and manner in which the public space was used over time. In addition to the survey along the Nguyen Tat Thanh Road, the spatial characteristics of nearby roads, such as Ton That Dam, Tran Cao Van, Ha Khe and Yen Khe, were also surveyed. Among the 460 interviewees, 247 people (53.7%) were original residents and the remainder (46.3%) were migrants who moved into the area during or after the development of the road.

3. Results

3.1. Changes in job distribution and jobs-housing balance

With the opening of the Nguyen Tat Thanh Road in 2003, the overall travel time to a number of sites in Danang was at least moderately reduced. The survey showed that the average travel time from the interviewees' house to the city center of Hai Chau by motorbikes was reduced by 7 min at non-peak hours, from 17 to 10 min. The travel time to Son Tra, which is a hilly area located in the northeastern corner of the city, was reduced by 20 min, from 35 to 15 min. Most of the interviewees attributed the reduced time to the opening of the Nguyen Tat Thanh Road, as well as the building of minor roads, e.g., Xuan Thieu 1-11, Nguyen An Ninh, Ngyen Sinh Sac, Yen Khe, Ha Khe, Ton That Dam, and Ong Ich Khem, that were linked with the road. The greater mobility along the road is likely to be associated with the dispersion of pre-existing jobs and the potential spread of newly created job locations across the city, including jobs in food sales, retail and tourism industries, fishing, construction work, and other service sectors. The following interview with an original resident, who lived in the neighborhood for 27 years, demonstrated that the level of satisfaction associated with the road was fairly high.

> Although I live in a housing block that is distant from the new road, I mostly ride on my motorbike to commute to my workplace (bank),

[2] Utilizing the function to calculate distance in Google Earth Pro to compare the average commuting distances between the two groups, we divided the sum of the commuting distances by the number of people with jobs in each group.

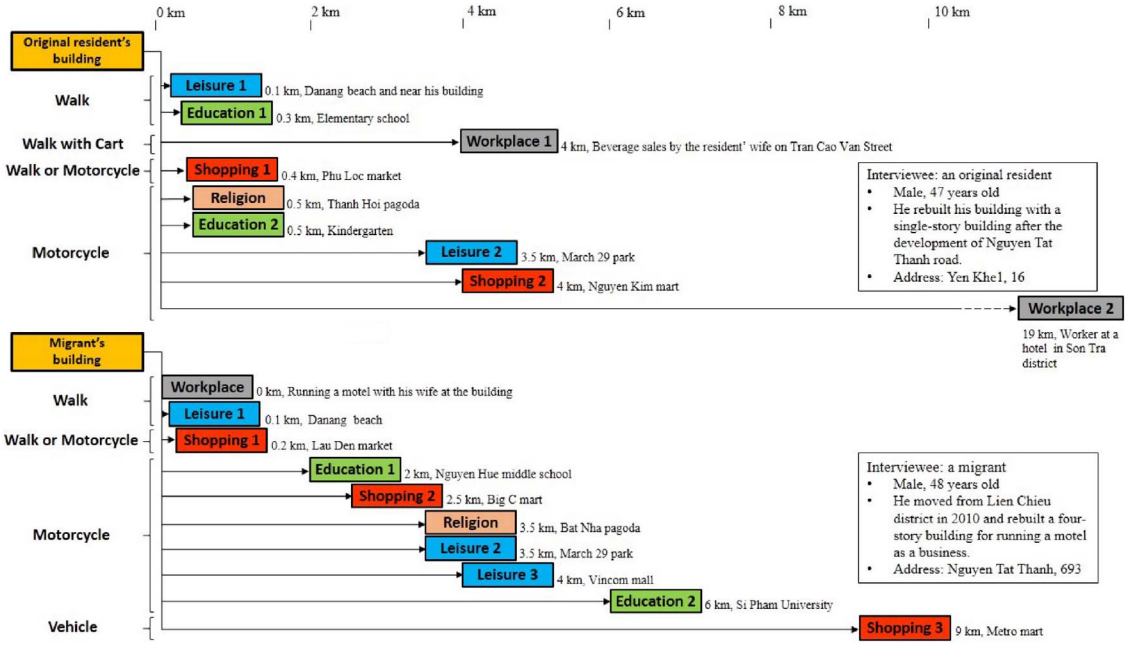

Fig. 2. Comparison of original residents and migrants traveling distances from home to workplace, places for shopping, leisure, education and religious activities according to modes of transportation.

> so accessing the Nguyen Tat Thanh Road from my home is not a big deal. As the freeway has many lanes, there is no congestion. I think my commuting time has been reduced by approximately 10–20 minutes every day. I am very satisfied because using the road will take me anywhere in Danang within 30 minutes. Moreover, one big advantage of the new road is its enjoyable scenery as it has a good view of the coastal lines and the sea. Prior to the development of the Nguyen Tat Thanh Road, Tran Cao Van was the only road that I could use to travel from home to the downtown area. Many people had to depend on it during the daytime, resulting in heavy traffic jams and the chaotic crawl of motorbikes as rush hour reached its peak. Compared to the past conditions, commuting has become much more convenient.
> –An interviewee aged 48, August 12, 2015

However, the desirable quality of the new road in terms of greater mobility was perceived differently by some residents. For them, the location of their jobs became more distant, leading to a significant increase in the total travel distance for commuting. Compared to migrants, the original residents were a predominant proportion of the disadvantaged residents. They tended to move farther from their home to search for a job that paid better than their previous workplace after the road development. Although there were some rare instances for which the original residents had their work space very close to their homes, the majority of their housing space was devoted to residential use. On the other hand, migrants did not travel a long distance for work. According to the survey, 70.9% of the migrants (n = 151) in the study area purchased one or more of the newly available parcels abutting the new road and built a mixed-use building. Some of the migrants already had a business in their original location; others attempted to initiate a new commercial venture after relocating to the study area. The migrants often built a three- to seven-story building on an elongated parcel near the new road with a size of 90 m^2 (4.5 m × 20 m) or 125 m^2 (5 m × 25 m). Then, they began to run a business within or in close proximity to their home, which dramatically shortened their commuting distance. The survey showed that, on average, the original residents traveled 3.9 km farther than migrants for work-related purposes. For instance, the owner of Yen Khe 1 is one of the original residents and has lived in the neighborhood since before the road opened. In 2003, he was employed as a hotel manager in Son Tra; since then, he rides his motorbike approximately 19 km along the new road (Fig. 2). His wife, who used to sell beverages near her home before the road development, now pushes a small cart to an emerging commercial street, the Tran Cao Van Road. Her daily travel distance is approximately 8 km. While the couple's travel time could have taken much longer without the presence of the new road, their cumulative daily travel distance increased significantly due to the dispersion of their job locations because of the road development. Compared to the original residents, one of the migrants interviewed said that he used to commute 8 km from Lien Chieu to the Hai Chau District before his relocation. However, he could afford to move to Nguyen Tat Thanh 693 after the road development and now runs a four-story accommodation along with his wife. A portion of the ground floor of the building is used as the living space for the family.

In Table 2, the differences in job distributions, job-related travel distances, and commuting patterns between the two groups were analyzed. The opening of the Nguyen Tat Thanh Road has generally enabled original residents to commute to distant workplaces as employees in service industries, manufacturing workshops, and construction sites. Some of the low-income original residents who have little higher education worked as street vendors far from their home. The dispersion of jobs among the original residents seemed to be associated with their greater dependence on motorbikes for commuting. On average, the number of motorbikes per household of the original residents dramatically increased by 85% after the road development, amounting to 2.4 motorbikes per household in 2015. The migrants' household motorbike ownership showed little change over the same period.

Of the multiple types of transportation, the motorbike is undoubtedly the predominant mode of daily transportation in the city. However, when the ratio of car ownership was compared, the difference was notable. For example, no more than 2% of the original residents (n = 5) owned a car in the area. There was little difference in the residents' car ownership between the pre- and post-development periods of the road. On the other hand, approximately 24% of the interviewed migrants (n = 51) owned one or more private cars. The number of cars per household was an average of 1.3. This number has increased by 240% compared to the pre-development period. The results suggested two things. First, there has been a continued social preference for motorbikes among the original residents and migrants.

Table 2
The trends and rationales of change in job distribution and commuting pattern.

		Original residents	Migrants
Changes	Job distribution	• Distributed across Danang - Residence and workplace coincide: Small retail - Danang Bay: Fishing industry - Son Tra district: Industrial complexes, tourist facilities, construction sites - Lien Chieu district: Industrial complexes - Along roadside: Service sector, market stalls - Downtown: White collar employees, service sector - Commercialized streets/sidewalks: Street vendor - Mobile throughout Danang: Selling of lotteries, fruits, refreshments, handmade products, on-site repair services	• Concentrated along the new roads - Residence and workplace coincide: Operation of hotels/ motels, restaurants, cafes - Along roadside: Service sector, government - Downtown: White collar employees, service sector
	Commuting frequency	• Dependent on jobs	• Daily, regular
	Commuting modes of transportation	• In the order of Motorbike (55%) – By walking[a] (41.3%) – Bicycle (3.0%)	• In the order of by Walking[a] (61.2%) – Motorbike (33.4%) – Vehicle (4.4%)
	Commuting distance	• Average distance 7.58 km • Increased compared to pre-development of the road	• Average distance 3.68 km • Reduced compared to pre-migration
	Type of vehicles owned per household	• Motorbike: 2.4 (85% increase) • Bicycle: 0.6 (43% decrease) • Vehicle: 0.02 (No change)	• Motorbike: 2.3 (45% increase) • Bicycle: 0.4 (42% decrease) • Vehicle: 0.3 (240% increase)
Rationale		• Changes in jobs and workplace locations for people who lost their livelihoods from road development • Increase in new jobs such as industrial complexes, tourist facilities, and construction sites • Widespread use of motorbike: 85% increase • Not supportive of businesses as they are located in landlocked places	• Preference of businesses operated in one building and attaining good job-housing balance • Settlement closer to the new roads • Increase of vehicles: 0.3 per household, representing a 240% increase compared to pre-development of the road

[a] Includes cases where place of residence and work coincide.

Second, the cars in the neighborhood were primarily purchased and driven by migrants. This means that the greater mobility effects associated with riding on a motorbike were enjoyed equally by the residents, but the benefits of driving a car on the new road was exclusively enjoyed by migrants, not the original residents. On the other hand, with the development of the road, a number of new jobs were created in the neighborhood. However, most of the jobs were occupied by the migrants, whereas a number of original residents traveled outside of their close neighborhood to commute to distant jobs. Given that one of the key purposes of the urban master plan in Danang was to improve overall labor mobility through road development,[3] it seemed that the original residents benefited to a lesser degree than migrants from the opening of the Nguyen Tat Thanh Road.

3.2. Non-job-related travel patterns and the use of privately owned communal spaces

Compared to a very short job-related travel distance, migrants traveled much farther and longer to a number of places for non-job-related purposes, such as shopping, leisure, and education. The survey showed that the original residents usually shopped within 0.5–2.5 km of their home by traveling either on foot or by motorbike (Fig. 3). No interviewee reported non-job-related travel of a distance of more than 3 km. The leisure spaces and educational institutions of the original residents' family were also limited to an area near their house, mostly within the Thanh Khe District. On the other hand, migrants' daily leisure, entertainment, and institutions for educating their children were not always limited to a nearby area. One of the migrants, for instance, regularly traveled to a shopping mall at a distance of 9 km during the weekend and his son commuted to a university that was 6 km away from his home (Fig. 2). Additionally, six children from migrants' households commuted to private schools in the Hai Chau District, which are 3 to 4 km away from their homes. The difference in the non-job-related travel patterns between the residents was at least partly associated with the difference in the financial capability of the groups. The average income of migrants, for example, was comparatively high due to the increased income from their businesses or renting part of the floor area of their new building.[4] This provided resources for choosing premium places to shop, participate in leisure activities, and attend private institutions for educating their children, which resulted in an increase in the non-job-related travel distances.

The difference in the manner that everyday shopping and leisure activities occurred also affected the use of privately owned outdoor space. The original residents, who spent a large amount of leisure time in their own residence and depended on their motorbikes for short-distance shopping, often used the outdoor space between their house and the local street as a multi-purpose, communal front yard (Figs. 4 and 5). The outdoor space often had a small garden and a parking area for motorbikes and bicycles. Sometimes, part of the space was lent to a street vendor who built a stall and sold vegetables or rice noodle soups to the passers-by. When the frontage of the parcel was narrow, the residents extended canopies that were connected to the front wall of their houses to provide shade or planted a tree in the corner to sit around with their neighbors. These were privately owned but adaptively transformed spaces for intimate interactions among neighbors who often spent their time sitting, eating, resting, and performing household chores.

The use of private outdoor spaces in a parcel owned by migrants was rather different from that of the original residents. In the migrant-owned sites, there was little space that the nearby community could share to perform informal activities, but the ground floor of the building was designed to directly face the sidewalk. Although there was a 1 to 1.5 m setback between the street frontage and the wall of the buildings, the in-between outdoor space was utilized to advertise the commercial use of the building. The ground floor space was used as motorbike parking exclusively for the owner's family or their customers.

[3] Retrieved from http://alainbertaud.com/wp-content/uploads/2013/07/AB_report_Danang_Graphs_rev.pdf.

[4] According to Won et al. (2015), the difference in personal income between the original residents and migrants was fivefold, with migrants being 5 times richer. At the time of the survey in 2014, the average personal income of the 166 original residents was USD $2767 and the average personal income of the 122 migrants was USD $13,564.

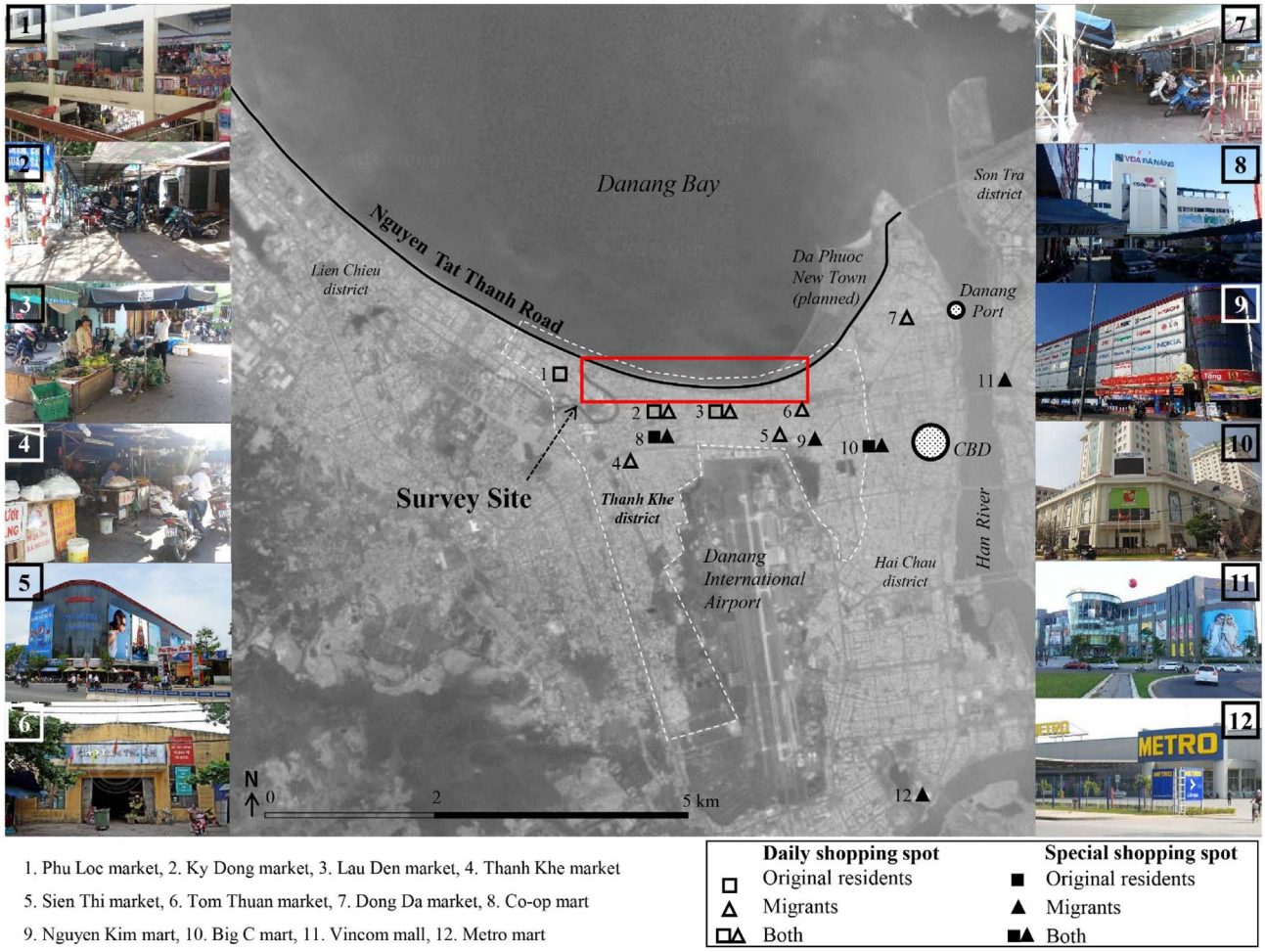

Fig. 3. Locations for shopping frequented by original residents and migrants.

Occasionally, for those migrants who owned a car, the space was used as a parking area. Most of the car owners did not have a legally allowed parking area and had no choice but to leave their vehicles in the pedestrian area (Table 3; Fig. 5).

3.3. Commercializing and regulating the streets

One of the prominent effects of road development was associated with the flourishing of on-street commercial activities and bustling nightlife (Adams & Vandrasek, 2007; Cervero & Duncan, 2002; Kim, Park, & Lee, 2014; Polzin, 1999). In Danang, a number of commercial facilities were built along with the development of the Nguyen Tat Thanh Road, including restaurants (24); retail shops, such as beauty salons and spas (22); accommodations with a range of sizes and rates (16); offices (10); and cafes (9). The presence of large-sized hotels, local cuisine restaurants, premium cafes, and small home-office spaces for designers was noticeable because these were not present in the neighborhood prior to the road development and provided a sense of an animated walking experience and social vitality to the neighborhood. Additionally, some new farmer's and fisherman's markets opened along the road, such as the Lau Den Market (opened in 2006) and the Ky Dong Market (opened in 2007). The survey showed that approximately 66% of the small-sized shops in the area, such as noodle shops, cafes, repair stores, beauty salons, barber shops, fruit stands, massage shops, and fashion retail, were run by original residents. However, there was little evidence that the road development led to an increase of small businesses run by original residents. Table 3 shows that the proportion of mixed-use and commercial buildings owned by original residents experienced limited change. On the other hand, approximately 86.5% of the large-scale hotels or cuisine restaurants in the area were run by migrants (Table 4). After the road development, a significant change was reported in the use of migrant-owned buildings. In Table 3, for instance, the percentage of mixed-use and commercial-only buildings owned by migrants increased substantially from 21.2% to 55.9% and from 0.9% to 15.5%, respectively. The migrants' settlement largely took place on the east side of the Nguyen Tat Thanh and Ton That Dam Roads. The following recorded interview was with a migrant who moved from Hai Chau to Ton That Dam 48-50 and ran a 6-story hotel in the study area in 2005.

> Before I moved, I used to own a small-sized, 5-story building. My family used the first floor as a shop to sell construction supplies and paint for home decoration. We used the rest of the floor space for living. However, expecting that the development of the Nguyen Tat Thanh Road would initiate a construction boom in Danang, we purchased two parcels along the new road and built a hotel on one parcel with a size of 87 m^2 (4.8 × 18 m) and a shop for selling construction supplies and paint on the other parcel. My family lives on the second floor of the shop building. Because we earned great profits from the hotel, we purchased another building next to the hotel in 2013 and renovated it to have more rooms. We also decorated the entrance of the hotel lobby with luxurious marble so that entrance to the building is comfortable. We also installed a restaurant on the first floor of the hotel and hired some chefs and staff.
>
> –Interviewee aged 38, July, 12, 2015

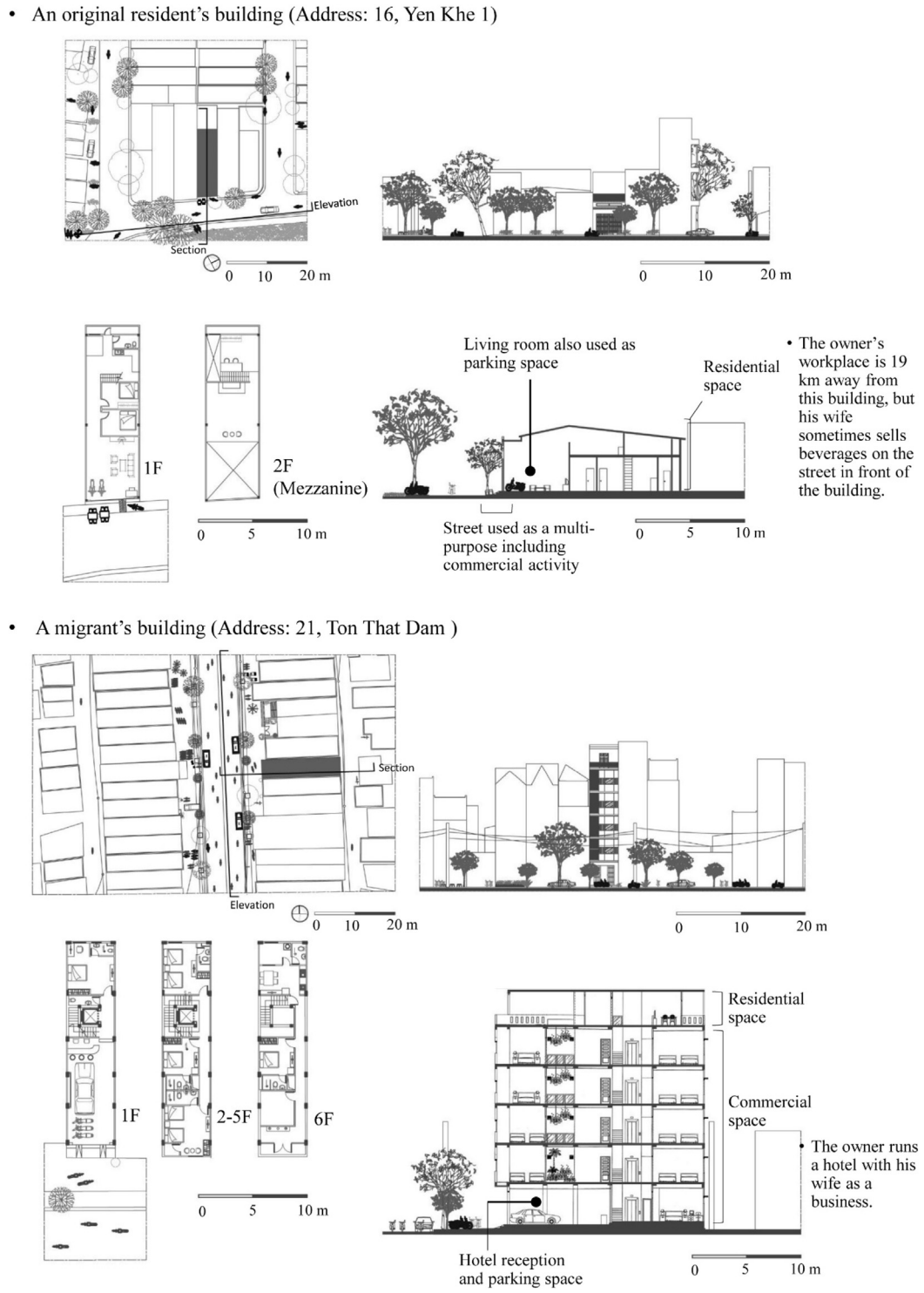

Fig. 4. Comparison of the building size and spatial characteristics of buildings located on the new road by original residents and migrants.

In some places, street commercialization led to the uncontrolled private use of public spaces. Although informal privatization of the sidewalks in Vietnamese cities is sometimes associated with a sense of a local culture and vibrancy, as argued by Kim (2015), the local government of Danang took a step towards preventing the use of public spaces for private uses. Since 2002, for example, all of the roads in Danang have been categorized according to their width, length, slope, and curvature. Then, business owners who wished to use part of the public sidewalk had to register as a paid user. A property tax was imposed on them based on the type of road and the permitted use. Since 2014, the local government has begun to mark a pedestrian zone along the middle of the sidewalk by drawing a white line to keep an open 1.5–2 m walkable area.

The pedestrian zone today is being used in a number of different manners. One notable aspect of this zone was that the users of the space vary depending on the time of day. For example, the 2 m pedestrian zone along the Nguyen Tat Thanh Road 531–555, where large hotels and restaurants are densely concentrated, is primarily used by a restaurant owner who opens his business at 5 pm. He recently obtained the right to use the sidewalk in front of the restaurant. The owner,

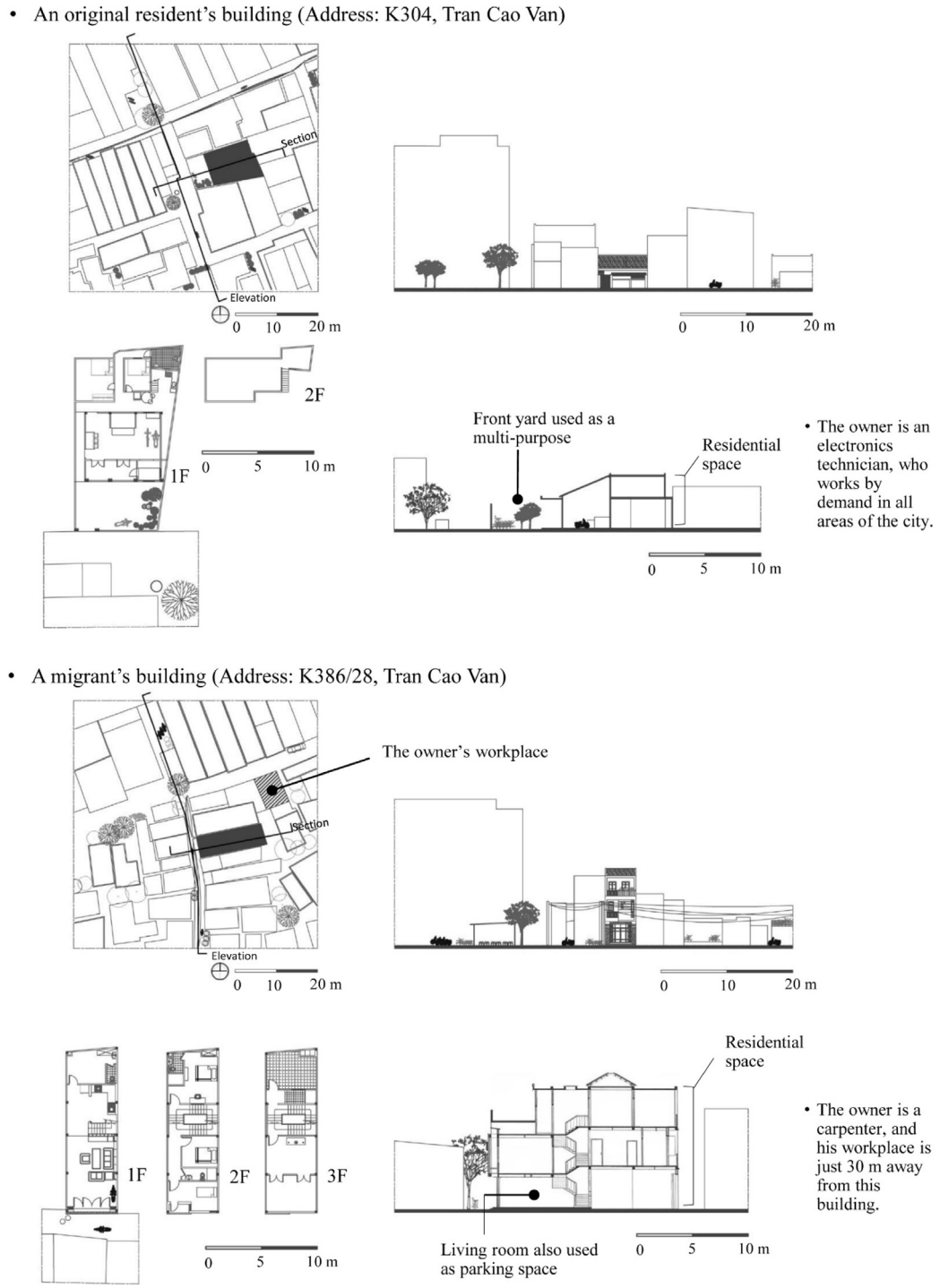

Fig. 5. Comparison of the building size and spatial characteristics of buildings located along an alley inside the urban block by original residents and migrants.

instead of using the space solely for himself, began to re-lease the space to the owner of a street cafe that is open between 10 am and 5 pm. In return for the unofficial use permit, the restaurant owner receives a modest fee from the owner of the street cafe. At approximately 5 pm, the cafe is closed and the original restaurant owner sets out his tables and an advertisement board. In some cases, an interviewee said that although the use right of the pedestrian zone was obtained by one business owner, he or she would let other business owners use the space without charging any fee. The free sharing of the space was largely due to the close social relationship between the business owners.

4. Discussion

The development of the Nguyen Tat Thanh Road in Danang has been associated with substantial changes in the environment and the type of social activities in the neighborhood. Greater mobility along the road and reduced travel times to distant locations were largely perceived as positive impacts on the lives of residents. However, if the mobility effects were examined carefully based on the lifestyles of original residents and migrants, the results were mixed.

For original residents, the benefits of greater mobility along the new road have been moderately offset by a longer commuting distance. In recent years, their jobs have become more dispersed due to the

Table 3
The trends and rationale of changes in land (re)development and housing typology.

		Original residents	Migrants
Changes	Location	• Diversely distributed along new roads far from downtown, the existing roads and inner areas of blocks - New road: Yen Khe 1, 2 - Existing road: Tran Cao Van • Either along roadsides or sidewalks accessible via motorbikes (width 1.5–3 m)	• Concentrated along the new roads closer to downtown - New road: Nguyen Tat Thanh, Ton That Dam • 70.9% either bordered the roads or were near roads accessible via vehicles
	Lots	• Mixture of elongated and atypical forms • Various lot sizes	• Elongated • 4.5 × (16 ~ 20 m), 5 × 25 m area
	Architectural characteristics	• Average building floors: 1.5 floors • 4–5 m in height, 1–2 stories with mezzanine accounts for 89.1% (n = 220) • 3–4 story buildings account for 10.9% (n = 27) • Simple structures utilizing iron concrete, brick walls and cement finishes. Simple in color. • Small front yards or staircases built	• Average building floors: 2.3 floors • 1–2 story buildings account for 59.1% (n = 126) • 3.3 m in heights, 3–7 stories: 40.8% (n = 87) • Cases of lot combinations allowing for higher and wider reconstructions account for 2.3% (n = 5) • Diverse range of materials (wood, glass, marble, aluminum, etc.) used to demonstrate the uniqueness of the building owner; varied use of colors and facade • Active utilization of rooftops as gardens or yards
	Building use	• Residential: 51.8% (6.9% decrease) • Mixed-use: 46.6% (6.1% increase) • Commercial: 1.6% (0.8% increase)	• Residential: 28.6% (49.3% decrease) • Mixed-use: 55.9% (34.7% increase) • Commercial: 15.5% (14.6% increase)
	Parking lots	• Motorbike parked inside the first floor of building or the yard • Vehicles parked illegally or on sidewalks	• Motorbike parked inside the first floor of building or sidewalk in front of building • Vehicles parked inside the first floor of building or (very rarely) underground or illegally on sidewalks
	Relationship with sidewalk	• Commercial buildings: The sidewalk and the buildings meet directly. Awnings installed on buildings so sidewalks can be utilized for commercial spaces or parking lots. • Residential buildings: Stairs and yards exist as communal spaces. Awnings installed among buildings so alleys can be utilized for relaxation or as mutual working space with neighbors.	• Commercial buildings: The sidewalk and the buildings meet directly; the 1st floor has a 1–1.5 m setback. Various signs for different purposes. Tables for commercial use or motorbike parking on sidewalks. • Residential buildings: Doors and small yards separate the building from the sidewalk.
	Urban spatial characteristics	• Increase of retail shops • Formation of a safe residential area for the low-income class	• Emergence of a large-scale commercial buildings • Formation of high-end residential area
Rationale		• Do not wish to migrate due to increased accessibility • Wish to continue to do economic activities and amenities offered by Danang Bay • Desire for a convenient and pleasant residential environment • Not financially stable	• Select plots suitable for starting a business or changing businesses • Desire for a large area of residence • Meet tourist demands for the amenities of Danang Bay • Prefer locations accessible by vehicles • Financially capable

Table 4
The trends and rationale of changes in street commercialization.

		Original residents	Migrants
Changes	Type and size	• Small shops such as noodle shops, cafes, repair stores, beauty salons, barber shops, fruit stands, etc. account for 66% • Areas transformed into commercial space showed a 6.9% increase • High proportion of residential area and low proportion of commercial usage	• Large hotels, motels, high-end restaurants and cafes account for 86.5% • Areas transformed into commercial space showed a 49.2% increase • High proportion of commercial area and low proportion of residential usage
	Use of sidewalk	• Various usage for commercial activities, parking and street stalls (in violation of regulations to protect pedestrian routes) • Minimized use for private purposes in alleyways along inner-facing blocks to allow better flow for pedestrians and motorbikes	• Public areas, not including the areas officially designated for pedestrians, are used for commercial use and parking (in most areas regulations are being met but illegal parking is found in areas where parking space is lacking) • Diversified usage of sidewalks depending on time of the day and user groups
	Target population and function	• Utilized by residents • Function as neighborhood living facilities	• Local tourists • Function as tourist infrastructure
	Management methods	• Retail shops are operated normally by women as secondary jobs • Others: Operated as a business	• Typically operated as a business • Others: Franchise, rented commercial facilities
	Marketplace creation	• Contribute to market formation - Lau Den Market (Opened in 2006): Traditional market - Ky Dong Market (Opened in 2007): Traditional market	• Commercial street formed - East of Nguyen Tat Thanh road: Hotel/motels, Large restaurants, Office buildings - Ton That Dam road: Hotel, office buildings, restaurants
Rationale		• Limitations to commercial space expansion as the majority lived in single-storey buildings • Unfavorable for vitalizing lower level exterior commercial activities due to an only small increase of mixed-use/ commercial use buildings • Preference for commercial activities that require little capital	• Preference for large lots that allow for both business and living • Plots distributed by government appropriate for large-scale development near Danang Bay • Vitalization of lower-level exterior due to a large increase of mixed-use/ commercial use buildings • Increased investment in expectation of additional development of the Da Phuoc New Town

Table 5
Mobility changes due to Nguyen Tat Thanh Road development and the subsequent changes in space utilization.

Type	Original residents	Migrants
Characteristics of mobility	• Commuting distance: Increased • Workplace locations: Distributed • Non-job-related travel pattern: Nearby one's home	• Commuting distance: Decreased (Jobs-housing balance) • Workplace locations: Concentrated along the new road • Non-job-related travel pattern: Away from one's home
Characteristics of spatial changes	• Increased privately-owned communal spaces such as front yards or staircases, increased shared spaces between buildings • Increased small-scale commercial spaces • Privatization of pedestrian streets • Gradual change	• Commercialization of spaces in front of buildings, increased parking space • Large-scale commercial spaces, high-end housing • Privatization of streets within the boundaries of local regulation • Fast-paced change

emergence of a newly urbanized area away from the Thanh Khe District or a commercialized street associated with a greatly reduced travel time along the road. This led to increases in the commuting distance among the original residents' family, who were sensitive to the location of reliable, well-paying jobs. For non-job-related travel, the road development had a minimal impact on original residents because they primarily spent their leisure time in close proximity to their home. Since the everyday lives of original residents were deeply attached to the neighborhood, significant effort was made to maintain the privately owned outdoor spaces for self-sufficient uses, such as neighborhood gatherings, family events, and personal activities. On the other hand, the majority of migrants who were more affluent than original residents purchased one or more of the parcels directly accessible to the new road and built a large-scale commercial or mixed-use building. This helped them to achieve a very good jobs-housing balance in the new location. Migrants, however, traveled a longer distance for shopping, leisure, and educational activities (Table 5).

Referring to the hypotheses, the first hypothesis seemed to be well supported by the results. The new road served as a convenient infrastructure, reducing travel time and providing a pleasant driving experience along the coastal area. This at least partly mediated the city's traffic congestion at peak hours. Nonetheless, original residents had to endure long commuting distances due to the dispersion of jobs, whereas migrants settled down near the new road and achieved a good jobs-housing balance. The second hypothesis is also well-supported. Migrants, achieving a good jobs-housing balance, owned larger commercial buildings than original residents and used the sidewalks to sell merchandise or park their vehicles. By contrast, original residents traveled shorter distances for non-job-related purposes, which was related to the active use of the ground floor. They used this area to spend time with their families or perform chores with their neighbors. This showed that the different travel patterns resulting from the new road development influenced the urban landscape.

There are several implications that result from the investigated travel patterns. First, the original residents were not fully benefited from the advantage of the good jobs-housing balance associated with the road development. Previous planning studies showed that an increase in the number of jobs and commuting populations through urban development may cause traffic congestion and longer commuting times (Cervero, 1996; Giuliano, 1991; Levine, 1998; Lin et al., 2015). However, in the study area, longer commuting time was largely observed among the original residents. This is problematic since greater commuting time in an underserviced area is directly related to the higher frequency of accidents and the overall quality of life (Cervero, 2013; Cervero & Duncan, 2006; Jackson, 2003; Lin, Jovanis, & Yang, 1994; Michelson, 2009). Moreover, health risks that arise from air pollution negatively affect the residents (Ho & Clappier, 2011; Hopke et al., 2008; Tung, Tong, Hung, & Anh, 2011). Additionally, the income disparity between the original residents and migrants continues to widen. This result may support the argument that Vietnam's government policy increases the socioeconomic gap between the rich and the poor (Gough & Tran, 2009).

Second, the role of planning is lacking despite the differing social use of the ground floor and the sidewalks. Currently, urban blocks are divided mainly to supply parcels for housing construction while essential neighborhood amenities, such as parks and cultural facilities, are minimally provided. In the study area, the only public amenity provided by the local government is a triangle-shaped neighborhood park located between Yen Khe 2 and Nguyen Huy Luong. The government should consider the manner that streets and ground floors are used and provide adequate space such as walkable streets, neighborhood parks, parking lots, and children's play areas because the lack of basic infrastructure can limit the choice of daily activities and travel routes of the original residents. Similar problems are evident from the FutaLand New Town project, a 147 ha site being developed by the Vietnamese real estate group Phuong Trang. Again, the land division only reflects the market demands and lacks the urban elements that make for a good neighborhood environment. To resolve this issue, the government may consider buying small plots that are unlikely to be re-developed and provide resting areas, co-work spaces or small exercising facilities for the community. In the case of the New Town developments, a neighborhood design guideline may also be required. Ultimately, in the future, land division methods, street width designation and housing typologies must be considered to resolve the problems of public space congestion in the context of increased motorbike use.

There must also be a continued effort towards studying other rapidly urbanizing areas where the development of the transportation infrastructure may have heavy influences on resident mobility, lifestyles, and the use of space.

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